Google Web Toolkit Tutorial

GOOGLE WEB TOOLKIT TUTORIAL

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ABOUT THE TUTORIAL

GWT Tutorial

Google Web Toolkit (GWT) is a development toolkit for building and optimizing complex browser-based applications. GWT is used by many products at Google, including Google AdWords and Orkut.

GWT is open source, completely free, and used by thousands of developers around the world. It is licensed under the Apache License version 2.0.

This tutorial will give you great understanding on GWT concepts needed to get a web application up and running.

Audience

This tutorial is designed for Software Professionals who are willing to learn GWT Programming in simple and easy steps. This tutorial will give you great understanding on GWT Programming concepts and after completing this tutorial you will be at intermediate level of experties from where you can take yourself at higher level of expertise.

Prerequisites

Before proceeding with this tutorial you should have a basic understanding of Java programming language, text editor and execution of programs etc. Because we are going to develop web based applications usin GWT, so it will be good if you have understanding on other web technologies like, HTML, CSS, AJAX etc.

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CHAPTER

1

GWTOverview

This chapter describes the basic definition and concepts of Google Web Toolkit.

What is GWT?

GWT is an open source, free development toolkit.

- Google Web Toolkit (GWT) is a development toolkit to create RICH Internet Application(RIA).
- GWT provides developers option to write client side application in JAVA.
- GWT compiles the code written in JAVA to JavaScript code.
- Application written in GWT is cross-browser compliant. GWT automatically generates javascript code suitable for each browser.
- GWT is open source, completely free, and used by thousands of developers around the world. It is licensed under the Apache License version 2.0.

Overall, GWT is a framework to build large scale and high performance web appliation while keeping them as easy-to-maintain.

Why to use GWT?

- Being Java based, you can use JAVA IDEs like Eclipse to develop GWT applcation. Developers can use code auto-complete/refactoring/navigation/project management and all features of IDEs.
- GWT provides full debugging capability. Developers can debug the client side application just as an Java Application.
- GWT provides easy integration with Junit and Maven.

- Again being Java based, GWT has a low learning curve for Java Developers.
- GWT generates optimized javascript code, produces browser's specific javascript code by self.
- GWT provides Widgets library provides most of tasks required in an application.
- GWT is extensible and custom widget can be created to cater to application needs.

On top of everything, GWT applications can run on all major browsers and smart phones including Android and iOS based phones/tablets.

Disadvantages of GWT

Though GWT comes with lots of plus points but same time we should consider the following points:

- Not indexable : Web pages generated by GWT would not be indexed by search engines because these applications are generated dynamically.
- Not degradable: If your application user disables Javascript then user will just see the basic page and nothing more.
- Not designer's friendly: GWT is not suitable for web designers who prefer using plain HTML with placeholders for inserting dynamic content at later point in time.

The GWT Components

The GWT framework can be divided into following three major parts:

- GWT Java to JavaScript compiler : This is the most important part of GWT which makes it a powerful tool for building RIAs. The GWT compiler is used to translate all the application code written in Java into JavaScript.
- JRE Emulation library : Google Web Toolkit includes a library that emulates a subset of the Java runtime library. The list includes java.lang, java.lang.annotation, java.math, java.io, java.sql, java.util and java.util.logging
- GWT UI building library : This part of GWT consists of many subparts which includes the actual UI components, RPC support, History management, and much more.
- GWT also provides a GWT Hosted Web Browser which lets you run and execute your GWT applications in hosted mode, where your code runs as Java in the Java Virtual Machine without compiling to JavaScript.

CHAPTER

2

Environment

This section describes how to setup your system environment before you start using Google Web Toolkit:

This will guide you on how to prepare a development environment to start your work with GWT Framework. This tutorial will also teach you how to setup JDK, Tomcat and Eclipse on your machine before you setup GWT Framework:

System Requirement

GWT requires JDK 1.6 or higher so the very first requirement is to have JDK installed in your machine.

JDK	1.6 or above.
Memory	no minimum requirement.
Disk Space	no minimum requirement.
Operating System	no minimum requirement.

Follow the given steps to setup your environment to start with GWT application development.

Step 1 - Verify Java installation on your machine

Now open console and execute the following **java** command.

OS	Task	Command
Windows	Open Command Console	c:\> java -version
Linux	Open Command Terminal	$ java -version
Mac	Open Terminal	machine:~ joseph$ java -version

Let's verify the output for all the operating systems:

OS	Generated Output
Windows	java version "1.6.0_21" Java(TM) SE Runtime Environment (build 1.6.0_21-b07) Java HotSpot(TM) Client VM (build 17.0-b17, mixed mode, sharing)
Linux	java version "1.6.0_21" Java(TM) SE Runtime Environment (build 1.6.0_21-b07) Java HotSpot(TM) Client VM (build 17.0-b17, mixed mode, sharing)
Mac	java version "1.6.0_21" Java(TM) SE Runtime Environment (build 1.6.0_21-b07) Java HotSpot(TM)64-Bit Server VM (build 17.0-b17, mixed mode, sharing)

Step 2 - Setup Java Development Kit (JDK):

If you do not have Java installed then you can install the Java Software Development Kit (SDK) from Oracle's Java site: Java SE Downloads. You will find instructions for installing JDK in downloaded files, follow the given instructions to install and configure the setup. Finally set PATH and JAVA_HOME environment variables to refer to the directory that contains java and javac, typically java_install_dir/bin and java_install_dir respectively.

Set the **JAVA_HOME** environment variable to point to the base directory location where Java is installed on your machine. For example:

OS	Output
Windows	Set the environment variable JAVA_HOME to C:\Program Files\Java\jdk1.6.0_21
Linux	export JAVA_HOME=/usr/local/java-current
Mac	export JAVA_HOME=/Library/Java/Home

Append Java compiler location to System Path.

OS	Output
Windows	Append the string ;%JAVA_HOME%\bin to the end of the system variable, Path.
Linux	export PATH=$PATH:$JAVA_HOME/bin/
Mac	not required

Alternatively, if you use an Integrated Development Environment (IDE) like Borland JBuilder, Eclipse, IntelliJ IDEA, or Sun ONE Studio, compile and run a simple program to confirm that the IDE knows where you installed Java, otherwise do proper setup as given document of the IDE.

Step 3 - Setup Eclipse IDE

All the examples in this tutorial have been written using Eclipse IDE. So I would suggest you should have latest version of Eclipse installed on your machine based on your operating system.

To install Eclipse IDE, download the latest Eclipse binaries from http://www.eclipse.org/downloads/. Once you downloaded the installation, unpack the binary distribution into a convenient location. For example in C:\eclipse on windows, or /usr/local/eclipse on Linux/Unix and finally set PATH variable appropriately.

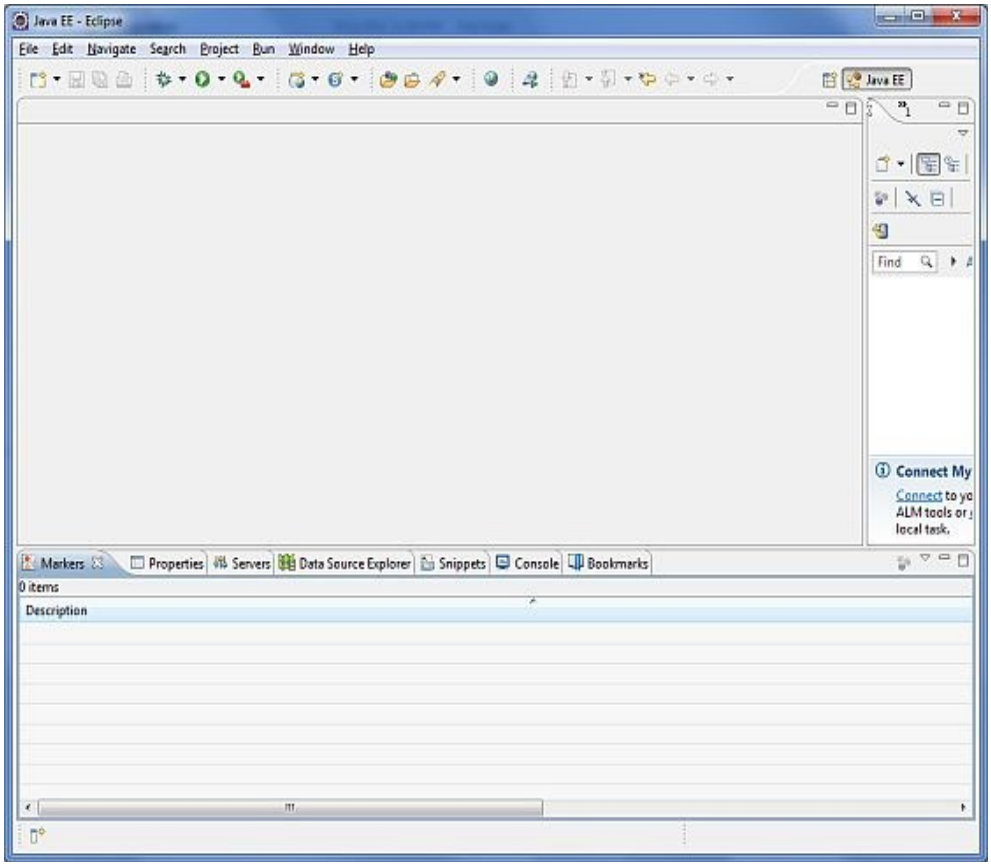
Eclipse can be started by executing the following commands on windows machine, or you can simply double click on eclipse.exe

```
%C:\eclipse\eclipse.exe
```

Eclipse can be started by executing the following commands on Unix (Solaris, Linux, etc.) machine:

```
$/usr/local/eclipse/eclipse
```

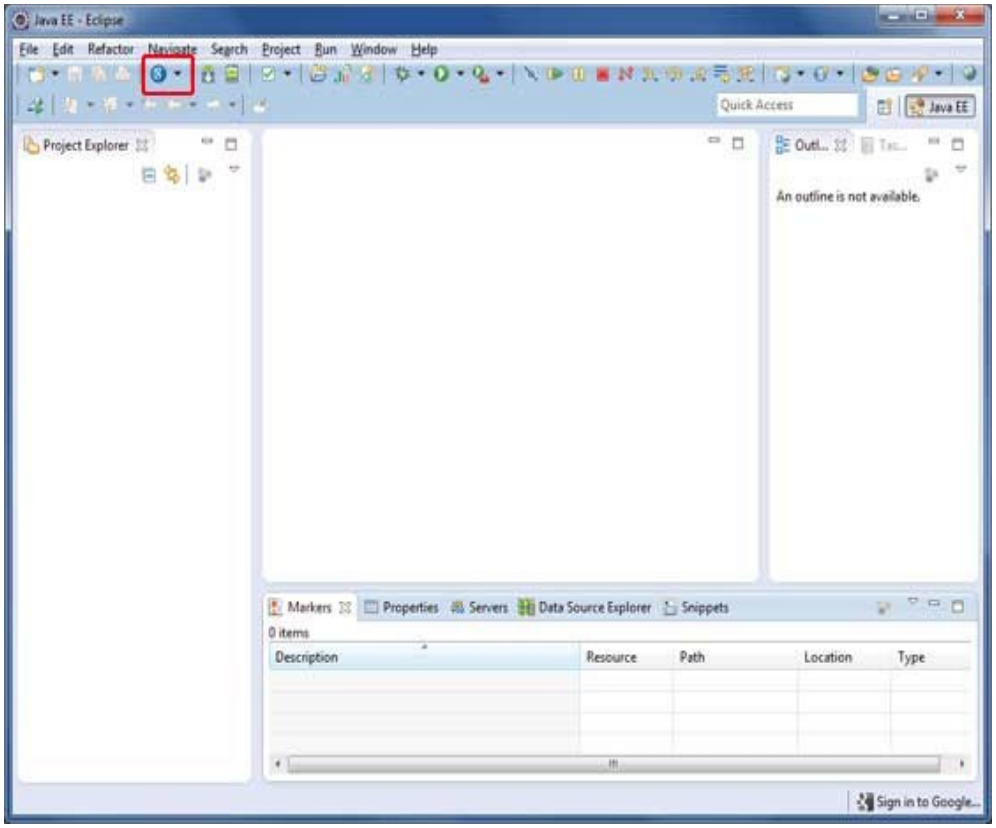
After a successful startup, if everything is fine then it should display following result:



Step 4: Install GWT SDK & Plugin for Eclipse

Follow the instructions given at the link Plugin for Eclipse (incl. SDKs) to install GWT SDK & Plugin for Eclipse version installed on your machine.

After a successful setup for the GWT plugin, if everything is fine then it should display following screen with google icon marked with red rectangle:



Step 5: Setup Apache Tomcat:

You can download the latest version of Tomcat from http://tomcat.apache.org/. Once you downloaded the installation, unpack the binary distribution into a convenient location. For example in C:\apache-tomcat-6.0.33 on windows, or /usr/local/apache-tomcat-6.0.33 on Linux/Unix and set CATALINA_HOME environment variable pointing to the installation locations.

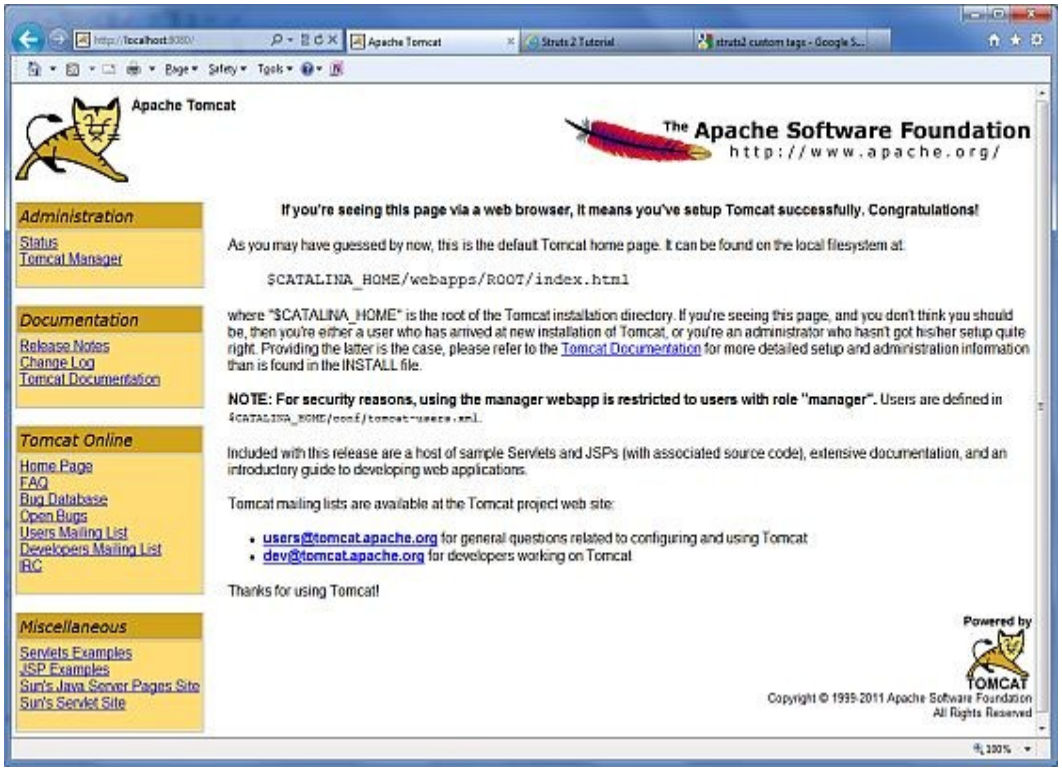
Tomcat can be started by executing the following commands on windows machine, or you can simply double click on startup.bat

```
%CATALINA_HOME%\bin\startup.bat

or

 C:\apache-tomcat-6.0.33\bin\startup.bat
```

Tomcat can be started by executing the following commands on Unix (Solaris, Linux, etc.) machine:

```
$CATALINA_HOME/bin/startup.sh

or

/usr/local/apache-tomcat-6.0.33/bin/startup.sh
```

After a successful startup, the default web applications included with Tomcat will be available by visiting **http://localhost:8080/**. If everything is fine then it should display following result



Further information about configuring and running Tomcat can be found in the documentation included here, as well as on the Tomcat web site: http://tomcat.apache.org

Tomcat can be stopped by executing the following commands on windows machine:

```
%CATALINA_HOME%\bin\shutdown

or

C:\apache-tomcat-5.5.29\bin\shutdown
```

Tomcat can be stopped by executing the following commands on Unix (Solaris, Linux, etc.) machine:

```
$CATALINA_HOME/bin/shutdown.sh

or

/usr/local/apache-tomcat-5.5.29/bin/shutdown.sh
```

CHAPTER

3

Applications

This section describes the applications under Google Web Toolkit:

Beforewe start with creating actual *HelloWorld* application using GWT, let us see what are the actual parts of a GWT application. A GWT application consists of following four important parts out of which last part is optional but first three parts are mandatory:

- Module descriptors
- Public resources
- Client-side code
- Server-side code

Sample locations of different parts of a typical gwt application **HelloWord** will be as shown below:

Name	Location
Project root	HelloWorld/
Module descriptor	src/com/tutorialspoint/HelloWorld.gwt.xml
Public resources	src/com/tutorialspoint/war/
Client-side code	src/com/tutorialspoint/client/
Server-side code	src/com/tutorialspoint/server/

Module Descriptors

A module descriptor is the configuration file in the form of XML which is used to configure a GWT application. A module descriptor file extension is ***.gwt.xml**, where * is the name of the application and this file should reside in the project's root. Following will be a default module descriptor**HelloWorld.gwt.xml** for a **HelloWorld** application:

```
<?xml version="1.0" encoding="utf-8"?>
<modulerename-to='helloworld'>
<!-- inherit the core web toolkit stuff.                          -->
<inheritsname='com.google.gwt.user.user'/>

<!-- inherit the default gwt style sheet.                         -->
<inheritsname='com.google.gwt.user.theme.clean.Clean'/>

<!-- specify the app entry point class.                           -->
<entry-pointclass='com.tutorialspoint.client.HelloWorld'/>

<!-- specify the paths for translatable code                      -->
<sourcepath='...'/>
<sourcepath='...'/>

<!-- specify the paths for static files like html, css etc.       -->
<publicpath='...'/>
<publicpath='...'/>

<!-- specify the paths for external javascript files              -->
<scriptsrc="js-url"/>
<scriptsrc="js-url"/>

<!-- specify the paths for external style sheet files              --
>
<stylesheetsrc="css-url"/>
<stylesheetsrc="css-url"/>
</module>
```

Following is the brief detail about different parts used in module descriptor.

S.N.	Nodes & Description
1	**<module rename-to="helloworld">** This provides name of the application.
2	**<inherits name="logical-module-name" />**This adds other gwt module in application just like import does in java applications. Any number of modules can be inherited in this manner.
3	**<entry-point class="classname" />**This specifies the name of class which will start loading the GWT Application. Any number of entry-point classes can be added and they are called sequentially in the order in which they appear in the module file. So when the onModuleLoad() of your first entry point finishes, the next entry point is called immediately.
4	**<source path="path" />**This specifies the names of source folders which GWT compiler will search for source compilation.
5	**<public path="path" />**The public path is the place in your project where static resources referenced by your GWT module, such as CSS or images, are stored. The default public path is the public subdirectory underneath where the Module XML File is stored.
6	**<script src="js-url" />**Automatically injects the external JavaScript file located at the location specified by src.
7	**<stylesheet src="css-url" />**Automatically injects the external CSS file located at the location specified by src.

Public resources

These are all files referenced by your GWT module, such as Host HTML page, CSS or images. The location of these resources can be configured using <public path="path" /> element in module configuration file. By default, it is the public subdirectory underneath where the Module XML File is stored.

When you compile your application into JavaScript, all the files that can be found on your public path are copied to the module's output directory.

The most important public resource is host page which is used to invoke actual GWT application. A typical HTML host page for an application might not include any visible HTML body content at all but it is always expected to include GWT application via a <script.../> tag as follows:

```
<html>
<head>
<title>Hello World</title>
<linkrel="stylesheet"href="HelloWorld.css"/>
<scriptlanguage="javascript"src="helloworld/helloworld.nocache.js">
</script>
</head>
<body>

<h1>Hello World</h1>
<p>Welcome to first GWT application</p>

</body>
</html>
```

Following is the sample style sheet which we have included in our host page:

```
body {
   text-align: center;
   font-family: verdana, sans-serif;
}
h1 {
  font-size:2em;
  font-weight: bold;
  color:#777777;
  margin:40px0px70px;
  text-align: center;
}
```

Client-side code

This is the actual Java code written implementing the business logic of the application and that the GWT compiler translates into JavaScript, which will eventually run inside the browser. The location of these resources can be configured using <source path="path" /> element in module configuration file.

For example **Entry Point** code will be used as client side code and its location will be specified using <source path="path" />. A module **entry-point** is any class that is assignable to **EntryPoint** and that can be constructed without parameters. When a module

is loaded, every entry point class is instantiated and its **EntryPoint.onModuleLoad()** method gets called. A sample HelloWorld Entry Point class will be as follows:

```
publicclassHelloWorldimplementsEntryPoint{
publicvoid onModuleLoad(){
Window.alert("Hello, World!");
}
}
```

Server-side code

This is the server side part of your application and its very much optional. If you are not doing any backend processing with-in your application then you do not need this part, but if there is some processing required at backend and your client-side application interact with the server then you will have to develop these components.

Next chapter will make use of all the above mentioned concepts to create HelloWorld application using Eclipse IDE.

CHAPTER

4

Create Application

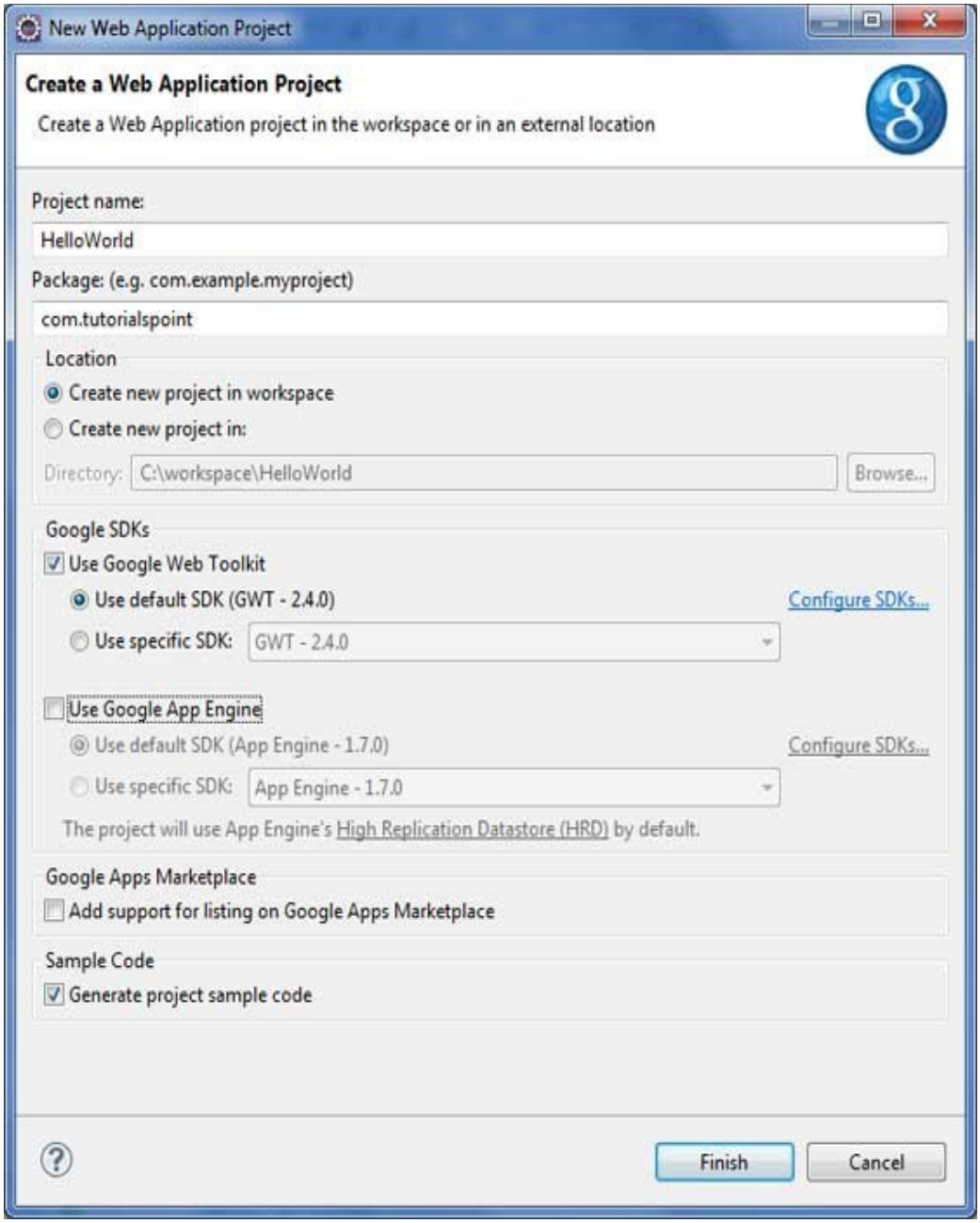
This section describes how to create application:

As power of GWT lies in **Write in Java, Run in JavaScript**, we'll be using Java IDE Eclipse to demonstrate our examples. Let's start with a simple *HelloWorld* application:

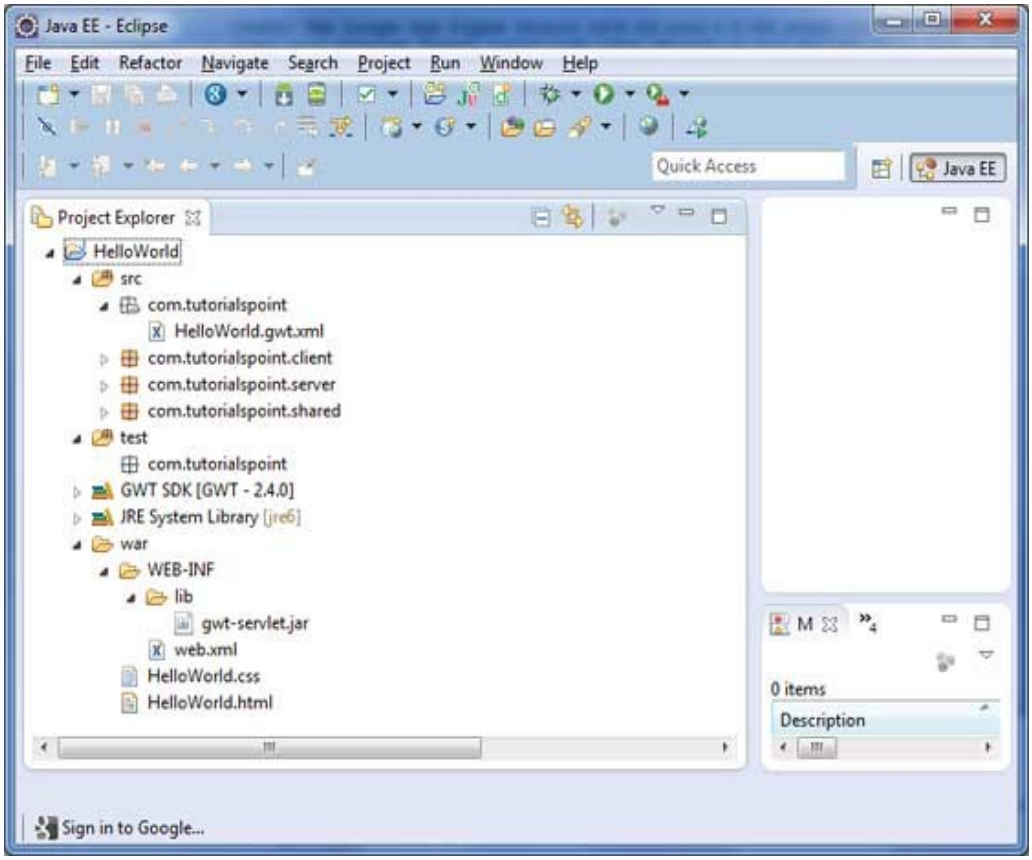
Step 1 - Create Project

The first step is to create a simple Web Application Project using Eclipse IDE. Launch project wizard using the option **Google Icon**  **> New Web Application Project...**.

Now name your project as*HelloWorld* using the wizard window as follows:



Unselect **Use Google App Engine** because we're not using it in this project and leave other default values (keep **Generate Sample project code** option checked) as such and click Finish Button. Once your project is created successfully, you will have following content in your Project Explorer:



Here is brief description of all important folders:

Folder	Location
src	Source code (java classes) files. Client folder containing the client-side specific java classes responsible for client UI display. Server folder containing the server-side java classes responsible for server side processing. Shared folder containing the java model class to transfer data from server to client and vice versa. HelloWorld.gwt.xml, a module descriptor file required for GWT compiler to compile the HelloWorld project.
test	Test code (java classes) source files. Client folder containing the java classes responsible to test gwt client side code.

war	This is the most important part, it represents the actual deployable web application. WEB-INF containing compiled classes, gwt libraries, servlet libraries. HelloWorld.css, project style sheet. HelloWorld.html, hots HTML which will invoke GWT UI Application.

Step 2 - Modify Module Descriptor: HelloWorld.gwt.xml

GWT plugin will create a default module descriptor file *src/com.tutorialspoint/HelloWorld.gwt.xml* which is given below. For this example we are not modifying it, but you can modify it based on your requirement.

```
<?xml version="1.0" encoding="UTF-8"?>
<modulerename-to='helloworld'>
<!-- Inherit the core Web Toolkit stuff.                        -->
<inheritsname='com.google.gwt.user.User'/>

<!-- Inherit the default GWT style sheet.  You can change       -->
<!-- the theme of your GWT application by uncommenting          -->
<!-- any one of the following lines.                            -->
<inheritsname='com.google.gwt.user.theme.clean.Clean'/>
<!--<inherits name='com.google.gwt.user.theme.chrome.Chrome'/> -->
<!--<inherits name='com.google.gwt.user.theme.dark.Dark'/>     -->

<!-- Other module inherits                                      -->

<!-- Specify the app entry point class.                         -->
<entry-pointclass='com.tutorialspoint.client.HelloWorld'/>

<!-- Specify the paths for translatable code                    -->
<sourcepath='client'/>
<sourcepath='shared'/>

</module>
```

Step 3 - Modify Style Sheet: HelloWorld.css

GWT plugin will create a default Style Sheet file *war/HelloWorld.css*. Let us modify this file to keep our example at simplest level of understaning:

```
body {
   text-align: center;
   font-family: verdana, sans-serif;
}
h1 {
  font-size:2em;
  font-weight: bold;
```

```
  color:#777777;
  margin:40px0px70px;
  text-align: center;
}
```

Step 4 - Modify Host File: HelloWorld.html

GWT plugin will create a default HTML host file *war/HelloWorld.html*. Let us modify this file to keep our example at simplest level of understaning:

```
<html>
<head>
<title>Hello World</title>
<linkrel="stylesheet"href="HelloWorld.css"/>
<scriptlanguage="javascript"src="helloworld/helloworld.nocache
.js">
</script>
</head>
<body>

<h1>Hello World</h1>
<p>Welcome to first GWT application</p>

</body>
</html>
```

You can create more static files like HTML, CSS or images in the same source directory or you can create further sub-directories and move files in those sub-directories and configure those sub-directories in module descriptor of the application.

Step 5 - Modify Entry Point: HelloWorld.java

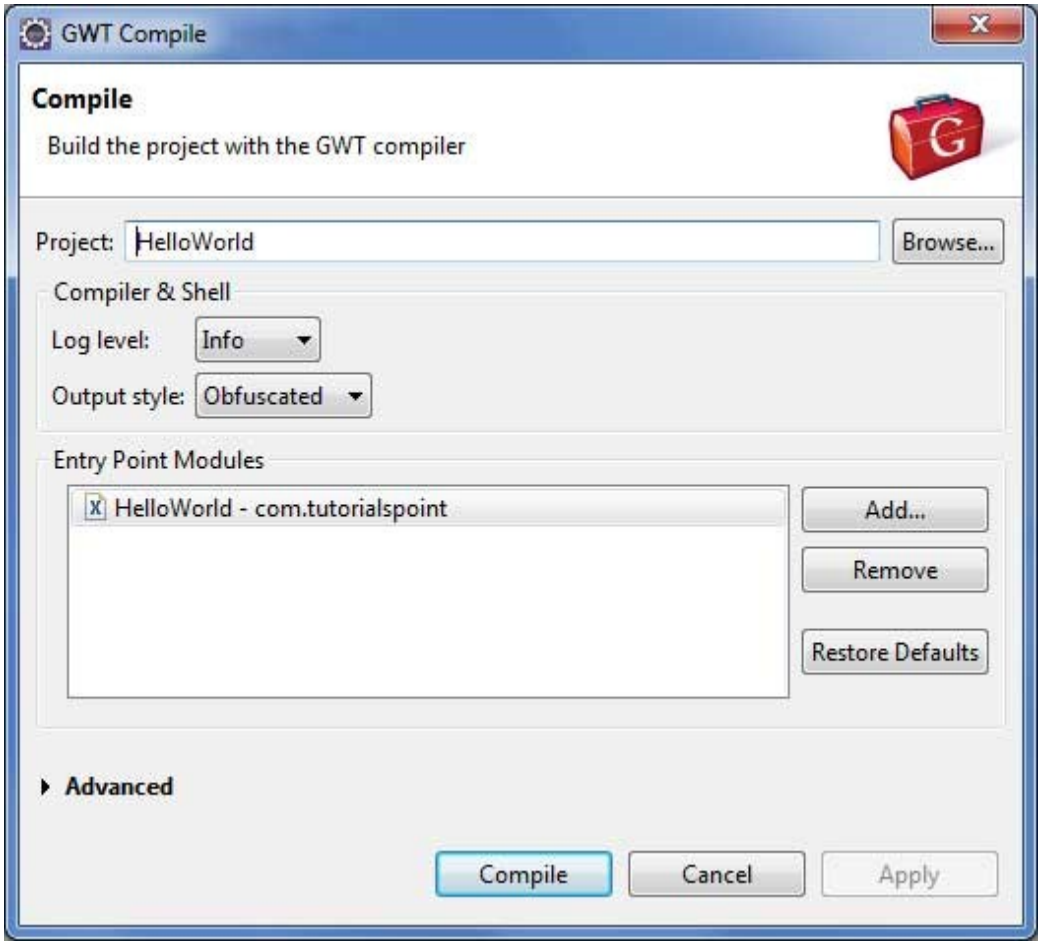
GWT plugin will create a default Java file *src/com.tutorialspoint/HelloWorld.java*, which keeps an entry point for the application. Let us modify this file to display "Hello,World!":

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.Window;

publicclassHelloWorldimplementsEntryPoint{
publicvoid onModuleLoad(){
        Window.alert("Hello, World!");
}
}
```

You can create more Java files in the same source directory to define either entry points or to define helper routines.

Step 6 - Compile Application

Once you are ready with all the changes done, its time to compile the project. Use the option **Google Icon > GWT Compile Project...** to launch GWT Compile dialogue box as shown below:



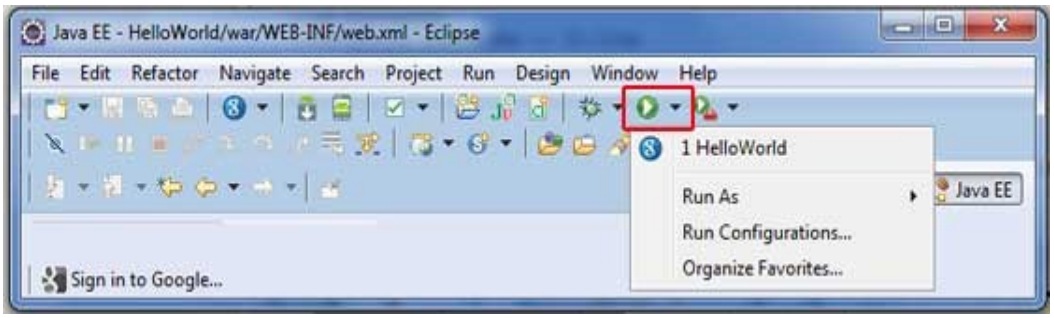
Keep default values intact and click Compile button. If everything goes fine, you will see following output in Eclipse console

```
Compiling module com.tutorialspoint.HelloWorld
   Compiling 6 permutations
      Compiling permutation 0...
      Compiling permutation 1...
      Compiling permutation 2...
      Compiling permutation 3...
      Compiling permutation 4...
      Compiling permutation 5...
   Compile of permutations succeeded
Linking into C:\workspace\HelloWorld\war\helloworld
```

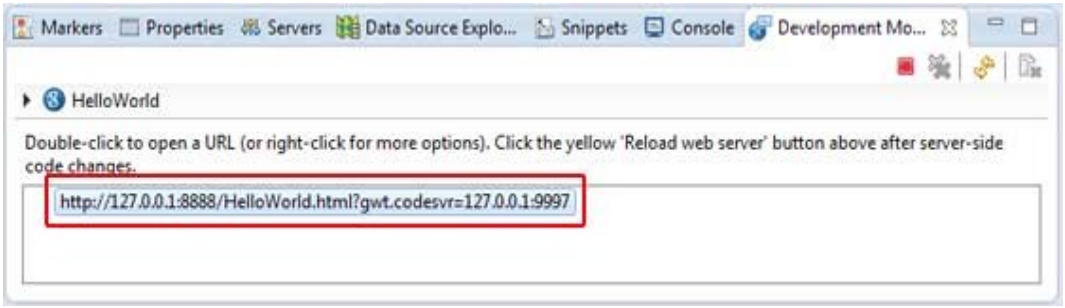
```
   Link succeeded

   Compilation succeeded -- 33.029s
```

Step 6 - Run Application

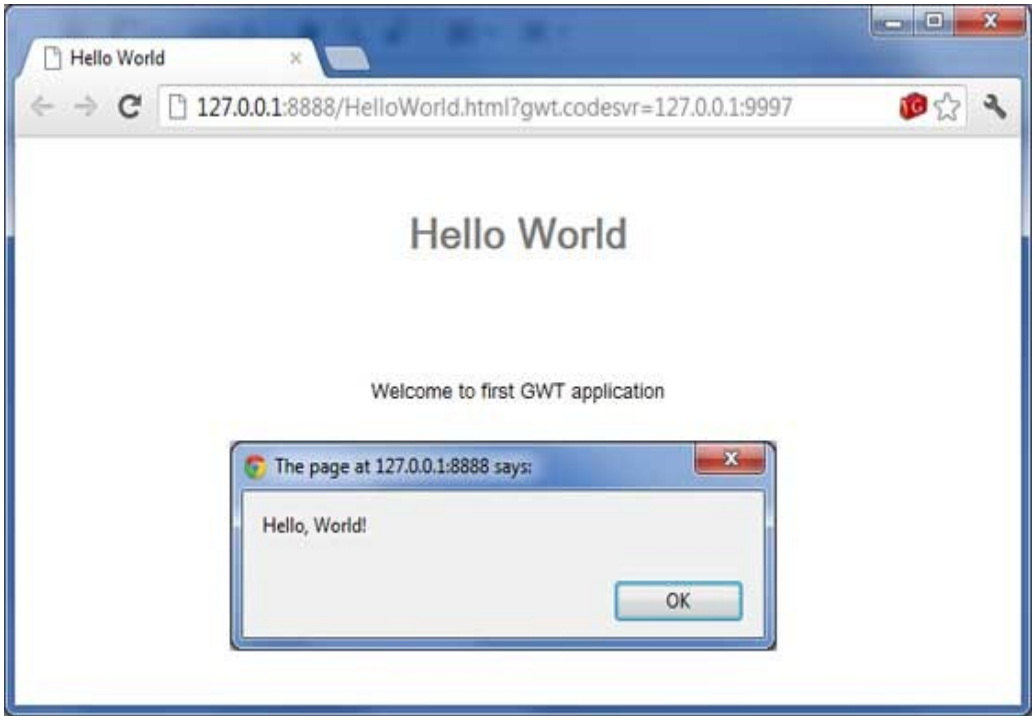
Now click on  Run application menu and select **HelloWorld** application to run the application.



If everything is fine, you must see GWT Development Mode active in Eclipse containing a URL as shown below. Double click the URL to open the GWT application.



Because you are running your application in development mode, so you will need to install GWT plugin for your browser. Simply follow the onscreen instructions to install the plugin. If you already have GWT plugin set for your browser, then you should be able to see the following output:



Congratulations! you have implemented your first application using Google Web Toolkit (GWT).

CHAPTER

5

Deploy Application

This section describes how to deploy application under Google Web Toolkit:

This tutorial will explain you how to create an application **war** file and how to deploy that in Apache Tomcat Websever root. If you understood this simple example then you will also be able to deploy a complex GWT application following the same steps.

Let us have working Eclipse IDE along with GWT plug in place and follow the following steps to create a GWT application:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to make sure business logic is working as per the requirements.
4	Finally, zip the content of the **war** folder of the application in the form of war file and deploy it in Apache Tomcat Webserver.
5	Launch your web application using appropriate URL as explained below in the last step.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>
```

```
  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
<source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body {
   text-align: center;
   font-family: verdana, sans-serif;
}
h1 {
  font-size:2em;
  font-weight: bold;
  color:#777777;
  margin:40px0px70px;
  text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>Hello World</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

I modified HTML a little bit from previous example. Here I created a placeholder ... where we will insert some content using our entry point java class. So let us have following content of Java file**src/com.tutorialspoint/HelloWorld.java**.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.RootPanel;

public class HelloWorld implementsEntryPoint{
   public void onModuleLoad(){
      HTML html =new HTML("<p>Welcome to GWT application</p>");

      RootPanel.get("gwtContainer").add(html);
   }
}
```

Here we created on basic widgest HTML and added it inside the div tag having id="gwtContainer". We will study different GWT widgets in coming chapters.

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

Create WAR File

Now our applictaion is working fine and we are ready to export it as a war file. Follow the following steps:

- Go into your project's war directory C:\workspace\HelloWorld\war
- Select all the files & folders available inside war directory.
- Zip all the selected files & folders in a file called HelloWorld.zip.
- Rename HelloWorld.zip to HelloWorld.war.

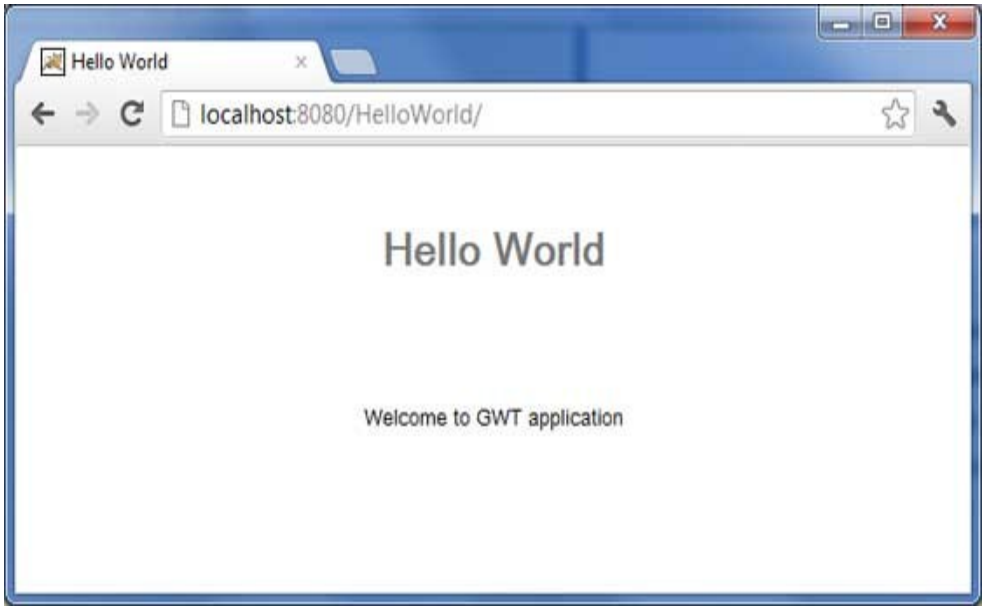
Deploy WAR file

- Stop the tomcat server.
- Copy the HelloWorld.war file to tomcat installation directory > webapps folder.
- Start the tomcat server.
- Look inside webapps directory, there should be a folder helloworld got created.
- Now HelloWorld.war is successfully deployed in Tomcat Webserver root.

Run Application

Enter a url in web browser: **http://localhost:8080/HelloWorld** to launch the application

Server name (localhost) and port (8080) may vary as per your tomcat configuration.



CHAPTER

6

Style with CSS

This section describes CSS with Google Web Toolkit:

GWT widgets rely on cascading style sheets (CSS) for visual styling. By default, the class name for each component is **gwt-<classname>**. For example, the Button widget has a default style of *gwt-Button*and similar way TextBox widgest has a default style of *gwt-TextBox*. In order to give all buttons and text boxes a larger font, you could put the following rule in your application's CSS file:

```
.gwt-Button{ font-size:150%;}
.gwt-TextBox{ font-size:150%;}
```

By default, neither the browser nor GWT creates default **id** attributes for widgets. You must explicitly create a unique id for the elements which you can use in CSS. In order to give a particular button with id**my-button-id** a larger font, you could put the following rule in your application's CSS file:

```
#my-button-id { font-size: 150%; }
```

To set the id for a GWT widget, retrieve its DOM Element and then set the id attribute as follows:

```
Button b =newButton();
DOM.setElementAttribute(b.getElement(),"id","my-button-id")
```

CSS Styling APIs

There are many APIs available to hangle CSS setting for any GWT widget. Following are few important APIs which will help you in your day to day web programming using GWT:

S.N.	API & Description
1	**public void setStyleName(java.lang.String style)** This method will clear any existing styles and set the widget style to the new CSS class provided using *style*.

2	**public void addStyleName(java.lang.String style)** This method will add a secondary or dependent style name to the widget. A secondary style name is an additional style name that is,so if there were any previous style names applied they are kept.
3	**public void removeStyleName(java.lang.String style)** This method will remove given style from the widget and leaves any others associated with the widget.
4	**public java.lang.String getStyleName()** This method gets all of the object's style names, as a space-separated list.
5	**public void setStylePrimaryName(java.lang.String style)** This method sets the object's primary style name and updates all dependent style names.

For example, let's define two new styles which we will apply to a text:

```
.gwt-Big-Text{
   font-size:150%;
}
.gwt-Small-Text{
   font-size:75%;
}
.gwt-Red-Text{
   color:red;
}
```

Now you can use *setStyleName(Style)* to change the default setting to new setting. After applying the below rule, a text's font will become large:

```
txtWidget.setStyleName("gwt-Big-Text");
```

We can apply a secondary CSS rule on the same widget to change its color as follows:

```
txtWidget.addStyleName("gwt-Red-Text");
```

Using above method you can add as many styles as you like to apply on a widget. If you remove first style from the button widget then second style will still remain with the text:

```
txtWidget.removeStyleName("gwt-Big-Text");
```

Primary & Secondary Styles

By default, the *primary style* name of a widget will be the default style name for its widget class for example *gwt-Button* for Button widgets. When we add and remove style names using AddStyleName() method, those styles are called secondary styles.
The final appearance of a widget is determined by the sum of all the secondary styles added to it, plus its primary style. You set the primary style of a widget with the *setStylePrimaryName(String)* method. To illustrate, let's say we have a Label widget. In our CSS file, we have the following rules defined:

```
.MyText{
  color: blue;
}
```

```
.BigText{
  font-size: large;
}
.LoudText{
  font-weight:  bold;
}
```

Let's suppose we want a particular label widget to always display blue text, and in some cases, use a larger, bold font for added emphasis. We could do something like this:

```
// set up our primary style
Label someText =newLabel();
someText.setStylePrimaryName("MyText");
...

// later on, to really grab the user's attention
someText.addStyleName("BigText");
someText.addStyleName("LoudText");
...

// after the crisis is over
someText.removeStyleName("BigText");
someText.removeStyleName("LoudText");
```

Associating CSS Files

There are multiple approaches for associating CSS files with your module. Modern GWT applications typically use a combination of CssResource and UiBinder. We are using only first approach in our examples.

- Using a <link> tag in the host HTML page.
- Using the <stylesheet> element in the module XML file.
- Using a CssResource contained within a ClientBundle.
- Using an inline <ui:style> element in a UiBinder template.

GWT CSS Example

This example will take you through simple steps to apply different CSS rules on your GWT widgest. Let us have working Eclipse IDE along with GWT plug in place and follow the following steps to create a GWT application:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-Button{
   font-size:150%;
   font-weight: bold;
   width:100px;
   height:100px;
}
.gwt-Big-Text{
   font-size:150%;
}
.gwt-Small-Text{
   font-size:75%;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html** to accomodate two buttons.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<divid="mytext"><h1>Hello, World!</h1></div>
<div id="gwtGreenButton"></div>
```

```
<div id="gwtRedButton"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will take care of adding two buttons in HTML and will apply custom CSS style.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.RootPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){

   // add button to change font to big when clicked.
   ButtonBtn1 = newButton("Big Text");
   Btn1.addClickHandler(newClickHandler(){
      publicvoid onClick(ClickEventevent){
         RootPanel.get("mytext").setStyleName("gwt-Big-Text");
      }
   });

   // add button to change font to small when clicked.
   ButtonBtn2 = newButton("Small Text");
   Btn2.addClickHandler(newClickHandler(){
      Public void onClick(ClickEventevent){
         RootPanel.get("mytext").setStyleName("gwt-Small-Text");
      }
   });

   RootPanel.get("gwtGreenButton").add(Btn1);
   RootPanel.get("gwtRedButton").add(Btn2);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

Now try clicking on the two buttons displayed and observe "Hello, World!" text which keeps changing its font upon clicking on the two buttons.

CHAPTER

7

Basic Widgets

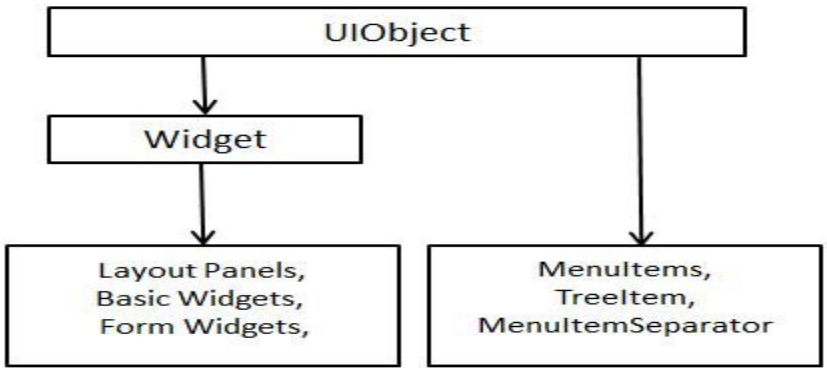
This section describes the basic widgets used:

Every user interface considers the following three main aspects:

- UI elements : Thes are the core visual elements the user eventually sees and interacts with. GWT provides a huge list of widely used and common elements varying from basic to complex which we will cover in this tutorial.
- Layouts: They define how UI elements should be organized on the screen and provide a final look and feel to the GUI (Graphical User Interface). This part will be covered in Layout chapter.
- Behavior: These are events which occur when the user interacts with UI elements. This part will be covered in Event Handling chapter.

GWT UI Elements:

The GWT library provides classes in a well-defined class hierarchy to create complex web-based user interfaces. All classes in this component hierarchy has been derived from the **UIObject** base class as shown below:



Every Basic UI widget inherits properties from Widget class which in turn inherits properties from UIObject. Tree and Menu will be covered in complex widgets tutorial.

S.N.	Widget & Description
1	**GWT UIObject Class** This widget contains text, not interpreted as HTML using a element, causing it to be displayed with block layout.
2	**GWT Widget Class** This widget can contain HTML text and displays the html content using a element, causing it to be displayed with block layout.

GWT UIObject Class

Introduction

The class **UIObject** is the superclass for all user-interface objects. It simply wraps a DOM element, and cannot receive events. It provides direct child classes like Widget, MenuItem, MenuItemSeparator, TreeItem.

- All UIObject objects can be styled using CSS.
- Every UIObject has a primary style name that identifies the key CSS style rule that should always be applied to it.
- More complex styling behavior can be achieved by manipulating an object's secondary style names.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.UIObject** class:

```
public abstract class UIObject
   extends java.lang.Object
```

Field

Following are the fields for **com.google.gwt.user.client.ui.UIObject** class:

- public static final java.lang.String DEBUG_ID_PREFIX -- The element ID that you specify will be prefixed by the static string DEBUG_ID_PREFIX.

Class constructors

S.N.	Constructor & Description
1	**UIObject()** This creates a UIObject for the child classes.

Class methods

S.N.	Method & Description
1	**void addStyleDependentName(java.lang.String styleSuffix)** Adds a dependent style name by specifying the style name's suffix.

2	**void addStyleName(java.lang.String style)** Adds a secondary or dependent style name to this object.
3	**static void ensureDebugId(Element elem, java.lang.String id)** Ensure that elem has an ID property set, which allows it to integrate with third-party libraries and test tools.
4	**protected static void ensureDebugId(Element elem, java.lang.String baseID, java.lang.String id)** Set the debug id of a specific element.
5	**ensureDebugId(java.lang.String id)** Ensure that the main Element for this UIObject has an ID property set, which allows it to integrate with third-party libraries and test tools.
6	**int getAbsoluteLeft()** Gets the object's absolute left position in pixels, as measured from the browser window's client area.
7	**int getAbsoluteTop()** Gets the object's absolute top position in pixels, as measured from the browser window's client area.
8	**Element getElement()** Gets a handle to the object's underlying DOM element.
9	**int getOffsetHeight()** Gets the object's offset height in pixels.
10	**int getOffsetWidth()** Gets the object's offset width in pixels.
11	**protected Element getStyleElement()** Template method that returns the element to which style names will be applied.
12	**java.lang.String getStyleName()** Gets all of the object's style names, as a space-separated list.
13	**protected static java.lang.String getStyleName(Element elem)** Gets all of the element's style names, as a space-separated list.
14	**java.lang.String getStylePrimaryName()** Gets the primary style name associated with the object.
15	**protected static java.lang.String getStylePrimaryName(Element elem)** Gets the element's primary style name.
16	**java.lang.String getTitle()** Gets the title associated with this object.
17	**boolean isVisible()** Determines whether or not this object is visible.
18	**static boolean isVisible(Element elem)** Determines whether element is visible or not.
19	**protected void onEnsureDebugId(java.lang.String baseID)** Called when the user sets the id using the ensureDebugId(String) method.
20	**void removeStyleDependentName(java.lang.String styleSuffix)** Removes a dependent style name by specifying the style name's suffix.
21	**void removeStyleName(java.lang.String style)**

	Removes a style name.
22	**protected void setElement(Element elem)** Sets this object's browser element.
23	**protected void setElement(Element elem)** Sets this object's browser element.
24	**void setHeight(java.lang.String height)** Sets the object's height.
25	**void setPixelSize(int width, int height)** Sets the object's size, in pixels, not including decorations such as border, margin, and padding.
26	**void setSize(java.lang.String width, java.lang.String height)** Sets the object's size.
27	**protected static void setStyleName(Element elem, java.lang.String styleName)** Clears all of the element's style names and sets it to the given style.
28	**protected static void setStyleName(Element elem, java.lang.String style, boolean add)** This convenience method adds or removes a style name for a given element.
29	**void setStyleName(java.lang.String style)** Clears all of the object's style names and sets it to the given style.
30	**protected static void setStylePrimaryName(Element elem, java.lang.String style)** Sets the element's primary style name and updates all dependent style names.
31	**void setStylePrimaryName(java.lang.String style)** Sets the object's primary style name and updates all dependent style names.
32	**void setTitle(java.lang.String title)** Sets the title associated with this object.
33	**void setVisible(boolean visible)** Sets whether this object is visible.
34	**static void setVisible(Element elem, boolean visible)** Sets whether this element is visible
35	**void setWidth(java.lang.String width)** Sets the object's width.
36	**java.lang.String toString()** This method is overridden so that any object can be viewed in the debugger as an HTML snippet.
37	**void unsinkEvents(int eventBitsToRemove)** Removes a set of events from this object's event list.

Methods inherited

This class inherits methods from the following classes:

- java.lang.Object

GWT Widget Class

Introduction

The class **Widget** is the base class for the majority of user-interface objects. Widget adds support for receiving events from the browser and being added directly to panels.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Widget** class:

```
public class Widget
   extends UIObject
      implements EventListener
```

Field

Following are the fields for **com.google.gwt.user.client.ui.Widget** class:

- public static final java.lang.String DEBUG_ID_PREFIX -- The element ID that you specify will be prefixed by the static string DEBUG_ID_PREFIX.

Class constructors

S.N.	Constructor & Description
1	**Widget()** This creates a Widget for the child classes.

Class methods

S.N.	Method & Description
1	**protected <H extends EventHandler> HandlerRegistration addDomHandler(H handler, DomEvent.Type<H> type)** Adds a native event handler to the widget and sinks the corresponding native event.
2	**protected <H extends EventHandler> HandlerRegistration addHandler(H handler, GwtEvent.Type<H> type)** Adds this handler to the widget.
3	**protected void delegateEvent(Widget target, GwtEvent<?> event)** Fires an event on a child widget.
4	**protected void doAttachChildren()** If a widget implements HasWidgets, it must override this method and call onAttach() for each of its child widgets.
5	**protected void doDetachChildren()** If a widget implements HasWidgets, it must override this method and call onDetach() for each of its child widgets.
6	**void fireEvent(GwtEvent<?> event)** Fires the given event to all the appropriate handlers.
7	**protected int getHandlerCount(GwtEvent.Type<?> type)** Gets the number of handlers listening to the event type.
8	**Widget getParent()**

	Gets this widget's parent panel.
9	**boolean isAttached()** Determines whether this widget is currently attached to the browser's document (i.e., there is an unbroken chain of widgets between this widget and the underlying browser document).
10	**protected boolean isOrWasAttached()** Has this widget ever been attached?
11	**protected void onAttach()** This method is called when a widget is attached to the browser's document.
12	**void onBrowserEvent(Event event)** Fired whenever a browser event is received.
13	**protected void onDetach()** This method is called when a widget is detached from the browser's document.
14	**protected void onLoad()** Gets a handle to the object's underlying DOM element.
15	**protected void onUnload()** This method is called immediately before a widget will be detached from the browser's document.
16	**void removeFromParent()** Removes this widget from its parent widget.
17	**void sinkEvents(int eventBitsToAdd)** Overridden to defer the call to super.sinkEvents until the first time this widget is attached to the dom, as a performance enhancement.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject

Basic Widgets

Following are few important *Basic Widgets*:

S.N.	Widget & Description
1	**Label** This widget contains text, not interpreted as HTML using a element, causing it to be displayed with block layout.
2	**HTML** This widget can contain HTML text and displays the html content using a element, causing it to be displayed with block layout.
3	**Image** This widget displays an image at a given URL.
4	**Anchor** This widget represents a simple <a> element.

Label

Introduction

The **Label** can contains only arbitrary text and it can not be interpreted as HTML. This widget uses a element, causing it to be displayed with block layout.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Label** class:

```
publicclassLabel
   extendsWidget
      implementsHasHorizontalAlignment,HasText,HasWordWrap,
         HasDirection,HasClickHandlers,SourcesClickEvents,
            SourcesMouseEvents,HasAllMouseHandlers
```

CSS style rules

Following default CSS Style rule will be applied to all the labels. You can override it as per your requirements.

```
.gwt-Label{}
```

Class constructors

S.N.	Constructor & Description
1	**Label()** Creates an empty label.
2	**protected Label(Element element)** This constructor may be used by subclasses to explicitly use an existing element.
3	**Label(java.lang.String text)** Creates a label with the specified text.
4	**Label(java.lang.String text, boolean wordWrap)** Creates a label with the specified text.

Class methods

S.N.	Method & Description
1	**void addClickListener(ClickListener listener)** Adds a listener interface to receive click events.
2	**void addMouseListener(MouseListener listener)** Adds a listener interface to receive mouse events.
3	**void addMouseWheelListener(MouseWheelListener listener)** Gets this widget's parent panel.
4	**HasDirection.Direction getDirection()** Gets the directionality of the widget.
5	**HasHorizontalAlignment.HorizontalAlignmentConstant getHorizontalAlignment()**

	Gets the horizontal alignment.
6	**java.lang.String getText()** Gets this object's text.
7	**boolean getWordWrap()** Gets whether word-wrapping is enabled.
8	**void onBrowserEvent(Event event)** Removes a previously added listener interface.
9	**void removeClickListener(ClickListener listener)** This method is called immediately before a widget will be detached from the browser's document.
10	**void removeMouseListener(MouseListener listener)** Removes a previously added listener interface.
11	**void removeMouseWheelListener(MouseWheelListener listener)** Removes a previously added listener interface.
12	**void setDirection(HasDirection.Direction direction)** Sets the directionality for a widget.
13	**void setHorizontalAlignment(HasHorizontalAlignment.HorizontalAlignmentConstant align)** Sets the horizontal alignment.
14	**void setText(java.lang.String text)** Sets this object's text.
15	**void setWordWrap(boolean wrap)** Sets whether word-wrapping is enabled.
16	**static Label wrap(Element element)** Creates a Label widget that wraps an existing or element.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget

Label Widget Example

This example will take you through simple steps to show usage of a Label Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.

3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-Label{
   font-size:150%;
   font-weight: bold;
   color:red;
   padding:5px;
   margin:5px;
}
.gwt-Green-Border{
   border:1px solid green;
}
.gwt-Blue-Border{
   border:1px solid blue;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html** to accomodate two buttons.

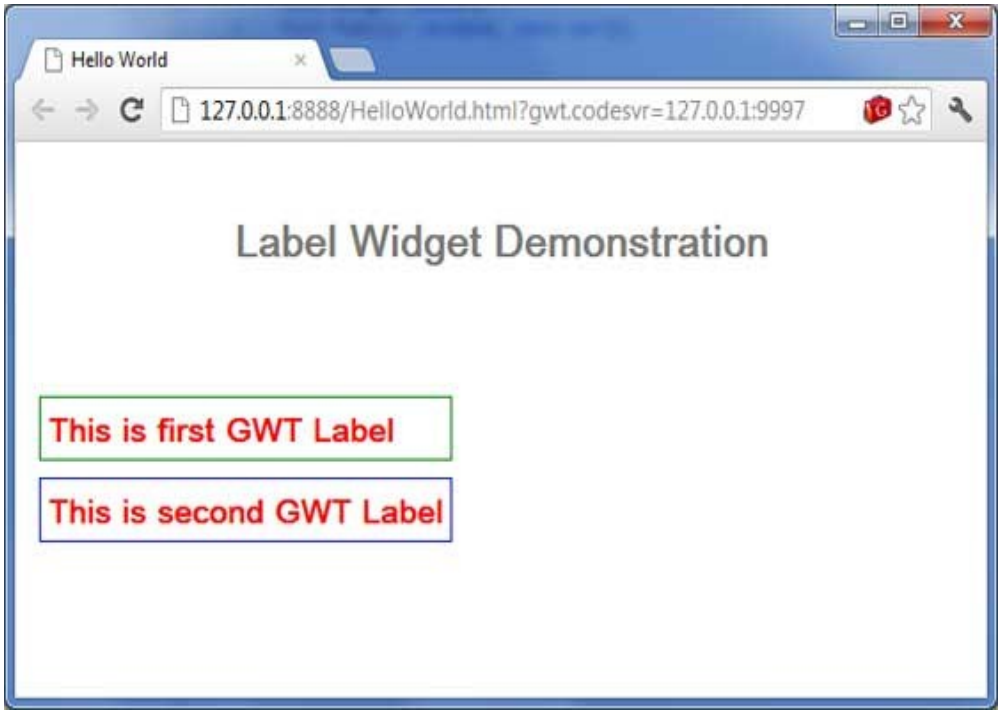
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
```

```
</head>
<body>

<h1>Label Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of Label widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      // create two Labels
      Label label1 =newLabel("This is first GWT Label");
      Label label2 =newLabel("This is second GWT Label");

      // use UIObject methods to set label properties.
      label1.setTitle("Title for first Lable");
      label1.addStyleName("gwt-Green-Border");
      label2.setTitle("Title for second Lable");
      label2.addStyleName("gwt-Blue-Border");

      // add labels to the root panel.
      VerticalPanel panel =newVerticalPanel();
      panel.add(label1);
      panel.add(label2);

      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



HTML

Introduction

The **HTML** widget can cantain arbitrary HTML it can be interpreted as HTML. This widget uses a element, causing it to be displayed with block layout.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Label** class:

```
public class HTML
   extends Label
      implements HasHTML
```

CSS style rules

Following default CSS Style rule will be applied to all the HTML widget. You can override it as per your requirements.

```
.gwt-HTML {}
```

Class constructors

S.N.	Constructor & Description
1	**HTML()**

	Creates an empty HTML.
2	**protected HTML(Element element)** This constructor may be used by subclasses to explicitly use an existing element.
3	**HTML(java.lang.String html)** Creates a HTML with the specified html contents.
4	**HTML(java.lang.String html, boolean wordWrap)** Creates an HTML widget with the specified contents, optionally treating it as HTML, and optionally disabling word wrapping.

Class methods

1	**java.lang.String getHTML()** Gets this object's contents as HTML.
2	**void setHTML(java.lang.String html)** Sets this object's contents via HTML.
3	**static HTML wrap(Element element)** Creates an HTML widget that wraps an existing or element.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.Label
- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.HasText
- java.lang.Object

Html Widget Example

This example will take you through simple steps to show usage of a HTML Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inheritsname='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-Green-Border{
   border:1px solid green;
}
.gwt-Blue-Border{
   border:1px solid blue;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>HTML Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of HTML widget.

```
package com.tutorialspoint.client;
```

```
import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      // create two HTML widgets
      HTML html1 =
      new HTML("This is first GWT HTML widget using <b> tag of html.");
      HTML html2 =
      new HTML("This is second GWT HTML widget using <i> tag of html.");

      // use UIObject methods to set HTML widget properties.
      html1.addStyleName("gwt-Green-Border");
      html2.addStyleName("gwt-Blue-Border");

      // add widgets to the root panel.
      VerticalPanel panel =newVerticalPanel();
      panel.setSpacing(10);
      panel.add(html1);
      panel.add(html2);

      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

IMAGE

Introduction

The **Image** widget displays an image at a given URL.The image widget can be in 'unclipped' mode (the default mode) or 'clipped' mode. In clipped mode, a viewport is overlaid on top of the image so that a subset of the image will be displayed. In unclipped

mode, there is no viewport - the entire image will be visible. Methods will operate differently depending on the mode that the image is in. These differences are detailed in the documentation for each method.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Image** class:

```
public lass Image
   extends Widget
      implements SourcesLoadEvents,HasLoadHandlers,
         HasErrorHandlers,SourcesClickEvents,
            HasClickHandlers,HasAllMouseHandlers,
               SourcesMouseEvents
```

CSS style rules

Following default CSS Style rule will be applied to all the Image widget. You can override it as per your requirements.

```
.gwt-Image{}
```

Class constructors

S.N.	Constructor & Description
1	**Image()** Creates an empty image.
2	**protected Image(Element element)** This constructor may be used by subclasses to explicitly use an existing element.
3	**Image(java.lang.String url)** Creates an image with the specified url.
4	**Image(java.lang.String html, int left, int top, int width, int height)** Creates a clipped image with a specified URL and visibility rectangle.

Class methods

S.N.	Function name & Description
1	**void addClickListener(ClickListener listener)** Adds a listener interface to receive click events.
2	**void addLoadListener(LoadListener listener)** Adds a listener interface to receive load events.
3	**void addMouseListener(MouseListener listener)** Adds a listener interface to receive mouse events.
4	**void addMouseWheelListener(MouseWheelListener listener)** Gets this widget's parent panel.
5	**int getHeight()** Gets the height of the image.
6	**int getOriginLeft()** Gets the horizontal co-ordinate of the upper-left vertex of the image's visibility rectangle.
7	**int getOriginTop()** Gets the vertical co-ordinate of the upper-left vertex of the image's visibility rectangle.

8	**java.lang.String getUrl()** Gets the URL of the image.
9	**int getWidth()** Gets the width of the image.
10	**void onBrowserEvent(Event event)** Removes a previously added listener interface.
11	**static void prefetch(java.lang.String url)** Causes the browser to pre-fetch the image at a given URL.
12	**void removeClickListener(ClickListener listener)** This method is called immediately before a widget will be detached from the browser's document.
13	**void removeLoadListener(LoadListener listener)** Removes a previously added listener interface.
14	**void removeMouseListener(MouseListener listener)** Removes a previously added listener interface.
15	**void removeMouseWheelListener(MouseWheelListener listener)** Removes a previously added listener interface.
16	**void setUrl(java.lang.String url)** Sets the URL of the image to be displayed.
17	**void setUrlAndVisibleRect(java.lang.String url, int left, int top, int width, int height)** Sets the url and the visibility rectangle for the image at the same time.
18	**void setVisibleRect(int left, int top, int width, int height)** Sets the visibility rectangle of an image.
19	**static Image wrap(Element element)** Creates a Image widget that wraps an existing <img> element.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- java.lang.Object

Image Widget Example

This example will take you through simple steps to show usage of a Image Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.

3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
  <module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>
<h1>Image Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of Image widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.Image;
```

```
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
     // Create a Image widget
     Image image =newImage();

     //set image source
     image.setUrl("http://www.tutorialspoint.com/images/gwt-mini.png");

     // Add image to the root panel.
     VerticalPanel panel =newVerticalPanel();
     panel.add(image);

     RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

ANCHOR

Introduction

The **Anchor** widget that represents a simple <a> element.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Anchor** class:

```
public class Anchor
   extends FocusWidget
      Implements HasHorizontalAlignment,HasName,
```

```
        HasHTML,HasWordWrap,HasDirection
```

CSS style rules

Following default CSS Style rule will be applied to all the Image widget. You can override it as per your requirements.

```
.gwt-Anchor{}
```

Class constructors

S.N.	Constructor & Description
1	**Anchor()** Creates an empty anchor.
2	**protected Anchor(Element element)** This constructor may be used by subclasses to explicitly use an existing element.
3	**Anchor(java.lang.String text)** Creates an anchor for scripting.
4	**Anchor(java.lang.String text, boolean asHtml)** Creates an anchor for scripting.
5	**Anchor(java.lang.String text, boolean asHTML, java.lang.String href)** Creates an anchor with its text and href (target URL) specified.
6	**Anchor(java.lang.String text, boolean asHtml, java.lang.String href, java.lang.String target)** Creates a source anchor (link to URI).
7	**Anchor(java.lang.String text, java.lang.String href)** Creates an anchor with its text and href (target URL) specified.
8	**Anchor(java.lang.String text, java.lang.String href, java.lang.String target)** Creates a source anchor with a frame target.

Class methods

S.N.	Function name & Description
1	**HasDirection.Direction getDirection()** Gets the directionality of the widget.
2	**HasHorizontalAlignment.HorizontalAlignmentConstant getHorizontalAlignment()** Gets the horizontal alignment.
3	**java.lang.String getHref()** Gets the anchor's href (the url to which it links).
4	**java.lang.String getHTML()** Gets this object's contents as HTML.
5	**java.lang.String getName()** Gets the widget's name.
6	**int getTabIndex()** Gets the widget's position in the tab index.

7	**java.lang.String getTarget()** Gets the anchor's target frame (the frame in which navigation will occur when the link is selected).
8	**java.lang.String getText()** Gets this object's text.
9	**boolean getWordWrap()** Gets whether word-wrapping is enabled.
10	**void setAccessKey(char key)** Sets the widget's 'access key'.
11	**void setFocus(boolean focused)** Explicitly focus/unfocus this widget.
12	**void setHorizontalAlignment(HasHorizontalAlignment.HorizontalAlignmentConstant align)** Sets the horizontal alignment.
13	**void setHref(java.lang.String href)** Sets the anchor's href (the url to which it links).
14	**void setHTML(java.lang.String html)** Sets this object's contents via HTML.
15	**void setName(java.lang.String name)** Sets the widget's name.
16	**void setTabIndex(int index)** Sets the widget's position in the tab index.
17	**void setText(java.lang.String text)** Sets this object's text.
18	**void setWordWrap(boolean wrap)** Sets whether word-wrapping is enabled.
19	**static Anchor wrap(Element element)** Creates an Anchor widget that wraps an existing <a> element.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.FocusWidget

Anchor Widget Example

This example will take you through simple steps to show usage of a Anchor Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description

1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
  <module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>Anchor Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of Anchor widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.Anchor;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      // Create a Anchor widget,
      // pass text as TutorialsPoint
      // set asHtml as false,
      // href as www.tutorialspoint.com,
      // target as _blank
      Anchor anchor = new Anchor("TutorialsPoint",
                                 false,
                                 "http://www.tutorialspoint.com",
                                 "_blank");
      // Add anchor to the root panel.
      VerticalPanel panel =new VerticalPanel();
      panel.add(anchor);

      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

CHAPTER

8

Form Widgets

This section describes the Form Widgets under Google Web Toolkit:

Form widgets allow users to input data and provides them interaction capability with the application. Every Form widget inherits properties from Widget class which in turn inherits properties from UIObject and Wigdet classes.

S.N.	Widget & Description
1	GWT UIObject Class This widget contains text, not interpreted as HTML using a element, causing it to be displayed with block layout.
2	GWT Widget Class This widget can contain HTML text and displays the html content using a element, causing it to be displayed with block layout.

Form Widgets

Following are few important *Form Widgets*:

S.N.	Widget & Description
1	Button This widget represents a standard push button.
2	PushButton This widget represents a normal push button with custom styling.
3	ToggleButton This widget represents a stylish stateful button which allows the user to toggle between up and down states.
4	CheckBox This widget represents a standard check box widget. This class also serves as a base class for RadioButton.
5	RadioButton This widget represents a mutually-exclusive selection radio button widget.

6	ListBox This widget represents a list of choices to the user, either as a list box or as a drop-down list.
7	SuggestBox This widget represents a text box or text area which displays a pre-configured set of selections that match the user's input. Each SuggestBox is associated with a single SuggestOracle. The SuggestOracle is used to provide a set of selections given a specific query string.
8	TextBox This widget represents a single line text box.
9	PasswordTextBox This widget represents a text box that visually masks its input to prevent eavesdropping..
10	TextArea This widget represents a text box that allows multiple lines of text to be entered.
11	RichTextArea This widget represents a rich text editor that allows complex styling and formatting.
12	FileUpload This widget wraps the HTML <input type='file'> element.
13	Hidden This widget represets a hidden field in an HTML form.

Button

Introduction

The **Button** widget represents a standard push button.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Button** class:

```
public class Button
   extends ButtonBase
```

CSS style rules

Following default CSS Style rule will be applied to all the Button widget. You can override it as per your requirements.

```
.gwt-Button{}
```

Class constructors

S.N.	Constructor & Description
1	**Button()** Creates a button with no caption.
2	**protected Button(Element element)** This constructor may be used by subclasses to explicitly use an existing

	element.
3	**Button(java.lang.String html)** Creates a button with the given HTML caption.
4	**Button(java.lang.String html, ClickListener listener)** Creates a button with the given HTML caption and click listener.

Class methods

S.N.	Function name & Description
1	**click()** Programmatic equivalent of the user clicking the button.
2	**static Button wrap(Element element)** Creates a Button widget that wraps an existing <a> element.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.FocusWidget
- com.google.gwt.user.client.ui.ButtonBase
- java.lang.Object

Button Widget Example

This example will take you through simple steps to show usage of a Button Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                  -->
  <inherits name='com.google.gwt.user.User'/>
```

```
  <!-- Inherit the default GWT style sheet.                      -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                        -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                   -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-Button{
   color:red;
}

.gwt-Green-Button{
   color:green;
}
.gwt-Blue-Button{
   color:blue;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>Button Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of Button widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
```

```
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){

      //create buttons
      Button redButton =new Button("Red");
      Button greenButton =new Button("Green");
      Button blueButton =new Button("Blue");

      // use UIObject methods to set button properties.
      redButton.setWidth("100px");
      greenButton.setWidth("100px");
      blueButton.setWidth("100px");
      greenButton.addStyleName("gwt-Green-Button");
      blueButton.addStyleName("gwt-Blue-Button");

      //add a clickListener to the button
      redButton.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            Window.alert("Red Button clicked!");
         }
      });

      //add a clickListener to the button
      greenButton.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            Window.alert("Green Button clicked!");
         }
      });

      //add a clickListener to the button
      blueButton.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            Window.alert("Blue Button clicked!");
         }
      });

      // Add button to the root panel.
      VerticalPanel panel =new VerticalPanel();
      panel.setSpacing(10);
      panel.add(redButton);
      panel.add(greenButton);
      panel.add(blueButton);

      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

When you click **Click Me** button, it will show an alert message **Hello World!**

PushButton

Introduction

The **PushButton** widget represents a standard push button with custom styling.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.PushButton** class:

```
public class PushButton
   extends CustomButton
```

CSS style rules

Following default CSS Style rules will be applied to all the PushButton widget. You can override it as per your requirements.

```
.gwt-PushButton-up {}
.gwt-PushButton-down {}
.gwt-PushButton-up-hovering {}
.gwt-PushButton-down-hovering {}
.gwt-PushButton-up-disabled {}
.gwt-PushButton-down-disabled {}
```

Class constructors

S.N.	Constructor & Description

1	**PushButton()** Constructor for PushButton.
2	**PushButton(Image upImage)** Creates a PushButton with up state image.
3	**PushButton(Image upImage, ClickListener listener)** Creates a PushButton with up state image and clickListener.
4	**PushButton(Image upImage, Image downImage)** Creates a PushButton with up state image.
5	**PushButton(Image upImage, Image downImage, ClickListener listener)** Creates a PushButton with up state image.
6	**PushButton(java.lang.String upText)** Creates a PushButton with up state text.
7	**PushButton(java.lang.String upText, ClickListener listener)** Creates a PushButton with up state text and clicklistener.
8	**PushButton(java.lang.String upText, java.lang.String downText)** Creates a PushButton with up state and down state text.
8	**PushButton(java.lang.String upText, java.lang.String downText, ClickListener listener)** Creates a PushButton with up state, down state text and click listener.

Class methods

S.N.	Function name & Description
1	**protected void onClick()** Called when the user finishes clicking on this button.
2	**protected void onClickCancel()** Called when the user aborts a click in progress; for example, by dragging the mouse outside of the button before releasing the mouse button.
3	**protected void onClickStart()** Called when the user begins to click on this button.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.FocusWidget
- com.google.gwt.user.client.ui.CustomWidget
- java.lang.Object

PushButton Widget Example

This example will take you through simple steps to show usage of a PushButton Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-PushButton{
   color:red;
}
.gwt-PushButton-up {
   color:green;
}
.gwt-PushButton-down {
   color:blue;
}
.gwt-PushButton-up-hovering {
   color:pink;
```

```
}
.gwt-PushButton-down-hovering {
   color:aqua;
}
.gwt-PushButton-up-disabled {
   color:lime;
}
.gwt-PushButton-down-disabled {
   color:maroon;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

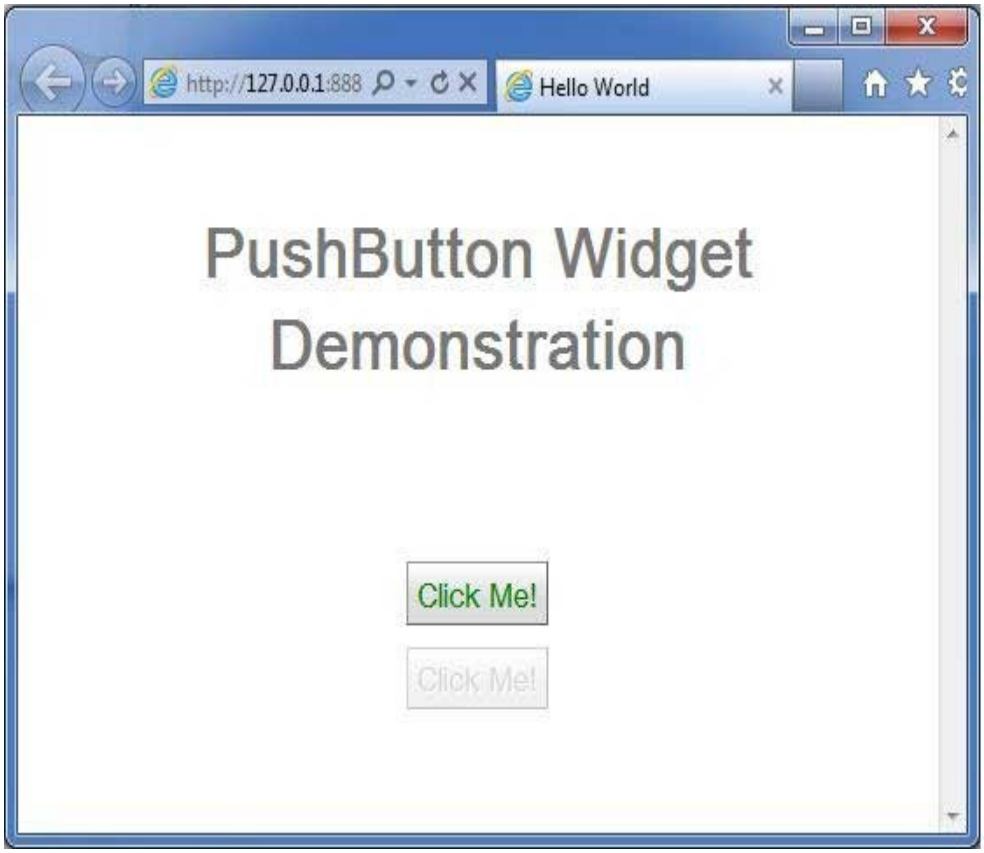
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>PushButton Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of PushButton widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.PushButton;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      //create a push button
      PushButton pushButton =newPushButton("Click Me!");

      //create a push button
      PushButton pushButton1 =newPushButton("Click Me!");

      //disable a push button
      pushButton1.setEnabled(false);

      //add a clickListener to the push button
      pushButton.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            Window.alert("Hello World!");
         }
      });
```

```
      // Add push buttons to the root panel.
      VerticalPanel panel =new VerticalPanel();
      panel.setSpacing(10);
      panel.add(pushButton);
      panel.add(pushButton1);
      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



When you click **Click Me** button, it will show an alert message **Hello World!**

You can see color of button text and its state will change with your interaction.

- Hover over the button, color will be pink.
- Press the button, color will be aqua.
- Release the button, color will be green.

ToggleButton

Introduction

The **ToggleButton** widget represents a stylish stateful button which allows the user to toggle between up and down states.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.ToggleButton** class:

```
public class ToggleButton
   extends CustomButton
```

CSS style rules

Following default CSS Style rules will be applied to all the ToggleButton widget. You can override it as per your requirements.

```
.gwt-ToggleButton-up {}
.gwt-ToggleButton-down {}
.gwt-ToggleButton-up-hovering {}
.gwt-ToggleButton-down-hovering {}
.gwt-ToggleButton-up-disabled {}
.gwt-ToggleButton-down-disabled {}
```

Class constructors

S.N.	Constructor & Description
1	**ToggleButton()** Constructor for ToggleButton.
2	**ToggleButton(Image upImage)** Creates a ToggleButton with up state image.
3	**ToggleButton(Image upImage, ClickListener listener)** Creates a ToggleButton with up state image and clickListener.
4	**ToggleButton(Image upImage, Image downImage)** Creates a ToggleButton with up state image.
5	**ToggleButton(Image upImage, Image downImage, ClickListener listener)** Creates a ToggleButton with up state image.
6	**ToggleButton(java.lang.String upText)** Creates a ToggleButton with up state text.
7	**ToggleButton(java.lang.String upText, ClickListener listener)** Creates a ToggleButton with up state text and clicklistener.
8	**ToggleButton(java.lang.String upText, java.lang.String downText)** Creates a ToggleButton with up state and down state text.
8	**ToggleButton(java.lang.String upText, java.lang.String downText, ClickListener listener)** Creates a ToggleButton with up state, down state text and click listener.

Class methods

S.N.	Function name & Description
1	**boolean isDown()** Is this button down?
2	**protected void onClick()** Called when the user finishes clicking on this button.
3	**void setDown(boolean down)** Sets whether this button is down.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.FocusWidget
- com.google.gwt.user.client.ui.CustomWidget
- java.lang.Object

ToggleButton Widget Example

This example will take you through simple steps to show usage of a ToggleButton Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>
```

```
  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-ToggleButton-up {
   color:green;
}
.gwt-ToggleButton-down {
   color:blue;
}
.gwt-ToggleButton-up-hovering {
   color:pink;
}
.gwt-ToggleButton-down-hovering {
   color:aqua;
}
.gwt-ToggleButton-up-disabled {
   color:lime;
}
.gwt-ToggleButton-down-disabled {
   color:maroon;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>ToggleButton Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of ToggleButton widget.

```
public class HelloWorld implements EntryPoint{
```

```
   public void onModuleLoad(){
      //create toggle buttons
      ToggleButton toggleButton =new ToggleButton("Click Me!");
      ToggleButton toggleButton1 =new ToggleButton("Click Me!");

      //disable a toggle button
      toggleButton1.setEnabled(false);

      //add a clickListener to the toggle button
      toggleButton.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            Window.alert("Hello World!");
         }
      });

      // Add toggle button to the root panel.
      VerticalPanel panel =new VerticalPanel();
      panel.setSpacing(10);
      panel.add(toggleButton);
      panel.add(toggleButton1);

      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

When you click **Click Me** button, it will show an alert message **Hello World!**

You can see color of button text will change with your interaction.

- Hover over the button, color will be pink.
- Press the button, color will be blue.
- Release the button, button will remain down.

CheckBox

Introduction

The **Checkbox** widget represents a standard checkbox.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.CheckBox** class:

```
public class CheckBox
   extends ButtonBase
      implements HasName
```

CSS style rules

Following default CSS Style rules will be applied to all the CheckBox widget. You can override it as per your requirements.

```
.gwt-CheckBox{}
.gwt-CheckBox-disabled {}
```

Class constructors

S.N.	Constructor & Description
1	**CheckBox()** Constructor for CheckkBox.
2	**CheckBox(Element element)** This constructor may be used by subclasses to explicitly use an existing element.
3	**CheckBox(java.lang.String label)** Creates a check box with the specified text label.
4	**CheckBox(java.lang.String label, boolean asHTML)** Creates a check box with the specified text label and set its contents as HTML.

Class methods

S.N.	Function name & Description
1	**java.lang.String getName()** Gets the widget's name.

2	**int getTabIndex()** Gets the widget's position in the tab index.
3	**java.lang.String getText()** Gets this object's text.
4	**boolean isChecked()** Determines whether this check box is currently checked.
5	**boolean isEnabled()** Gets whether this widget is enabled.
6	**protected void onEnsureDebugId(java.lang.String baseID)** Affected Elements: -label = label next to checkbox.
7	**protected void onLoad()** This method is called when a widget is attached to the browser's document.
8	**protected void onUnload()** This method is called when a widget is detached from the browser's document.
9	**protected void replaceInputElement(Element elem)** Replace the current input element with a new one.
10	**void setAccessKey(char key)** Sets the widget's 'access key'.
11	**void setChecked(boolean checked)** Checks or unchecks this check box.
12	**void setEnabled(boolean enabled)** Sets whether this widget is enabled.
13	**void setFocus(boolean focused)** Explicitly focus/unfocus this widget.
14	**void setHTML(java.lang.String html)** Sets this object's contents via HTML.
15	**void setName(java.lang.String name)** Sets the widget's name.
16	**void setTabIndex(int index)** Sets the widget's position in the tab index.
17	**void setText(java.lang.String text)** Sets this object's text.
18	**void sinkEvents(int eventBitsToAdd)** Adds a set of events to be sunk by this object.
19	**java.lang.String getHTML()** Gets this object's contents as HTML.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget

- com.google.gwt.user.client.ui.FocusWidget
- java.lang.Object

CheckBox Widget Example

This example will take you through simple steps to show usage of a CheckBox Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-CheckBox{
   color:green;
}
.gwt-CheckBox-disabled {
```

```
   color:green;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

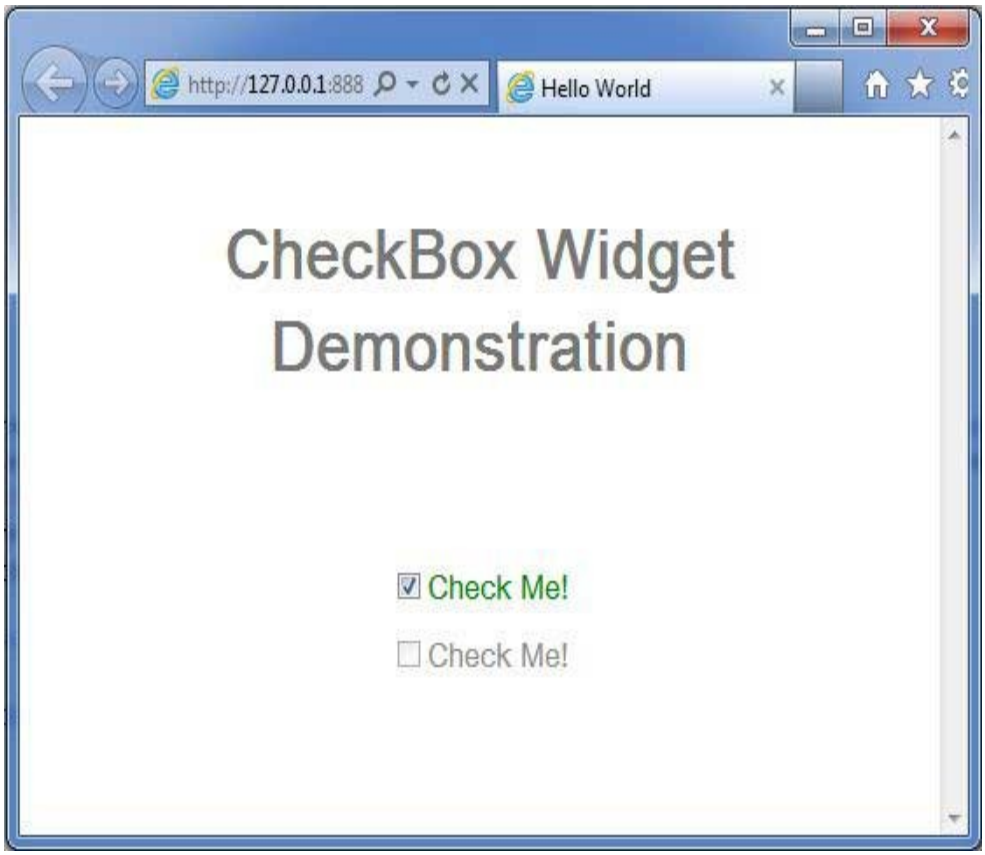
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>CheckBox Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of CheckBox widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.CheckBox;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;


public class HelloWorld implementsEntryPoint{
   public void onModuleLoad(){

      // Make a new check box, and select it by default.
      CheckBox checkBox1 =new CheckBox("Check Me!");
      CheckBox checkBox2 =new CheckBox("Check Me!");

      // set check box as selected
      checkBox1.setValue(true);

      //disable a checkbox
      checkBox2.setEnabled(false);

      checkBox1.addClickHandler(new ClickHandler(){

         @Override
         public void onClick(ClickEvent event){
            CheckBox checkBox =(CheckBox)event.getSource();
            Window.alert("CheckBox is "+
            (checkBox.getValue()?"":"not")+" checked");
         }
      });


      // Add checkboxes to the root panel.
      VerticalPanel panel =new VerticalPanel();
      panel.setSpacing(10);
      panel.add(checkBox1);
      panel.add(checkBox2);
```

```
        RootPanel.get("gwtContainer").add(panel);
    }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



When you click **Click Me** CheckBox, it will show an alert message saying **CheckBox** is checked or not checked.

RadioButton

Introduction

The **RadioButton** widget represents a mutually exclusive selection radio button.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.RadioButton** class:

```
public class RadioButton
   extends CheckBox
```

CSS style rules

Following default CSS Style rules will be applied to all the RadioButton widget. You can override it as per your requirements.

```
.gwt-RadioButton{}
```

Class constructors

S.N.	Constructor & Description
1	**RadioButton(java.lang.String name)** Creates a new radio associated with a particular group name.
2	**RadioButton(java.lang.String name,java.lang.String label)** Creates a new radio associated with a particular group, and initialized with the given HTML label.
3	**RadioButton(java.lang.String name,java.lang.String label, boolean asHTML)** Creates a new radio button associated with a particular group, and initialized with the given label (optionally treated as HTML).

Class methods

S.N.	Function name & Description
1	**void setName(java.lang.String name)** Change the group name of this radio button.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.FocusWidget
- com.google.gwt.user.client.ui.CheckBox
- java.lang.Object

RadioButton Widget Example

This example will take you through simple steps to show usage of a RadioButton Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as

	explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-RadioButton{
   color:green;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>RadioButton Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of RadioButton widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.RadioButton;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implementsEntryPoint{
   public void onModuleLoad(){

      // Create some radio buttons, all in one group 'radioGroup'.
      RadioButton radioButton1 =new RadioButton("radioGroup","First");
      RadioButton radioButton2 =new RadioButton("radioGroup","Second");
      RadioButton radioButton3 =new RadioButton("radioGroup","Third");

      // Check 'First' by default.
      radioButton1.setValue(true);

      //disable 'Second' radio button
      radioButton2.setEnabled(false);

      // Add toggle button to the root panel.
      VerticalPanel panel =new VerticalPanel();
      panel.setSpacing(10);
      panel.add(radioButton1);
      panel.add(radioButton2);
      panel.add(radioButton3);

      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

ListBox

Introduction

The **ListBox** widget represents a list of choices to the user, either as a list box or as a drop-down list.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.ListBox** class:

```
public class ListBox
   extends FocusWidget
      implements SourcesChangeEvents,HasName
```

CSS style rules

Following default CSS Style rules will be applied to all the ListBox widget. You can override it as per your requirements.

```
.gwt-ListBox{}
```

Class constructors

S.N.	Constructor & Description
1	**ListBox()** Creates an empty list box in single selection mode.
2	**ListBox(boolean isMultipleSelect)** Creates an empty list box.
3	**ListBox(Element element)** This constructor may be used by subclasses to explicitly use an existing element.

Class methods

S.N.	Function name & Description
1	**void addItem(java.lang.String item)** Adds an item to the list box.
2	**void addItem(java.lang.String item, java.lang.String value)** Adds an item to the list box, specifying an initial value for the item.
3	**void clear()** Removes all items from the list box.
4	**int getItemCount()** Gets the number of items present in the list box.
5	**java.lang.String getItemText(int index)** Gets the text associated with the item at the specified index.
6	**java.lang.String getName()** Gets the widget's name.
7	**int getSelectedIndex()** Gets the currently-selected item.
8	**java.lang.String getValue(int index)** Gets the value associated with the item at a given index.
9	**int getVisibleItemCount()** Gets the number of items that are visible.
10	**void insertItem(java.lang.String item, int index)** Inserts an item into the list box.
11	**void insertItem(java.lang.String item, java.lang.String value, int index)** Inserts an item into the list box, specifying an initial value for the item.
12	**boolean isItemSelected(int index)** Determines whether an individual list item is selected.
13	**boolean isMultipleSelect()** Gets whether this list allows multiple selection.
14	**void onBrowserEvent(Event event)** Fired whenever a browser event is received.
15	**protected void onEnsureDebugId(java.lang.String baseID)**

	Affected Elements: -item# = the option at the specified index.
16	**void removeChangeListener(ChangeListener listener)** Removes a previously added listener interface.
17	**void removeItem(int index)** Removes the item at the specified index.
18	**void setItemSelected(int index, boolean selected)** Sets whether an individual list item is selected.
19>	**void setItemText(int index,java.lang.String text)** Sets the text at given index
20	**void setMultipleSelect(boolean multiple)** Sets whether this list allows multiple selections.
21	**void setName(java.lang.String name)** Sets the widget's name.
22	**void setSelectedIndex(int index)** Sets the currently selected index.
23	**void setValue(int index, java.lang.String value)** Sets the value associated with the item at a given index.
24	**void setVisibleItemCount(int visibleItems)** Sets the number of items that are visible.
25	**static ListBox wrap(Element element)** Creates a ListBox widget that wraps an existing <select> element.
26	**void addChangeListener(ChangeListener listener)** Adds a listener interface to receive change events.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.FocusWidget
- java.lang.Object

ListBox Widget Example

This example will take you through simple steps to show usage of a ListBox Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as

	explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<modulerename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-ListBox{
   color:green;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

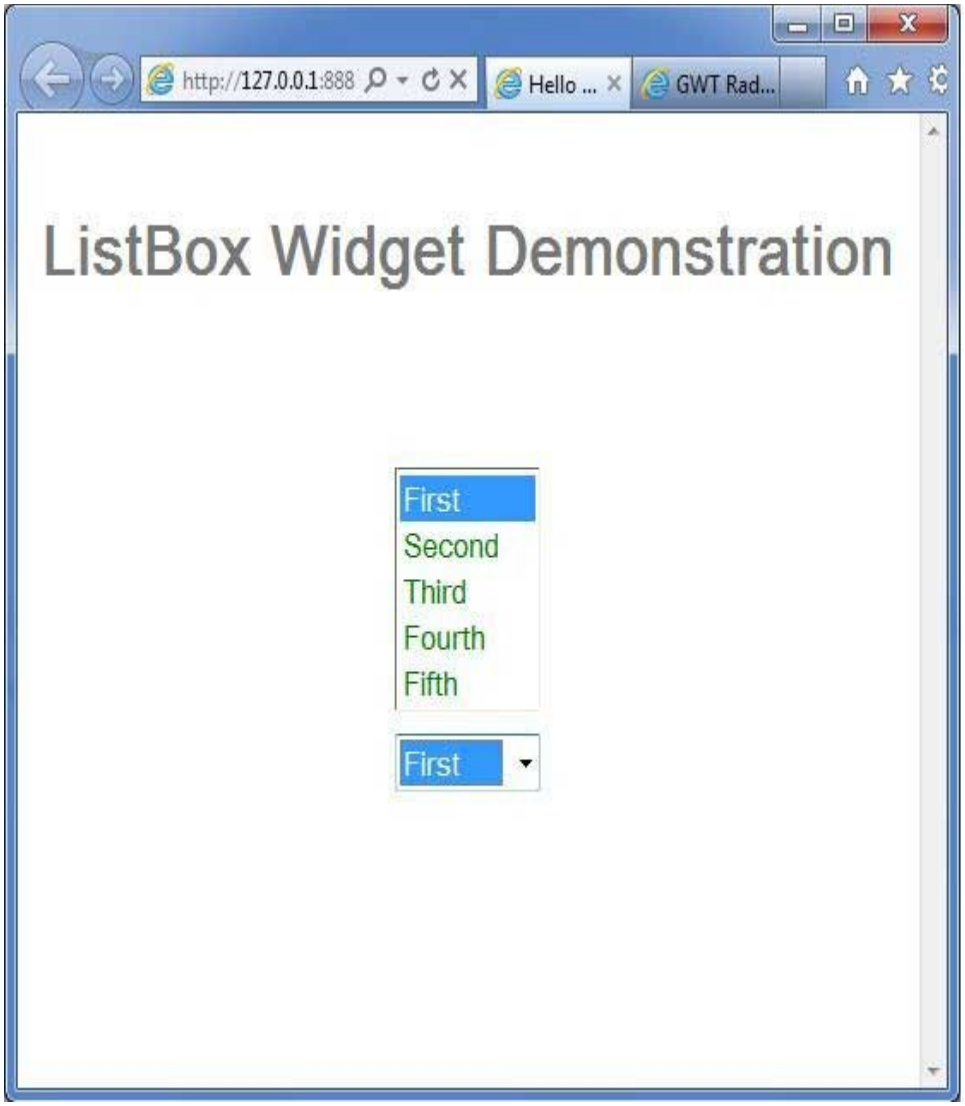
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>ListBox Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
```

```
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of ListBox widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.ListBox;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){

      // Make a new list box, adding a few items to it.
      ListBox listBox1 =new ListBox();
      listBox1.addItem("First");
      listBox1.addItem("Second");
      listBox1.addItem("Third");
      listBox1.addItem("Fourth");
      listBox1.addItem("Fifth");

      // Make a new list box, adding a few items to it.
      ListBox listBox2 =new ListBox();
      listBox2.addItem("First");
      listBox2.addItem("Second");
      listBox2.addItem("Third");
      listBox2.addItem("Fourth");
      listBox2.addItem("Fifth");

      // Make enough room for all five items
      listBox1.setVisibleItemCount(5);

      //setting itemcount value to 1 turns listbox into a drop-down list.
      listBox2.setVisibleItemCount(1);

      // Add listboxes to the root panel.
      VerticalPanel panel =newVerticalPanel();
      panel.setSpacing(10);
      panel.add(listBox1);
      panel.add(listBox2);

      RootPanel.get("gwtContainer").add(panel);
    }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



SuggestBox

Introduction

The **SuggestionBox** widget represents a text box or text area which displays a pre-configured set of selections that match the user's input. Each SuggestBox is associated with a single SuggestOracle. The SuggestOracle is used to provide a set of selections given a specific query string.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.SuggestionBox** class:

```
public final class SuggestBox
   extends Composite
      implements HasText,HasFocus,HasAnimation,
```

```
        SourcesClickEvents,SourcesFocusEvents,
           SourcesChangeEvents,SourcesKeyboardEvents,
              FiresSuggestionEvents
```

CSS style rules

Following default CSS Style rules will be applied to all the ListBox widget. You can override it as per your requirements.

```
.gwt-SuggestBox{}
.gwt-SuggestBoxPopup{}
.gwt-SuggestBoxPopup.item {}
.gwt-SuggestBoxPopup.item-selected {}
.gwt-SuggestBoxPopup.suggestPopupTopLeft {}
.gwt-SuggestBoxPopup.suggestPopupTopLeftInner {}
.gwt-SuggestBoxPopup.suggestPopupTopCenter {}
.gwt-SuggestBoxPopup.suggestPopupTopCenterInner {}
.gwt-SuggestBoxPopup.suggestPopupTopRight {}
.gwt-SuggestBoxPopup.suggestPopupTopRightInner {}
.gwt-SuggestBoxPopup.suggestPopupMiddleLeft {}
.gwt-SuggestBoxPopup.suggestPopupMiddleLeftInner {}
.gwt-SuggestBoxPopup.suggestPopupMiddleCenter {}
.gwt-SuggestBoxPopup.suggestPopupMiddleCenterInner {}
.gwt-SuggestBoxPopup.suggestPopupMiddleRight {}
.gwt-SuggestBoxPopup.suggestPopupMiddleRightInner {}
.gwt-SuggestBoxPopup.suggestPopupBottomLeft {}
.gwt-SuggestBoxPopup.suggestPopupBottomLeftInner {}
.gwt-SuggestBoxPopup.suggestPopupBottomCenter {}
.gwt-SuggestBoxPopup.suggestPopupBottomCenterInner {}
.gwt-SuggestBoxPopup.suggestPopupBottomRight {}
.gwt-SuggestBoxPopup.suggestPopupBottomRightInner {}
```

Class constructors

S.N.	Constructor & Description
1	**SuggestBox()** Constructor for Suggestion Box.
2	**SuggestBox(SuggestOracle oracle)** Constructor for Suggestion Box.
3	**SuggestBox(SuggestOracle oracle, TextBoxBase box)** Constructor for Suggestion Box.

Class methods

S.N.	Function name & Description
1	**void addChangeListener(ChangeListener listener)** Adds a listener to recieve change events on the SuggestBox's text box.
2	**void addClickListener(ClickListener listener)** Adds a listener to recieve click events on the SuggestBox's text box.
3	**void addEventHandler(SuggestionHandler handler)** Adds a handler interface to receive suggestion events.

4	**void addFocusListener(FocusListener listener)** Adds a listener to recieve focus events on the SuggestBox's text box.
5	**void addKeyboardListener(KeyboardListener listener)** Adds a listener to recieve keyboard events on the SuggestBox's text box.
6	**int getLimit()** Gets the limit for the number of suggestions that should be displayed for this box.
7	**SuggestOracle getSuggestOracle()** Gets the suggest box's SuggestOracle.
8	**int getTabIndex()** Gets the widget's position in the tab index.
9	**java.lang.String getText()** Gets this object's text.
10	**boolean isAnimationEnabled()** Gets whether animation is enabled or not.
11	**protected void onEnsureDebugId(java.lang.String baseID)** Affected Elements: -popup = The popup that appears with suggestions. -items-item# = The suggested item at the specified index.
12	**void removeChangeListener(ChangeListener listener)** Removes a previously added listener interface.
13	**void removeClickListener(ClickListener listener)** Removes a previously added listener interface.
14	**void removeEventHandler(SuggestionHandler handler)** Removes a previously added listener interface.
15	**void removeFocusListener(FocusListener listener)** Removes a previously added listener interface.
16	**void removeKeyboardListener(KeyboardListener listener)** Removes a previously added listener interface.
17	**void setAccessKey(char key)** Sets the widget's 'access key'.
18	**void setAnimationEnabled(boolean enable)** Enable or disable animations.
19	**void setFocus(boolean focused)** Explicitly focus/unfocus this widget.
20	**void setLimit(int limit)** Sets the limit to the number of suggestions the oracle should provide.
21	**void setPopupStyleName(java.lang.String style)** Sets the style name of the suggestion popup.
22	**void setTabIndex(int index)** Sets the widget's position in the tab index.
23	**void setText(java.lang.String text)** Sets this object's text.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Composite
- java.lang.Object

SuggestionBox Widget Example

This example will take you through simple steps to show usage of a SuggestionBox Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
```

```
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-SuggestBox{
   color: green;
}
.gwt-SuggestBoxPopup{
   border: thin 1px solid green;
   width:200px;
}
.gwt-SuggestBoxPopup.item {
   color: red;
}
.gwt-SuggestBoxPopup.item-selected {
   color: gray;
}
.gwt-SuggestBoxPopup.suggestPopupTopLeft {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupTopLeftInner {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupTopCenter {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupTopCenterInner {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupTopRight {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupTopRightInner {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupMiddleLeft {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupMiddleLeftInner {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupMiddleCenter {
   border: thin 1px solid green; width:200px;
}
.gwt-SuggestBoxPopup.suggestPopupMiddleCenterInner {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupMiddleRight {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupMiddleRightInner {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupBottomLeft {
```

```
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupBottomLeftInner {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupBottomCenter {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupBottomCenterInner {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupBottomRight {
   border: thin 1px solid green;
}
.gwt-SuggestBoxPopup.suggestPopupBottomRightInner {
   border: thin 1px solid green;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

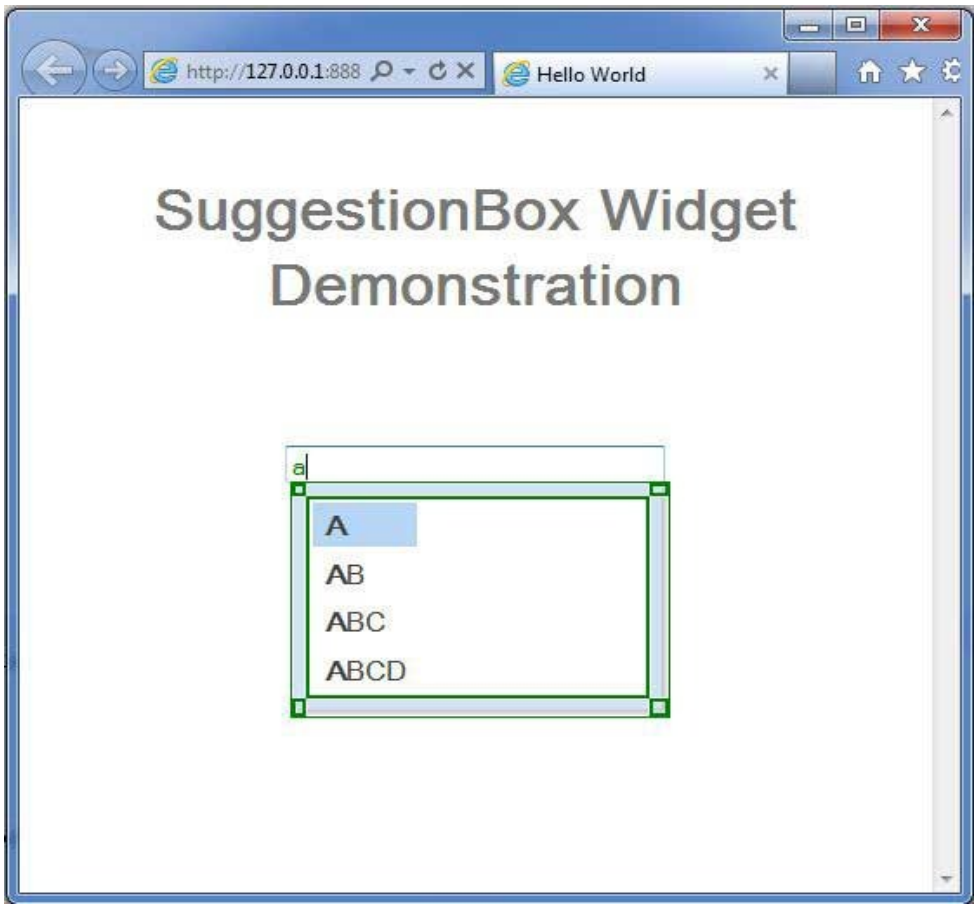
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>SuggestionBox Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of SuggestionBox widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.MultiWordSuggestOracle;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.SuggestBox;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      //create the suggestion data
      MultiWordSuggestOracle oracle =new MultiWordSuggestOracle();
      oracle.add("A");
      oracle.add("AB");
      oracle.add("ABC");
      oracle.add("ABCD");
      oracle.add("B");
      oracle.add("BC");
      oracle.add("BCD");
      oracle.add("BCDE");
      oracle.add("C");
```

```
        oracle.add("CD");
        oracle.add("CDE");
        oracle.add("CDEF");
        oracle.add("D");
        oracle.add("DE");
        oracle.add("DEF");
        oracle.add("DEFG");

        //create the suggestion box and pass it the data created above
        SuggestBox suggestionBox =new SuggestBox(oracle);

        //set width to 200px.
        suggestionBox.setWidth("200");

        // Add suggestionbox to the root panel.
        VerticalPanel panel =new VerticalPanel();
        panel.add(suggestionBox);

        RootPanel.get("gwtContainer").add(panel);
    }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



TextBox

Introduction

The **TextBox** widget represents a standard single-line text box.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.TextBox** class:

```
public classTextBox
   extends TextBoxBase
      Implements HasDirection
```

CSS style rules

Following default CSS Style rules will be applied to all the TextBox widget. You can override it as per your requirements.

```
.gwt-TextBox{}
.gwt-TextBox-readonly{}
```

Class constructors

S.N.	Constructor & Description
1	**TextBox()** Creates an empty text box.
2	**TextBox(Element element)** This constructor may be used by subclasses to explicitly use an existing element.

Class methods

S.N.	Function name & Description
1	**HasDirection.Direction getDirection()** Gets the directionality of the widget.
2	**int getMaxLength()** Gets the maximum allowable length of the text box.
3	**int getVisibleLength()** Gets the number of visible characters in the text box.
4	**void setDirection(HasDirection.Direction direction)** Sets the directionality for a widget.
5	**void setMaxLength(int length)** Sets the maximum allowable length of the text box.
6	**void setVisibleLength(int length)** Sets the number of visible characters in the text box.
7	**static TextBox wrap(Element element)** Creates a TextBox widget that wraps an existing <input type='text'> element.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.FocusWidget
- com.google.gwt.user.client.ui.TextBoxBase
- java.lang.Object

TextBox Widget Example

This example will take you through simple steps to show usage of a TextBox Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                      -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                     -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                       -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                  -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
```

```
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-TextBox{
   color: green;
}
.gwt-TextBox-readonly{
   background-color: yellow;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

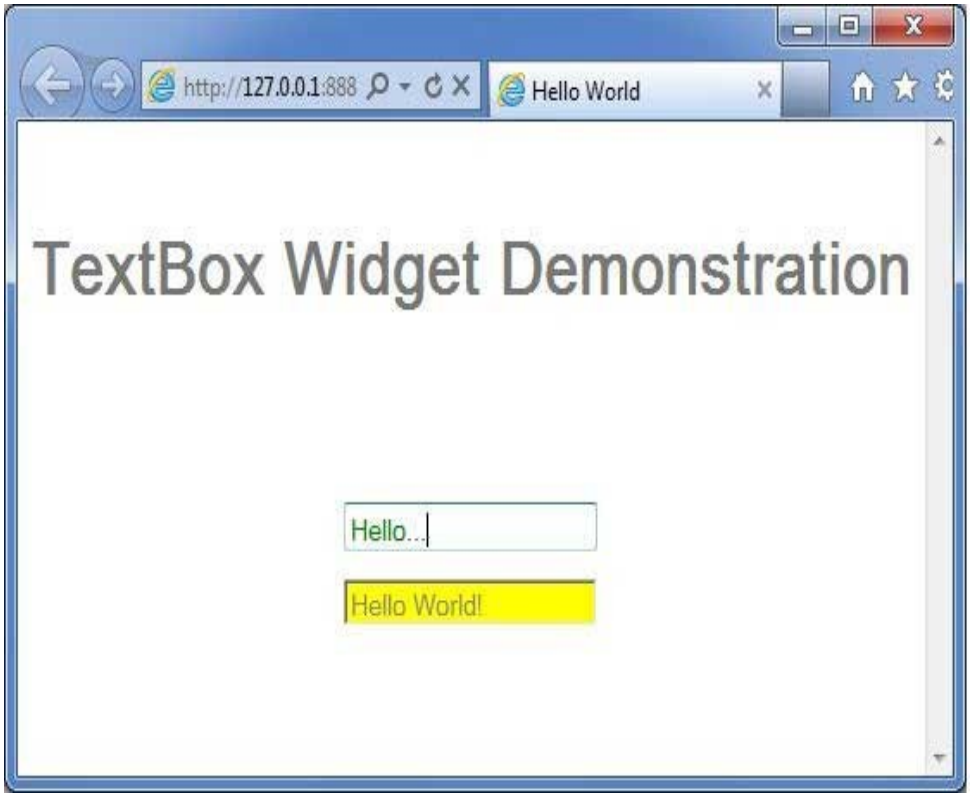
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <scriptlanguage="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>TextBox Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of TextBox widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextBox;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
     //create textboxes
     TextBox textBox1 =new TextBox();
     TextBox textBox2 =new TextBox();

     //add text to text box
     textBox2.setText("Hello World!");

     //set textbox as readonly
     textBox2.setReadOnly(true);

     // Add text boxes to the root panel.
     VerticalPanel panel =new VerticalPanel();
      panel.setSpacing(10);
      panel.add(textBox1);
      panel.add(textBox2);
```

```
      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



PasswordTextBox

Introduction

The **PasswordTextBox** widget represents a standard single-line text box that visually masks its input to prevent eavesdropping.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.PasswordTextBox** class:

```
public class PasswordTextBox
   extends TextBox
```

CSS style rules

Following default CSS Style rules will be applied to all the PasswordTextBox widget. You can override it as per your requirements.

```
.gwt-PasswordTextBox{}
.gwt-PasswordTextBox-readonly{}
```

Class constructors

S.N.	Constructor & Description
1	**PasswordTextBox()** Creates an empty password text box.
2	**PasswordTextBox(Element element)** This constructor may be used by subclasses to explicitly use an existing element.

Class methods

S.N.	Function name & Description
1	**static PasswordTextBox wrap(Element element)** Creates a PasswordTextBox widget that wraps an existing <input type='password'> element.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.FocusWidget
- com.google.gwt.user.client.ui.TextBoxBase
- com.google.gwt.user.client.ui.TextBox
- java.lang.Object

PasswordTextBox Widget Example

This example will take you through simple steps to show usage of a PasswordTextBox Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.

2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
   <!-- Inherit the core Web Toolkit stuff.                        -->
   <inherits name='com.google.gwt.user.User'/>

   <!-- Inherit the default GWT style sheet.                       -->
   <inherits name='com.google.gwt.user.theme.clean.Clean'/>

   <!-- Specify the app entry point class.                         -->
   <entry-point class='com.tutorialspoint.client.HelloWorld'/>

   <!-- Specify the paths for translatable code                    -->
   <source path='client'/>
   <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-PasswordTextBox{
   color: green;
}
.gwt-PasswordTextBox-readonly{
   background-color: yellow;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

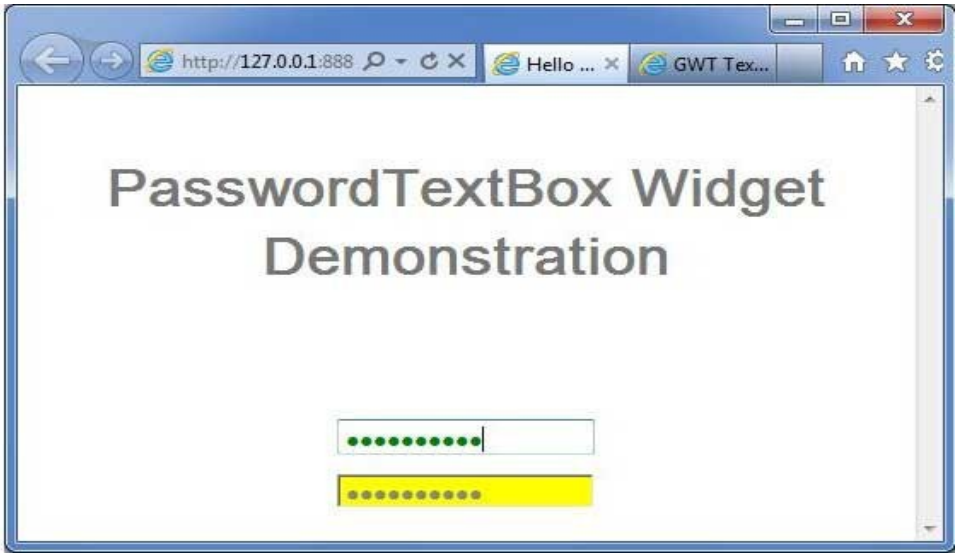
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>PasswordTextBox Widget Demonstration</h1>
<div id="gwtContainer"></div>
```

```
</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of PasswordTextBox widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.PasswordTextBox;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      //create password textboxes
      PasswordTextBox passwordTextBox1 =new PasswordTextBox();
      PasswordTextBox passwordTextBox2 =new PasswordTextBox();

      //add text to text box
      passwordTextBox2.setText("hell@W@rld");

      //set textbox as readonly
      passwordTextBox2.setReadOnly(true);

      // Add text boxes to the root panel.
      VerticalPanel panel =new VerticalPanel();
      panel.setSpacing(10);
      panel.add(passwordTextBox1);
      panel.add(passwordTextBox2);

      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



TextArea

Introduction

The **TextArea** widget represents a text box that allows multiple lines of text to be entered.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.TextArea** class:

```
public class TextArea
   Extends TextBoxBase
      Implements HasDirection
```

CSS style rules

Following default CSS Style rules will be applied to all the TextBox widget. You can override it as per your requirements.

```
.gwt-TextArea{}
.gwt-TextArea-readonly{}
```

Class constructors

S.N.	Constructor & Description
1	**TextArea()** Creates an empty text area.

Class methods

S.N.	Function name & Description
1	**int getCharacterWidth()** Gets the requested width of the text box (this is not an exact value, as not all characters are created equal).
2	**int getCursorPos()** Gets the current position of the cursor (this also serves as the beginning of the text selection).
3	**HasDirection.Direction getDirection()** Gets the directionality of the widget.
4	**int getSelectionLength()** Gets the length of the current text selection.
5	**int getVisibleLines()** Gets the number of text lines that are visible.
6	**void setCharacterWidth(int width)** Sets the requested width of the text box (this is not an exact value, as not all characters are created equal).
7	**void setDirection(HasDirection.Direction direction)** Sets the directionality for a widget.

8	**void setVisibleLines(int lines)** Sets the number of text lines that are visible.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.FocusWidget
- com.google.gwt.user.client.ui.TextBoxBase
- java.lang.Object

TextBox Widget Example

This example will take you through simple steps to show usage of a TextBox Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
   <!-- Inherit the core Web Toolkit stuff.                        -->
   <inherits name='com.google.gwt.user.User'/>

   <!-- Inherit the default GWT style sheet.                       -->
   <inherits name='com.google.gwt.user.theme.clean.Clean'/>

   <!-- Specify the app entry point class.                         -->
   <entry-point class='com.tutorialspoint.client.HelloWorld'/>

   <!-- Specify the paths for translatable code                    -->
   <source path='client'/>
   <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-TextArea{
   color: green;
}
.gwt-TextArea-readonly{
   background-color: yellow;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

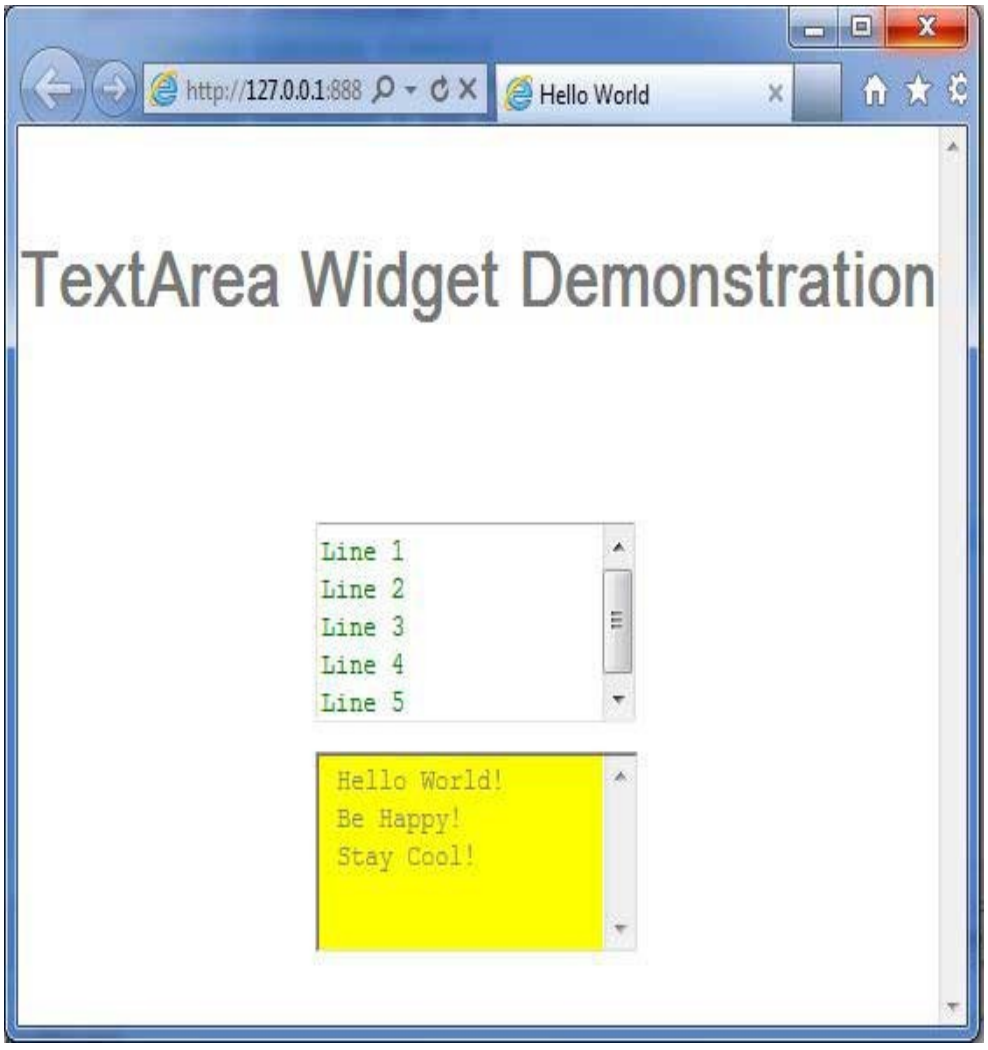
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>TextArea Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of TextBox widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextArea;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implementsEntryPoint{
   public void onModuleLoad(){
      //create textarea elements
      TextArea textArea1 =new TextArea();
      TextArea textArea2 =new TextArea();

      //set width as 10 characters
      textArea1.setCharacterWidth(20);
      textArea2.setCharacterWidth(20);

      //set height as 5 lines
      textArea1.setVisibleLines(5);
      textArea2.setVisibleLines(5);
```

```
      //add text to text area
      textArea2.setText(" Hello World! \n Be Happy! \n Stay Cool!");

      //set textbox as readonly
      textArea2.setReadOnly(true);

      // Add text boxes to the root panel.
      VerticalPanel panel =newVerticalPanel();
      panel.setSpacing(10);
      panel.add(textArea1);
      panel.add(textArea2);

      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



RichTextArea

Introduction

The **RichTextArea** widget represents a rich text editor that allows complex styling and formatting. Because some browsers do not support rich text editing, and others support only a limited subset of functionality, there are two formatter interfaces, accessed via getBasicFormatter() and getExtendedFormatter() . A browser that does not support rich text editing at all will return null for both of these,and one that supports only the basic functionality will return null for the latter getExtendedFormatter().

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.RichTextArea** class:

```
public class RichTextArea
   extends FocusWidget
      implements HasHTML,HasInitializeHandlers,HasSafeHtml
```

CSS style rules

Following default CSS Style rules will be applied to all the TextBox widget. You can override it as per your requirements.

```
.gwt-RichTextArea{}
```

Class constructors

S.N.	Constructor & Description
1	**RichTextArea()** Creates a new, blank RichTextArea object with no stylesheet.

Class methods

S.N.	Function name & Description
1	**HandlerRegistration addInitializeHandler(InitializeHandler handler)** Adds an InitializeEvent handler.
2	**RichTextArea.BasicFormatter getBasicFormatter()** Deprecated. use getFormatter() instead
3	**RichTextArea.ExtendedFormatter getExtendedFormatter()** Deprecated. use getFormatter() instead
4	**RichTextArea.Formatter getFormatter()** Gets the rich text formatting interface.
5	**java.lang.String getHTML()** Gets this object's contents as HTML.
6	**java.lang.String getText()** Gets this object's text.
7	**boolean isEnabled()** Gets whether this widget is enabled.

8	**protected void onAttach()** This method is called when a widget is attached to the browser's document.
9	**protected void onDetach()** This method is called when a widget is detached from the browser's document.
10	**void setEnabled(boolean enabled)** Sets whether this widget is enabled.
11	**void setFocus(boolean focused)** Explicitly focus/unfocus this widget.
12	**void setHTML(java.lang.String safeHtml)** Sets this object's contents via safe HTML.
13	**void setHTML(java.lang.String html)** Sets this object's contents via HTML.
14	**void setText(java.lang.String text)** Sets this object's text.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.FocusWidget
- java.lang.Object

RichTextBox Widget Example

This example will take you through simple steps to show usage of a RichTextBox Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inheritsname='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
```

```
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-RichTextArea{
   padding:10px;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

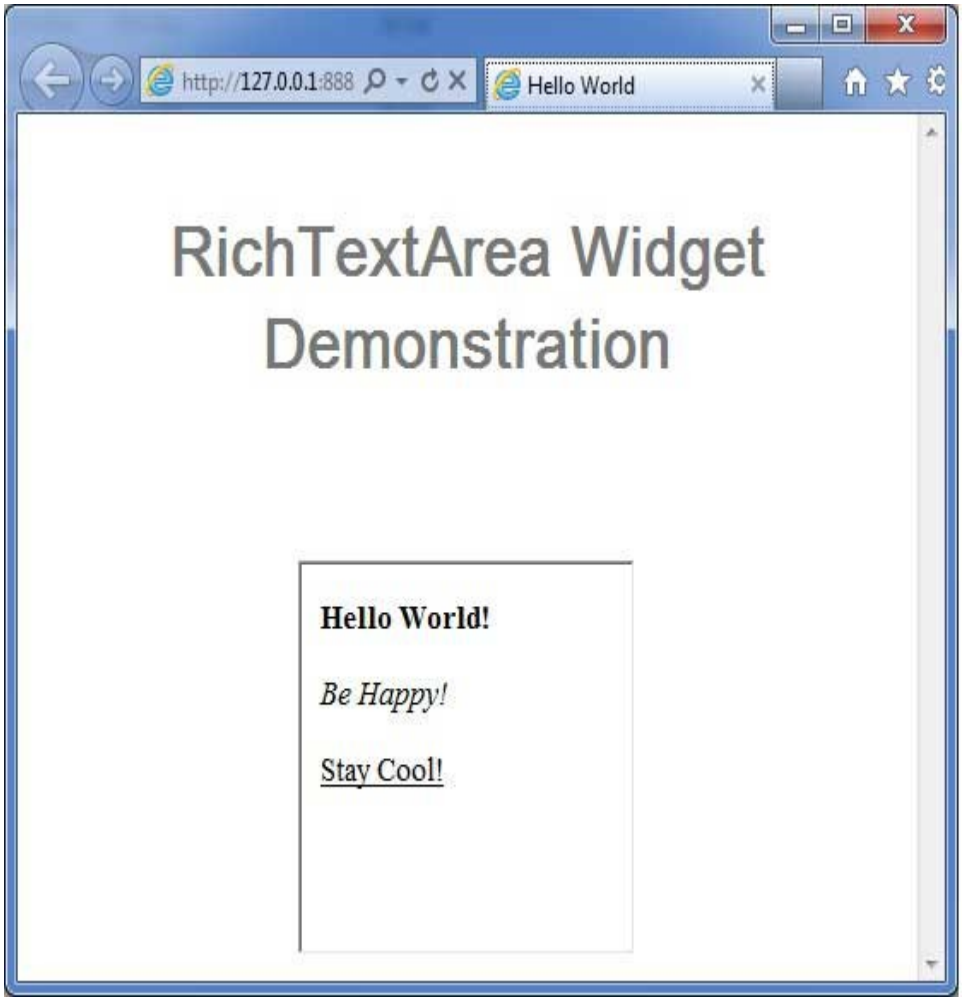
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>RichTextArea Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of TextBox widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.RichTextArea;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implementsEntryPoint{
   public void onModuleLoad(){
      //create RichTextArea elements
      RichTextArea richTextArea =new RichTextArea();
```

```
        richTextArea.setHeight("200");
        richTextArea.setWidth("200");

        //add text to text area
        richTextArea.setHTML("<b>Hello World!</b><br/><br/>"+
        "<i>Be Happy!</i></br><br/><u>Stay Cool!</u>");

        // Add text boxes to the root panel.
        VerticalPanel panel =new VerticalPanel();
        panel.add(richTextArea);

        RootPanel.get("gwtContainer").add(panel);
    }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



FileUpload

Introduction

The **FileUpload** widget wraps the HTML <input type='file'> element. This widget must be used with FormPanel if it is to be submitted to a server.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.FileUpload** class:

```
public class FileUpload
   Extends Widget
      Implements HasName,HasChangeHandlers
```

CSS style rules

Following default CSS Style rules will be applied to all the TextBox widget. You can override it as per your requirements.

```
.gwt-FileUpload{}
```

Class constructors

S.N.	Constructor & Description
1	**FileUpload()** Constructs a new file upload widget.
2	**FileUpload(Element element)** This constructor may be used by subclasses to explicitly use an existing element.

Class methods

S.N.	Function name & Description
1	**HandlerRegistration addChangeHandler(ChangeHandler handler)** Adds a ChangeEvent handler.
2	**java.lang.String getFilename()** Gets the filename selected by the user.
3	**java.lang.String getName()** Gets the widget's name.
4	**boolean isEnabled()** Gets whether this widget is enabled.
5	**void onBrowserEvent(Event event)** Fired whenever a browser event is received.
6	**void setEnabled(boolean enabled)** Sets whether this widget is enabled.
7	**void setName(java.lang.String name)** Sets the widget's name.

8	**static FileUpload wrap(Element element)** Creates a FileUpload widget that wraps an existing <input type='file'> element.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- java.lang.Object

FileUpload Widget Example

This example will take you through simple steps to show usage of a FileUpload Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
```

```
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-FileUpload{
   color: green;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

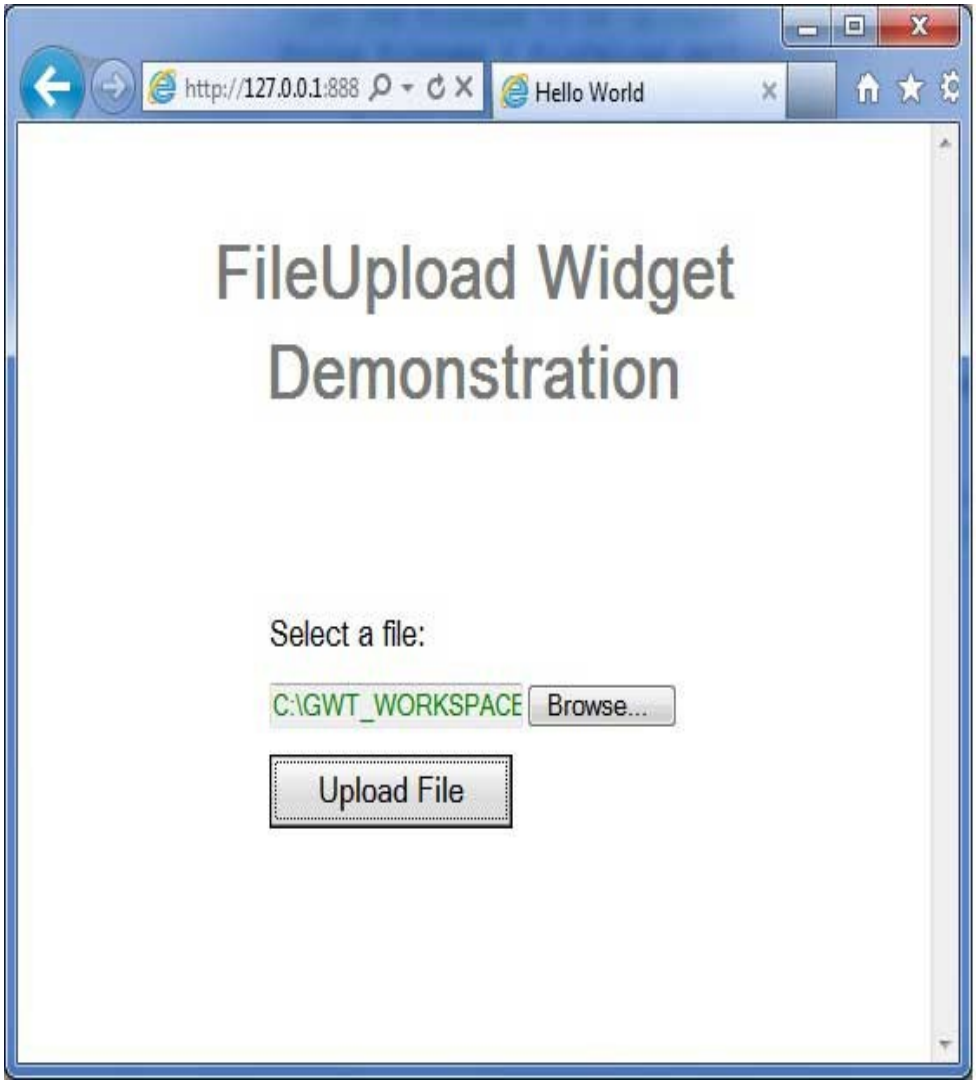
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>FileUpload Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of FileUpload widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.FileUpload;
import com.google.gwt.user.client.ui.FormPanel;
import com.google.gwt.user.client.ui.FormPanel.SubmitCompleteEvent;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      VerticalPanel panel =new VerticalPanel();
      //create a FormPanel
      finalFormPanel form =new FormPanel();
      //create a file upload widget
      finalFileUpload fileUpload =new FileUpload();
      //create labels
      Label selectLabel =new Label("Select a file:");
      //create upload button
      Button uploadButton =new Button("Upload File");
      //pass action to the form to point to service handling file
      //receiving operation.

     form.setAction("http://www.tutorialspoint.com/gwt/myFormHandler");
      // set form to use the POST method, and multipart MIME encoding.
      form.setEncoding(FormPanel.ENCODING_MULTIPART);
      form.setMethod(FormPanel.METHOD_POST);
```

```
      //add a label
      panel.add(selectLabel);
      //add fileUpload widget
      panel.add(fileUpload);
      //add a button to upload the file
      panel.add(uploadButton);
      uploadButton.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            //get the filename to be uploaded
            String filename = fileUpload.getFilename();
            if(filename.length()==0){
               Window.alert("No File Specified!");
            }else{
               //submit the form
               form.submit();
            }
         }
      });

      form.addSubmitCompleteHandler(newFormPanel.SubmitCompleteHandler(){

         @Override
         public void onSubmitComplete(SubmitCompleteEvent event){
            // When the form submission is successfully completed, this
            //event is fired. Assuming the service returned a response
            //of type text/html, we can get the result text here
            Window.alert(event.getResults());
         }
      });
      panel.setSpacing(10);

      // Add form to the root panel.
      form.add(panel);

      RootPanel.get("gwtContainer").add(form);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



- Following is the java server page code snippet demonstrating server side capability for file upload
- We're using Common IO and Commons FileUpload libraries to add file-upload capability to server side page.
- File will be uploaded to uploadFiles folder relative to location where upload.jsp is located on server side.

```
<%@pageimport="org.apache.commons.fileupload.FileItemFactory"%>
<%@pageimport="org.apache.commons.fileupload.disk.DiskFileItemFactory"%
>
<%@pageimport="org.apache.commons.fileupload.servlet.ServletFileUpload"
%>
<%@pageimport="org.apache.commons.fileupload.FileItem"%>
<%@pageimport="org.apache.commons.io.FilenameUtils"%>
<%@pageimport="java.util.List"%>
<%@pageimport="java.util.Iterator"%>
```

```
<%@pageimport="java.io.File"%>
<%@pageimport="java.io.FileOutputStream"%>
<%@pageimport="java.io.InputStream"%>

<%
   // Create a factory for disk-based file items
   FileItemFactory factory =newDiskFileItemFactory();
   // Create a new file upload handler
   ServletFileUpload upload =newServletFileUpload(factory);
   try {
       // Parse the request
       List items = upload.parseRequest(request);

       // Process the uploaded items
       Iterator iter = items.iterator();

       while(iter.hasNext()){
       FileItem item =(FileItem) iter.next();
       //handling a normal form-field
       if(item.isFormField()){
          System.out.println("Got a form field");
          String name = item.getFieldName();
          String value = item.getString();
          System.out.print("Name:"+name+",Value:"+value);
       }else{//handling file loads
          System.out.println("Not form field");
          String fieldName = item.getFieldName();
          String fileName = item.getName();
          if(fileName !=null){
             fileName =FilenameUtils.getName(fileName);
          }
       String contentType = item.getContentType();
       boolean isInMemory = item.isInMemory();
       long sizeInBytes = item.getSize();
       System.out.print("Field Name:"+fieldName
       +",File Name:"+fileName);
       System.out.print("Content Type:"+contentType
       +",Is In Memory:"+isInMemory+",Size:"+sizeInBytes);
       byte[] data = item.get();
       fileName = getServletContext()
       .getRealPath("/uploadedFiles/"+ fileName);
       System.out.print("File name:"+fileName);
       FileOutputStream fileOutSt =new FileOutputStream(fileName);
       fileOutSt.write(data);
       fileOutSt.close();
       out.print("File Uploaded Successfully!");
       }
     }
    }catch(Exception e){
      out.print("File Uploading Failed!"+ e.getMessage());
   }
%>
```

Hidden

Introduction

The **Hidden** widget represents a hidden field in an HTML form.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Hidden** class:

```
public class Hidden
   extends Widget
      implementsHasName
```

Class constructors

S.N.	Constructor & Description
1	**Hidden()** Constructor for Hidden.
2	**Hidden(Element element)** This constructor may be used by subclasses to explicitly use an existing element.
3	**Hidden(java.lang.String name)** Constructor for Hidden.
4	**Hidden(java.lang.String name, java.lang.String value)** Constructor for Hidden.

Class methods

S.N.	Function name & Description
1	**java.lang.String getDefaultValue()** Gets the default value of the hidden field.
2	**java.lang.String getID()** Gets the id of the hidden field.
3	**java.lang.String getName()** Gets the name of the hidden field.
4	**java.lang.String getValue()** Gets the value of the hidden field.
5	**void setDefaultValue(java.lang.String defaultValue)** Sets the default value of the hidden field.
6	**void setID(java.lang.String id)** Sets the id of the hidden field.
7	**void setName(java.lang.String name)** Sets the name of the hidden field.
8	**void setValue(java.lang.String value)** Sets the value of the hidden field.
9	**static Hidden wrap(Element element)** Creates a Hidden widget that wraps an existing <input type='hidden'> element.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject

- com.google.gwt.user.client.ui.Widget
- java.lang.Object

Hidden Widget Example

This example will take you through simple steps to show usage of a Hidden Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter
:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
```

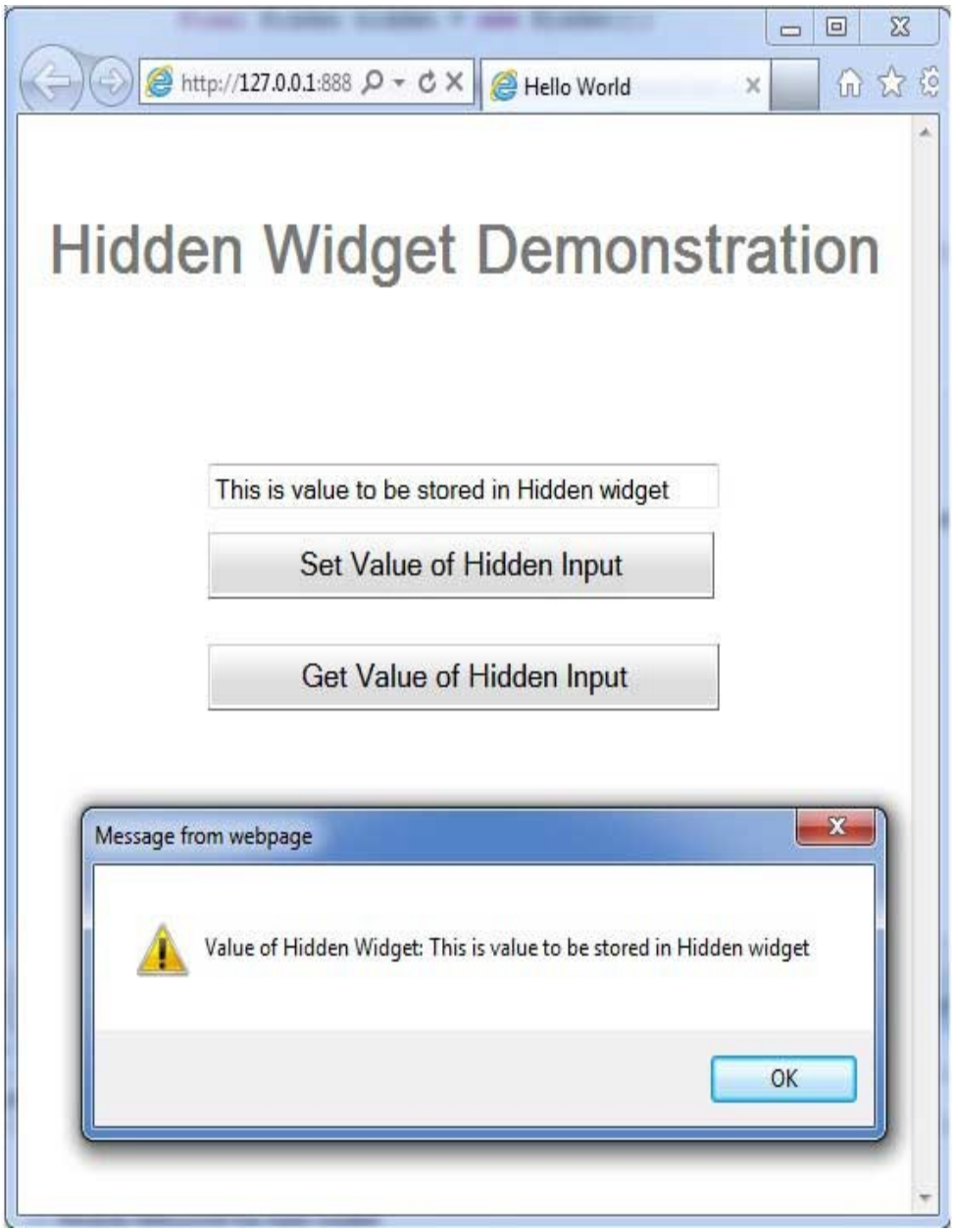
```
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>Hidden Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of Hidden widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.Hidden;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextBox;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      //create textboxes
      final TextBox textBox =new TextBox();
      textBox.setWidth("275");
      Button button1 =new Button("Set Value of Hidden Input");
      Button button2 =new Button("Get Value of Hidden Input");
      final Hidden hidden =new Hidden();

      button1.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            hidden.setValue(textBox.getValue());
            Window.alert("Value of Hidden Widget Updated!");
         }
      });

      button2.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
           Window.alert("Value of Hidden Widget: "+ hidden.getValue());
         }
      });

      // Add widgets to the root panel.
      VerticalPanel panel =newVerticalPanel();
      panel.setSpacing(10);
      panel.add(textBox);
      panel.add(button1);
      panel.add(hidden);
      panel.add(button2);

      RootPanel.get("gwtContainer").add(panel);
   }
```

```
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



CHAPTER

9

Complex Widgets

This section describes Complex Widgets used under Google Web Toolkit:

Complex widgets allows users to advanced interaction capability with the application.

Every Complex widget inherits properties from Widget class which in turn inherits properties from UIObject.

S.N.	Widget & Description
1	GWT UIObject Class This widget contains text, not interpreted as HTML using a element, causing it to be displayed with block layout.
2	GWT Widget Class This widget can contain HTML text and displays the html content using a element, causing it to be displayed with block layout.

Complex Widgets

Following are few important *Complex Widgets*:

S.N.	Widget & Description
1	Tree This widget represents a standard hierarchical tree widget. The tree contains a hierarchy of TreeItems that the user can open, close, and select.
2	MenuBar This widget represents a standard menu bar widget. A menu bar can contain any number of menu items, each of which can either fire a Command or open a cascaded menu bar.
3	DatePicker This widget represents a standard GWT date picker.
4	CellTree This widget represents a view of a tree. This widget will only work in standards mode, which requires that the HTML page in which it is run have an explicit <!DOCTYPE> declaration.
5	CellList This widget represents a single column list of cells.

6	CellTable This widget represents a tabular view that supports paging and columns.
7	CellBrowser This widget represents a **browsable** view of a tree in which only a single node per level may be open at one time. This widget will only work in standards mode, which requires that the HTML page in which it is run have an explicit <!DOCTYPE> declaration.

Tree

Introduction

The **Tree** widget represents a standard hierarchical tree widget. The tree contains a hierarchy of TreeItems that the user can open, close, and select.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Tree** class:

```
public class Tree
   extends Widget
      implements HasWidgets,SourcesTreeEvents,HasFocus,
         HasAnimation,HasAllKeyHandlers,HasAllFocusHandlers,
            HasSelectionHandlers,HasOpenHandlers,
               HasCloseHandlers,SourcesMouseEvents,HasAllMouseHandlers
```

CSS style rules

Following default CSS Style rules will be applied to all the Tree widget. You can override it as per your requirements.

```
.gwt-Tree{}
.gwt-TreeItem{}
.gwt-TreeItem-selected {}
```

Class constructors

S.N.	Constructor & Description
1	**Tree()** Constructs an empty tree.
2	**Tree(TreeImages images)** Constructs a tree that uses the specified image bundle for images.
3	**Tree(TreeImages images, boolean useLeafImages)** Constructs a tree that uses the specified image bundle for images.

Class methods

S.N.	Function name & Description
1	**void add(Widget widget)** Adds the widget as a root tree item.

2	**void addFocusListener(FocusListener listener)** Adds a listener interface to receive mouse events.
3	**TreeItem addItem(java.lang.String itemText)** Adds a simple tree item containing the specified text.
4	**void addItem(TreeItem item)** Adds an item to the root level of this tree.
5	**TreeItem addItem(Widget widget)** Adds a new tree item containing the specified widget.
6	**void addKeyboardListener(KeyboardListener listener)** Adds a listener interface to receive keyboard events.
7	**void addMouseListener(MouseListener listener)**
8	**void addTreeListener(TreeListener listener)** Adds a listener interface to receive tree events.
9	**void clear()** Clears all tree items from the current tree.
10	**protected void doAttachChildren()** If a widget implements HasWidgets, it must override this method and call onAttach() for each of its child widgets.
11	**protected void doDetachChildren()** If a widget implements HasWidgets, it must override this method and call onDetach() for each of its child widgets.
12	**void ensureSelectedItemVisible()** Ensures that the currently-selected item is visible, opening its parents and scrolling the tree as necessary.
13	**java.lang.String getImageBase()** Deprecated. Use Tree(TreeImages) as it provides a more efficent and manageable way to supply a set of images to be used within a tree.
14	**TreeItem getItem(int index)** Gets the top-level tree item at the specified index.
15	**int getItemCount()** Gets the number of items contained at the root of this tree.
16	**TreeItem getSelectedItem()** Gets the currently selected item.
17	**int getTabIndex()** Gets the widget's position in the tab index.
18	**boolean isAnimationEnabled()**
19	**protected boolean isKeyboardNavigationEnabled(TreeItem currentItem)** Indicates if keyboard navigation is enabled for the Tree and for a given TreeItem.
20	**java.util.Iterator<Widget> iterator()** Gets an iterator for the contained widgets.
21	**void onBrowserEvent(Event event)** Fired whenever a browser event is received.
22	**protected void onEnsureDebugId(java.lang.String baseID)**

	Affected Elements: -root = The root TreeItem.
23	**protected void onLoad()** This method is called immediately after a widget becomes attached to the browser's document.
24	**boolean remove(Widget w)** Removes a child widget.
25	**void removeFocusListener(FocusListener listener)** Removes a previously added listener interface.
26	**void removeItem(TreeItem item)** Removes an item from the root level of this tree.
27	**void removeItems()** Removes all items from the root level of this tree.
28	**void removeKeyboardListener(KeyboardListener listener)** Removes a previously added listener interface.
29	**void removeTreeListener(TreeListener listener)** Removes a previously added listener interface.
30	**void setAccessKey(char key)** Sets the widget's 'access key'.
31	**void setAnimationEnabled(boolean enable)** Enable or disable animations.
32	**void setFocus(boolean focus)** Explicitly focus/unfocus this widget.
33	**void setImageBase(java.lang.String baseUrl)** Deprecated. Use Tree(TreeImages) as it provides a more efficent and manageable way to supply a set of images to be used within a tree.
34	**void setSelectedItem(TreeItem item)** Selects a specified item.
35	**void setSelectedItem(TreeItem item, boolean fireEvents)** Selects a specified item.
36	**void setTabIndex(int index)** Sets the widget's position in the tab index.
37	**java.util.Iterator<TreeItem> treeItemIterator()** Iterator of tree items.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- java.lang.Object

Tree Widget Example

This example will take you through simple steps to show usage of a Tree Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}

.gwt-Label{
   font-weight: bold;
   color: maroon;
}

.gwt-Tree.gwt-TreeItem{
  padding:1px0px;
  margin:0px;
  white-space: nowrap;
```

```
  cursor: hand;
  cursor: pointer;
}

.gwt-Tree.gwt-TreeItem-selected {
  background:#ebeff9;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

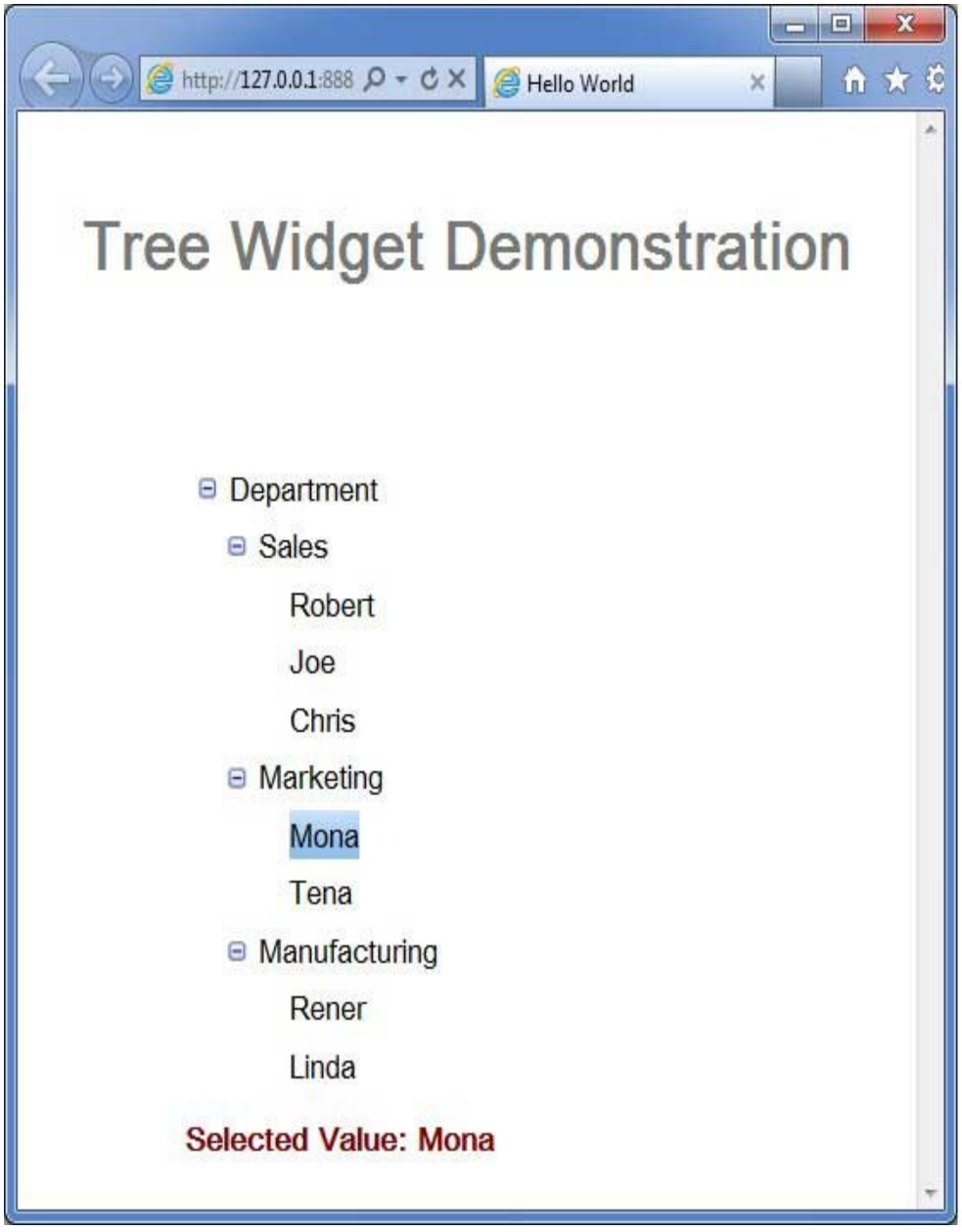
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>Tree Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of Tree widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.logical.shared.SelectionEvent;
import com.google.gwt.event.logical.shared.SelectionHandler;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.Tree;
import com.google.gwt.user.client.ui.TreeItem;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      //create a label
      final Label labelMessage =new Label();
      labelMessage.setWidth("300");

      // Create a root tree item as department
      TreeItem department =new TreeItem("Department");

      //create other tree items as department names
      TreeItem salesDepartment =new TreeItem("Sales");
      TreeItem marketingDepartment =new TreeItem("Marketing");
      TreeItem manufacturingDepartment =new TreeItem("Manufacturing");

      //create other tree items as employees
      TreeItem employee1 =new TreeItem("Robert");
      TreeItem employee2 =new TreeItem("Joe");
      TreeItem employee3 =new TreeItem("Chris");

      //add employees to sales department
      salesDepartment.addItem(employee1);
      salesDepartment.addItem(employee2);
```

```
      salesDepartment.addItem(employee3);

      //create other tree items as employees
      TreeItem employee4 =new TreeItem("Mona");
      TreeItem employee5 =new TreeItem("Tena");

      //add employees to marketing department
      marketingDepartment.addItem(employee4);
      marketingDepartment.addItem(employee5);

      //create other tree items as employees
      TreeItem employee6 =newTreeItem("Rener");
      TreeItem employee7 =newTreeItem("Linda");

      //add employees to sales department
      manufacturingDepartment.addItem(employee6);
      manufacturingDepartment.addItem(employee7);

      //add departments to department item
      department.addItem(salesDepartment);
      department.addItem(marketingDepartment);
      department.addItem(manufacturingDepartment);

      //create the tree
      Tree tree =new Tree();

      //add root item to the tree
      tree.addItem(department);

      tree.addSelectionHandler(new SelectionHandler(){
         @Override
         public void onSelection(SelectionEvent event){
            labelMessage.setText("Selected Value: "
            +event.getSelectedItem().getText());
         }
      });

      // Add text boxes to the root panel.
      VerticalPanel panel =new VerticalPanel();
      panel.setSpacing(10);
      panel.add(tree);
      panel.add(labelMessage);

      //add the tree to the root panel
      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



Selecting any value in tree, will update a message below the tree displaying the selected value.

MenuBar

Introduction

The **MenuBar** widget represents a standard menu bar widget. A menu bar can contain any number of menu items, each of which can either fire a Command or open a cascaded menu bar.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.MenuBar** class:

```
public class MenuBar
   extends Widget
      implements PopupListener,HasAnimation,
         HasCloseHandlers<PopupPanel>
```

CSS style rules

Following default CSS Style rules will be applied to all the MenuBar widget. You can override it as per your requirements.

```
.gwt-MenuBar{}
.gwt-MenuBar-horizontal {}
.gwt-MenuBar-vertical{}
.gwt-MenuBar.gwt-MenuItem{}
.gwt-MenuBar.gwt-MenuItem-selected {}
.gwt-MenuBar.gwt-MenuItemSeparator{}
.gwt-MenuBar.gwt-MenuItemSeparator.menuSeparatorInner {}
.gwt-MenuBarPopup.menuPopupTopLeft {}
.gwt-MenuBarPopup.menuPopupTopLeftInner {}
.gwt-MenuBarPopup.menuPopupTopCenter {}
.gwt-MenuBarPopup.menuPopupTopCenterInner {}
.gwt-MenuBarPopup.menuPopupTopRight {}
.gwt-MenuBarPopup.menuPopupTopRightInner {}
.gwt-MenuBarPopup.menuPopupMiddleLeft {}
.gwt-MenuBarPopup.menuPopupMiddleLeftInner {}
.gwt-MenuBarPopup.menuPopupMiddleCenter {}
.gwt-MenuBarPopup.menuPopupMiddleCenterInner {}
.gwt-MenuBarPopup.menuPopupMiddleRight {}
.gwt-MenuBarPopup.menuPopupMiddleRightInner {}
.gwt-MenuBarPopup.menuPopupBottomLeft {}
.gwt-MenuBarPopup.menuPopupBottomLeftInner {}
.gwt-MenuBarPopup.menuPopupBottomCenter {}
.gwt-MenuBarPopup.menuPopupBottomCenterInner {}
.gwt-MenuBarPopup.menuPopupBottomRight {}
.gwt-MenuBarPopup.menuPopupBottomRightInner {}
```

Class constructors

S.N.	Constructor & Description
1	**MenuBar()** Creates an empty horizontal menu bar.
2	**MenuBar(boolean vertical)** Creates an empty menu bar.
3	**MenuBar(boolean vertical, MenuBar.MenuBarImages images)** Deprecated. replaced by MenuBar(boolean, Resources)
4	**MenuBar(boolean vertical, MenuBar.Resources resources)** Creates an empty menu bar that uses the specified ClientBundle for menu images.
5	**MenuBar(MenuBar.MenuBarImages images)** Deprecated. replaced by MenuBar(Resources)

6	**MenuBar(MenuBar.Resources resources)** Creates an empty horizontal menu bar that uses the specified ClientBundle for menu images.

Class methods

S.N.	Function name & Description
1	**HandlerRegistration addCloseHandler(CloseHandler handler)** Adds a CloseEvent handler.
2	**MenuItem addItem(MenuItem item)** Adds a menu item to the bar.
3	**MenuItem addItem(SafeHtml html, Command cmd)** Adds a menu item to the bar containing SafeHtml, that will fire the given command when it is selected.
4	**MenuItem addItem(SafeHtml html, MenuBar popup)** Adds a menu item to the bar, that will open the specified menu when it is selected.
5	**MenuItem addItem(java.lang.String text, boolean asHTML, Command cmd)** Adds a menu item to the bar, that will fire the given command when it is selected.
6	**MenuItem addItem(java.lang.String text, boolean asHTML, MenuBar popup)** Adds a menu item to the bar, that will open the specified menu when it is selected.
7	**MenuItem addItem(java.lang.String text, Command cmd)** Adds a menu item to the bar, that will fire the given command when it is selected.
8	**MenuItem addItem(java.lang.String text, MenuBar popup)** Adds a menu item to the bar, that will open the specified menu when it is selected.
9	**MenuItemSeparator addSeparator()** Adds a thin line to the MenuBar to separate sections of MenuItems.
10	**MenuItemSeparator addSeparator(MenuItemSeparator separator)** Adds a thin line to the MenuBar to separate sections of MenuItems.
11	**void clearItems()** Removes all menu items from this menu bar.
12	**void closeAllChildren(boolean focus)** Closes this menu and all child menu popups.
13	**void focus()** Give this MenuBar focus.
14	**boolean getAutoOpen()** Gets whether this menu bar's child menus will open when the mouse is moved over it.
15	**int getItemIndex(MenuItem item)** Get the index of a MenuItem.
16	**protected java.util.List getItems()** Returns a list containing the MenuItem objects in the menu bar.
17	**protected MenuItem getSelectedItem()** Returns the MenuItem that is currently selected (highlighted) by the user.
18	**int getSeparatorIndex(MenuItemSeparator item)** Get the index of a MenuItemSeparator.

19	**MenuItem insertItem(MenuItem item, int beforeIndex)** Adds a menu item to the bar at a specific index.
20	**MenuItemSeparator insertSeparator(int beforeIndex)** Adds a thin line to the MenuBar to separate sections of MenuItems at the specified index.
21	**MenuItemSeparator insertSeparator(MenuItemSeparator separator, int beforeIndex)** Adds a thin line to the MenuBar to separate sections of MenuItems at the specified index.
22	**boolean isAnimationEnabled()** Returns true if animations are enabled, false if not.
23	**boolean isFocusOnHoverEnabled()** Check whether or not this widget will steal keyboard focus when the mouse hovers over it.
24	**void moveSelectionDown()** Moves the menu selection down to the next item.
25	**void moveSelectionUp()** Moves the menu selection up to the previous item.
26	**void onBrowserEvent(Event event)** Fired whenever a browser event is received.
27	**protected void onDetach()** This method is called when a widget is detached from the browser's document.
28	**protected void onEnsureDebugId(java.lang.String baseID)** Affected Elements: -item# = the MenuItem at the specified index.
29	**void onPopupClosed(PopupPanel sender, boolean autoClosed)** Deprecated. Use addCloseHandler(CloseHandler) instead
30	**void removeItem(MenuItem item)** Removes the specified menu item from the bar.
31	**void removeSeparator(MenuItemSeparator separator)** Removes the specified MenuItemSeparator from the bar.
32	**void selectItem(MenuItem item)** Select the given MenuItem, which must be a direct child of this MenuBar.
33	**void setAnimationEnabled(boolean enable)** Enable or disable animations.
34	**void setAutoOpen(boolean autoOpen)** Sets whether this menu bar's child menus will open when the mouse is moved over it.
35	**void setFocusOnHoverEnabled(boolean enabled)** Enable or disable auto focus when the mouse hovers over the MenuBar.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- java.lang.Object

MenuBar Widget Example

This example will take you through simple steps to show usage of a MenuBar Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
    <source path='client'/>
<source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}

.gwt-MenuBar{
   cursor:default;
}
.gwt-MenuBar.gwt-MenuItem{
   cursor:default;
   font-family:ArialUnicode MS,Arial, sans-serif;
   font-size:12px;
```

```
}
.gwt-MenuBar.gwt-MenuItem-selected {
   background:#E3E8F3;
}
.gwt-MenuBar-horizontal {
   background:#e3e8f3 url(images/hborder.png) repeat-x 0px -
2003px;
   border:1px solid #e0e0e0;
}
.gwt-MenuBar-horizontal .gwt-MenuItem{
   padding:5px10px;
   vertical-align: bottom;
   color:#000;
   font-weight: bold;
}
.gwt-MenuBar-horizontal .gwt-MenuItemSeparator{
   width:1px;
   padding:0px;
   margin:0px;
   border:0px;
   border-left:1px solid #ccc;
   background: white;
}
.gwt-MenuBar-horizontal .gwt-
MenuItemSeparator.menuSeparatorInner {
   width:1px;
   height:1px;
   background: white;
}
.gwt-MenuBar-vertical {
   margin-top:0px;
   margin-left:0px;
   background: white;
}
.gwt-MenuBar-vertical table {
   border-collapse: collapse;
}
.gwt-MenuBar-vertical .gwt-MenuItem{
   padding:2px40px2px1px;
}
.gwt-MenuBar-vertical .gwt-MenuItemSeparator{
   padding:2px0px;
}
.gwt-MenuBar-vertical .gwt-MenuItemSeparator.menuSeparatorInner
{
   height:1px;
   padding:0px;
   border:0px;
   border-top:1px solid #ccc;
   overflow: hidden;
}
.gwt-MenuBar-vertical .subMenuIcon {
   padding-right:4px;
}
.gwt-MenuBar-vertical .subMenuIcon-selected {
   background:#E3E8F3;
}
```

```
.gwt-MenuBarPopup{
   margin:0px0px0px3px;
}

.gwt-MenuBarPopup.menuPopupTopLeftInner {
   width:5px;
   height:5px;
   zoom:1;
}
.gwt-MenuBarPopup.menuPopupTopRightInner {
   width:8px;
   height:5px;
   zoom:1;
}
.gwt-MenuBarPopup.menuPopupBottomLeftInner {
   width:5px;
   height:8px;
   zoom:1;
}
.gwt-MenuBarPopup.menuPopupBottomRightInner {
   width:8px;
   height:8px;
   zoom:1;
}
.gwt-MenuBarPopup.menuPopupTopLeft {
   background: url(images/corner.png)no-repeat 0px-36px;
-background: url(images/corner_ie6.png)no-repeat 0px-36px;
}
.gwt-MenuBarPopup.menuPopupTopRight {
   background: url(images/corner.png)no-repeat -5px-36px;
-background: url(images/corner_ie6.png)no-repeat -5px-36px;
}
.gwt-MenuBarPopup.menuPopupBottomLeft {
   background: url(images/corner.png)no-repeat 0px-41px;
-background: url(images/corner_ie6.png)no-repeat 0px-41px;
}
.gwt-MenuBarPopup.menuPopupBottomRight {
   background: url(images/corner.png)no-repeat -5px-41px;
-background: url(images/corner_ie6.png)no-repeat -5px-41px;
}
html>body .gwt-MenuBarPopup{
}
* html .gwt-MenuBarPopup.menuPopupTopLeftInner {
   width:5px;
   height:5px;
   overflow: hidden;
}
* html .gwt-MenuBarPopup.menuPopupTopRightInner {
   width:8px;
   height:5px;
   overflow: hidden;
}
* html .gwt-MenuBarPopup.menuPopupBottomLeftInner {
   width:5px;
   height:8px;
   overflow: hidden;
}
* html .gwt-MenuBarPopup.menuPopupBottomRightInner {
```

```
   width:8px;
   height:8px;
   overflow: hidden;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

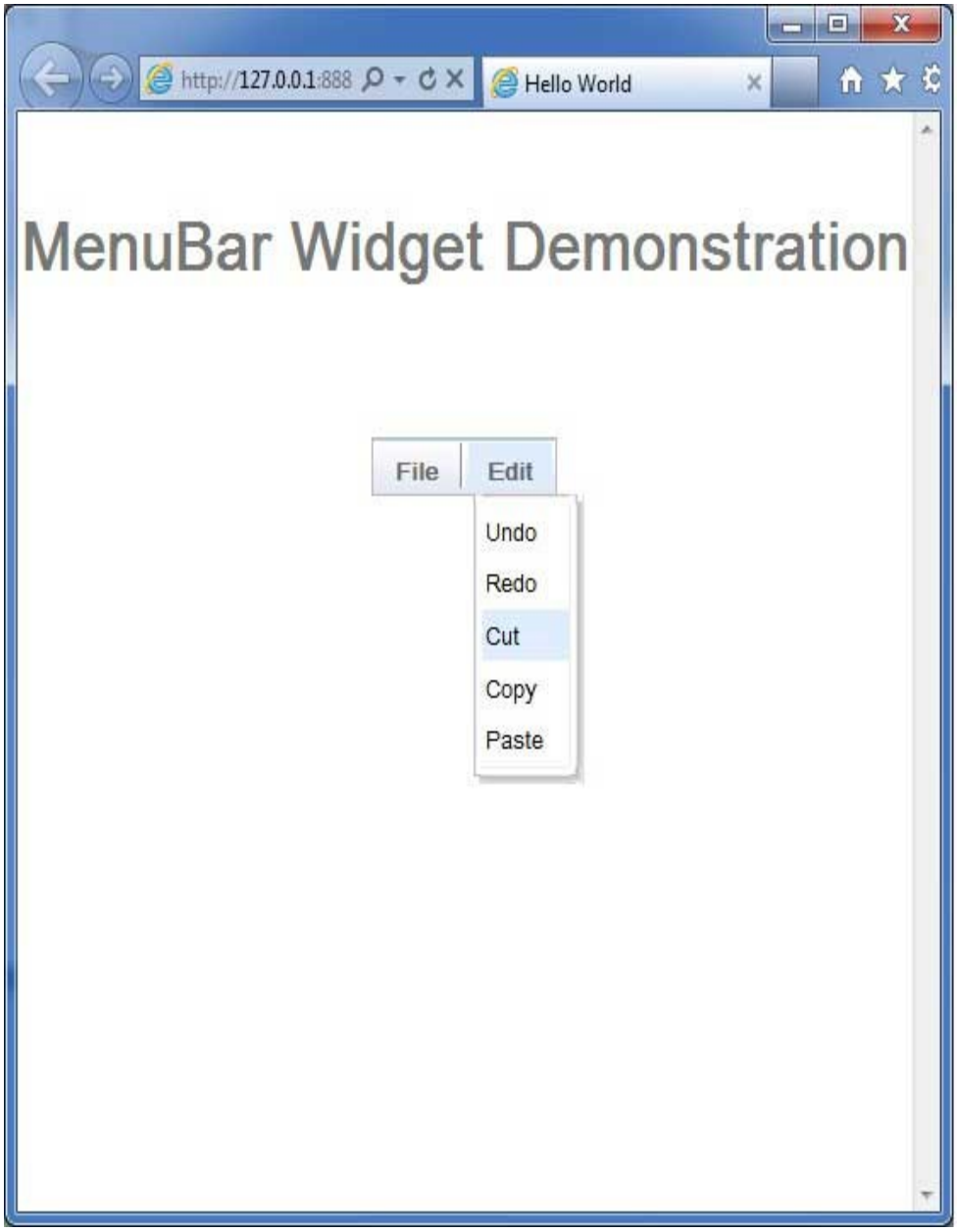
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>MenuBar Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of MenuBar widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.Command;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.MenuBar;
import com.google.gwt.user.client.ui.MenuItem;
import com.google.gwt.user.client.ui.RootPanel;

public class HelloWorld implements EntryPoint{

   private void showSelectedMenuItem(String menuItemName){
      Window.alert("Menu item: "+menuItemName+" selected");
   }

   public void onModuleLoad(){

      // Create a menu bar
      MenuBar menu =newMenuBar();
      menu.setAutoOpen(true);
      menu.setWidth("100px");
      menu.setAnimationEnabled(true);

      // Create the file menu
      MenuBar fileMenu =newMenuBar(true);
      fileMenu.setAnimationEnabled(true);

      fileMenu.addItem("New",new Command(){
         @Override
        public void execute(){
           showSelectedMenuItem("New");
        }
      });
      fileMenu.addItem("Open",new Command(){
         @Override
```

```
         public void execute(){
            showSelectedMenuItem("Open");
         }
      });
      fileMenu.addSeparator();
      fileMenu.addItem("Exit",new Command(){
         @Override
         public void execute(){
            showSelectedMenuItem("Exit");
         }
      });

      // Create the edit menu
      MenuBar editMenu =new MenuBar(true);
      editMenu.setAnimationEnabled(true);

      editMenu.addItem("Undo",new Command(){
         @Override
         public void execute(){
            showSelectedMenuItem("Undo");
         }
      });
      editMenu.addItem("Redo",new Command(){
         @Override
         public void execute(){
            showSelectedMenuItem("Redo");
         }
      });
      editMenu.addItem("Cut",new Command(){
         @Override
         public void execute(){
            showSelectedMenuItem("Cut");
         }
      });
      editMenu.addItem("Copy",new Command(){
         @Override
         public void execute(){
            showSelectedMenuItem("Copy");
         }
      });
      editMenu.addItem("Paste",new  Command(){
         @Override
         public void execute(){
            showSelectedMenuItem("Paste");
         }
      });

      menu.addItem(newMenuItem("File", fileMenu));
      menu.addSeparator();
      menu.addItem(newMenuItem("Edit", editMenu));

     //add the menu to the root panel
     RootPanel.get("gwtContainer").add(menu);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



Selecting any value in menubar, will popup an alert message showing the selected value.

DatePicker

Introduction

The **DatePicker** widget represents a standard GWT date picker.

Class declaration

Following is the declaration for **com.google.gwt.user.datepicker.client.DatePicker** class:

```
public class DatePicker
   extends Composite
      implements HasHighlightHandlers<java.util.Date>,
          HasShowRangeHandlers<java.util.Date>,HasValue<java.util.Date>
```

CSS style rules

Following default CSS Style rules will be applied to all the DatePicker widget. You can override it as per your requirements.

```
.gwt-DatePicker{}
.datePickerMonthSelector {}
.datePickerMonth {}
.datePickerPreviousButton {}
.datePickerNextButton {}
.datePickerDays {}
.datePickerWeekdayLabel {}
.datePickerWeekendLabel {}
.datePickerDay {}
.datePickerDayIsToday {}
.datePickerDayIsWeekend {}
.datePickerDayIsFiller {}
.datePickerDayIsValue {}
.datePickerDayIsDisabled {}
.datePickerDayIsHighlighted {}
.datePickerDayIsValueAndHighlighted {}
```

Class constructors

S.N.	Constructor & Description
1	**DatePicker()** Create a new date picker.
2	**protected DatePicker(MonthSelector monthSelector, CalendarView view, CalendarModel model)** Create a new date picker.

Class methods

S.N.	Function name & Description
1	**HandlerRegistration addHighlightHandler(HighlightHandler<java.util.Date> handler)** Adds a HighlightEvent handler.
2	**HandlerRegistration addShowRangeHandler(ShowRangeHandler<java.util.Date> handler)** Adds a ShowRangeEvent handler.
3	**HandlerRegistration addShowRangeHandlerAndFire(ShowRangeHandler<java.util.Date> handler)** Adds a show range handler and immediately activate the handler on the current view.
4	**void addStyleToDates(java.lang.String styleName, java.util.Date date)**

	Add a style name to the given dates.
5	**void addStyleToDates(java.lang.String styleName, java.util.Date date, java.util.Date... moreDates)** Add a style name to the given dates.
6	**void addStyleToDates(java.lang.String styleName, java.lang.Iterable<java.util.Date> dates)** Add a style name to the given dates.
7	**void addTransientStyleToDates(java.lang.String styleName, java.util.Date date)** Adds the given style name to the specified dates, which must be visible.
8	**void addTransientStyleToDates(java.lang.String styleName, java.util.Date date, java.util.Date... moreDates)** Adds the given style name to the specified dates, which must be visible.
9	**void addTransientStyleToDates(java.lang.String styleName, java.lang.Iterable<java.util.Date> dates)** Adds the given style name to the specified dates, which must be visible.
10	**HandlerRegistration addValueChangeHandler(ValueChangeHandler<java.util.Date> handler)** Adds a ValueChangeEvent handler.
11	**java.util.Date getCurrentMonth()** Gets the current month the date picker is showing.
12	**java.util.Date getFirstDate()** Returns the first shown date.
13	**java.util.Date getHighlightedDate()** Gets the highlighted date (the one the mouse is hovering over), if any.
14	**java.util.Date getLastDate()** Returns the last shown date.
15	**protected CalendarModel getModel()** Gets the CalendarModel associated with this date picker.
16	**protected MonthSelector getMonthSelector()** Gets the MonthSelector associated with this date picker.
17	**java.lang.String getStyleOfDate(java.util.Date date)** Gets the style associated with a date (does not include styles set via addTransientStyleToDates(java.lang.String, java.util.Date)).
18	**java.util.Date getValue()** Returns the selected date, or null if none is selected.
19	**protected CalendarView getView()** Gets the CalendarView associated with this date picker.
20	**boolean isDateEnabled(java.util.Date date)** Is the visible date enabled?
21	**boolean isDateVisible(java.util.Date date)** Is the date currently shown in the date picker?
22	**void onLoad()** This method is called immediately after a widget becomes attached to the browser's document.

23	**protected void refreshAll()** Refreshes all components of this date picker.
24	**void removeStyleFromDates(java.lang.String styleName, java.util.Date date)** Removes the styleName from the given dates (even if it is transient).
25	**void removeStyleFromDates(java.lang.String styleName, java.util.Date date, java.util.Date... moreDates)** Removes the styleName from the given dates (even if it is transient).
26	**void removeStyleFromDates(java.lang.String styleName, java.lang.Iterable<java.util.Date> dates)** Removes the styleName from the given dates (even if it is transient).
27	**void setCurrentMonth(java.util.Date month)** Sets the date picker to show the given month, use getFirstDate() and getLastDate() to access the exact date range the date picker chose to display.
28	**void setStyleName(java.lang.String styleName)** Sets the date picker style name.
29	**void setTransientEnabledOnDates(boolean enabled, java.util.Date date)** Sets a visible date to be enabled or disabled.
30	**void setTransientEnabledOnDates(boolean enabled, java.util.Date date, java.util.Date... moreDates)** Sets a visible date to be enabled or disabled.
31	**void setTransientEnabledOnDates(boolean enabled, java.lang.Iterable<java.util.Date> dates)** Sets a group of visible dates to be enabled or disabled.
32	**protected void setup()** Sets up the date picker.
33	**void setValue(java.util.Date newValue)** Sets the DatePicker's value.
34	**void setValue(java.util.Date newValue, boolean fireEvents)** Sets the DatePicker's value.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Composite
- java.lang.Object

DatePicker Widget Example

This example will take you through simple steps to show usage of a DatePicker Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}

.gwt-DatePicker{
   border:1px solid #ccc;
   border-top:1px solid #999;
   cursor:default;
}
.gwt-DatePicker td,
.datePickerMonthSelector td:focus {
   outline: none;
}
.datePickerMonthSelector td:focus {
   outline: none;
}
.datePickerDays {
   width:100%;
```

```
   background: white;
}
.datePickerDay,
.datePickerWeekdayLabel,
.datePickerWeekendLabel {
   font-size:85%;
   text-align: center;
   padding:4px;
   outline: none;
   font-weight:bold;
   color:#333;
   border-right:1px solid #EDEDED;
   border-bottom:1px solid #EDEDED;
}
.datePickerWeekdayLabel,
.datePickerWeekendLabel {
   background:#fff;
   padding:0px4px2px;
   cursor:default;
   color:#666;
   font-size:70%;
   font-weight:normal;
}
.datePickerDay {
   padding:4px7px;
   cursor: hand;
   cursor: pointer;
}
.datePickerDayIsWeekend {
   background:#f7f7f7;
}
.datePickerDayIsFiller {
   color:#999;
   font-weight:normal;
}
.datePickerDayIsValue {
   background:#d7dfe8;
}
.datePickerDayIsDisabled {
   color:#AAAAAA;
   font-style: italic;
}
.datePickerDayIsHighlighted {
   background:#F0E68C;
}
.datePickerDayIsValueAndHighlighted {
   background:#d7dfe8;
}
.datePickerDayIsToday {
   padding:3px;
   color:#00f;
   background: url(images/hborder.png) repeat-x 0px-2607px;
}
.datePickerMonthSelector {
   width:100%;
   padding:1px05px0;
   background:#fff;
```

```
}
.datePickerPreviousButton,
.datePickerNextButton {
   font-size:120%;
   line-height:1em;
   color:#3a6aad;
   cursor: hand;
   cursor: pointer;
   font-weight: bold;
   padding:0px4px;
   outline: none;
}
td.datePickerMonth {
   text-align: center;
   vertical-align: middle;
   white-space: nowrap;
   font-size:100%;
   font-weight: bold;
   color:#333;
}
.gwt-DateBox{
   padding:5px4px;
   border:1px solid #ccc;
   border-top:1px solid #999;
   font-size:100%;
}
.gwt-DateBox input {
   width:8em;
}
.dateBoxFormatError {
   background:#ffcccc;
}
.dateBoxPopup {
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

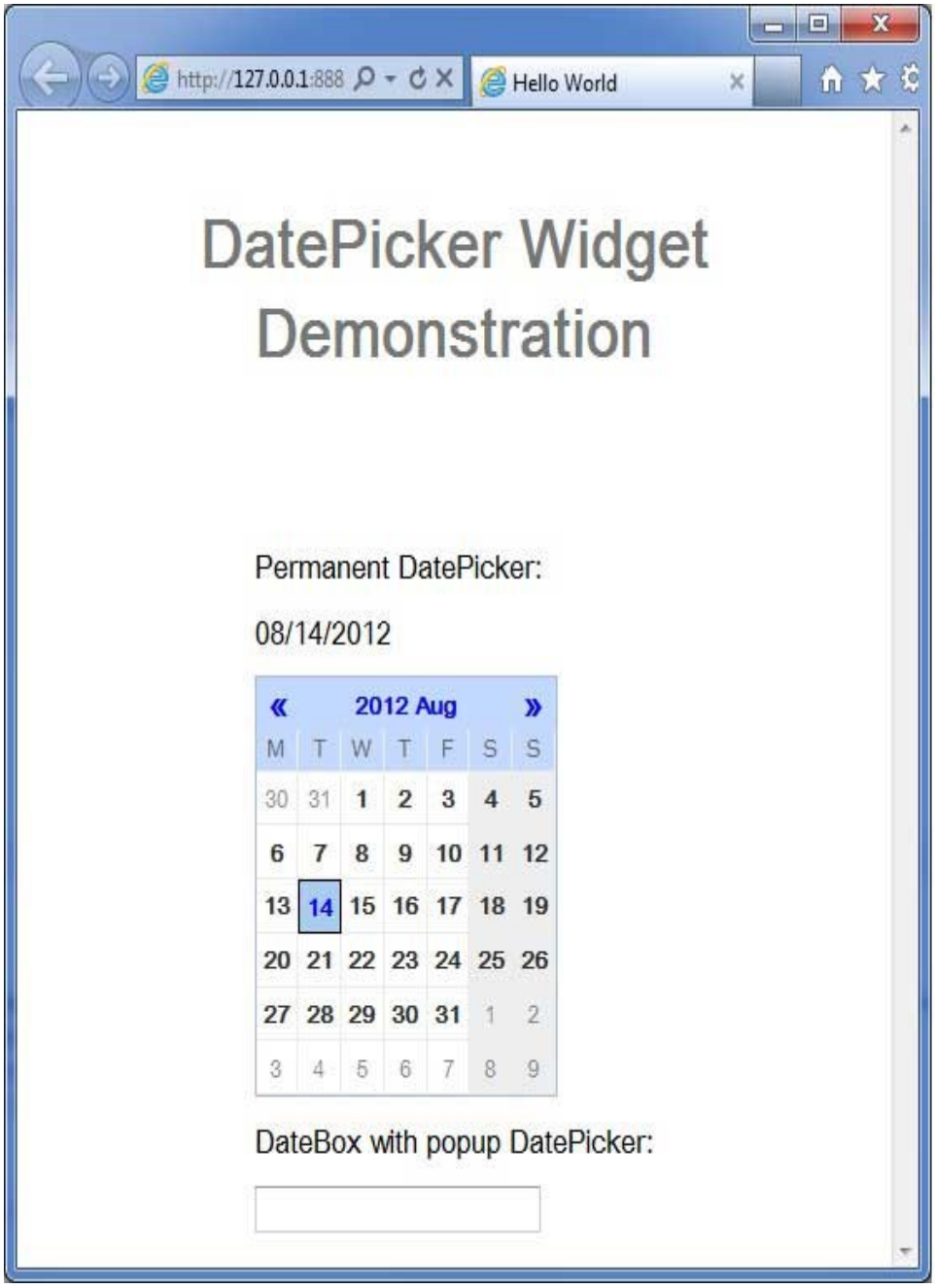
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>DatePicker Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of Tree widget.

```
package com.tutorialspoint.client;
```

```
import java.util.Date;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.logical.shared.ValueChangeEvent;
import com.google.gwt.event.logical.shared.ValueChangeHandler;
import com.google.gwt.i18n.client.DateTimeFormat;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;
import com.google.gwt.user.datepicker.client.DateBox;
import com.google.gwt.user.datepicker.client.DatePicker;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      // Create a basic date picker
      DatePicker datePicker =new DatePicker();
      finalLabel text =new Label();

      // Set the value in the text box when the user selects a date
      datePicker.addValueChangeHandler(new ValueChangeHandler<Date>(){
         @Override
         public void onValueChange(ValueChangeEvent<Date> event){
         Date date =event.getValue();
         String dateString =
         DateTimeFormat.getFormat("MM/dd/yyyy").format(date);
         text.setText(dateString);
         }
      });
      // Set the default value
      datePicker.setValue(new Date(),true);

      // Create a DateBox
      DateTimeFormat dateFormat =DateTimeFormat.getFormat("MM/dd/yyyy");
      DateBox dateBox =new DateBox();
      dateBox.setFormat(new DateBox.DefaultFormat(dateFormat));

      Label selectLabel =new Label("Permanent DatePicker:");
      Label selectLabel2 =new Label("DateBox with popup DatePicker:");
      // Add widgets to the root panel.
      VerticalPanel vPanel =new VerticalPanel();
      vPanel.setSpacing(10);
      vPanel.add(selectLabel);
      vPanel.add(text);
      vPanel.add(datePicker);
      vPanel.add(selectLabel2);
      vPanel.add(dateBox);

      RootPanel.get("gwtContainer").add(vPanel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



CellTree

Introduction

The **CellTree** widget represents a view of a tree.

Class declaration

Following is the declaration for **com.google.gwt.user.cellview.client.CellTree** class:

```
public class CellTree
   extends AbstractCellTree
      implements HasAnimation,Focusable
```

Class constructors

S.N.	Constructor & Description
1	**CellTree(TreeViewModel viewModel, T rootValue)** Construct a new CellTree.
2	**CellTree(TreeViewModel viewModel, T rootValue, CellTree.Resources resources)** Construct a new CellTree.

Class methods

S.N.	Function name & Description
1	**protected char getAccessKey()** Get the access key.
2	**CellTree.NodeAnimation getAnimation()** Get the animation used to open and close nodes in this tree if animations are enabled.
3	**int getDefaultNodeSize()** Get the default maximum number of children to display under each tree node.
4	**TreeNode getRootTreeNode()** Get the root TreeNode.
5	**int getTabIndex()** Gets the widget's position in the tab index.
6	**boolean isAnimationEnabled()** Returns true if animations are enabled, false if not.
7	**protected void onBlur()** Called when the keyboard selected node loses focus.
8	**void onBrowserEvent(Event event)** Fired whenever a browser event is received.
9	**protected void onFocus()** Called when the keyboard selected node gains focus.
10	**void setAccessKey(char key)** Sets the widget's 'access key'.
11	**void setAnimation(CellTree.NodeAnimation animation)** Set the animation used to open and close nodes in this tree.
12	**void setAnimationEnabled(boolean enable)** Enable or disable animations.
13	**void setDefaultNodeSize(int defaultNodeSize)** Set the default number of children to display beneath each child node.
14	**void setFocus(boolean focused)** Explicitly focus/unfocus this widget.

15	**void setTabIndex(int index)** Sets the widget's position in the tab index.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Composite
- com.google.gwt.user.cellview.client.AbstractCellTree
- java.lang.Object

CellTree Widget Example

This example will take you through simple steps to show usage of a CellTree Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>CellTree Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of CellTree widget.

```
package com.tutorialspoint.client;

import java.util.ArrayList;
import java.util.List;

import com.google.gwt.cell.client.AbstractCell;
import com.google.gwt.cell.client.Cell;
import com.google.gwt.cell.client.TextCell;
import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.core.client.GWT;
import com.google.gwt.safehtml.shared.SafeHtmlBuilder;
import com.google.gwt.user.cellview.client.CellTree;
import com.google.gwt.user.cellview.client.
HasKeyboardSelectionPolicy.KeyboardSelectionPolicy;
import com.google.gwt.user.cellview.client.TreeNode;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;
import com.google.gwt.view.client.ListDataProvider;
import com.google.gwt.view.client.SingleSelectionModel;
import com.google.gwt.view.client.TreeViewModel;

public class HelloWorld implements EntryPoint{

  /**
  * A list of songs.
  */
  private static class Playlist{
   private final String name;
```

```
  private final List<String> songs =new ArrayList<String>();

  public Playlist(String name){
  this.name = name;
  }

  /**
    * Add a song to the playlist.
    *
    * @param name the name of the song
    */
  public void addSong(String name){
     songs.add(name);
  }

  Public String getName(){
     return name;
  }

  /**
    * Return the list of songs in the playlist.
    */
  public List<String> getSongs(){
     return songs;
  }
}

/**
  * A composer of classical music.
  */
private static class Composer{
   private final String name;
   privatefinalList<Playlist> playlists =new ArrayList<Playlist>();

   public Composer(String name){
   this.name = name;
   }

   /**
     * Add a playlist to the composer.
     *
     * @param playlist the playlist to add
     */
   public Playlist addPlaylist(Playlist playlist){
      playlists.add(playlist);
      return playlist;
   }

   publicString getName(){
      return name;
   }

  /**
    * Return the rockin' playlist for this composer.
    */
  public List<Playlist> getPlaylists(){
     return playlists;
  }
}

/**
  * The model that defines the nodes in the tree.
  */
 private static class CustomTreeModel implements TreeViewModel{
```

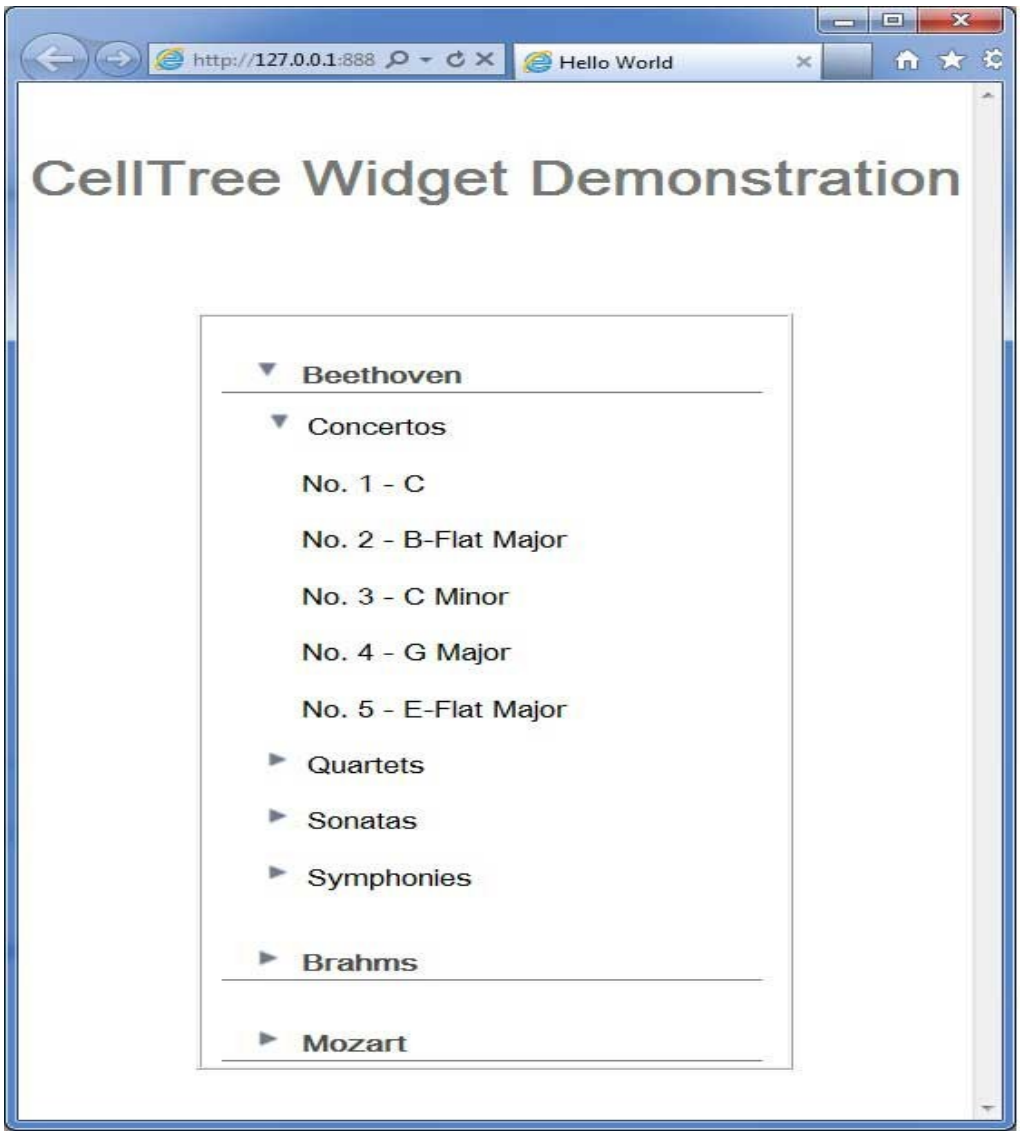
```
private final List<Composer> composers;

/**
* This selection model is shared across all leaf nodes.
* A selection model can also be shared across all nodes
* in the tree, or each set of child nodes can have
* its own instance. This gives you flexibility to
* determine how nodes are selected.
*/
private final SingleSelectionModel<String> selectionModel
=new SingleSelectionModel<String>();

public CustomTreeModel(){
   // Create a database of information.
   composers =new ArrayList<Composer>();

   // Add compositions by Beethoven.
   {
      Composer beethoven =new Composer("Beethoven");
      composers.add(beethoven);

      Playlist concertos = beethoven.addPlaylist(
      new Playlist("Concertos"));
      concertos.addSong("No. 1 - C");
      concertos.addSong("No. 2 - B-Flat Major");
      concertos.addSong("No. 3 - C Minor");
      concertos.addSong("No. 4 - G Major");
      concertos.addSong("No. 5 - E-Flat Major");

      Playlist quartets = beethoven.addPlaylist(
      new Playlist("Quartets"));
      quartets.addSong("Six String Quartets");
      quartets.addSong("Three String Quartets");
      quartets.addSong("Grosse Fugue for String Quartets");

      Playlist sonatas = beethoven.addPlaylist(
      new Playlist("Sonatas"));
      sonatas.addSong("Sonata in A Minor");
      sonatas.addSong("Sonata in F Major");

      Playlist symphonies = beethoven.addPlaylist(
      new Playlist("Symphonies"));
      symphonies.addSong("No. 2 - D Major");
      symphonies.addSong("No. 2 - D Major");
      symphonies.addSong("No. 3 - E-Flat Major");
      symphonies.addSong("No. 4 - B-Flat Major");
      symphonies.addSong("No. 5 - C Minor");
      symphonies.addSong("No. 6 - F Major");
      symphonies.addSong("No. 7 - A Major");
      symphonies.addSong("No. 8 - F Major");
      symphonies.addSong("No. 9 - D Minor");
   }

   // Add compositions by Brahms.
   {
      Composer brahms =newComposer("Brahms");
      composers.add(brahms);
      Playlist concertos = brahms.addPlaylist(
      newPlaylist("Concertos"));
      concertos.addSong("Violin Concerto");
      concertos.addSong("Double Concerto - A Minor");
       concertos.addSong("Piano Concerto No. 1 - D Minor");
       concertos.addSong("Piano Concerto No. 2 - B-Flat Major");
```

```
            Playlist quartets = brahms.addPlaylist(
            New Playlist("Quartets"));
            quartets.addSong("Piano Quartet No. 1 - G Minor");
            quartets.addSong("Piano Quartet No. 2 - A Major");
            quartets.addSong("Piano Quartet No. 3 - C Minor");
            quartets.addSong("String Quartet No. 3 - B-Flat Minor");

            Playlist sonatas = brahms.addPlaylist(
            New Playlist("Sonatas"));
            sonatas.addSong("Two Sonatas for Clarinet - F Minor");
            sonatas.addSong("Two Sonatas for Clarinet - E-Flat Major");

            Playlist symphonies = brahms.addPlaylist(
            new Playlist("Symphonies"));
            symphonies.addSong("No. 1 - C Minor");
            symphonies.addSong("No. 2 - D Minor");
            symphonies.addSong("No. 3 - F Major");
            symphonies.addSong("No. 4 - E Minor");
         }

         // Add compositions by Mozart.
         {
            Composer mozart =newComposer("Mozart");
            composers.add(mozart);
            Playlist concertos = mozart.addPlaylist(
            new Playlist("Concertos"));
            concertos.addSong("Piano Concerto No. 12");
            concertos.addSong("Piano Concerto No. 17");
            concertos.addSong("Clarinet Concerto");
            concertos.addSong("Violin Concerto No. 5");
            concertos.addSong("Violin Concerto No. 4");
          }
      }

   /**
    * Get the {@link NodeInfo} that provides the children of the
    * specified value.
    */
   public<T>NodeInfo<?> getNodeInfo(T value){
      if(value ==null){
         // LEVEL 0.
         // We passed null as the root value. Return the composers.

         // Create a data provider that contains the list of composers.
         ListDataProvider<Composer> dataProvider
         =new ListDataProvider<HelloWorld.Composer>(
         composers);

         // Create a cell to display a composer.
         Cell<HelloWorld.Composer> cell
         =new AbstractCell<HelloWorld.Composer>(){
            @Override
            public void render(Composer value,Object key,
            SafeHtmlBuilder sb){
               if(value !=null){
                  sb.appendHtmlConstant("    ");
                  sb.appendEscaped(value.getName());
                }
            }
         };

    // Return a node info that pairs the data provider and the cell.
    Return newDefaultNodeInfo<Composer>(dataProvider, cell);
```

```
    }elseif(value instanceofComposer){
       // LEVEL 1.
       // We want the children of the composer. Return the playlists.
       ListDataProvider<HelloWorld.Playlist> dataProvider
       =new ListDataProvider<HelloWorld.Playlist>(
          ((Composer) value).getPlaylists());
          Cell<HelloWorld.Playlist> cell =
          new AbstractCell<HelloWorld.Playlist>(){
             @Override
              public void render(Playlist value,Object key,
              SafeHtmlBuilder sb){
                 if(value !=null){
                    sb.appendHtmlConstant("    ");
                    sb.appendEscaped(value.getName());
                 }
              }
          };
       return new DefaultNodeInfo<Playlist>(dataProvider, cell);
     }elseif(value instanceofPlaylist){
        // LEVEL 2 - LEAF.
        // We want the children of the playlist. Return the songs.
        ListDataProvider<String> dataProvider
       =new ListDataProvider<String>(
          ((Playlist) value).getSongs());

          // Use the shared selection model.
          return newDefaultNodeInfo<String>(dataProvider,newTextCell(),
          selectionModel,null);
      }

    return null;
   }

   /**
     * Check if the specified value represents a leaf node.
     * Leaf nodes cannot be opened.
     */
   public boolean isLeaf(Object value){
      // The leaf nodes are the songs, which are Strings.
      if(value instanceofString){
         return true;
      }
      returnfalse;
   }
 }

public void onModuleLoad(){
   // Create a model for the tree.
   TreeViewModel model =new CustomTreeModel();
   //Get CellTree style using its BasicResources
   //CellTree.Resources res = GWT.create(CellTree.BasicResources.class);
   /*
    * Create the tree using the model. We use <code>null</code>
    * as the default value of the root node. The default value will
    * be passed to CustomTreeModel#getNodeInfo();
    */
    CellTree tree =new CellTree(model,null);

    tree.setKeyboardSelectionPolicy(KeyboardSelectionPolicy.ENABLED);

    // Open the first playlist by default.
   TreeNode rootNode = tree.getRootTreeNode();
   TreeNode firstPlaylist = rootNode.setChildOpen(0,true);
   firstPlaylist.setChildOpen(0,true);
```

```
    VerticalPanel panel =newVerticalPanel()
    panel.setBorderWidth(1);
    panel.setWidth("300");
    panel.add(tree);


    // Add the widgets to the root panel.
    RootPanel.get().add(panel);
  }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



CellList

Introduction

The **CellList** widget represents a single column list of cells.

Class declaration

Following is the declaration for **com.google.gwt.user.cellview.client.CellList<T>** class:

```
public class CellList<T>
   extends AbstractHasData<T>
```

Class constructors

S.N.	Constructor & Description
1	**CellList(Cell<T> cell)** Construct a new CellList.
2	**CellList(Cell<T> cell, CellList.Resources resources)** Construct a new CellList with the specified CellList.Resources.
3	**CellList(Cell<T> cell, CellList.Resources resources, ProvidesKey<T> keyProvider)** Construct a new CellList with the specified CellList.Resources and key provider.
4	**CellList(Cell<T> cell, ProvidesKey<T> keyProvider)** Construct a new CellList with the specified key provider.

Class methods

S.N.	Function name & Description
1	**protected boolean dependsOnSelection()** Check whether or not the cells in the view depend on the selection state.
2	**protected void doSelection(Event event, T value, int indexOnPage)** Deprecated. use AbstractHasData.addCellPreviewHandler(com.google.gwt.view.client.CellPreviewEvent.Handler) instead
3	**protected void fireEventToCell(Cell.Context context, Event event, Element parent, T value)** Fire an event to the cell.
4	**protected Cell<T> getCell()** Return the cell used to render each item.
5	**protected Element getCellParent(Element item)** Get the parent element that wraps the cell from the list item.
6	**protected Element getChildContainer()** Return the element that holds the rendered cells.
7	**SafeHtml getEmptyListMessage()** Get the message that is displayed when there is no data.
8	**protected Element getKeyboardSelectedElement()** Get the element that has keyboard selection.

9	**Element getRowElement(int indexOnPage)** Get the Element for the specified index.
10	**protected boolean isKeyboardNavigationSuppressed()** Check if keyboard navigation is being suppressed, such as when the user is editing a cell.
11	**protected void onBlur()** Called when the widget is blurred.
12	**protected void onBrowserEvent2(Event event)** Called after AbstractHasData.onBrowserEvent(Event) completes.
13	**protected void onFocus()** Called when the widget is focused.
14	**protected void renderRowValues(SafeHtmlBuilder sb, java.util.List<T> values, int start, SelectionModel<? super T> selectionModel)** Render all row values into the specified SafeHtmlBuilder.
15	**protected boolean resetFocusOnCell()** Reset focus on the currently focused cell.
16	**void setEmptyListMessage(SafeHtml html)** Set the message to display when there is no data.
17	**protected void setKeyboardSelected(int index, boolean selected, boolean stealFocus)** Update an element to reflect its keyboard selected state.
18	**protected void setSelected(Element elem, boolean selected)** Deprecated. this method is never called by AbstractHasData, render the selected styles in renderRowValues(SafeHtmlBuilder, List, int, SelectionModel)
19	**void setValueUpdater(ValueUpdater<T> valueUpdater)** Set the value updater to use when cells modify items.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.cellview.client.AbstractHasData
- java.lang.Object

CellList Widget Example

This example will take you through simple steps to show usage of a CellList Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.

2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

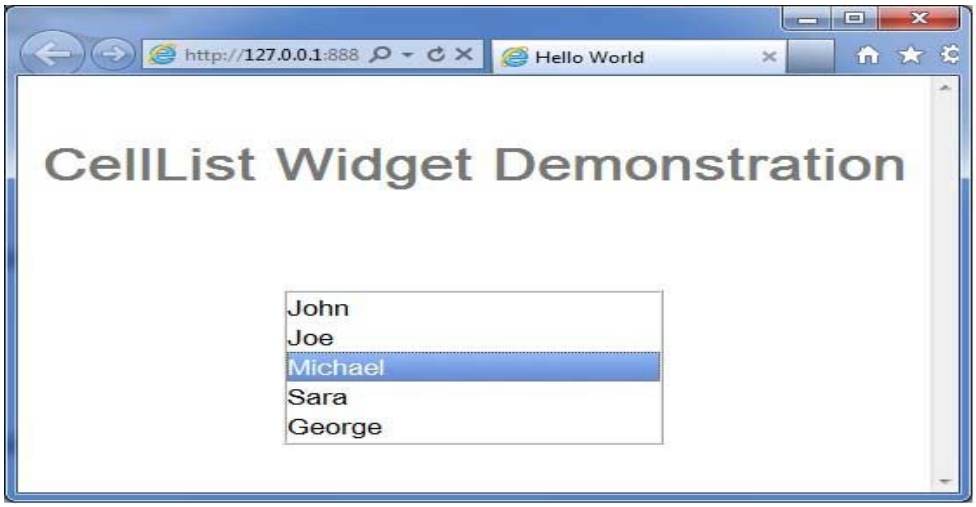
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet"  href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>CellList Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of CellList widget.

```
package com.tutorialspoint.client;

import java.util.Arrays;
import java.util.List;

import com.google.gwt.cell.client.AbstractCell;
import com.google.gwt.cell.client.Cell;
import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.safehtml.shared.SafeHtmlBuilder;
import com.google.gwt.user.cellview.client.CellList;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;
import com.google.gwt.view.client.ProvidesKey;
import com.google.gwt.view.client.SelectionModel;
import com.google.gwt.view.client.SingleSelectionModel;

public class HelloWorld implements EntryPoint{
  /**
   * A simple data type that represents a contact.
   */
  private static class Contact{
     private static int nextId =0;
     private final int id;
     private String name;

     public Contact(String name){
        nextId++;
        this.id = nextId;
        this.name = name;
     }
  }

  /**
   * A custom {@link Cell} used to render a {@link Contact}.
   */
  private static classContactCell extends AbstractCell<Contact>{
     @Override
     public void render(Contact value,Object key,SafeHtmlBuilder sb){
        if(value !=null){
           sb.appendEscaped(value.name);
        }
     }
  }

  /**
   * The list of data to display.
   */
  private static final List<Contact> CONTACTS =Arrays.asList(newContact(
  "John"),newContact("Joe"),new Contact("Michael"),
      newContact("Sarah"),new Contact("George"));

  public void onModuleLoad(){
     /*
      * Define a key provider for a Contact. We use the unique ID
      * as the key, which allows to maintain selection even if the
      * name changes.
      */
      ProvidesKey<Contact> keyProvider =new ProvidesKey<Contact>(){
         public Object getKey(Contact item){
            // Always do a null check.
            return(item ==null)?null: item.id;
```

```
        }
      };

    // Create a CellList using the keyProvider.
    CellList<Contact> cellList =newCellList<Contact>(newContactCell(),
    keyProvider);

    // Push data into the CellList.
    cellList.setRowCount(CONTACTS.size(),true);
    cellList.setRowData(0, CONTACTS);

    // Add a selection model using the same keyProvider.
    SelectionModel<Contact> selectionModel
    =new SingleSelectionModel<Contact>(
       keyProvider);
       cellList.setSelectionModel(selectionModel);

    /*
     * Select a contact. The selectionModel will select based on the
     * ID because we used a keyProvider.
     */
    Contact sarah = CONTACTS.get(3);
    selectionModel.setSelected(sarah,true);

    // Modify the name of the contact.
    sarah.name ="Sara";

    /*
     * Redraw the CellList. Sarah/Sara will still be selected because we
     * identify her by ID. If we did not use a keyProvider,
     * Sara would not be selected.
     */
     cellList.redraw();

     VerticalPanel panel =new VerticalPanel();
     panel.setBorderWidth(1);
     panel.setWidth("200");
     panel.add(cellList);

     // Add the widgets to the root panel.
     RootPanel.get().add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



CellTable

Introduction

The **CellTable** widget represents a A tabular view that supports paging and columns.

Class declaration

Following is the declaration for **com.google.gwt.user.cellview.client.CellTable<T>** class:

```
public class CellTable<T>
   extends AbstractHasData<T>
```

Class constructors

S.N.	Constructor & Description
1	**CellTable()** Constructs a table with a default page size of 15.
2	**CellTable(int pageSize)** Constructs a table with the given page size.
3	**CellTable(int pageSize, CellTable.Resources resources)** Constructs a table with the given page size with the specified CellTable.BasicResources.
4	**CellTable(int pageSize, CellTable.Resources resources, ProvidesKey<T> keyProvider)** Constructs a table with the given page size, the specified CellTable.BasicResources, and the given key provider.
5	**CellTable(int pageSize, ProvidesKey<T> keyProvider)** Constructs a table with the given page size and the given key provider.
6	**CellTable(ProvidesKey<T> keyProvider)** Constructs a table with a default page size of 15, and the given key provider.

Class methods

S.N.	Function name & Description
1	**void addColumn(Column<T,?> col)** Adds a column to the table.
2	**void addColumn(Column<T,?> col, Header<?> header)** Adds a column to the table with an associated header.
3	**void addColumn(Column<T,?> col, Header<?> header, Header<?> footer)** Adds a column to the table with an associated header and footer.
4	**void addColumn(Column<T,?> col, SafeHtml headerHtml)** Adds a column to the table with an associated SafeHtml header.
5	**void addColumn(Column<T,?> col, SafeHtml headerHtml, SafeHtml footerHtml)** Adds a column to the table with an associated SafeHtml header and footer.
6	**void addColumn(Column<T,?> col, java.lang.String headerString)** Adds a column to the table with an associated String header.
7	**void addColumn(Column<T,?> col, java.lang.String headerString, java.lang.String footerString)** Adds a column to the table with an associated String header and footer.
8	**void addColumnStyleName(int index, java.lang.String styleName)** Add a style name to the TableColElement at the specified index, creating it if necessary.
9	**protected Element convertToElements(SafeHtml html)** Convert the specified HTML into DOM elements and return the parent of the DOM elements.
10	**protected boolean dependsOnSelection()** Check whether or not the cells in the view depend on the selection state.
11	**protected void doSelection(Event event, T value, int row, int column)** Deprecated. use AbstractHasData.addCellPreviewHandler(com.google.gwt.view.client.CellPreviewEvent.Handler) instead
12	**int getBodyHeight()** Return the height of the table body.
13	**protected Element getChildContainer()** Return the element that holds the rendered cells.
14	**int getHeaderHeight()** Return the height of the table header.
15	**protected Element getKeyboardSelectedElement()** Get the element that has keyboard selection.
16	**TableRowElement getRowElement(int row)** Get the TableRowElement for the specified row.
17	**protected boolean isKeyboardNavigationSuppressed()** Check if keyboard navigation is being suppressed, such as when the user is editing a cell.

18	**protected void onBlur()** Called when the widget is blurred.
19	**protected void onBrowserEvent2(Event event)** Called after AbstractHasData.onBrowserEvent(Event) completes.
20	**protected void onFocus()** Called when the widget is focused.
21	**void redrawFooters()** Redraw the table's footers.
22	**void redrawHeaders()** Redraw the table's headers.
23	**void removeColumn(Column<T,?> col)** Remove a column.
24	**void removeColumn(int index)** Remove a column.
25	**void removeColumnStyleName(int index, java.lang.String styleName)** Remove a style from the TableColElement at the specified index.
26	**protected void renderRowValues(SafeHtmlBuilder sb, java.util.List<T> values, int start, SelectionModel<? super T> selectionModel)** Render all row values into the specified SafeHtmlBuilder.
27	**protected void replaceAllChildren(java.util.List<T> values, SafeHtml html)** Replace all children with the specified html.
28	**protected boolean resetFocusOnCell()** Reset focus on the currently focused cell.
29	**protected void setKeyboardSelected(int index, boolean selected, boolean stealFocus)** Update an element to reflect its keyboard selected state.
30	**void setRowStyles(RowStyles<T> rowStyles)** Sets the object used to determine how a row is styled; the change will take effect the next time that the table is rendered.
31	**protected void setSelected(Element elem, boolean selected)** Deprecated. this method is never called by AbstractHasData, render the selected styles in renderRowValues(SafeHtmlBuilder, List, int, SelectionModel)

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.cellview.client.AbstractHasData
- java.lang.Object

CellTable Widget Example

This example will take you through simple steps to show usage of a CellTable Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>CellTable Widget Demonstration</h1>
```

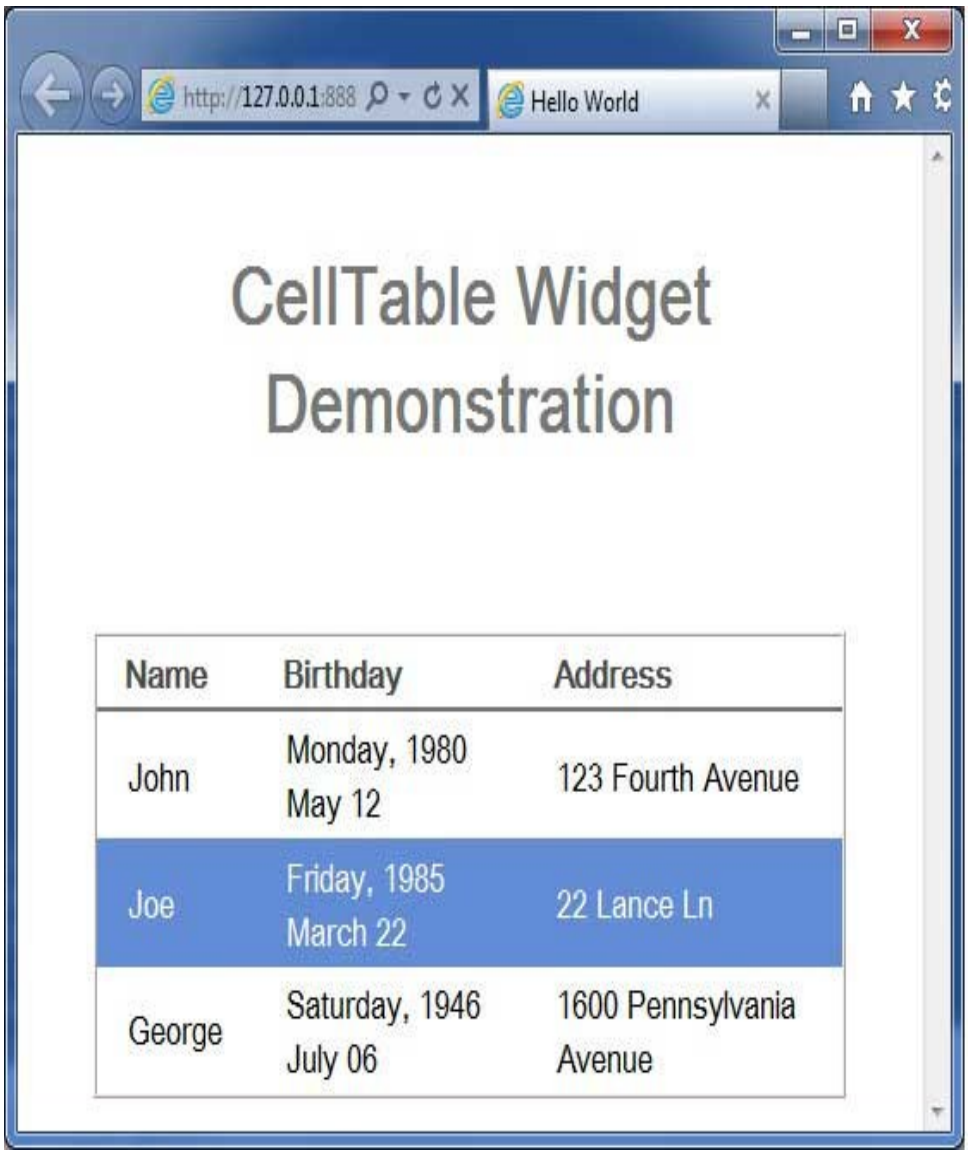
```
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of CellTable widget.

```
package com.tutorialspoint.client;

import java.util.Arrays;
import java.util.Date;
import java.util.List;

import com.google.gwt.cell.client.DateCell;
import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.cellview.client.CellTable;
import com.google.gwt.user.cellview.client.Column;
import com.google.gwt.user.cellview.client
.HasKeyboardSelectionPolicy.KeyboardSelectionPolicy;
import com.google.gwt.user.cellview.client.TextColumn;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;
import com.google.gwt.view.client.SelectionChangeEvent;
import com.google.gwt.view.client.SingleSelectionModel;

public class HelloWorld implements EntryPoint{
  /**
   * A simple data type that represents a contact.
   */
  private static class Contact{
     private final String address;
     private final Date birthday;
     private finalString name;

     public Contact(String name,Date birthday,String address){
        this.name = name;
        this.birthday = birthday;
        this.address = address;
     }
  }

  /**
   * The list of data to display.
   */
  private static final List<Contact> CONTACTS =Arrays.asList(
     new Contact("John",new Date(80,4,12),"123 Fourth Avenue"),
     new Contact("Joe",new Date(85,2,22),"22 Lance Ln"),
     new Contact("George",new Date(46,6,6),"1600 Pennsylvania
     Avenue"));

  public void onModuleLoad(){
     // Create a CellTable.
     CellTable<Contact> table =new CellTable<Contact>();
     table.setKeyboardSelectionPolicy(KeyboardSelectionPolicy.ENABLED);

     // Add a text column to show the name.
     TextColumn<Contact> nameColumn = new TextColumn<Contact>(){
        @Override
        public String getValue(Contactobject){
           return object.name;
        }
```

```
      };
       table.addColumn(nameColumn,"Name");

    // Add a date column to show the birthday.
    DateCell dateCell =new DateCell();
    Column<Contact,Date> dateColumn
    =new Column<Contact,Date>(dateCell){
       @Override
       public Date getValue(Contact object){
          return object.birthday;
       }
    };
    table.addColumn(dateColumn,"Birthday");

    // Add a text column to show the address.
    TextColumn<Contact> addressColumn
    =new TextColumn<Contact>(){
       @Override
       public String getValue(Contact object){
          return object.address;
       }
    };
    table.addColumn(addressColumn,"Address");

    // Add a selection model to handle user selection.
    final SingleSelectionModel<Contact> selectionModel
    =newSingleSelectionModel<Contact>();
    table.setSelectionModel(selectionModel);
    selectionModel.addSelectionChangeHandler(
       new SelectionChangeEvent.Handler(){
          public void onSelectionChange(SelectionChangeEvent event){
             Contact selected = selectionModel.getSelectedObject();
                if(selected !=null){
                   Window.alert("You selected: "+ selected.name);
                }
          }
       });

       // Set the total row count. This isn't strictly necessary,
       // but it affects paging calculations, so its good habit to
       // keep the row count up to date.
       table.setRowCount(CONTACTS.size(),true);

       // Push the data into the widget.
       table.setRowData(0, CONTACTS);

        VerticalPanel panel =newVerticalPanel();
        panel.setBorderWidth(1);
        panel.setWidth("400");
        panel.add(table);

       // Add the widgets to the root panel.
       RootPanel.get().add(panel);
    }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



CellBrowser

Introduction

The **CellBrowser** widget represents a **browsable** view of a tree in which only a single node per level may be open at one time.

Class declaration

Following is the declaration for **com.google.gwt.user.cellview.client.CellBrowser<T>** class:

```
public class CellBrowser
  extends AbstractCellTree
     implements ProvidesResize,RequiresResize,HasAnimation
```

Class constructors

S.N.	Constructor & Description
1	**CellBrowser(TreeViewModel viewModel, T rootValue)** Construct a new CellBrowser.
2	**CellBrowser(TreeViewModel viewModel, T rootValue, CellBrowser.Resources resources)** Construct a new CellBrowser with the specified CellBrowser.Resources.

Class methods

S.N.	Function name & Description
1	**protected Widget createPager(HasData display)** Create a pager to control the list view.
2	**int getDefaultColumnWidth()** Get the default width of new columns.
3	**int getMinimumColumnWidth()** Get the minimum width of columns.
4	**TreeNode getRootTreeNode()** Get the root TreeNode.
5	**boolean isAnimationEnabled()** Returns true if animations are enabled, false if not.
6	**void onBrowserEvent(Event event)** Fired whenever a browser event is received.
7	**void onResize()** This method must be called whenever the implementor's size has been modified.
8	**void setAnimationEnabled(boolean enable)** Enable or disable animations.
9	**void setDefaultColumnWidth(int width)** Set the default width of new columns.
10	**void setKeyboardSelectionPolicy(HasKeyboardSelectionPolicy.KeyboardSelectionPolicy policy)** Set the HasKeyboardSelectionPolicy.KeyboardSelectionPolicy.
11	**void setMinimumColumnWidth(int minWidth)** Set the minimum width of columns.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Composite

- com.google.gwt.user.cellview.client.AbstractCellTree
- java.lang.Object

CellBrowser Widget Example

This example will take you through simple steps to show usage of a CellBrowser Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
```

```
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>CellBrowser Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of CellBrowser widget.

```
package com.tutorialspoint.client;

import java.util.ArrayList;
import java.util.List;

import com.google.gwt.cell.client.AbstractCell;
import com.google.gwt.cell.client.Cell;
import com.google.gwt.cell.client.TextCell;
import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.safehtml.shared.SafeHtmlBuilder;
import com.google.gwt.user.cellview.client.CellBrowser;
import com.google.gwt.user.cellview.client.
HasKeyboardSelectionPolicy.KeyboardSelectionPolicy;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;
import com.google.gwt.view.client.ListDataProvider;
import com.google.gwt.view.client.SingleSelectionModel;
import com.google.gwt.view.client.TreeViewModel;

public class HelloWorld implements EntryPoint{

  /**
   * A list of songs.
   */
  private static classPlaylist{
     private final String name;
     private final List<String> songs =new ArrayList<String>();

     public Playlist(String name){
        this.name = name;
     }

     /**
      * Add a song to the playlist.
      *
      * @param name the name of the song
      */
     public void addSong(String name){
        songs.add(name);
     }

     public String getName(){
        return name;
     }

    /**
      * Return the list of songs in the playlist.
```

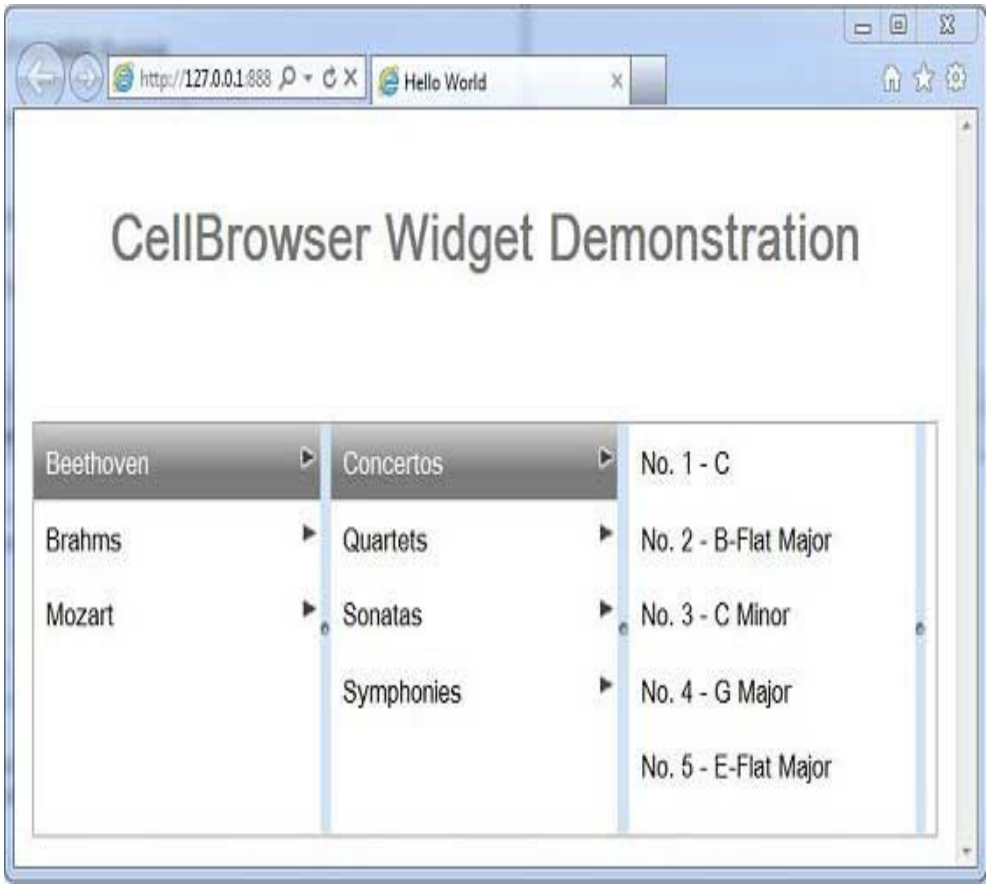
```
     */
    public List<String> getSongs(){
       return songs;
    }
}

/**
 * A composer of classical music.
 */
private static class Composer{
   private final String name;
   private final List<Playlist> playlists =new ArrayList<Playlist>();

   public Composer(String name){
      this.name = name;
   }

   /**
    * Add a playlist to the composer.
    *
    * @param playlist the playlist to add
    */
   public Playlist addPlaylist(Playlist playlist){
       playlists.add(playlist);
       return playlist;
   }

   public String getName(){
      return name;
   }

   /**
    * Return the rockin' playlist for this composer.
    */
   public List<Playlist> getPlaylists(){
      return playlists;
   }
}

/**
 * The model that defines the nodes in the tree.
 */
private static classCustomTreeModel implements TreeViewModel{

private final List<Composer> composers;

/**
  * This selection model is shared across all leaf nodes.
  * A selection model can also be shared across all nodes
  * in the tree, or each set of child nodes can have its
  * own instance. This gives you flexibility to determine
  * how nodes are selected.
  */
private final SingleSelectionModel<String> selectionModel
=new SingleSelectionModel<String>();

public CustomTreeModel(){
   // Create a database of information.
   composers =new ArrayList<Composer>();

  // Add compositions by Beethoven.
   {
       Composer beethoven =new Composer("Beethoven");
       composers.add(beethoven);
```

```
        Playlist concertos = beethoven.addPlaylist(
        new Playlist("Concertos"));
        concertos.addSong("No. 1 - C");
        concertos.addSong("No. 2 - B-Flat Major");
        concertos.addSong("No. 3 - C Minor");
        concertos.addSong("No. 4 - G Major");
        concertos.addSong("No. 5 - E-Flat Major");

        Playlist quartets = beethoven.addPlaylist(
        new Playlist("Quartets"));
        quartets.addSong("Six String Quartets");
        quartets.addSong("Three String Quartets");
        quartets.addSong("Grosse Fugue for String Quartets");

        Playlist sonatas = beethoven.addPlaylist(
        new Playlist("Sonatas"));
        sonatas.addSong("Sonata in A Minor");
        sonatas.addSong("Sonata in F Major");

        Playlist symphonies = beethoven.addPlaylist(
        new Playlist("Symphonies"));
        symphonies.addSong("No. 2 - D Major");
        symphonies.addSong("No. 2 - D Major");
        symphonies.addSong("No. 3 - E-Flat Major");
        symphonies.addSong("No. 4 - B-Flat Major");
        symphonies.addSong("No. 5 - C Minor");
        symphonies.addSong("No. 6 - F Major");
        symphonies.addSong("No. 7 - A Major");
        symphonies.addSong("No. 8 - F Major");
        symphonies.addSong("No. 9 - D Minor");
    }

    // Add compositions by Brahms.
    {
        Composer brahms =new Composer("Brahms");
        composers.add(brahms);
        Playlist concertos = brahms.addPlaylist(
        new Playlist("Concertos"));
        concertos.addSong("Violin Concerto");
        concertos.addSong("Double Concerto - A Minor");
        concertos.addSong("Piano Concerto No. 1 - D Minor");
        concertos.addSong("Piano Concerto No. 2 - B-Flat Major");

        Playlist quartets = brahms.addPlaylist(
        new Playlist("Quartets"));
        quartets.addSong("Piano Quartet No. 1 - G Minor");
        quartets.addSong("Piano Quartet No. 2 - A Major");
        quartets.addSong("Piano Quartet No. 3 - C Minor");
        quartets.addSong("String Quartet No. 3 - B-Flat Minor");

        Playlist sonatas = brahms.addPlaylist(
        new Playlist("Sonatas"));
        sonatas.addSong("Two Sonatas for Clarinet - F Minor");
        sonatas.addSong("Two Sonatas for Clarinet - E-Flat Major");

        Playlist symphonies = brahms.addPlaylist(
        new Playlist("Symphonies"));
        symphonies.addSong("No. 1 - C Minor");
        symphonies.addSong("No. 2 - D Minor");
        symphonies.addSong("No. 3 - F Major");
        symphonies.addSong("No. 4 - E Minor");
     }
```

```
      // Add compositions by Mozart.
      {
         Composer mozart =new Composer("Mozart");
         composers.add(mozart);
         Playlist concertos = mozart.addPlaylist(
         new Playlist("Concertos"));
         concertos.addSong("Piano Concerto No. 12");
         concertos.addSong("Piano Concerto No. 17");
         concertos.addSong("Clarinet Concerto");
         concertos.addSong("Violin Concerto No. 5");
         concertos.addSong("Violin Concerto No. 4");
      }
   }

   /**
    * Get the {@link NodeInfo} that provides the children of the
    * specified value.
    */
   public <T>NodeInfo<?> getNodeInfo(T value){
      if(value ==null){
         // LEVEL 0.
         // We passed null as the root value. Return the composers.

         // Create a data provider that contains the list of composers.
         ListDataProvider<Composer> dataProvider
         =newListDataProvider<Composer>(composers);

         //Create a cell to display a composer.
         Cell<Composer> cell =new AbstractCell<Composer>(){
            @Override
            public void render(Composer value,Object key,
            SafeHtmlBuilder sb){
               sb.appendEscaped(value.getName());
            }
         };

         // Return a node info that pairs the data provider and the cell.
         return newDefaultNodeInfo<Composer>(dataProvider, cell);
      }elseif(value instanceofComposer){
         // LEVEL 1.
         // We want the children of the composer. Return the playlists.
          ListDataProvider<Playlist> dataProvider
          =new ListDataProvider<Playlist>(
          ((Composer) value).getPlaylists());
          Cell<Playlist> cell =new AbstractCell<Playlist>(){
             @Override
             public void render(Playlist value,Object key,
             SafeHtmlBuilder sb){
                if(value !=null){
                   sb.appendEscaped(value.getName());
                }
             }
          };
       return new DefaultNodeInfo<Playlist>(dataProvider, cell);
      }elseif(value instanceofPlaylist){
         // LEVEL 2 - LEAF.
         // We want the children of the playlist. Return the songs.
         ListDataProvider<String> dataProvider
         =new ListDataProvider<String>(
            ((Playlist) value).getSongs());

            // Use the shared selection model.
           return new DefaultNodeInfo<String>(dataProvider,newTextCell(),
           selectionModel,null);
      }
```

```
      return null;
   }

   /**
    * Check if the specified value represents a leaf node.
    * Leaf nodes cannot be opened.
    */
   public boolean isLeaf(Object value){
      // The leaf nodes are the songs, which are Strings.
      if(value instanceofString){
         returntrue;
      }
      returnfalse;
   }
}

public void onModuleLoad(){
   // Create a model for the browser.
   TreeViewModel model =new CustomTreeModel();

   /*
     * Create the browser using the model. We use <code>null</code> as
     * the default value of the root node. The default value will be
     * passed to CustomTreeModel#getNodeInfo();
     */
   CellBrowser browser =new CellBrowser(model,null);
   browser.setKeyboardSelectionPolicy(KeyboardSelectionPolicy.ENABLED);

   browser.setHeight("200");
   browser.setWidth("630");

   VerticalPanel panel =newVerticalPanel();
   panel.setBorderWidth(1);
   panel.add(browser);

   // Add the widgets to the root panel.
   RootPanel.get().add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:


http://127.0.0.1:888
Hello World
CellBrowser Widget Demonstration
Beethoven
Brahms
Mozart
Concertos
Quartets
Sonatas
Symphonies
No. 1 - C
No. 2 - B-Flat Major
No. 3 - C Minor
No. 4 - G Major
No. 5 - E-Flat Major

CHAPTER

10

Layout Panels

This section describes the different types of layout panels used under Google Web Toolkit:

Layout Panels can contain other widgets. These panels controls the way widgets to be shown on User Interface. Every Panel widget inherits properties from Panel class which in turn inherits properties from Widget class and which in turn inherits properties from UIObject class.

S.N.	Widget & Description
1	GWT UIObject Class This widget contains text, not interpreted as HTML using a element, causing it to be displayed with block layout.
2	GWT Widget Class This widget can contain HTML text and displays the html content using a element, causing it to be displayed with block layout.
3	GWT Panel Class This is an is the abstract base class for all panels, which are widgets that can contain other widgets.

GWT Panel Class

Introduction

The class **Panel** is the abstract base class for all panels, which are widgets that can contain other widgets.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Panel** class:

```
public abstract classPanel
   extends Widget
      implements HasWidgets.ForIsWidget
```

Field

Following are the fields for **com.google.gwt.user.client.ui.Panel** class:

- public static final java.lang.String DEBUG_ID_PREFIX -- The element ID that you specify will be prefixed by the static string DEBUG_ID_PREFIX.

Class constructors

S.N.	Constructor & Description
1	**Panel()** This creates a Panel for the child classes.

Class methods

S.N.	Method & Description
1	**void add(IsWidget child)**
2	**void add(Widget child)** Adds a child widget.
3	**protected void adopt(Widget child)** Finalize the attachment of a Widget to this Panel.
4	**protected void adopt(Widget w, Element container)** Deprecated. Use adopt(Widget).
5	**void clear()**
6	**protected void disown(Widget w)** Removes all child widgets.
7	**protected void doAttachChildren()** Deprecated. Use orphan(Widget).
8	**protected void doDetachChildren()** If a widget contains one or more child widgets that are not in the logical widget hierarchy (the child is physically connected only on the DOM level), it must override this method and call Widget.onAttach() for each of its child widgets.
9	**protected void orphan(Widget child)** If a widget contains one or more child widgets that are not in the logical widget hierarchy (the child is physically connected only on the DOM level), it must override this method and call Widget.onDetach() for each of its child widgets.
10	**boolean remove(IsWidget child)** This method must be called as part of the remove method of any Panel.
11	**abstract boolean remove(Widget child)** Removes a child widget.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject

- com.google.gwt.user.client.ui.Widget

Layout Panels

Following are few important *Layout Panels*:

S.N.	Widget & Description
1	FlowPanel This widget represents a panel that formats its child widgets using the default HTML layout behavior.
2	HorizontalPanel This widget represents a panel that lays all of its widgets out in a single horizontal column.
3	VerticalPanel This widget represents a panel that lays all of its widgets out in a single vertical column.
4	HorizontalSplitPanel This widget represents a panel that arranges two widgets in a single horizontal row and allows the user to interactively change the proportion of the width dedicated to each of the two widgets. Widgets contained within a HorizontalSplitPanel will be automatically decorated with scrollbars when necessary.
5	VerticalSplitPanel This widget represents a A panel that arranges two widgets in a single vertical column and allows the user to interactively change the proportion of the height dedicated to each of the two widgets. Widgets contained within a VertialSplitPanel will be automatically decorated with scrollbars when necessary.
6	FlexTable This widget represents a flexible table that creates cells on demand. It can be jagged (that is, each row can contain a different number of cells) and individual cells can be set to span multiple rows or columns.
7	Grid This widget represents a A rectangular grid that can contain text, html, or a child Widget within its cells. It must be resized explicitly to the desired number of rows and columns.
8	DeckPanel panel that displays all of its child widgets in a 'deck', where only one can be visible at a time. It is used by TabPanel.
9	DockPanel This widget represents a panel that lays its child widgets out "docked" at its outer edges, and allows its last widget to take up the remaining space in its center.
10	HTMLPanel This widget represents a panel that contains HTML, and which can attach child widgets to identified elements within that HTML.
11	TabPanel This widget represents a panel that represents a tabbed set of pages, each of which contains another widget. Its child widgets are shown as the user selects the various tabs associated with them. The tabs can contain arbitrary HTML.
12	Composite This widget represents a type of widget that can wrap another widget, hiding the

	wrapped widget's methods. When added to a panel, a composite behaves exactly as if the widget it wraps had been added.
13	SimplePanel This widget represents a Base class for panels that contain only one widget.
14	ScrollPanel This widget represents a simple panel that wraps its contents in a scrollable area
15	FocusPanel This widget represents a simple panel that makes its contents focusable, and adds the ability to catch mouse and keyboard events.
16	FormPanel This widget represents a simple panel that makes its contents focusable, and adds the ability to catch mouse and keyboard events.
17	PopupPanel This widget represents a panel that can **pop up** over other widgets. It overlays the browser's client area (and any previously-created popups).
18	DialogBox This widget represents a form of popup that has a caption area at the top and can be dragged by the user. Unlike a PopupPanel, calls to PopupPanel.setWidth(String) and PopupPanel.setHeight(String) will set the width and height of the dialog box itself, even if a widget has not been added as yet.

FlowPanel

Introduction

The **FlowPanel** widget represents a panel that formats its child widgets using the default HTML layout behavior.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.FlowPanel** class:

```
public classFlowPanel
   extends ComplexPanel
      implements InsertPanel.ForIsWidget
```

Class constructors

S.N.	Constructor & Description
1	**FlowPanel()** Constructor for empty Flow Panel.

Class methods

S.N.	Function name & Description
1	**void add(Widget w)** Adds a new child widget to the panel.
2	**void clear()**

	Removes all child widgets.
3	**void insert(IsWidget w, int beforeIndex)**
4	**void insert(Widget w, int beforeIndex)** Inserts a widget before the specified index.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.ComplexPanel
- java.lang.Object

FlowPanel Widget Example

This example will take you through simple steps to show usage of a FlowPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-CheckBox{
   margin:10px;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

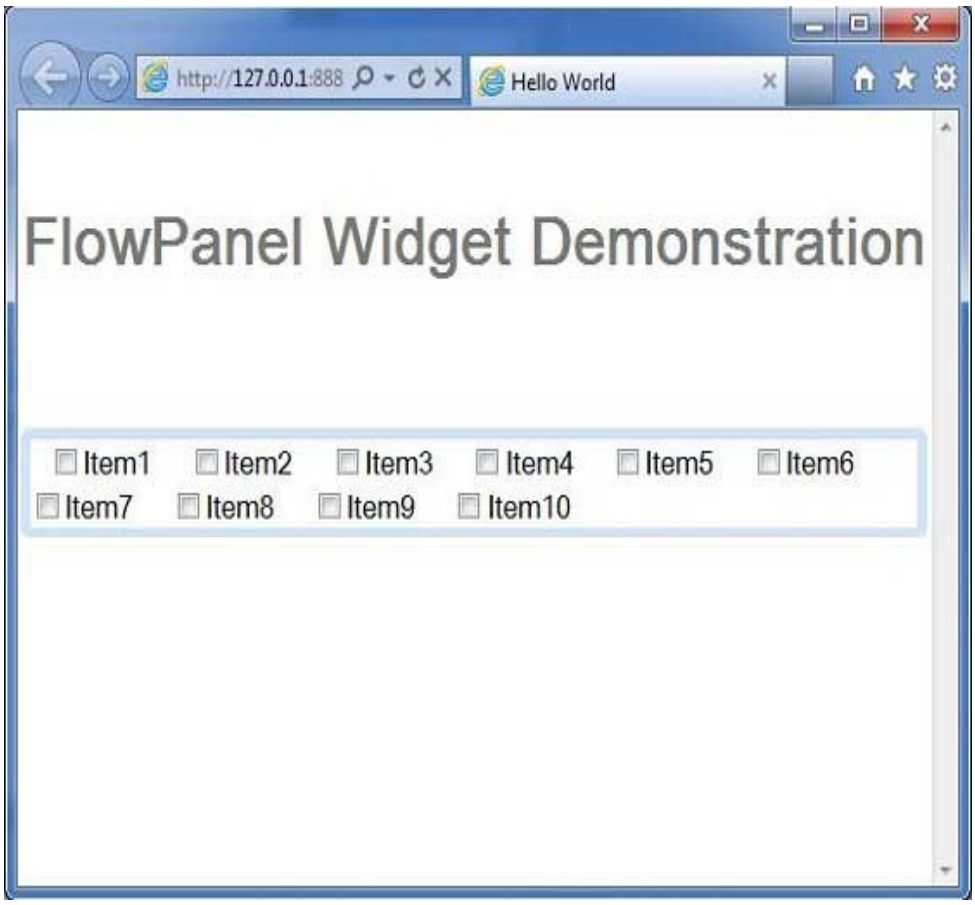
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1>FlowPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of FlowPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.CheckBox;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.FlowPanel;
import com.google.gwt.user.client.ui.RootPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      // Create a flow panel
      FlowPanel flowPanel =new FlowPanel();

      // Add CheckBoxes to flow Panel
      for(int i =1;  i <=10; i++) {
         CheckBox checkBox =new CheckBox("Item"+ i);
         flowPanel.add(checkBox);
      }

      DecoratorPanel decoratorPanel =new DecoratorPanel();
      decoratorPanel.setWidth("500");
      decoratorPanel.add(flowPanel);

      // Add the widgets to the root panel.
```

```
        RootPanel.get().add(decoratorPanel);
    }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



Horizontal Panel

Introduction

The **HorizantalPanel** widget represents a panel that lays all of its widgets out in a single horizontal column.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.HorizontalPanel** class:

```
public class HorizontalPanel
   extends CellPanel
      implements HasAlignment,InsertPanel.ForIsWidget
```

Class constructors

S.N.	Constructor & Description
1	**HorizontalPanel()** Constructor for empty horizontal Panel.

Class methods

S.N.	Function name & Description
1	**void add(Widget w)** Adds a child widget.
2	**HasHorizontalAlignment.HorizontalAlignmentConstant getHorizontalAlignment()** Gets the horizontal alignment.
3	**HasVerticalAlignment.VerticalAlignmentConstant getVerticalAlignment()** Gets the vertical alignment.
4	**void insert(IsWidget w, int beforeIndex)**
5	**void insert(Widget w, int beforeIndex)** Inserts a child widget before the specified index.
6	**protected void onEnsureDebugId(java.lang.String baseID)** Affected Elements: -# = the cell at the given index.
7	**boolean remove(Widget w)** Removes a child widget.
8	**void setHorizontalAlignment(HasHorizontalAlignment.HorizontalAlignmentConstant align)** Sets the default horizontal alignment to be used for widgets added to this panel.
9	**void setVerticalAlignment(HasVerticalAlignment.VerticalAlignmentConstant align)** Sets the default vertical alignment to be used for widgets added to this panel.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.ComplexPanel
- com.google.gwt.user.client.ui.CellPanel
- java.lang.Object

HorizontalPanel Widget Example

This example will take you through simple steps to show usage of a HorizontalPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
   <!-- Inherit the core Web Toolkit stuff.                        -->
   <inherits name='com.google.gwt.user.User'/>

   <!-- Inherit the default GWT style sheet.                       -->
   <inherits name='com.google.gwt.user.theme.clean.Clean'/>

   <!-- Specify the app entry point class.                         -->
   <entry-point class='com.tutorialspoint.client.HelloWorld'/>

   <!-- Specify the paths for translatable code                    -->
   <source path='client'/>
   <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-CheckBox{
   margin:10px;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
```

```
  </script>
</head>
<body>

<h1>HorizontalPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of HorizontalPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.CheckBox;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HorizontalPanel;
import com.google.gwt.user.client.ui.RootPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      // Create a horizontal panel
      HorizontalPanel horizontalPanel =newHorizontalPanel();

      // Add CheckBoxes to horizontal Panel
      for(int i =1;  i <=10; i++){
      CheckBox checkBox =new CheckBox("Item"+ i);
         horizontalPanel.add(checkBox);
      }

      DecoratorPanel decoratorPanel =new DecoratorPanel();
      decoratorPanel.setWidth("500");
      decoratorPanel.add(horizontalPanel);

      // Add the widgets to the root panel.
      RootPanel.get().add(decoratorPanel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

VerticalPanel

Introduction

The **VerticalPanel** widget represents a panel that lays all of its widgets out in a single vertical row.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.VerticalPanel** class:

```
public classVerticalPanel
   extends CellPanel
      implements HasAlignment,InsertPanel.ForIsWidget
```

Class constructors

S.N.	Constructor & Description
1	**VerticalPanel()** Constructor for empty vertical Panel.

Class methods

S.N.	Function name & Description
1	**void add(Widget w)** Adds a child widget.

2	**HasHorizontalAlignment.HorizontalAlignmentConstant getHorizontalAlignment()** Gets the horizontal alignment.
3	**HasVerticalAlignment.VerticalAlignmentConstant getVerticalAlignment()** Gets the vertical alignment.
4	**void insert(IsWidget w, int beforeIndex)**
5	**void insert(Widget w, int beforeIndex)** Inserts a child widget before the specified index.
6	**protected void onEnsureDebugId(java.lang.String baseID)** Affected Elements: -# = the cell at the given index.
7	**boolean remove(Widget w)** Removes a child widget.
8	**void setHorizontalAlignment(HasHorizontalAlignment.HorizontalAlignmentConstant align)** Sets the default horizontal alignment to be used for widgets added to this panel.
9	**void setVerticalAlignment(HasVerticalAlignment.VerticalAlignmentConstant align)** Sets the default vertical alignment to be used for widgets added to this panel.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.ComplexPanel
- com.google.gwt.user.client.ui.CellPanel
- java.lang.Object

VerticalPanel Widget Example

This example will take you through simple steps to show usage of a VerticalPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* a s explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-CheckBox{
   margin:10px;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

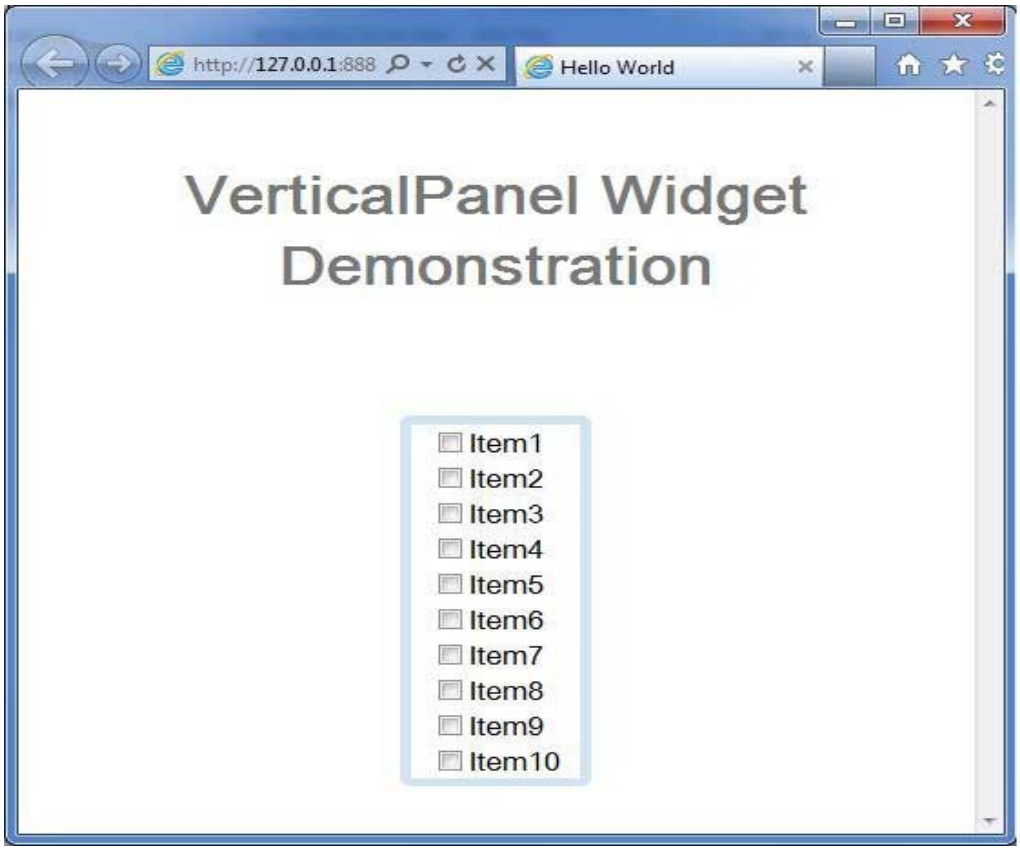
```
<html>
<head>
<title>Hello World</title>
   <link rel="stylesheet" href="HelloWorld.css"/>
   <script language="javascript" src="helloworld/helloworld.nocache.js">
   </script>
</head>
<body>

<h1>VerticalPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of VerticalPanel widget.

```
package com.tutorialspoint.client;
```

```
import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.CheckBox;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.VerticalPanel;
import com.google.gwt.user.client.ui.RootPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      // Create a vertical panel
      VerticalPanel verticalPanel =new VerticalPanel();

      // Add CheckBoxes to vertical Panel
      for(int i =1;  i <=10; i++){
         CheckBox checkBox =newCheckBox("Item"+ i);
         verticalPanel.add(checkBox);
      }

      DecoratorPanel decoratorPanel =new DecoratorPanel();
      decoratorPanel.add(verticalPanel);

      // Add the widgets to the root panel.
      RootPanel.get().add(decoratorPanel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



HorizontalSplitPanel

Introduction

The **HorizantalSplitPanel** widget represents a panel that arranges two widgets in a single horizontal row and allows the user to interactively change the proportion of the width dedicated to each of the two widgets. Widgets contained within a HorizontalSplitPanel will be automatically decorated with scrollbars when necessary.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.HorizontalSplitPanel** class:

```
@Deprecated
public final class HorizontalSplitPanel
   extends Panel
```

CSS style rules

Following default CSS Style rules will be applied to all the HorizontalSpiltPanel widget. You can override it as per your requirements.

```
.gwt-HorizontalSplitPanel{}
.gwt-HorizontalSplitPanel hsplitter {}
```

Class constructors

S.N.	Constructor & Description
1	**HorizontalSplitPanel()** Deprecated.
2	**HorizontalSplitPanel(HorizontalSplitPanel.Resources resources)** Deprecated. Creates an empty horizontal split panel.
3	**HorizontalSplitPanel(HorizontalSplitPanel(HorizontalSplitPanelImages images))** Deprecated. replaced by HorizontalSplitPanel(Resources)

Class methods

S.N.	Function name & Description
1	**void add(Widget w)** Deprecated. Adds a widget to a pane in the HorizontalSplitPanel.
2	**protected Element getElement(int index)** Deprecated. Gets the content element for the given index.
3	**Widget getEndOfLineWidget()** Deprecated. Gets the widget in the pane that is at the end of the line direction for the layout.
4	**Widget getLeftWidget()** Deprecated. Gets the widget in the left side of the panel.
5	**Widget getRightWidget()**

	Deprecated. Gets the widget in the right side of the panel.
6	**protected Element getSplitElement()** Deprecated. Gets the element that is acting as the splitter.
7	**Widget getStartOfLineWidget()** Deprecated. Gets the widget in the pane that is at the start of the line direction for the layout.
8	**protected Widget getWidget(int index)** Deprecated. Gets one of the contained widgets.
9	**boolean isResizing()** Deprecated. Indicates whether the split panel is being resized.
10	**java.util.Iterator<Widget> iterator()** Deprecated. Gets an iterator for the contained widgets.
11	**void onBrowserEvent(Event event)** Deprecated. Fired whenever a browser event is received.
12	**protected void onEnsureDebugId(java.lang.String baseID)** Deprecated. Affected Elements: -splitter = the container containing the splitter element. -right = the container on the right side of the splitter. -left = the container on the left side of the splitter.
13	**protected void onLoad()** Deprecated. This method is called immediately after a widget becomes attached to the browser's document.
14	**protected void onUnload()** Deprecated. This method is called immediately before a widget will be detached from the browser's document.
15	**boolean remove(Widget widget)** Deprecated. Removes a child widget.
16	**void setEndOfLineWidget(Widget w)** Deprecated. Sets the widget in the pane that is at the end of the line direction for the layout.
17	**void setLeftWidget(Widget w)** Deprecated. Sets the widget in the left side of the panel.
18	**void setRightWidget(Widget w)** Deprecated. Sets the widget in the right side of the panel.
19	**void setSplitPosition(java.lang.String pos)** Deprecated. Moves the position of the splitter.
20	**void setStartOfLineWidget(Widget w)** Deprecated. Sets the widget in the pane that is at the start of the line direction for the layout.
21	**protected void setWidget(int index, Widget w)** Deprecated. Sets one of the contained widgets.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject

- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- java.lang.Object

HorizontalSplitPanel Widget Example

This example will take you through simple steps to show usage of a HorizontalSplitPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<modulerename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

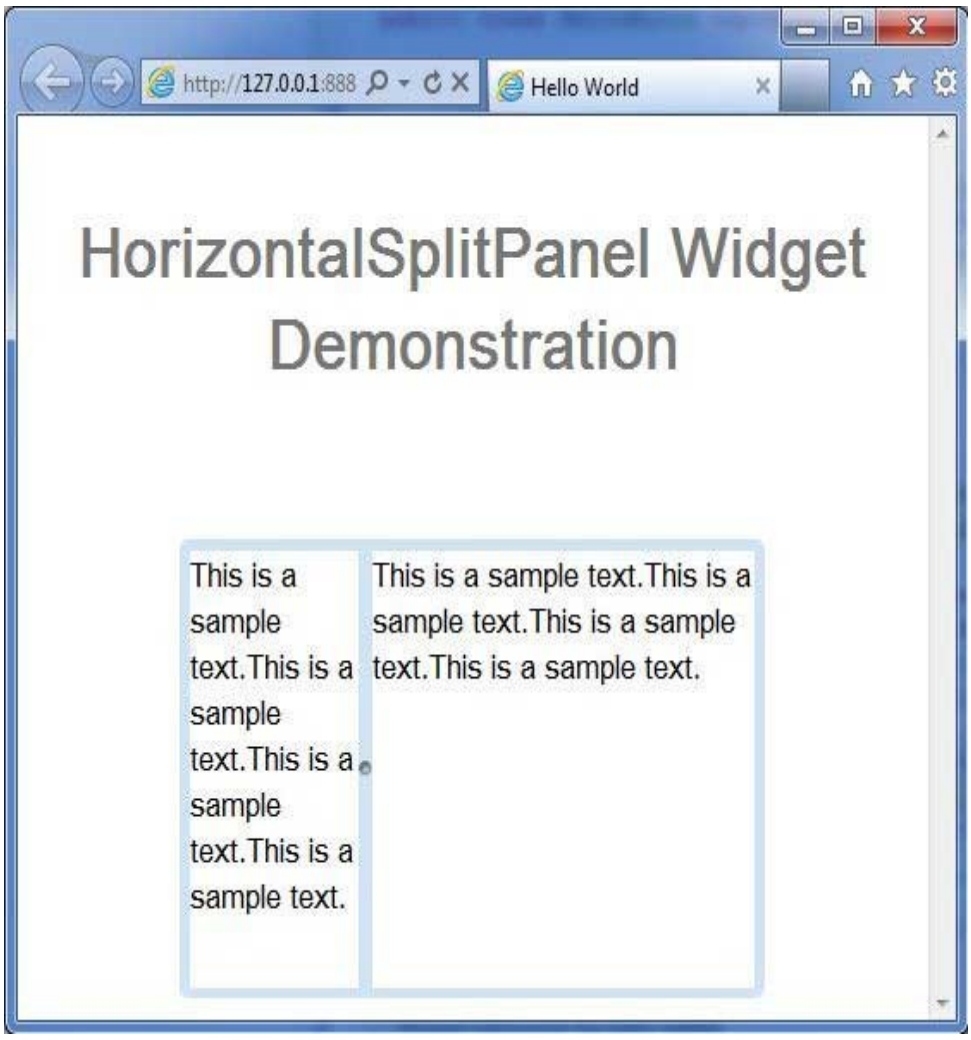
Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>HorizontalSplitPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of HorizontalSplitPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.CheckBox;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.HorizontalSplitPanel;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      // Create a Horizontal Split Panel
      HorizontalSplitPanel horizontalSplitPanel =new
      HorizontalSplitPanel();
      horizontalSplitPanel.setSize("300px","200px");
      horizontalSplitPanel.setSplitPosition("30%");

      // Add some content
      String randomText ="This is a sample text.";
      for(int i =0; i <2; i++){
         randomText += randomText;
      }
      horizontalSplitPanel.setRightWidget(new HTML(randomText));
      horizontalSplitPanel.setLeftWidget(new HTML(randomText));

      DecoratorPanel decoratorPanel =new DecoratorPanel();
      decoratorPanel.add(horizontalSplitPanel);
      // Add the widgets to the root panel.
      RootPanel.get().add(decoratorPanel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



VeticalSplitPanel

Introduction

The **VerticalSplitPanel** widget represents a panel that arranges two widgets in a single vertical column and allows the user to interactively change the proportion of the height dedicated to each of the two widgets. Widgets contained within a VerticalSplitterPanel will be automatically decorated with scrollbars when necessary.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.VerticalSplitPanel** class:

```
@Deprecated
public final class VerticalSplitPanel
   extends Panel
```

CSS style rules

Following default CSS Style rules will be applied to all the VerticalSpiltPanel widget. You can override it as per your requirements.

```
.gwt-VerticalSplitPanel{}
.gwt-VerticalSplitPanel vsplitter {}
```

Class constructors

S.N.	Constructor & Description
1	**VerticalSplitPanel()** Deprecated.
2	**VerticalSplitPanel(VerticalSplitPanel.Resources resources)** Deprecated. Creates an empty vertical split panel.
3	**VerticalSplitPanel(VerticalSplitPanelImages images)** Deprecated. replaced by VerticalSplitPanel(Resources)

Class methods

S.N.	Function name & Description
1	**void add(Widget w)** Deprecated. Adds a widget to a pane in the HorizontalSplitPanel.
2	**protected Element getElement(int index)** Deprecated. Gets the content element for the given index.
3	**Widget getEndOfLineWidget()** Deprecated. Gets the widget in the pane that is at the end of the line direction for the layout.
4	**Widget getBottomWidget()** Deprecated. Gets the widget in the bottom side of the panel.
5	**Widget getTopWidget()** Deprecated. Gets the widget in the top side of the panel.
6	**protected Element getSplitElement()** Deprecated. Gets the element that is acting as the splitter.
7	**Widget getStartOfLineWidget()** Deprecated. Gets the widget in the pane that is at the start of the line direction for the layout.
8	**protected Widget getWidget(int index)** Deprecated. Gets one of the contained widgets.
9	**boolean isResizing()** Deprecated. Indicates whether the split panel is being resized.
10	**java.util.Iterator<Widget> iterator()** Deprecated. Gets an iterator for the contained widgets.
11	**void onBrowserEvent(Event event)** Deprecated. Fired whenever a browser event is received.

12	**protected void onEnsureDebugId(java.lang.String baseID)** Deprecated. Affected Elements: -splitter = the container containing the splitter element. -right = the container on the right side of the splitter. -left = the container on the left side of the splitter.
13	**protected void onLoad()** Deprecated. This method is called immediately after a widget becomes attached to the browser's document.
14	**protected void onUnload()** Deprecated. This method is called immediately before a widget will be detached from the browser's document.
15	**boolean remove(Widget widget)** Deprecated. Removes a child widget.
16	**void setEndOfLineWidget(Widget w)** Deprecated. Sets the widget in the pane that is at the end of the line direction for the layout.
17	**void setBottomWidget(Widget w)** Deprecated. Sets the widget in the bottom side of the panel.
18	**void setTopWidget(Widget w)** Deprecated. Sets the widget in the top side of the panel.
19	**void setSplitPosition(java.lang.String pos)** Deprecated. Moves the position of the splitter.
20	**void setStartOfLineWidget(Widget w)** Deprecated. Sets the widget in the pane that is at the start of the line direction for the layout.
21	**protected void setWidget(int index, Widget w)** Deprecated. Sets one of the contained widgets.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- java.lang.Object

VerticalSplitPanel Widget Example

This example will take you through simple steps to show usage of a VerticalSplitPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.

2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

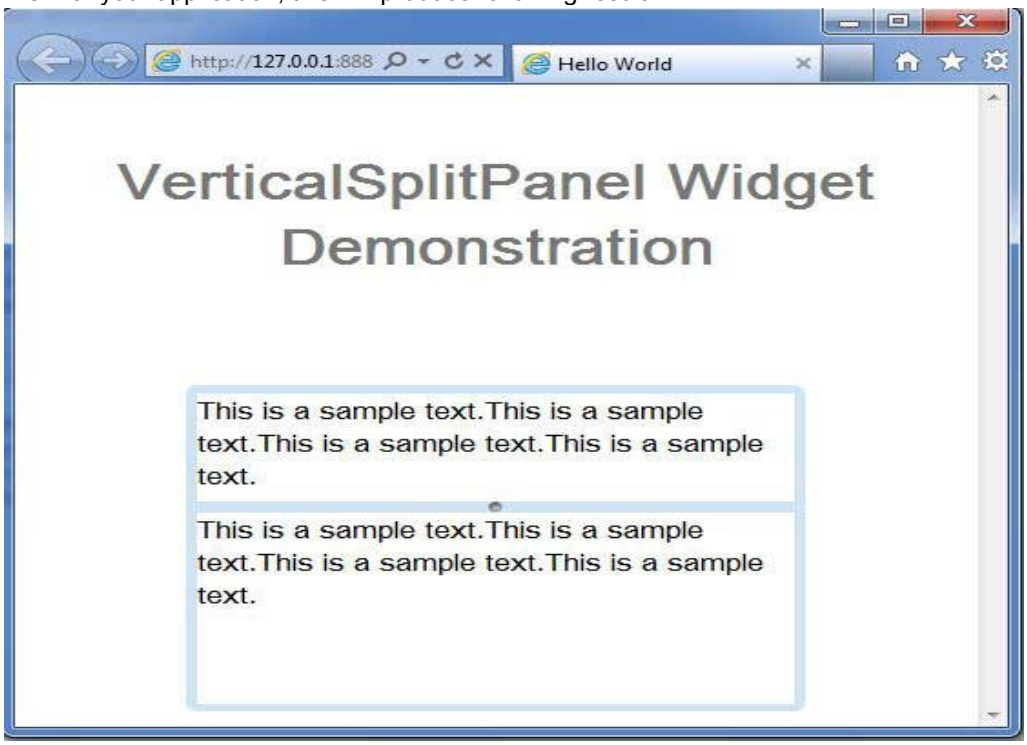
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <scriptlanguage="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>VerticalSplitPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of VerticalSplitPanel widget.

```
package com.tutorialspoint.client;
```

```
import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.CheckBox;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.VerticalSplitPanel;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

publicclassHelloWorldimplementsEntryPoint{

public void onModuleLoad(){
   // Create a Vertical Split Panel
   VerticalSplitPanel verticalSplitPanel =new VerticalSplitPanel();
   verticalSplitPanel.setSize("300px","200px");
   verticalSplitPanel.setSplitPosition("35%");

   // Add some content
   String randomText ="This is a sample text.";
   for(int i =0; i <2; i++){
         randomText += randomText;
   }
   verticalSplitPanel.setBottomWidget(new HTML(randomText));
   verticalSplitPanel.setTopWidget(new HTML(randomText));

   DecoratorPanel decoratorPanel =new DecoratorPanel();
   decoratorPanel.add(verticalSplitPanel);
   // Add the widgets to the root panel.
   RootPanel.get().add(decoratorPanel);
 }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



FlexTable

Introduction

The **FlexTable** widget represents a flexible table that creates cells on demand. It can be jagged (that is, each row can contain a different number of cells) and individual cells can be set to span multiple rows or columns.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.FlowPanel** class:

```
public class FlexTable
   extends HTMLTable
```

Class constructors

S.N.	Constructor & Description
1	**FlexTable()** Constructor for empty Flex Table.

Class methods

S.N.	Function name & Description
1	**void addCell(int row)** Appends a cell to the specified row.
2	**int getCellCount(int row)** Gets the number of cells on a given row.
3	**FlexTable.FlexCellFormatter getFlexCellFormatter()** Explicitly gets the FlexTable.FlexCellFormatter.
4	**int getRowCount()** Gets the number of rows.
5	**void insertCell(int beforeRow, int beforeColumn)** Inserts a cell into the FlexTable.
6	**int insertRow(int beforeRow)** Inserts a row into the FlexTable.
7	**protected void prepareCell(int row, int column)** Ensure that the cell exists.
8	**protected void prepareRow(int row)** Ensure that the row exists.
9	**void removeAllRows()** Remove all rows in this table.
10	**void removeCell(int row, int col)** Removes the specified cell from the table.
11	**void removeCells(int row, int column, int num)** Removes a number of cells from a row in the table.
12	**void removeRow(int row)** Removes the specified row from the table.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.HTMLTable
- java.lang.Object

FlexTable Widget Example

This example will take you through simple steps to show usage of a FlexTable Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
```

```
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.flexTable td {
   border:1px solid #BBBBBB;
   padding:3px;
}

.flexTable-buttonPanel td {
   border:0px;
}

.fixedWidthButton {
   width:150px;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <scriptlanguage="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>FlexTable Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of FlexTable widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.FlexTable;
import com.google.gwt.user.client.ui.FlexTable.FlexCellFormatter;
import com.google.gwt.user.client.ui.HasHorizontalAlignment;
import com.google.gwt.user.client.ui.HasVerticalAlignment;
import com.google.gwt.user.client.ui.Image;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      // Create a Flex Table
      final FlexTable flexTable =new FlexTable();
      FlexCellFormatter cellFormatter = flexTable.getFlexCellFormatter();
      flexTable.addStyleName("flexTable");
      flexTable.setWidth("32em");
```

```
      flexTable.setCellSpacing(5);
      flexTable.setCellPadding(3);

      // Add some text
      cellFormatter.setHorizontalAlignment(
         0,1,HasHorizontalAlignment.ALIGN_LEFT);
         flexTable.setHTML(0,0,"This is a FlexTable that supports"
                           +" <b>colspans</b> and <b>rowspans</b>."
                           +" You can use it to format your page"
                           +" or as a special purpose table.");
         cellFormatter.setColSpan(0,0,2);

         // Add a button that will add more rows to the table
         Button addRowButton =new Button("Add a Row");
         addRowButton.addClickHandler(new ClickHandler(){
            @Override
            public void onClick(ClickEvent event){
            addRow(flexTable);
            }
         });

         addRowButton.addStyleName("fixedWidthButton");

         // Add a button that will add more rows to the table
         Button removeRowButton =new Button("Remove a Row");
         removeRowButton.addClickHandler(new ClickHandler(){
            @Override
            public void onClick(ClickEvent event){
            removeRow(flexTable);
            }
        });

      removeRowButton.addStyleName("fixedWidthButton");

      VerticalPanel buttonPanel =new VerticalPanel();
      buttonPanel.setStyleName("flexTable-buttonPanel");
      buttonPanel.add(addRowButton);
      buttonPanel.add(removeRowButton);
      flexTable.setWidget(0,1, buttonPanel);
      cellFormatter.setVerticalAlignment(0,1,
      HasVerticalAlignment.ALIGN_TOP);

      // Add two rows to start
      addRow(flexTable);
      addRow(flexTable);

      // Add the widgets to the root panel.
      RootPanel.get().add(flexTable);
   }

   /**
    * Add a row to the flex table.
    */
   private void addRow(FlexTable flexTable){
      int numRows = flexTable.getRowCount();
      flexTable.setWidget(numRows,0,
      newImage("http://www.tutorialspoint.com/images/gwt-mini.png"));
      flexTable.setWidget(numRows,1,
      newImage("http://www.tutorialspoint.com/images/gwt-mini.png"));
      flexTable.getFlexCellFormatter().setRowSpan(0,1, numRows +1);
   }

   /**
    * Remove a row from the flex table.
```

```
   */
  private void removeRow(FlexTable flexTable){
  int numRows = flexTable.getRowCount();
  if(numRows >1){
     flexTable.removeRow(numRows -1);
     flexTable.getFlexCellFormatter().setRowSpan(0,1, numRows -1);    }
  }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

Grid

Introduction

The **Grid** widget represents a rectangular grid that can contain text, html, or a child Widget within its cells. It must be resized explicitly to the desired number of rows and columns.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Grid** class:

```
publicclassGrid
extendsHTMLTable
```

Class constructors

S.N.	Constructor & Description
1	**Grid()** Constructor for Grid.
2	**Grid(int rows, int columns)** Constructor for Grid with requested size.

Class methods

S.N.	Function name & Description
1	**boolean clearCell(int row, int column)** Replaces the contents of the specified cell with a single space.
2	**protected Element createCell()** Creates a new, empty cell.
3	**int getCellCount(int row)** Return number of columns.
4	**int getColumnCount()** Gets the number of columns in this grid.
5	**int getRowCount()** Return number of rows.
6	**int insertRow(int beforeRow)** Inserts a new row into the table.
7	**protected void prepareCell(int row, int column)** Checks that a cell is a valid cell in the table.
8	**protected void prepareColumn(int column)** Checks that the column index is valid.
9	**protected void prepareRow(int row)** Checks that the row index is valid.
10	**void removeRow(int row)** Removes the specified row from the table.
11	**void resize(int rows, int columns)** Resizes the grid.
12	**void resizeColumns(int columns)** Resizes the grid to the specified number of columns.

13	**void resizeRows(int rows)** Resizes the grid to the specified number of rows.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.HTMLTable
- java.lang.Object

Grid Widget Example

This example will take you through simple steps to show usage of a Grid Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
```

```
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>Grid Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of Grid widget.

```
package com.tutorialspoint.client;


import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.Grid;
import com.google.gwt.user.client.ui.Image;
import com.google.gwt.user.client.ui.RootPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
   // Create a grid
   Grid grid =new Grid(2,2);

   // Add images to the grid
   int numRows = grid.getRowCount();
   int numColumns = grid.getColumnCount();
   for(int row =0; row < numRows; row++){
      for(int col =0; col < numColumns; col++){
         grid.setWidget(row, col,new
         Image("http://www.tutorialspoint.com/images/gwt-mini.png"));
      }
   }

   DecoratorPanel decoratorPanel =new DecoratorPanel();
   decoratorPanel.add(grid);
   // Add the widgets to the root panel.
   RootPanel.get().add(decoratorPanel);
  }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

DeckPanel

Introduction

The **DeckPanel** widget represents a panel that displays all of its child widgets in a 'deck', where only one can be visible at a time. It is used by TabPanel.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.DeckPanel** class:

```
public class DeckPanel
   extends ComplexPanel
      implements HasAnimation,InsertPanel.ForIsWidget
```

Class constructors

S.N.	Constructor & Description
1	**DeckPanel()** Constructor for DeckPanel.

Class methods

S.N.	Function name & Description
1	**void add(Widget w)** Adds a child widget.

2	**int getVisibleWidget()** Gets the index of the currently-visible widget.
3	**void insert(IsWidget w, int beforeIndex)**
4	**void insert(Widget w, int beforeIndex)** Inserts a child widget before the specified index.
5	**boolean isAnimationEnabled()** Returns true if animations are enabled, false if not.
6	**boolean remove(Widget w)** Removes a child widget.
7	**void setAnimationEnabled(boolean enable)** Enable or disable animations.
8	**void showWidget(int index)** Shows the widget at the specified index.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.ComplexPanel
- java.lang.Object

DeckPanel Widget Example

This example will take you through simple steps to show usage of a DeckPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
```

```
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                        -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                          -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                     -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.deckpanel {
  border:1px solid #BBBBBB;
  padding:3px;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

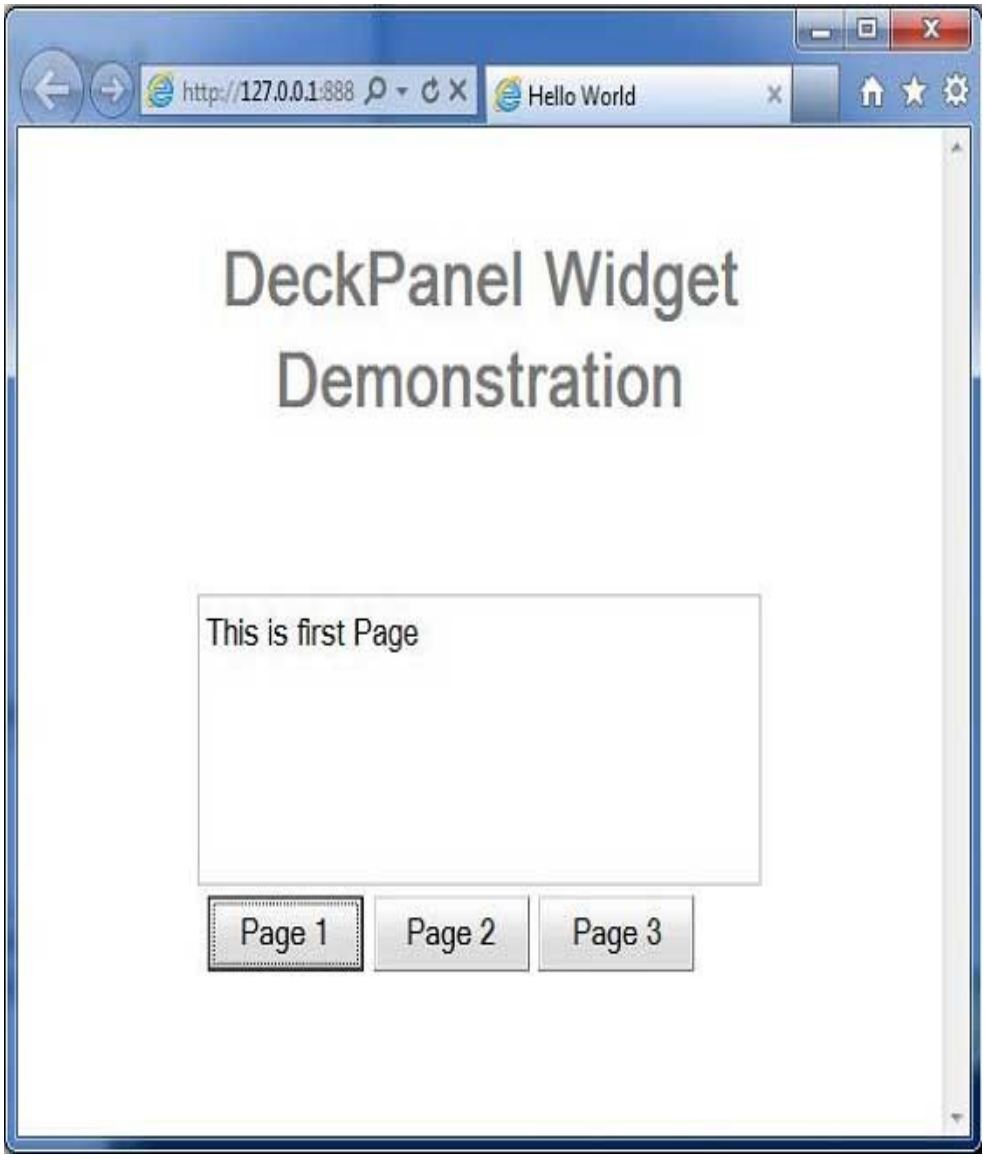
```
<html>
<head>
<title>Hello World</title>
<link rel="stylesheet" href="HelloWorld.css"/>
<script language="javascript" src="helloworld/helloworld.nocache.js">
</script>
</head>
<body>

<h1>DeckPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of DeckPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.DeckPanel;
import com.google.gwt.user.client.ui.HorizontalPanel;
import com.google.gwt.user.client.ui.Label;
```

```
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      // Create DeckPanel widget
      final DeckPanel deckPanel =new DeckPanel();
      deckPanel.setSize("300px","120px");
      deckPanel.setStyleName("deckpanel");
      // Create lables to add to deckpanel
      Label label1 =new Label("This is first Page");
      Label label2 =new Label("This is second Page");
      Label label3 =new Label("This is third Page");
      // Add labels to deckpanel
      deckPanel.add(label1);
      deckPanel.add(label2);
      deckPanel.add(label3);
      //show first label
      deckPanel.showWidget(0);
      //create button bar
      HorizontalPanel buttonBar =new HorizontalPanel();
      buttonBar.setSpacing(5);

      // create button and add click handlers
      // show different labels on click of different buttons
      Button button1 =new Button("Page 1");
      button1.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            deckPanel.showWidget(0);
         }
      });

      Button button2 =newButton("Page 2");
      button2.addClickHandler(newClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            deckPanel.showWidget(1);
         }
      });

      Button button3 =new Button("Page 3");
      button3.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            deckPanel.showWidget(2);
         }
      });
      buttonBar.add(button1);
      buttonBar.add(button2);
      buttonBar.add(button3);

      VerticalPanel vPanel =new VerticalPanel();
      vPanel.add(deckPanel);
      vPanel.add(buttonBar);
      // Add the widgets to the root panel.
      RootPanel.get().add(vPanel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



DockPanel

Introduction

The **DockPanel** widget represents a panel that lays its child widgets out "docked" at its outer edges, and allows its last widget to take up the remaining space in its center.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.DockPanel** class:

```
@Deprecated
public class DockPanel
   extends CellPanel
```

```
    implements HasAlignment
```

Class constructors

S.N.	Constructor & Description
1	**DockPanel()** Constructor for DockPanel.

Class methods

S.N.	Function name & Description
1	**void add(Widget widget, DockPanel.DockLayoutConstant direction)** Deprecated. Adds a widget to the specified edge of the dock.
2	**HasHorizontalAlignment.HorizontalAlignmentConstant getHorizontalAlignment()** Deprecated. Gets the horizontal alignment.
3	**HasVerticalAlignment.VerticalAlignmentConstant getVerticalAlignment()** Deprecated. Gets the vertical alignment.
4	**DockPanel.DockLayoutConstant getWidgetDirection(Widget w)** Deprecated. Gets the layout direction of the given child widget.
5	**protected void onEnsureDebugId(java.lang.String baseID)** Deprecated. DockPanel supports adding more than one cell in a direction, so an integer will be appended to the end of the debug id.
6	**boolean remove(Widget w)** Deprecated. Removes a child widget.
7	**void setCellHeight(Widget w, java.lang.String height)** Deprecated. Sets the height of the cell associated with the given widget, related to the panel as a whole.
8	**void setCellHorizontalAlignment(Widget w, HasHorizontalAlignment.HorizontalAlignmentConstant align)** Deprecated. Sets the horizontal alignment of the given widget within its cell.
9	**void setCellVerticalAlignment(Widget w, HasVerticalAlignment.VerticalAlignmentConstant align)** Deprecated. Sets the vertical alignment of the given widget within its cell.
10	**void setCellWidth(Widget w, java.lang.String width)** Deprecated. Sets the width of the cell associated with the given widget, related to the panel as a whole.
11	**void setHorizontalAlignment(HasHorizontalAlignment.HorizontalAlignmentConstant align)** Deprecated. Sets the default horizontal alignment to be used for widgets added to this panel.
12	**void setVerticalAlignment(HasVerticalAlignment.VerticalAlignmentConstant align)** Deprecated. Sets the default vertical alignment to be used for widgets added to this panel.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject

- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.ComplexPanel
- com.google.gwt.user.client.ui.CellPanel
- java.lang.Object

DockPanel Widget Example

This example will take you through simple steps to show usage of a DockPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>
</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
```

```
}
.dockpanel td {
   border:1px solid #BBBBBB;
   padding:3px;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

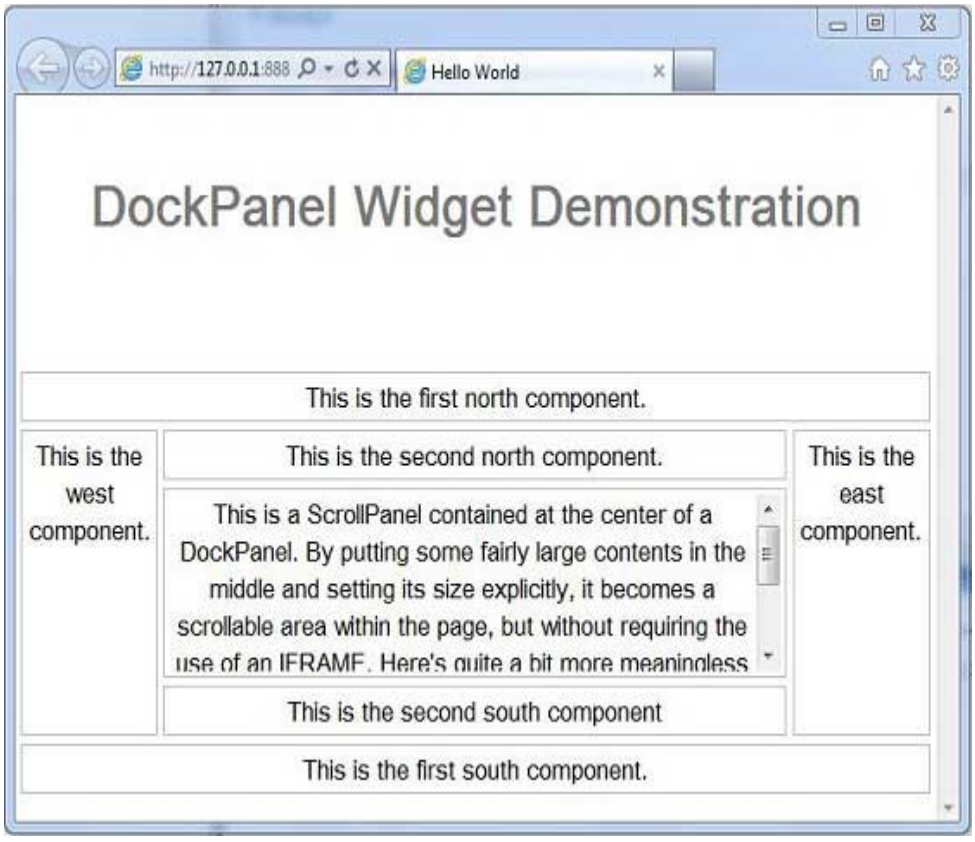
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>DockPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of DockPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.DockPanel;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.ScrollPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      DockPanel dockPanel =new DockPanel();
      dockPanel.setStyleName("dockpanel");
      dockPanel.setSpacing(4);
      dockPanel.setHorizontalAlignment(DockPanel.ALIGN_CENTER);

      // Add text all around
      dockPanel.add(new HTML("This is the first north component."),
      DockPanel.NORTH);
      dockPanel.add(new HTML("This is the first south component."),
      DockPanel.SOUTH);
      dockPanel.add(new HTML("This is the east component."),
      DockPanel.EAST);
      dockPanel.add(new HTML("This is the west component."),
      DockPanel.WEST);
      dockPanel.add(new HTML("This is the second north component."),
      DockPanel.NORTH);
      dockPanel.add(new HTML("This is the second south component"),
      DockPanel.SOUTH);

      // Add scrollable text in the center
      HTML contents =new HTML("This is a ScrollPanel contained"
      +" at the center of a DockPanel. "
      +" By putting some fairly large contents in the middle"
      +" and setting its size explicitly, it becomes a scrollable area"
      +" within the page, but without requiring the use of an IFRAME."
```

```
      +" Here's quite a bit more meaningless text that will serveprimarily"
      +" to make this thing scroll off the bottom of its visible area."
      +" Otherwise, you might have to make it really, really"
      +" small in order to see the nifty scroll bars!");
      ScrollPanel scroller =new ScrollPanel(contents);
      scroller.setSize("400px","100px");
      dockPanel.add(scroller,DockPanel.CENTER);


      VerticalPanel vPanel =new VerticalPanel();
      vPanel.add(dockPanel);

      // Add the widgets to the root panel.
      RootPanel.get().add(vPanel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



HTMLPanel

Introduction

The **HTMLPanel** widget represents a panel that contains HTML, and which can attach child widgets to identified elements within that HTML.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.HTMLPanel** class:

```
public classHTMLPanel
   extends ComplexPanel
```

Class constructors

S.N.	Constructor & Description
1	**HTMLPanel(SafeHtml safeHtml)** Initializes the panel's HTML from a given SafeHtml object.
2	**HTMLPanel(java.lang.String html)** Creates an HTML panel with the specified HTML contents inside a DIV element.
3	**HTMLPanel(java.lang.String tag, java.lang.String html)** Creates an HTML panel whose root element has the given tag, and with the specified HTML contents.

Class methods

S.N.	Function name & Description
1	**void add(Widget widget, Element elem)** Adds a child widget to the panel, contained within an HTML element.
2	**void add(Widget widget, java.lang.String id)** Adds a child widget to the panel, contained within the HTML element specified by a given id.
3	**void addAndReplaceElement(Widget widget, Element toReplace)** Adds a child widget to the panel, replacing the HTML element.
4	**void addAndReplaceElement(Widget widget, java.lang.String id)** Adds a child widget to the panel, replacing the HTML element specified by a given id.
5	**static java.lang.String createUniqueId()** A helper method for creating unique IDs for elements within dynamically- generated HTML.
6	**Element getElementById(java.lang.String id)** Finds an element within this panel by its id.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.ComplexPanel
- java.lang.Object

HTMLPanel Widget Example

This example will take you through simple steps to show usage of a HTMLPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

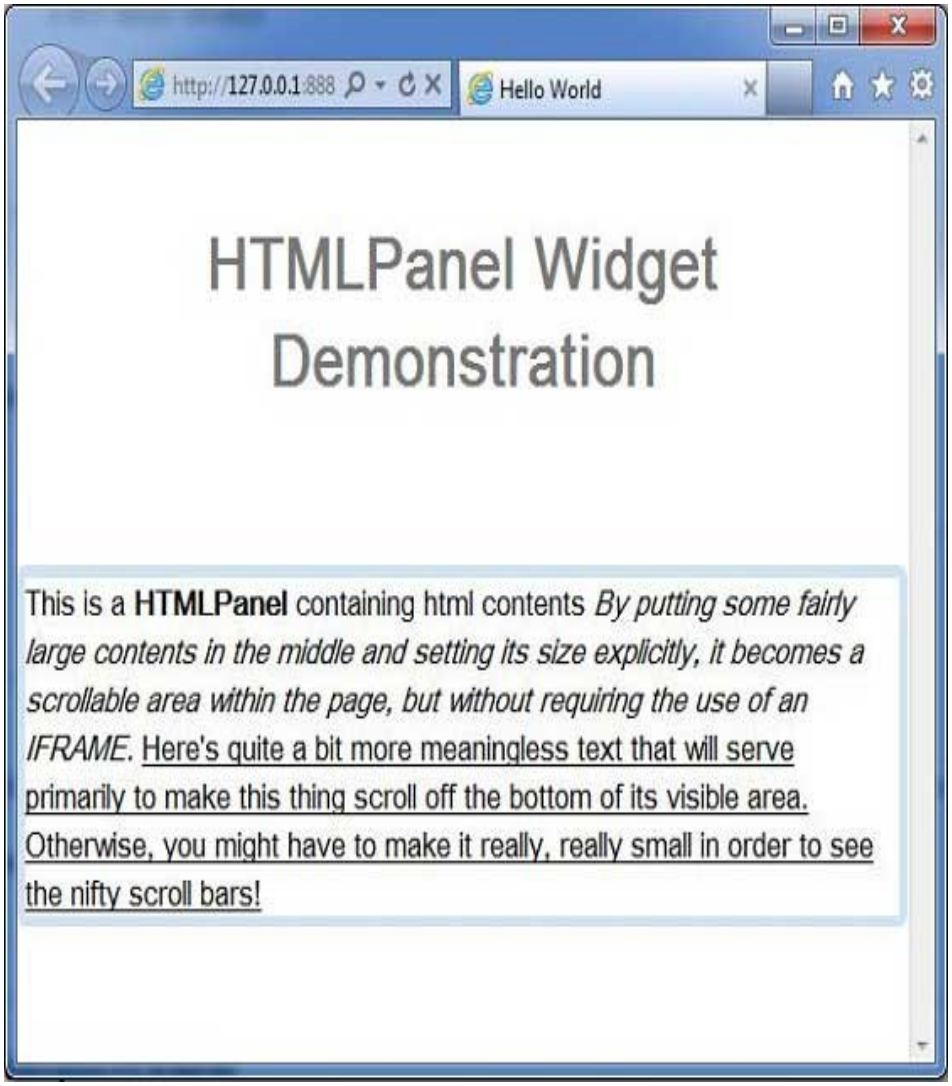
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
```

```
<body>

<h1>HTMLPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of HTMLPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HTMLPanel;
import com.google.gwt.user.client.ui.RootPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      String htmlString ="This is a <b>HTMLPanel</b> containing"
      +" html contents. "
      +" <i>By putting some fairly large contents in the middle"
      +" and setting its size explicitly, it becomes a scrollable area"
      +" within the page, but without requiring the use of an
         IFRAME.</i>"
      +" <u>Here's quite a bit more meaningless text that will serve"
      +" to make this thing scroll off the bottom of its visible area."
      +" Otherwise, you might have to make it really, really"
      +" small in order to see the nifty scroll bars!</u>";

      HTMLPanel htmlPanel =new HTMLPanel(htmlString);

      DecoratorPanel panel =new DecoratorPanel();
      panel.add(htmlPanel);

      // Add the widgets to the root panel.
      RootPanel.get().add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



TabPanel

Introduction

The **TabPanel** widget represents panel that represents a tabbed set of pages, each of which contains another widget. Its child widgets are shown as the user selects the various tabs associated with them. The tabs can contain arbitrary HTML.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.TabPanel** class:

```
@Deprecated
public classTabPanel
   extends Composite
      implements TabListener,SourcesTabEvents,
         HasWidgets,HasAnimation,IndexedPanel.ForIsWidget,
            HasBeforeSelectionHandlers<java.lang.Integer>,
```

```
HasSelectionHandlers<java.lang.Integer>
```

Class constructors

S.N.	Constructor & Description
1	**TabPanel()** Deprecated. Creates an empty tab panel.

Class methods

S.N.	Function name & Description
1	**void add(IsWidget w, IsWidget tabWidget)** Deprecated. Convenience overload to allow IsWidget to be used directly.
2	**void add(IsWidget w, java.lang.String tabText)** Deprecated. Convenience overload to allow IsWidget to be used directly.
3	**void add(IsWidget w, java.lang.String tabText, boolean asHTML)** Deprecated. Convenience overload to allow IsWidget to be used directly.
4	**void add(Widget w)** Deprecated. Adds a child widget.
5	**void add(Widget w, java.lang.String tabText)** Deprecated. Adds a widget to the tab panel.
6	**void add(Widget w, java.lang.String tabText, boolean asHTML)** Deprecated. Adds a widget to the tab panel.
7	**void add(Widget w, Widget tabWidget)** Deprecated. Adds a widget to the tab panel.
8	**HandlerRegistration addBeforeSelectionHandler(BeforeSelectionHandler<java.lang.Integer> handler)** Deprecated. Adds a BeforeSelectionEvent handler.
9	**HandlerRegistration addSelectionHandler(SelectionHandler<java.lang.Integer> handler)** Deprecated. Adds a SelectionEvent handler.
10	**void addTabListener(TabListener listener)** Deprecated. Use addBeforeSelectionHandler(com.google.gwt.event.logical.shared.BeforeSelectionHandler) and addSelectionHandler(com.google.gwt.event.logical.shared.SelectionHandler) instead
11	**void clear()** Deprecated. Removes all child widgets.
12	**protected SimplePanel createTabTextWrapper()** Deprecated. Create a SimplePanel that will wrap the contents in a tab.
13	**DeckPanel getDeckPanel()** Deprecated. Gets the deck panel within this tab panel.
14	**TabBar getTabBar()**

	Deprecated. Gets the tab bar within this tab panel.
15	**Widget getWidget(int index)** Deprecated. Gets the child widget at the specified index.
16	**int getWidgetCount()** Deprecated. Gets the number of child widgets in this panel.
17	**int getWidgetIndex(IsWidget child)** Deprecated. Convenience overload to allow IsWidget to be used directly.
18	**int getWidgetIndex(Widget widget)** Deprecated. Gets the index of the specified child widget.
19	**void insert(IsWidget widget, IsWidget tabWidget, int beforeIndex)** Deprecated. Convenience overload to allow IsWidget to be used directly.
20	**void insert(IsWidget widget, java.lang.String tabText, boolean asHTML, int beforeIndex)** Deprecated. Convenience overload to allow IsWidget to be used directly.
21	**void insert(IsWidget widget, java.lang.String tabText, int beforeIndex)** Deprecated. Convenience overload to allow IsWidget to be used directly.
22	**void insert(Widget widget, java.lang.String tabText, boolean asHTML, int beforeIndex)** Deprecated. Inserts a widget into the tab panel.
23	**void insert(Widget widget, java.lang.String tabText, int beforeIndex)** Deprecated. Inserts a widget into the tab panel.
24	**void insert(Widget widget, Widget tabWidget, int beforeIndex)** Deprecated. Inserts a widget into the tab panel.
25	**boolean isAnimationEnabled()** Deprecated. Returns true if animations are enabled, false if not.
26	**java.util.Iterator<Widget> iterator()** Deprecated. Gets an iterator for the contained widgets.
27	**boolean onBeforeTabSelected(SourcesTabEvents sender, int tabIndex)** Deprecated. Use BeforeSelectionHandler.onBeforeSelection(com.google.gwt.event.logical.shared.BeforeSelectionEvent) instead
28	**protected void onEnsureDebugId(java.lang.String baseID)** Deprecated. Affected Elements: -bar = The tab bar. -bar-tab# = The element containing the content of the tab itself. -bar-tab-wrapper# = The cell containing the tab at the index. -bottom = The panel beneath the tab bar.
29	**void onTabSelected(SourcesTabEvents sender, int tabIndex)** Deprecated. Use SelectionHandler.onSelection(com.google.gwt.event.logical.shared.SelectionEvent) instead
30	**boolean remove(int index)** Deprecated. Removes the widget at the specified index.
31	**boolean remove(Widget widget)** Deprecated. Removes the given widget, and its associated tab.

32	**void removeTabListener(TabListener listener)** Deprecated. Use the HandlerRegistration.removeHandler() method on the object returned by and add*Handler method instead
33	**void selectTab(int index)** Deprecated. Programmatically selects the specified tab and fires events.
34	**void selectTab(int index, boolean fireEvents)** Deprecated. Programmatically selects the specified tab.
35	**void setAnimationEnabled(boolean enable)** Deprecated. Enable or disable animations.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Composite
- java.lang.Object

TabPanel Widget Example

This example will take you through simple steps to show usage of a TabPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>
```

```
</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

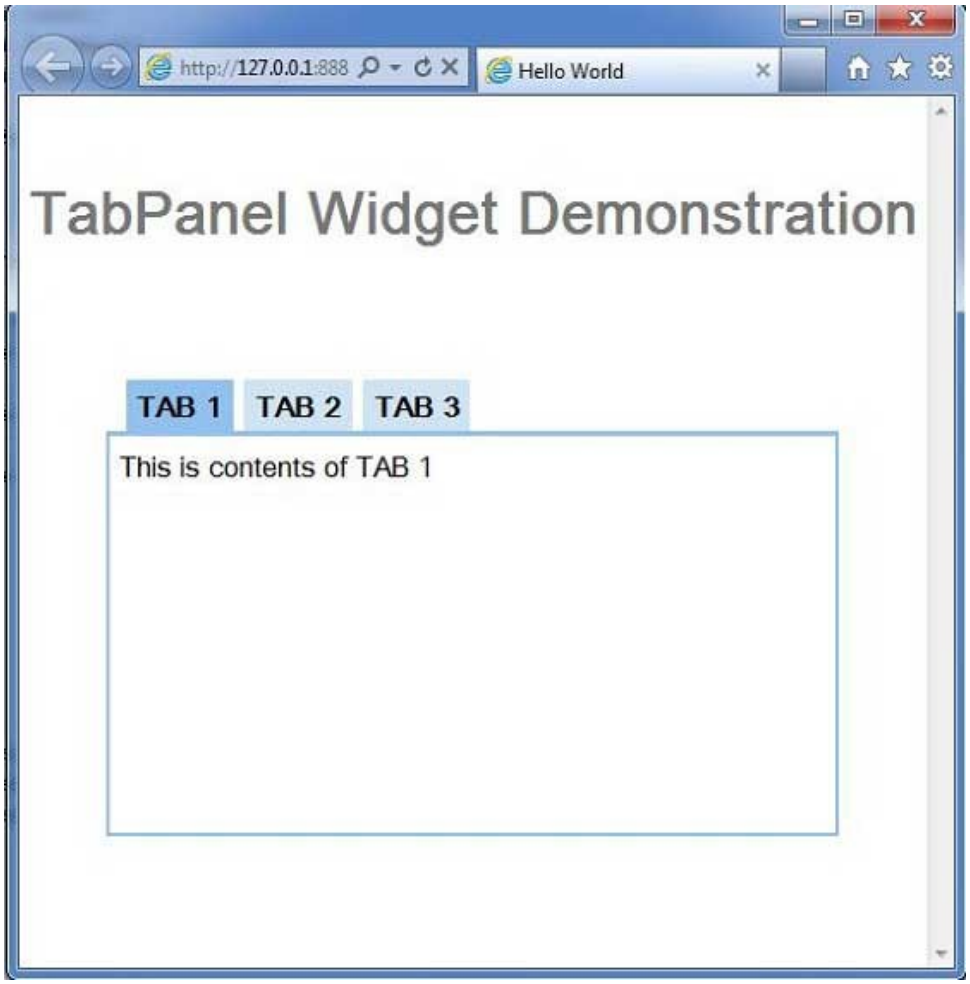
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>TabPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of TabPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HTMLPanel;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TabPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      //Create an empty tab panel
      TabPanel tabPanel =newTabPanel();

      //create contents for tabs of tabpanel
      Label label1 =new Label("This is contents of TAB 1");
      label1.setHeight("200");
      Label label2 =new Label("This is contents of TAB 2");
      label2.setHeight("200");
      Label label3 =new Label("This is contents of TAB 3");
      label3.setHeight("200");

      //create titles for tabs
```

```
      String tab1Title ="TAB 1";
      String tab2Title ="TAB 2";
      String tab3Title ="TAB 3";

      //create tabs
      tabPanel.add(label1, tab1Title);
      tabPanel.add(label2, tab2Title);
      tabPanel.add(label3, tab3Title);

      //select first tab
      tabPanel.selectTab(0);

      //set width if tabpanel
      tabPanel.setWidth("400");

      // Add the widgets to the root panel.
      RootPanel.get().add(tabPanel);
    }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



Composite Widget

Introduction

The **Composite** widget is a type of widget that can wrap another widget, hiding the wrapped widget's methods. When added to a panel, a composite behaves exactly as if the widget it wraps had been added. The composite is useful for creating a single widget out of an aggregate of multiple other widgets contained in a single panel.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.Composite** class:

```
public abstract class Composite
   extends Widget
```

Class constructors

S.N.	Constructor & Description
1	**Composite()**

Class methods

S.N.	Function name & Description
1	**protected Widget getWidget()** Provides subclasses access to the topmost widget that defines this composite.
2	**protected void initWidget(Widget widget)** Sets the widget to be wrapped by the composite.
3	**boolean isAttached()** Determines whether this widget is currently attached to the browser's document (i.e., there is an unbroken chain of widgets between this widget and the underlying browser document).
4	**protected void onAttach()** This method is called when a widget is attached to the browser's document.
5	**void onBrowserEvent(Event event)** Fired whenever a browser event is received.
6	**protected void onDetach()** This method is called when a widget is detached from the browser's document.
7	**protected void setWidget(Widget widget)** Deprecated. Use initWidget(Widget) instead

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- java.lang.Object

Composite Widget Example

This example will take you through simple steps to show usage of a Composite Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <linkrel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>
```

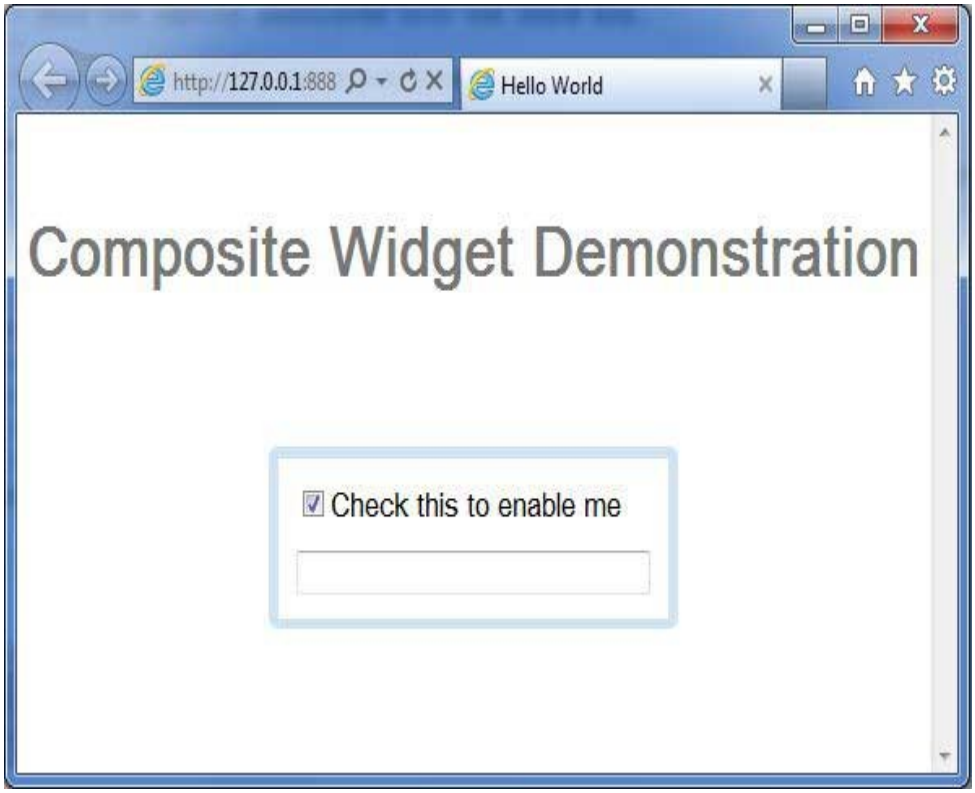
```
<h1>Composite Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of Composite widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.ui.CheckBox;
import com.google.gwt.user.client.ui.Composite;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextBox;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

  /**
   * A composite of a TextBox and a CheckBox that optionally enables    it.
   */
  private static class OptionalTextBox extends Composite implements
  ClickHandler{

     privateTextBox textBox =new TextBox();
     privateCheckBox checkBox =new CheckBox();

     /**
      * Constructs an OptionalTextBox with the given caption
      * on the check.
      * @param caption the caption to be displayed with the check box
      */
     public OptionalTextBox(String caption){
         // Place the check above the text box using a vertical panel.
         VerticalPanel panel =new VerticalPanel();
         // panel.setBorderWidth(1);
         panel.setSpacing(10);
         panel.add(checkBox);
         panel.add(textBox);

         textBox.setWidth("200");
         // Set the check box's caption, and check it by default.
         checkBox.setText(caption);
         checkBox.setValue(true);
         checkBox.addClickHandler(this);

         DecoratorPanel decoratorPanel =new DecoratorPanel();

         decoratorPanel.add(panel);
         // All composites must call initWidget() in their constructors.
         initWidget(decoratorPanel);
     }

     public void onClick(ClickEvent event){
        if(event.getSource()== checkBox){
           // When the check box is clicked,
           //update the text box's enabled state.
```

```
            textBox.setEnabled(checkBox.getValue());
          }
        }
    }

    public void onModuleLoad(){
    // Create an optional text box and add it to the root panel.
    OptionalTextBox otb =new OptionalTextBox("Check this to enable me");
    RootPanel.get().add(otb);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



SimplePanel

Introduction

The **SimplePanel** widget represents a base class for panels that contain only one widget.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.SimplePanel** class:

```
public class SimplePanel
   extends Panel
```

```
implementsHasOneWidget
```

Class constructors

S.N.	Constructor & Description
1	**SimplePanel()** Creates an empty panel that uses a DIV for its contents.
2	**protected SimplePanel(Element elem)** Creates an empty panel that uses the specified browser element for its contents.

Class methods

S.N.	Function name & Description
1	**void add(Widget w)** Adds a widget to this panel.
2	**protected Element getContainerElement()** Override this method to specify that an element other than the root element be the container for the panel's child widget.
3	**Widget getWidget()** Gets the panel's child widget.
4	**java.util.Iterator<Widget> iterator()** Gets an iterator for the contained widgets.
5	**boolean remove(Widget w)** Removes a child widget.
6	**void setWidget(IsWidget w)** Set the only widget of the receiver, replacing the previous widget if there was one.
7	**void setWidget(Widget w)** Sets this panel's widget.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- java.lang.Object

SimplePanel Widget Example

This example will take you through simple steps to show usage of a SimplePanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
  <module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

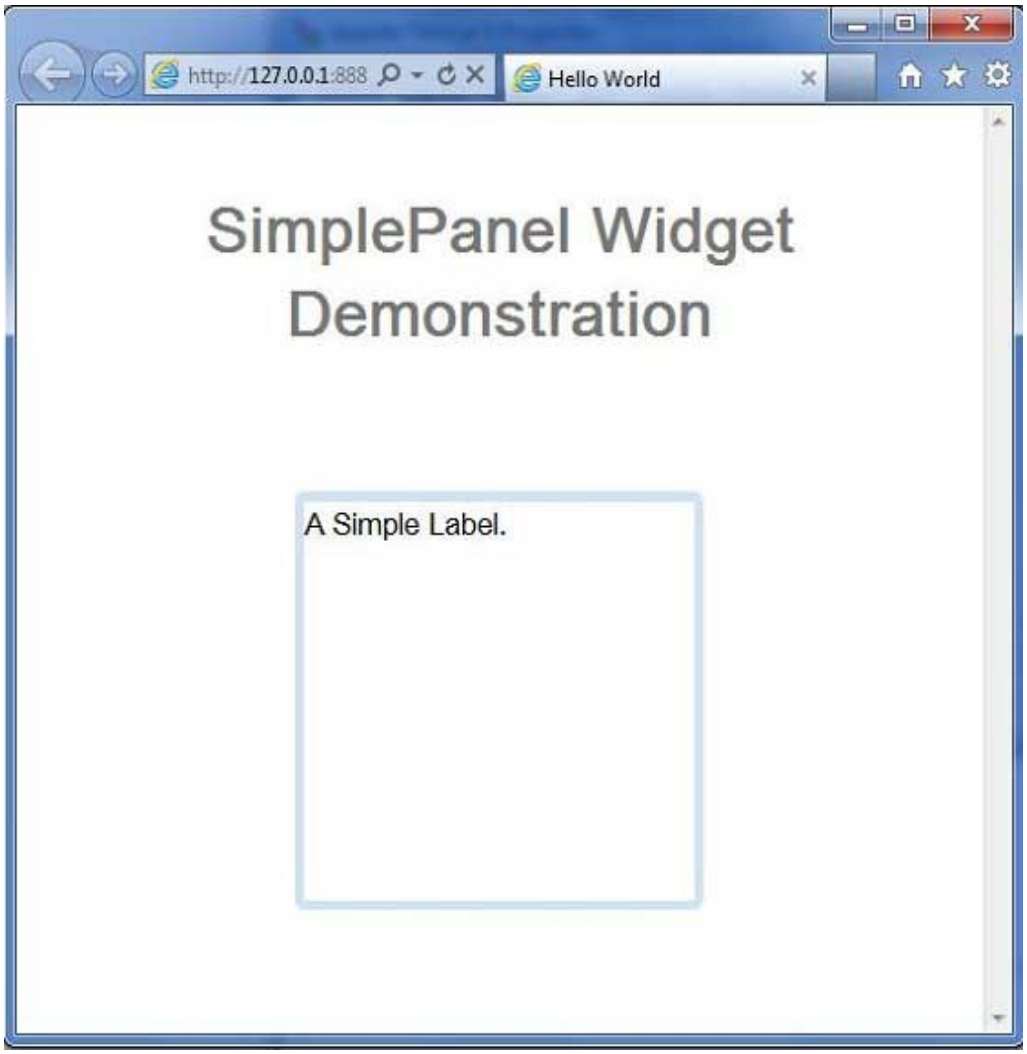
Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>SimplePanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of SimplePanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.SimplePanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      // Create a Simple Panel
      SimplePanel simplePanel =new SimplePanel();
      Label label =new Label("A Simple Label.");
      //add label to simple panel
      simplePanel.add(label);
      //set height and width of simple panel
      simplePanel.setHeight("200");
      simplePanel.setWidth("200");

      DecoratorPanel decoratorPanel =newDecoratorPanel();
      decoratorPanel.add(simplePanel);

      // Add the widgets to the root panel.
      RootPanel.get().add(decoratorPanel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



ScrollPanel

Introduction

The **ScrollPanel** widget represents a simple panel that wraps its contents in a scrollable area.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.ScrollPanel** class:

```
public class ScrollPanel
   extends SimplePanel
      implements SourcesScrollEvents,HasScrollHandlers,
         RequiresResize,ProvidesResize
```

Class constructors

S.N.	Constructor & Description
1	**ScrollPanel()** Creates an empty scroll panel.
2	**ScrollPanel(Widget child)** Creates a new scroll panel with the given child widget.

Class methods

S.N.	Function name & Description
1	**HandlerRegistration addScrollHandler(ScrollHandler handler)** Adds a ScrollEvent handler.
2	**void addScrollListener(ScrollListener listener)** Deprecated. Use addScrollHandler(com.google.gwt.event.dom.client.ScrollHandler) instead
3	**void ensureVisible(UIObject item)** Ensures that the specified item is visible, by adjusting the panel's scroll position.
4	**protected Element getContainerElement()** Override this method to specify that an element other than the root element be the container for the panel's child widget.
5	**int getHorizontalScrollPosition()** Gets the horizontal scroll position.
6	**int getScrollPosition()** Gets the vertical scroll position.
7	**void onResize()** This method must be called whenever the implementor's size has been modified.
8	**void removeScrollListener(ScrollListener listener)** Deprecated. Use the HandlerRegistration.removeHandler() method on the object returned by addScrollHandler(com.google.gwt.event.dom.client.ScrollHandler) instead
9	**void scrollToBottom()** Scroll to the bottom of this panel.
10	**void scrollToLeft()** Scroll to the far left of this panel.
11	**void scrollToRight()** Scroll to the far right of this panel.
12	**void scrollToTop()** Scroll to the top of this panel.
13	**void setAlwaysShowScrollBars(boolean alwaysShow)** Sets whether this panel always shows its scroll bars, or only when necessary.
14	**void setHeight(java.lang.String height)** Sets the object's height.

15	**void setHorizontalScrollPosition(int position)** Sets the horizontal scroll position.
16	**void setScrollPosition(int position)** Sets the vertical scroll position.
17	**void setSize(java.lang.String width, java.lang.String height)** Sets the object's size.
18	**void setWidth(java.lang.String width)** Sets the object's width.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.SimplePanel
- java.lang.Object

ScrollPanel Widget Example

This example will take you through simple steps to show usage of a ScrollPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
```

```
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

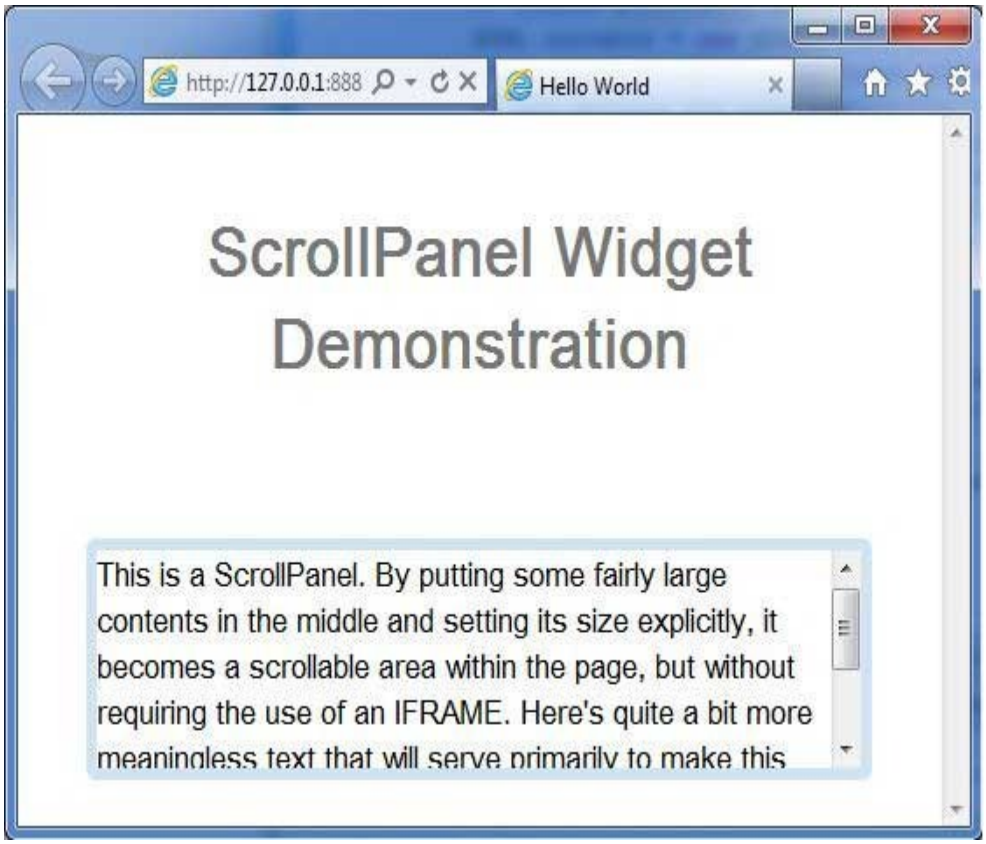
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>ScrollPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of ScrollPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.ScrollPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
     // Create scrollable text
     HTML contents =new HTML("This is a ScrollPanel."
     +" By putting some fairly large contents in the middle"
     +" and setting its size explicitly, it becomes a scrollable area"
     +" within the page, but without requiring the use of an IFRAME."
     +" Here's quite a bit more meaningless text that will serve primarily"
     +" to make this thing scroll off the bottom of its visible area."
     +" Otherwise, you might have to make it really, really"
     +" small in order to see the nifty scroll bars!");

     //create scrollpanel with content
    ScrollPanel scrollPanel =new ScrollPanel(contents);
```

```
    scrollPanel.setSize("400px","100px");

    DecoratorPanel decoratorPanel =new DecoratorPanel();

    decoratorPanel.add(scrollPanel);

    // Add the widgets to the root panel.
    RootPanel.get().add(decoratorPanel);
  }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



FocusPanel

Introduction

The **FocusPanel** widget represents a simple panel that makes its contents focusable, and adds the ability to catch mouse and keyboard events.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.FocusPanel** class:

```
public class FocusPanel
```

```
   extends SimplePanel
      implements HasFocus,SourcesClickEvents,
         SourcesMouseEvents,SourcesMouseWheelEvents,
            HasAllMouseHandlers,HasClickHandlers,
               HasDoubleClickHandlers,HasAllKeyHandlers,
                  HasAllFocusHandlers
```

Class constructors

S.N.	Constructor & Description
1	**FocusPanel()** Creates an empty focus panel.
2	**FocusPanel(Widget child)** Creates a new focus panel with the given child widget.

Class methods

S.N.	Function name & Description
1	**HandlerRegistration addBlurHandler(BlurHandler handler)** Adds a BlurEvent handler.
2	**HandlerRegistration addClickHandler(ClickHandler handler)** Adds a ClickEvent handler.
3	**void addClickListener(ClickListener listener)** Deprecated. Use addClickHandler(com.google.gwt.event.dom.client.ClickHandler) instead
4	**HandlerRegistration addDoubleClickHandler(DoubleClickHandler handler)** Adds a DoubleClickEvent handler.
5	**HandlerRegistration addFocusHandler(FocusHandler handler)** Adds a FocusEvent handler.
6	**void addFocusListener(FocusListener listener)** Deprecated. Use addFocusHandler(com.google.gwt.event.dom.client.FocusHandler) instead
7	**void addKeyboardListener(KeyboardListener listener)** Deprecated. Use addKeyDownHandler(com.google.gwt.event.dom.client.KeyDownHandler), addKeyUpHandler(com.google.gwt.event.dom.client.KeyUpHandler) and addKeyPressHandler(com.google.gwt.event.dom.client.KeyPressHandler) instead
8	**HandlerRegistration addKeyDownHandler(KeyDownHandler handler)** Adds a KeyDownEvent handler.
9	**HandlerRegistration addKeyPressHandler(KeyPressHandler handler)** Adds a KeyPressEvent handler.
10	**HandlerRegistration addKeyUpHandler(KeyUpHandler handler)** Adds a KeyUpEvent handler.
11	**HandlerRegistration addMouseDownHandler(MouseDownHandler handler)** Adds a MouseDownEvent handler.

12	**void addMouseListener(MouseListener listener)** Deprecated. Use addMouseOverHandler(com.google.gwt.event.dom.client.MouseOverHandler), addMouseMoveHandler(com.google.gwt.event.dom.client.MouseMoveHandler), addMouseDownHandler(com.google.gwt.event.dom.client.MouseDownHandler), addMouseUpHandler(com.google.gwt.event.dom.client.MouseUpHandler) and addMouseOutHandler(com.google.gwt.event.dom.client.MouseOutHandler) instead
13	**HandlerRegistration addMouseMoveHandler(MouseMoveHandler handler)** Adds a MouseMoveEvent handler.
14	**HandlerRegistration addMouseOutHandler(MouseOutHandler handler)** Adds a MouseOutEvent handler.
15	**HandlerRegistration addMouseOverHandler(MouseOverHandler handler)** Adds a MouseOverEvent handler.
16	**HandlerRegistration addMouseUpHandler(MouseUpHandler handler)** Adds a MouseUpEvent handler.
17	**HandlerRegistration addMouseWheelHandler(MouseWheelHandler handler)** Adds a MouseWheelEvent handler.
18	**void addMouseWheelListener(MouseWheelListener listener)** Deprecated. Use addMouseWheelHandler(com.google.gwt.event.dom.client.MouseWheelHandler) instead
19	**int getTabIndex()** Gets the widget's position in the tab index.
20	**void removeClickListener(ClickListener listener)** Deprecated. Use the HandlerRegistration.removeHandler() method on the object returned by addClickHandler(com.google.gwt.event.dom.client.ClickHandler) instead
21	**void removeFocusListener(FocusListener listener)** Deprecated. Use the HandlerRegistration.removeHandler() method on the object returned by addFocusHandler(com.google.gwt.event.dom.client.FocusHandler) instead
22	**void removeKeyboardListener(KeyboardListener listener)** Deprecated. Use the HandlerRegistration.removeHandler() method on the object returned by an add*Handler method instead
23	**void removeMouseListener(MouseListener listener)** Deprecated. Use the HandlerRegistration.removeHandler() method on the object returned by an add*Handler method instead
24	**void removeMouseWheelListener(MouseWheelListener listener)** Deprecated. Use the HandlerRegistration.removeHandler() method on the object returned by addMouseWheelHandler(com.google.gwt.event.dom.client.MouseWheelHandler) instead
25	**void setAccessKey(char key)** Sets the widget's 'access key'.
26	**void setFocus(boolean focused)** Explicitly focus/unfocus this widget.
27	**void setTabIndex(int index)** Sets the widget's position in the tab index.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.SimplePanel
- java.lang.Object

FocusPanel Widget Example

This example will take you through simple steps to show usage of a FocusPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
```

```
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

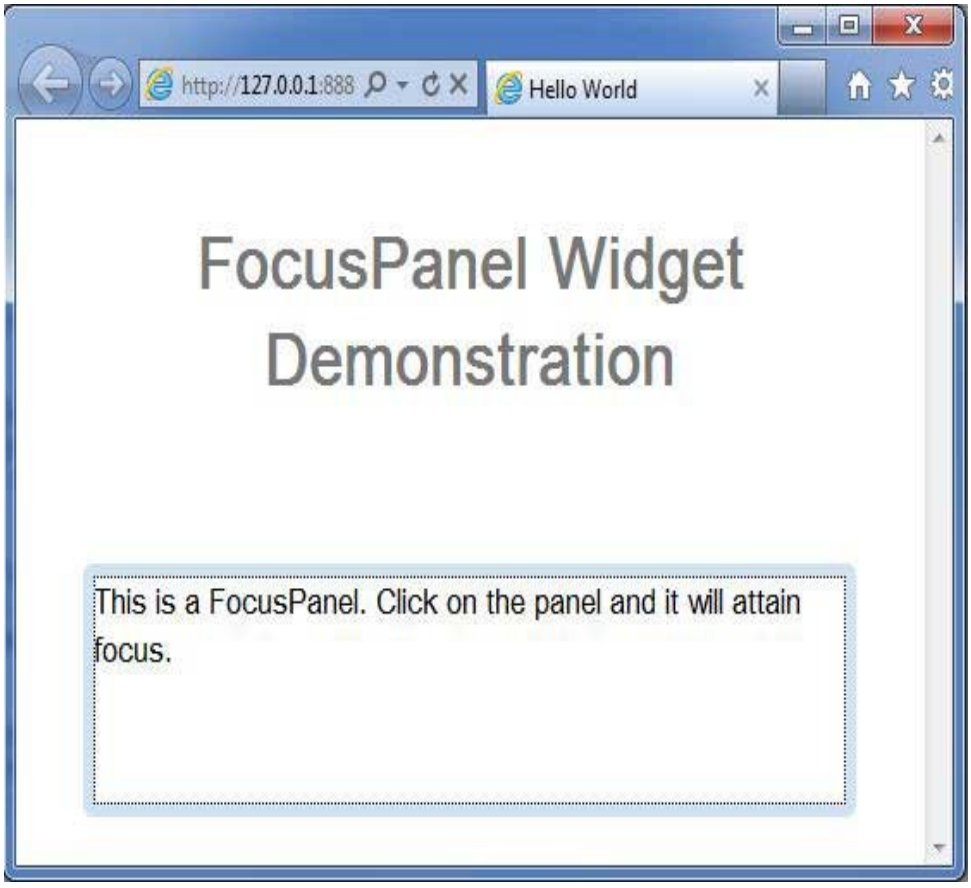
Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>FocusPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of FocusPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.FocusPanel;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.RootPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      // Create text
      HTML contents =new HTML("This is a FocusPanel."
      +" Click on the panel and it will attain focus.");

      //create focus panel with content
      FocusPanel focusPanel =new FocusPanel(contents);
      focusPanel.setSize("400px","100px");

      DecoratorPanel decoratorPanel =new DecoratorPanel();

      decoratorPanel.add(focusPanel);

     // Add the widgets to the root panel.
     RootPanel.get().add(decoratorPanel);
  }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



FormPanel

Introduction

The **FormPanel** widget represents a panel that wraps its contents in an HTML <FORM> element.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.FormPanel** class:

```
public class FormPanel
   extends SimplePanel
      implements FiresFormEvents,
         com.google.gwt.user.client.ui.impl.FormPanelImplHost
```

Class constructors

S.N.	Constructor & Description
1	**FormPanel()** Creates a new FormPanel.

2	**protected FormPanel(Element element)** This constructor may be used by subclasses to explicitly use an existing element.
3	**protected FormPanel(Element element, boolean createIFrame)** This constructor may be used by subclasses to explicitly use an existing element.
4	**FormPanel(NamedFrame frameTarget)** Creates a FormPanel that targets a NamedFrame.
5	**FormPanel(java.lang.String target)** Creates a new FormPanel.

Class methods

Gets the encoding used for submitting this form.

S.N.	Function name & Description
1	**void addFormHandler(FormHandler handler)** Deprecated. Use addSubmitCompleteHandler(com.google.gwt.user.client.ui.FormPanel.SubmitCompleteHandler) and addSubmitHandler(com.google.gwt.user.client.ui.FormPanel.SubmitHandler) instead
2	**HandlerRegistration addSubmitCompleteHandler(FormPanel.SubmitCompleteHandler handler)** Adds a FormPanel.SubmitCompleteEvent handler.
3	**HandlerRegistration addSubmitHandler(FormPanel.SubmitHandler handler)** Adds a FormPanel.SubmitEvent handler.
4	**java.lang.String getAction()** Gets the 'action' associated with this form.
5	**java.lang.String getEncoding()**
6	**java.lang.String getMethod()** Gets the HTTP method used for submitting this form.
7	**java.lang.String getTarget()** Gets the form's 'target'.
8	**protected void onAttach()** This method is called when a widget is attached to the browser's document.
9	**protected void onDetach()** This method is called when a widget is detached from the browser's document.
10	**boolean onFormSubmit()** Fired when a form is submitted.
11	**void onFrameLoad()**
12	**void removeFormHandler(FormHandler handler)** Deprecated. Use the HandlerRegistration.removeHandler() method on the object returned by and add*Handler method instead
13	**void reset()** Resets the form, clearing all fields.

14	**void setAction(java.lang.String url)** Sets the 'action' associated with this form.
15	**void setEncoding(java.lang.String encodingType)** Sets the encoding used for submitting this form.
16	**void setMethod(java.lang.String method)** Sets the HTTP method used for submitting this form.
17	**void submit()** Submits the form.
18	**static FormPanel wrap(Element element)** Creates a FormPanel that wraps an existing <form> element.
19	**static FormPanel wrap(Element element, boolean createIFrame)** Creates a FormPanel that wraps an existing <form> element.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.SimplePanel
- java.lang.Object

FormPanel Widget Example

This example will take you through simple steps to show usage of a FormPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>
```

```
  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>FormPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

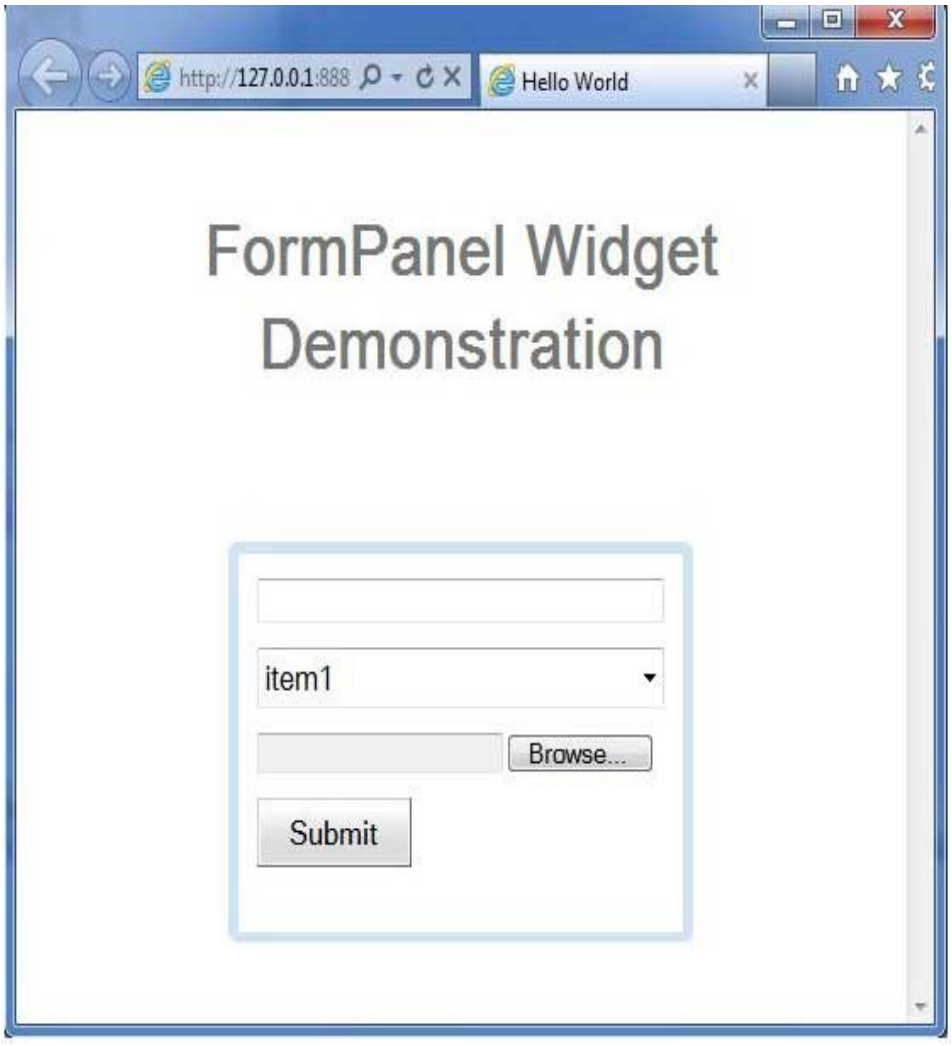
Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of FormPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.FileUpload;
import com.google.gwt.user.client.ui.FormPanel;
import com.google.gwt.user.client.ui.FormPanel.SubmitCompleteEvent;
import com.google.gwt.user.client.ui.FormPanel.SubmitEvent;
import com.google.gwt.user.client.ui.ListBox;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextBox;
import com.google.gwt.user.client.ui.VerticalPanel;
```

```
public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      // Create a FormPanel and point it at a service.
      final FormPanel form =new FormPanel();
      form.setAction("/myFormHandler");

      // Because we're going to add a FileUpload widget,
      // we'll need to set the form to use the POST method,
      // and multipart MIME encoding.
      form.setEncoding(FormPanel.ENCODING_MULTIPART);
      form.setMethod(FormPanel.METHOD_POST);

      // Create a panel to hold all of the form widgets.
      VerticalPanel panel =new VerticalPanel();
      panel.setSpacing(10);
      form.setWidget(panel);

      // Create a TextBox, giving it a name so that it will be   submitted.
      final TextBox tb =new TextBox();
      tb.setWidth("220");

      tb.setName("textBoxFormElement");
      panel.add(tb);

      // Create a ListBox, giving it a name and
      // some values to be associated with its options.
      ListBox lb =new ListBox();
      lb.setName("listBoxFormElement");
      lb.addItem("item1","item1");
      lb.addItem("item2","item2");
      lb.addItem("item3","item3");
      lb.setWidth("220");
      panel.add(lb);

      // Create a FileUpload widget.
      FileUpload upload =new FileUpload();
      upload.setName("uploadFormElement");
      panel.add(upload);

      // Add a 'submit' button.
      panel.add(newButton("Submit",new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            form.submit();
         }
      }));

      // Add an event handler to the form.
      form.addSubmitHandler(new FormPanel.SubmitHandler(){
         @Override
         public void onSubmit(SubmitEvent event){
            // This event is fired just before the form is submitted.
            // We can take this opportunity to perform validation.
            if(tb.getText().length()==0){
               Window.alert("The text box must not be empty");
               event.cancel();
            }
         }
      });


     form.addSubmitCompleteHandler(newFormPanel.
     SubmitCompleteHandler(){
```

```
         @Override
         public void onSubmitComplete(SubmitCompleteEvent event){
            // When the form submission is successfully completed,
            // this event is fired. Assuming the service returned
            // a response of type text/html, we can get the result
            // here.
            Window.alert(event.getResults());
         }
      });

      DecoratorPanel decoratorPanel =new DecoratorPanel();
      decoratorPanel.add(form);
      // Add the widgets to the root panel.
      RootPanel.get().add(decoratorPanel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



PopupPanel

Introduction

The **PopupPanel** widget represents a panel that can **pop up** over other widgets. It overlays the browser's client area (and any previously-created popups).

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.PopupPanel** class:

```
public class PopupPanel
   extends SimplePanel
      implements SourcesPopupEvents,EventPreview,
         HasAnimation,HasCloseHandlers<PopupPanel>
```

Class constructors

S.N.	Constructor & Description
1	**PopupPanel()** Creates an empty popup panel.
2	**PopupPanel(boolean autoHide)** Creates an empty popup panel, specifying its **auto-hide** property.
3	**PopupPanel(boolean autoHide, boolean modal)** Creates an empty popup panel, specifying its **auto-hide** and **modal** properties.

Class methods

S.N.	Function name & Description
1	**void addAutoHidePartner(Element partner)** Mouse events that occur within an autoHide partner will not hide a panel set to autoHide.
2	**HandlerRegistration addCloseHandler(CloseHandler<PopupPanel> handler)** Adds a CloseEvent handler.
3	**void addPopupListener(PopupListener listener)** Deprecated. Use addCloseHandler(com.google.gwt.event.logical.shared.CloseHandler) instead
4	**void center()** Centers the popup in the browser window and shows it.
5	**protected Element getContainerElement()** Override this method to specify that an element other than the root element be the container for the panel's child widget.
6	**protected Element getGlassElement()** Get the glass element used by this PopupPanel.
7	**java.lang.String getGlassStyleName()** Gets the style name to be used on the glass element.
8	**int getOffsetHeight()** Gets the panel's offset height in pixels.
9	**int getOffsetWidth()** Gets the panel's offset width in pixels.

10	**int getPopupLeft()** Gets the popup's left position relative to the browser's client area.
11	**int getPopupTop()** Gets the popup's top position relative to the browser's client area.
12	**protected Element getStyleElement()** Template method that returns the element to which style names will be applied.
13	**java.lang.String getTitle()** Gets the title associated with this object.
14	**void hide()** Hides the popup and detaches it from the page.
15	**void hide(boolean autoClosed)** Hides the popup and detaches it from the page.
16	**boolean isAnimationEnabled()** Returns true if animations are enabled, false if not.
17	**boolean isAutoHideEnabled()** Returns true if the popup should be automatically hidden when the user clicks outside of it.
18	**boolean isAutoHideOnHistoryEventsEnabled()** Returns true if the popup should be automatically hidden when the history token changes, such as when the user presses the browser's back button.
19	**boolean isGlassEnabled()** Returns true if a glass element will be displayed under the PopupPanel.
20	**boolean isModal()** Returns true if keyboard or mouse events that do not target the PopupPanel or its children should be ignored.
21	**boolean isPreviewingAllNativeEvents()** Returns true if the popup should preview all native events, even if the event has already been consumed by another popup.
22	**boolean isShowing()** Determines whether or not this popup is showing.
23	**boolean isVisible()** Determines whether or not this popup is visible.
24	**boolean onEventPreview(Event event)** Deprecated. Use onPreviewNativeEvent(com.google.gwt.user.client.Event.NativePreviewEvent) instead
25	**boolean onKeyDownPreview(char key, int modifiers)** Deprecated. Use onPreviewNativeEvent(com.google.gwt.user.client.Event.NativePreviewEvent) instead
26	**boolean onKeyPressPreview(char key, int modifiers)** Deprecated. Use onPreviewNativeEvent(com.google.gwt.user.client.Event.NativePreviewEvent) instead
27	**boolean onKeyUpPreview(char key, int modifiers)**

	Deprecated. Use onPreviewNativeEvent(com.google.gwt.user.client.Event.NativePreviewEvent) instead
28	**protected void onPreviewNativeEvent(Event.NativePreviewEvent event)**
29	**protected void onUnload()** This method is called immediately before a widget will be detached from the browser's document.
30	**void removeAutoHidePartner(Element partner)** Remove an autoHide partner.
31	**void removePopupListener(PopupListener listener)** Deprecated. Use the HandlerRegistration.removeHandler() method on the object returned by addCloseHandler(com.google.gwt.event.logical.shared.CloseHandler) instead
32	**void setAnimationEnabled(boolean enable)** Enable or disable animations.
33	**void setAutoHideEnabled(boolean autoHide)** Enable or disable the autoHide feature.
34	**void setAutoHideOnHistoryEventsEnabled(boolean enabled)** Enable or disable autoHide on history change events.
35	**void setGlassEnabled(boolean enabled)** When enabled, the background will be blocked with a semi-transparent pane the next time it is shown.
36	**void setGlassStyleName(java.lang.String glassStyleName)** Sets the style name to be used on the glass element.
37	**void setHeight(java.lang.String height)** Sets the height of the panel's child widget.
38	**void setModal(boolean modal)** When the popup is modal, keyboard or mouse events that do not target the PopupPanel or its children will be ignored.
39	**void setPopupPosition(int left, int top)** Sets the popup's position relative to the browser's client area.
40	**void setPopupPositionAndShow(PopupPanel.PositionCallback callback)** Sets the popup's position using a PopupPanel.PositionCallback, and shows the popup.
41	**void setPreviewingAllNativeEvents(boolean previewAllNativeEvents)** When enabled, the popup will preview all native events, even if another popup was opened after this one.
42	**void setTitle(java.lang.String title)** Sets the title associated with this object.
43	**void setVisible(boolean visible)** Sets whether this object is visible.
44	**void setWidget(Widget w)** Sets this panel's widget.
45	**void setWidth(java.lang.String width)** Sets the width of the panel's child widget.

46	**void show()** Shows the popup and attach it to the page.
47	**void showRelativeTo(UIObject target)** Normally, the popup is positioned directly below the relative target, with its left edge aligned with the left edge of the target.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.SimplePanel
- java.lang.Object

PopupPanel Widget Example

This example will take you through simple steps to show usage of a PopupPanel Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                      -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                     -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                       -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                  -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-PopupPanel{
   border:3px solid #000000;
   padding:3px;
   background: white;
}

.gwt-PopupPanelGlass{
   background-color:#000;
   opacity:0.3;
   filter: alpha(opacity=30);
}

.gwt-PopupPanel.popupContent {
   border: none;
   padding:3px;
   background: gray;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>PopupPanel Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

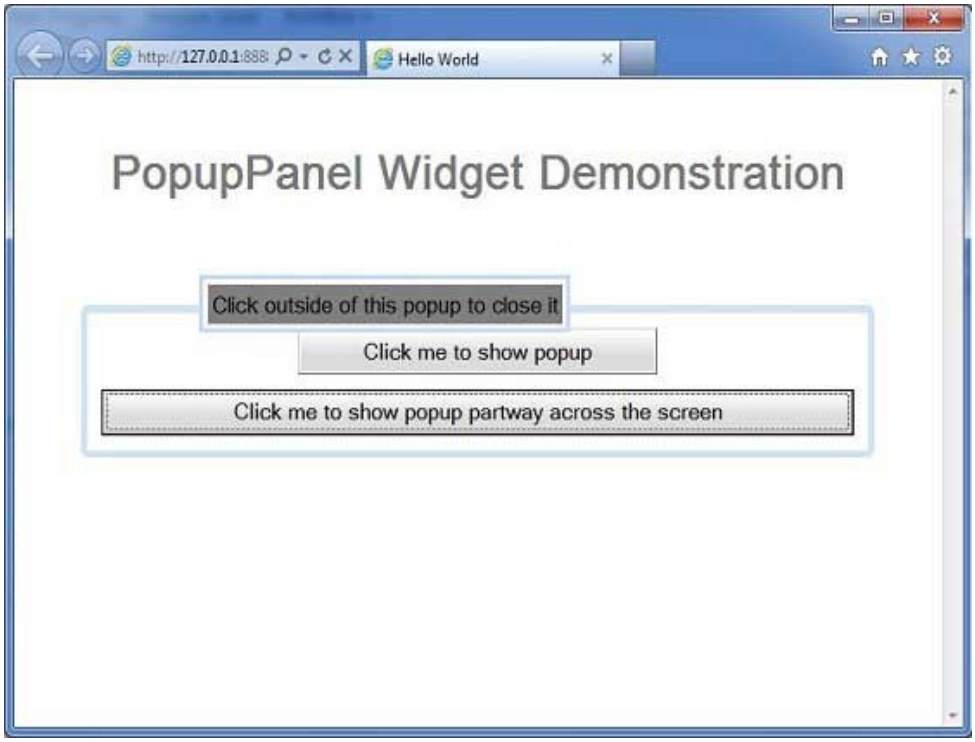
Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of PopupPanel widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HasHorizontalAlignment;
```

```
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.PopupPanel;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   private static class MyPopup extends PopupPanel{

      public MyPopup(){
         // PopupPanel's constructor takes 'auto-hide' as its boolean
         // parameter. If this is set, the panel closes itself
         // automatically when the user clicks outside of it.
         super(true);

         // PopupPanel is a SimplePanel, so you have to set it's widget
         // property to whatever you want its contents to be.
         setWidget(new Label("Click outside of this popup to close  it"));
         }
   }

   public void onModuleLoad(){
      Button b1 =new Button("Click me to show popup");
      b1.addClickHandler(new ClickHandler(){
         public void onClick(ClickEvent event){
         // Instantiate the popup and show it.
         new MyPopup().show();
      }
   });

   Button b2 =new Button("Click me to show popup partway"
   +" across the screen");
   b2.addClickHandler(new ClickHandler(){
      publicvoid onClick(ClickEvent event){
         // Create the new popup.
         final MyPopup popup =new MyPopup();
         // Position the popup 1/3rd of the way down and across
         // the screen, and show the popup. Since the position
         // calculation is based on the offsetWidth and offsetHeight
         // of the popup, you have to use the
         // setPopupPositionAndShow(callback)  method. The alternative
         // would be to call show(), calculate  the left and
         // top positions, and call setPopupPosition(left, top).
         // This would have the ugly side effect of the popup jumping
         // from its original position to its new position.

         popup.setPopupPositionAndShow(new PopupPanel.
         PositionCallback(){
            publicvoid setPosition(int offsetWidth,int offsetHeight){
               int left =(Window.getClientWidth()- offsetWidth)/3;
               int top =(Window.getClientHeight()- offsetHeight)/3;
               popup.setPopupPosition(left, top);
            }
         });
      }
  });
      VerticalPanel panel =new VerticalPanel();
      panel.setHorizontalAlignment(HasHorizontalAlignment.ALIGN_CENTER);
      panel.setSpacing(10);
      panel.add(b1);
      panel.add(b2);

      DecoratorPanel decoratorPanel =new DecoratorPanel();
      decoratorPanel.add(panel);
```

```
        // Add the widgets to the root panel.
        RootPanel.get().add(decoratorPanel);
    }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



DialogBox Widget

Introduction

The **DialogBox** widget represents a form of popup that has a caption area at the top and can be dragged by the user. Unlike a PopupPanel, calls to PopupPanel.setWidth(String) and PopupPanel.setHeight(String) will set the width and height of the dialog box itself, even if a widget has not been added as yet.

Class declaration

Following is the declaration for **com.google.gwt.user.client.ui.DialogBox** class:

```
public class DialogBox
   extends DecoratedPopupPanel
      implements HasHTML,HasSafeHtml,MouseListener
```

Class constructors

S.N.	Constructor & Description
1	**DialogBox()** Creates an empty dialog box.
2	**DialogBox(boolean autoHide)** Creates an empty dialog box, specifying its **auto-hide** property.
3	**DialogBox(boolean autoHide, boolean modal)** Creates an empty dialog box, specifying its **auto-hide** and **modal** properties.

Class methods

S.N.	Function name & Description
1	**protected void beginDragging(MouseDownEvent event)** Called on mouse down in the caption area, begins the dragging loop by turning on event capture.
2	**protected void continueDragging(MouseMoveEvent event)** Called on mouse move in the caption area, continues dragging if it was started by beginDragging(com.google.gwt.event.dom.client.MouseDownEvent).
3	**protected void doAttachChildren()** If a widget contains one or more child widgets that are not in the logical widget hierarchy (the child is physically connected only on the DOM level), it must override this method and call Widget.onAttach() for each of its child widgets.
4	**protected void doDetachChildren()** If a widget contains one or more child widgets that are not in the logical widget hierarchy (the child is physically connected only on the DOM level), it must override this method and call Widget.onDetach() for each of its child widgets.
5	**protected void endDragging(MouseUpEvent event)** Called on mouse up in the caption area, ends dragging by ending event capture.
6	**DialogBox.Caption getCaption()** Provides access to the dialog's caption.
7	**java.lang.String getHTML()** Gets this object's contents as HTML.
8	**java.lang.String getText()** Gets this object's text.
9	**void hide()** Hides the popup and detaches it from the page.
10	**void onBrowserEvent(Event event)** Fired whenever a browser event is received.
11	**protected void onEnsureDebugId(java.lang.String baseID)** Affected Elements: -caption = text at the top of the DialogBox. -content = the container around the content.
12	**void onMouseDown(Widget sender, int x, int y)** Deprecated. Use beginDragging(com.google.gwt.event.dom.client.MouseDownEvent) and

	getCaption() instead
13	**void onMouseEnter(Widget sender)** Deprecated. Use HasMouseOverHandlers.addMouseOverHandler(com.google.gwt.event.dom.client.MouseOverHandler) instead
14	**void onMouseLeave(Widget sender)** Deprecated. Use HasMouseOutHandlers.addMouseOutHandler(com.google.gwt.event.dom.client.MouseOutHandler) instead
15	**void onMouseMove(Widget sender, int x, int y)** Deprecated. Use continueDragging(com.google.gwt.event.dom.client.MouseMoveEvent) and getCaption() instead
16	**void onMouseUp(Widget sender, int x, int y)** Deprecated. Use endDragging(com.google.gwt.event.dom.client.MouseUpEvent) and getCaption() instead
17	**protected void onPreviewNativeEvent(Event.NativePreviewEvent event)**
18	**void setHTML(SafeHtml html)** Sets the html string inside the caption.
19	**void setHTML(java.lang.String html)** Sets the html string inside the caption.
20	**void setText(java.lang.String text)** Sets the text inside the caption.
21	**void show()** Shows the popup and attach it to the page.

Methods inherited

This class inherits methods from the following classes:

- com.google.gwt.user.client.ui.UIObject
- com.google.gwt.user.client.ui.Widget
- com.google.gwt.user.client.ui.Panel
- com.google.gwt.user.client.ui.SimplePanel
- com.google.gwt.user.client.ui.PopupPanel
- com.google.gwt.user.client.ui.DecoratedPopupPanel
- java.lang.Object

DialogBox Widget Example

This example will take you through simple steps to show usage of a DialogBox Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}

.gwt-DialogBox.Caption{
   background:#e3e8f3 url(images/hborder.png) repeat-x 0px -
2003px;
   padding:4px4px4px8px;
   cursor:default;
   border-bottom:1px solid #bbbbbb;
   border-top:5px solid #d0e4f6;
}

.gwt-DialogBox.dialogContent {
}
```

```
.gwt-DialogBox.dialogMiddleCenter {
   padding:3px;
   background: white;
}

.gwt-DialogBox.dialogBottomCenter {
   background: url(images/hborder.png) repeat-x 0px-4px;
-background: url(images/hborder_ie6.png) repeat-x 0px-4px;
}

.gwt-DialogBox.dialogMiddleLeft {
   background: url(images/vborder.png) repeat-y;
}

.gwt-DialogBox.dialogMiddleRight {
   background: url(images/vborder.png) repeat-y -4px0px;
-background: url(images/vborder_ie6.png) repeat-y -4px0px;
}

.gwt-DialogBox.dialogTopLeftInner {
   width:5px;
   zoom:1;
}

.gwt-DialogBox.dialogTopRightInner {
   width:8px;
   zoom:1;
}

.gwt-DialogBox.dialogBottomLeftInner {
   width:5px;
   height:8px;
   zoom:1;
}

.gwt-DialogBox.dialogBottomRightInner {
   width:5px;
   height:8px;
   zoom:1;
}

.gwt-DialogBox.dialogTopLeft {
   background: url(images/corner.png)no-repeat -13px0px;
-background: url(images/corner_ie6.png)no-repeat -13px0px;
}

.gwt-DialogBox.dialogTopRight {
   background: url(images/corner.png)no-repeat -18px0px;
-background: url(images/corner_ie6.png)no-repeat -18px0px;
}

.gwt-DialogBox.dialogBottomLeft {
   background: url(images/corner.png)no-repeat 0px-15px;
-background: url(images/corner_ie6.png)no-repeat 0px-15px;
}

.gwt-DialogBox.dialogBottomRight {
```

```
   background: url(images/corner.png)no-repeat -5px-15px;
-background: url(images/corner_ie6.png)no-repeat -5px-15px;
}

html>body .gwt-DialogBox{
}

* html .gwt-DialogBox.dialogTopLeftInner {
   width:5px;
   overflow: hidden;
}

* html .gwt-DialogBox.dialogTopRightInner {
   width:8px;
   overflow: hidden;
}

* html .gwt-DialogBox.dialogBottomLeftInner {
   width:5px;
   height:8px;
   overflow: hidden;
}

* html .gwt-DialogBox.dialogBottomRightInner {
   width:8px;
   height:8px;
   overflow: hidden;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

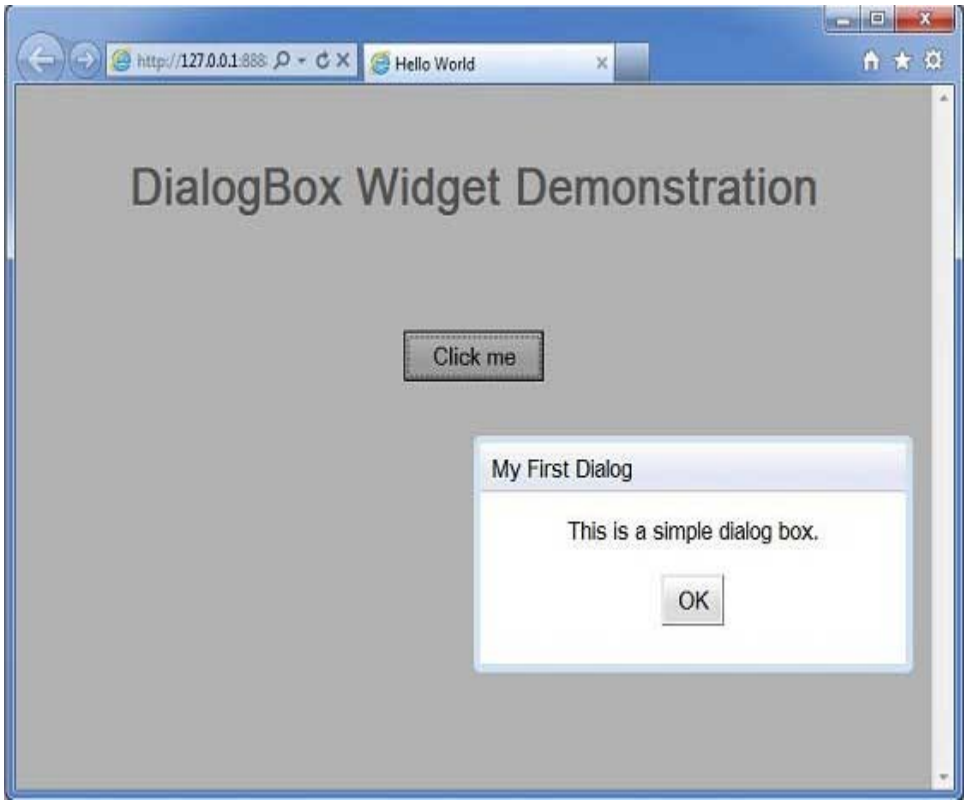
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>DialogBox Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of DialogBox widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.DialogBox;
import com.google.gwt.user.client.ui.HasHorizontalAlignment;
import com.google.gwt.user.client.ui.Label;
```

```
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   private static class MyDialog extends DialogBox{

      public MyDialog(){
         // Set the dialog box's caption.
         setText("My First Dialog");

         // Enable animation.
         setAnimationEnabled(true);

         // Enable glass background.
         setGlassEnabled(true);

         // DialogBox is a SimplePanel, so you have to set its widget
         // property to whatever you want its contents to be.
         Button ok =new Button("OK");
         ok.addClickHandler(new ClickHandler(){
            public void onClick(ClickEventevent){
            MyDialog.this.hide();
            }
         });

         Label label =new Label("This is a simple dialog box.");

         VerticalPanel panel =new VerticalPanel();
         panel.setHeight("100");
         panel.setWidth("300");
         panel.setSpacing(10);
         panel.setHorizontalAlignment(HasHorizontalAlignment.
         ALIGN_CENTER);
         panel.add(label);
         panel.add(ok);

         setWidget(panel);
      }
   }

  public void onModuleLoad(){
     Button b =new Button("Click me");
     b.addClickHandler(new ClickHandler(){
        @Override
        public void onClick(ClickEvent event){
           // Instantiate the dialog box and show it.
           MyDialog myDialog =new MyDialog();
           int left =Window.getClientWidth()/2;
           int top =Window.getClientHeight()/2;
           myDialog.setPopupPosition(left, top);
           myDialog.show();
        }
     });

    RootPanel.get().add(b);
  }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:


Hello World
DialogBox Widget Demonstration
Click me
My First Dialog
This is a simple dialog box.
OK

CHAPTER

11

Event Handling

This section shows Event handling under Google Web Toolkit:

GWT provides a event handler model similar to Java AWT or SWING User Interface frameworks.

- A listener interface defines one or more methods that the widget calls to announce an event. GWT provides a list of interfaces corresponding to various possible events.
- A class wishing to receive events of a particular type implements the associated handler interface and then passes a reference to itself to the widget to subscribe to a set of events.
- For example, the Button class publishes click events so you will have to write a class to implementClickHandler to handle click event.

Event Handler Interfaces

All GWT event handlers have been extended from *EventHandler* interface and each handler has only a single method with a single argument. This argument is always an object of associated event type. Each **event** object have a number of methods to manipulate the passed event object. For example for click event you will have to write your handler as follows:

```
/**
 * create a custom click handler which will call
 * onClick method when button is clicked.
 */
public class MyClickHandler implements ClickHandler{
   @Override
   public void onClick(ClickEvent event){
   Window.alert("Hello World!");
  }
}
```

Now any class wishing to receive click events will call **addClickHandler()** to register an event handler as follows:

```
/**
 * create button and attach click handler
 */
```

```
Button button = new Button("Click Me!");
button.addClickHandler(new MyClickHandler());
```

Each widget supporting an event type will have a method of the form HandlerRegistration add**Foo**Handler(**Foo**Event) where **Foo** is the actual event like Click, Error, KeyPress etc.

Following is the list of important GWT event handlers and associated events and handler registration methods:

S.N.	Event Interface	Event Method & Description
1	BeforeSelectionHandler<I>	**void onBeforeSelection(BeforeSelectionEvent<I> event);** Called when BeforeSelectionEvent is fired.
2	BlurHandler	**void onBlur(BlurEvent event);** Called when BlurEvent is fired.
3	ChangeHandler	**void onChange(ChangeEvent event) ;** Called when a change event is fired.
4	ClickHandler	**void onClick(ClickEvent event);** Called when a native click event is fired.
5	CloseHandler<T>	**void onClose(CloseEvent<T> event) ;** Called when CloseEvent is fired.
6	ContextMenuHandler	**void onContextMenu(ContextMenuEvent event);** Called when a native context menu event is fired.
7	DoubleClickHandler	**void onDoubleClick(DoubleClickEvent event);** Called when a DoubleClickEvent is fired.
8	ErrorHandler	**void onError(ErrorEvent event);** Called when ErrorEvent is fired.
9	FocusHandler	**void onFocus(FocusEvent event) ;** Called when FocusEvent is fired.
10	FormPanel.SubmitCompleteHandler	**void onSubmitComplete(FormPanel.SubmitCompleteEvent event) ;** Fired when a form has been submitted successfully.
11	FormPanel.SubmitHandler	**void onSubmit(FormPanel.SubmitEvent event);** Fired when the form is submitted.
12	KeyDownHandler	**void onKeyDown(KeyDownEvent event);** Called when KeyDownEvent is fired.
13	KeyPressHandler	**void onKeyPress(KeyPressEvent event) ;** Called when KeyPressEvent is fired.
14	KeyUpHandler	**void onKeyUp(KeyUpEvent event) ;** Called when KeyUpEvent is fired.
15	LoadHandler	**void onLoad(LoadEvent event);** Called when LoadEvent is fired.
16	MouseDownHandler	**void onMouseDown(MouseDownEvent event) ;** Called when MouseDown is fired.
17	MouseMoveHandler	**void onMouseMove(MouseMoveEvent event);** Called when MouseMoveEvent is fired.
18	MouseOutHandler	**void onMouseOut(MouseOutEvent event) ;** Called when MouseOutEvent is fired.

19	MouseOverHandler	**void onMouseOver(MouseOverEvent event);** Called when MouseOverEvent is fired.
20	MouseUpHandler	**void onMouseUp(MouseUpEvent event) ;** Called when MouseUpEvent is fired.
21	MouseWheelHandler	**void onMouseWheel(MouseWheelEvent event) ;** Called when MouseWheelEvent is fired.
22	ResizeHandler	**void onResize(ResizeEvent event) ;** Fired when the widget is resized.
23	ScrollHandler	**void onScroll(ScrollEvent event) ;** Called when ScrollEvent is fired.
24	SelectionHandler<I>	**void onSelection(SelectionEvent<I> event) ;** Called when SelectionEvent is fired.
25	ValueChangeHandler<I>	**void onValueChange(ValueChangeEvent<I> event) ;** Called when ValueChangeEvent is fired.
26	Window.ClosingHandler	**void onWindowClosing(Window.ClosingEvent event) ;** Fired just before the browser window closes or navigates to a different site.
27	Window.ScrollHandler	**void onWindowScroll(Window.ScrollEvent event) ;** Fired when the browser window is scrolled.

Event Methods

As mentioned earlier, each handler has a single method with a single argument which holds the event object, for example *void onClick(ClickEvent event)* or *void onKeyDown(KeyDownEvent event)*. The event objects like *ClickEvent* and *KeyDownEvent* has few common methods which are listed below:

S.N.	Method & Description
1	**protected void dispatch(ClickHandler handler)** This method Should only be called by HandlerManager
2	**DomEvent.Type <FooHandler> getAssociatedType()** This method returns the type used to register **Foo** event.
3	**static DomEvent.Type<FooHandler> getType()** This method gets the event type associated with **Foo** events.
4	**public java.lang.Object getSource()** This method returns the source that last fired this event.
5	**protected final boolean isLive()** This method returns whether the event is live.
6	**protected void kill()** This method kills the event

Example

This example will take you through simple steps to show usage of a **Click** Event and **KeyDown** Event handling in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.

3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

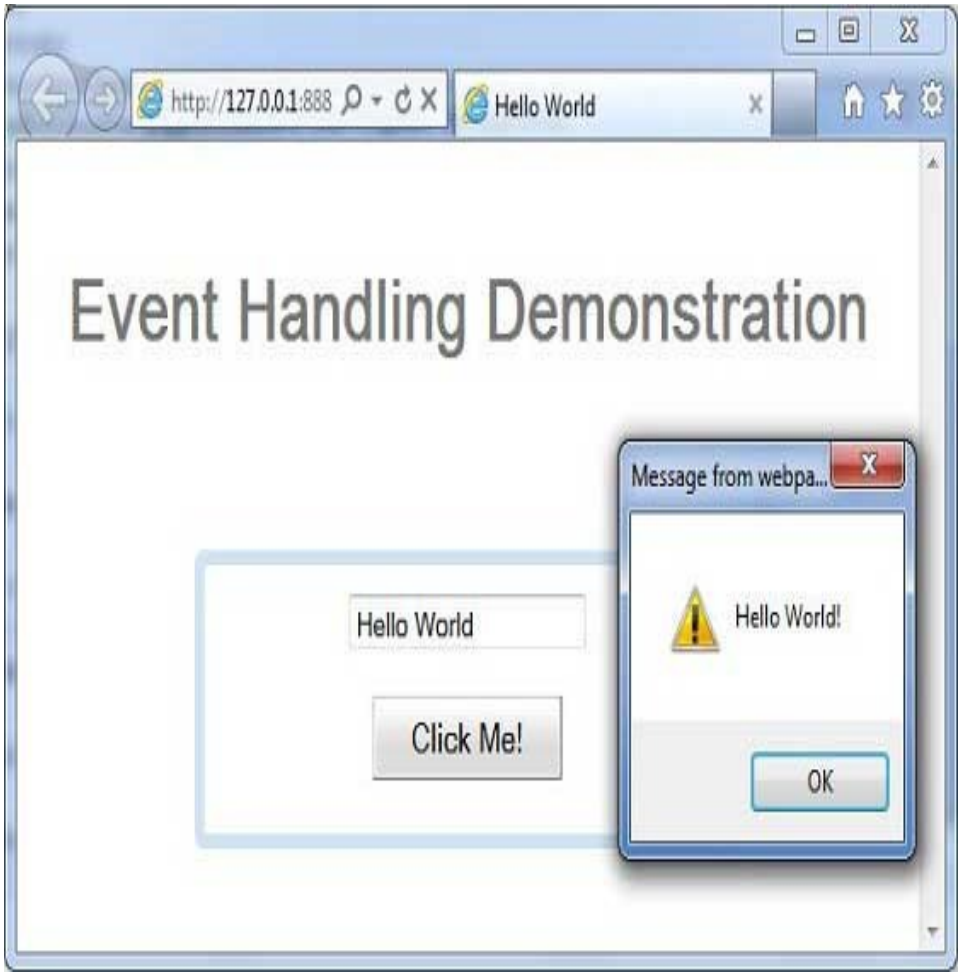
```
<html>
<head>
<title>Hello World</title>
   <link rel="stylesheet" href="HelloWorld.css"/>
   <script language="javascript" src="helloworld/helloworld.nocache.js">
   </script>
</head>
<body>

<h1>Event Handling Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of Event Handling in GWT.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.event.dom.client.KeyCodes;
import com.google.gwt.event.dom.client.KeyDownEvent;
import com.google.gwt.event.dom.client.KeyDownHandler;
import com.google.gwt.user.client.Window;
```

```
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HasHorizontalAlignment;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextBox;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      /**
      * create textbox and attach key down handler
      */
      TextBox textBox =new TextBox();
      textBox.addKeyDownHandler(new MyKeyDownHandler());

      /*
      * create button and attach click handler
      */
      Button button =new Button("Click Me!");
      button.addClickHandler(new MyClickHandler());

      VerticalPanel panel =new VerticalPanel();
      panel.setSpacing(10);
      panel.setHorizontalAlignment(HasHorizontalAlignment.
      ALIGN_CENTER);
      panel.setSize("300","100");
      panel.add(textBox);
      panel.add(button);

      DecoratorPanel decoratorPanel =new DecoratorPanel();
      decoratorPanel.add(panel);
      RootPanel.get("gwtContainer").add(decoratorPanel);
   }

     /**
      * create a custom click handler which will call
      * onClick method when button is clicked.
      */
   private class MyClickHandler implements ClickHandler{
      @Override
      public void onClick(ClickEvent event){
         Window.alert("Hello World!");
      }
   }

   /**
    * create a custom key down handler which will call
    * onKeyDown method when a key is down in textbox.
    */
   privateclassMyKeyDownHandler implements KeyDownHandler{
      @Override
      public void onKeyDown(KeyDownEvent event){
         if(event.getNativeKeyCode()==KeyCodes.KEY_ENTER){
            Window.alert(((TextBox)event.getSource()).getValue());
         }
      }
  }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:


http://127.0.0.1:888
Hello World
Event Handling Demonstration
Hello World
Click Me!
Message from webpa...
Hello World!
OK

CHAPTER

12

Custom Widgets

This section describes the Custom Widgets used under Google Web Toolkit:

GWT provides three ways to create custom user interface elements. There are three general strategies to follow:

- Create a widget by extending Composite Class: This is the most common and easiest way to create custom widgets. Here you can use existing widgets to create composite view with custom properties.
- Create a widget using GWT DOM API in JAVA: GWT basic widgets are created in this way. Still its a very complicated way to create custom widget and should be used cautiously.
- Use JavaScript and wrap it in a widget using JSNI: This should generally only be done as a last resort. Considering the cross-browser implications of the native methods, it becomes very complicated and also becomes more difficult to debug.

Create Custom Widget with Composite Class

This example will take you through simple steps to show creation of a Custom Widget in GWT. Follow the following steps to update the GWT application we created in *GWT - Basic Widgets* chapter:

Here we are going to create a custom widget by extending Composite class, which is the easiest way to build custom widgets.

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <sourcepath='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>Custom Widget Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

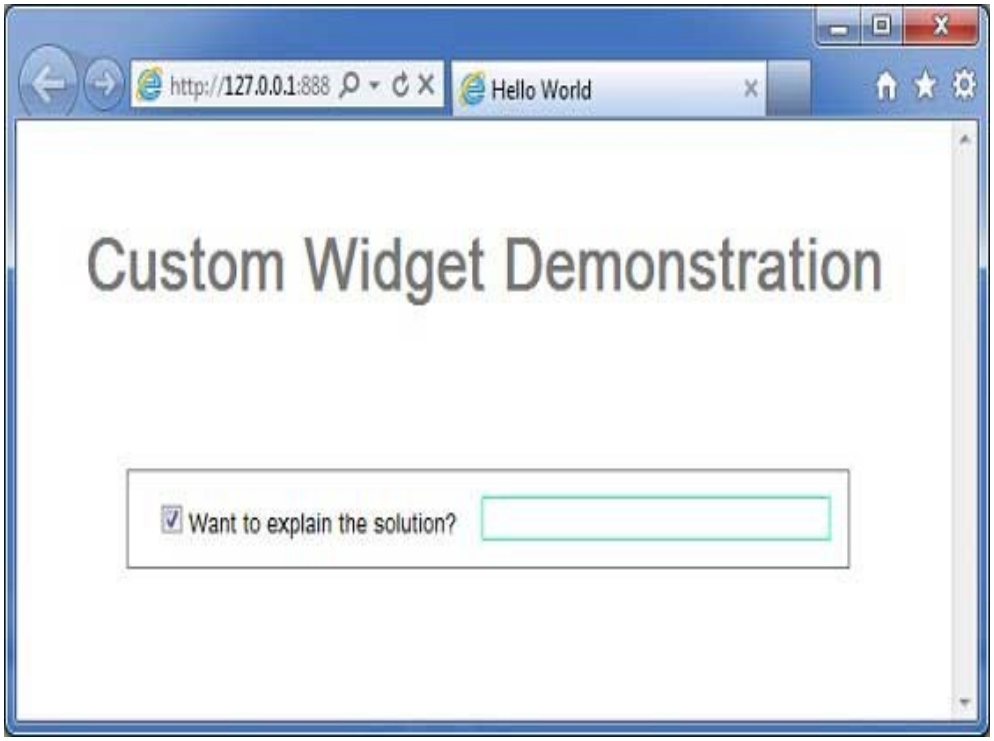
Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate creation of a Custom widget.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.user.client.ui.CheckBox;
import com.google.gwt.user.client.ui.Composite;
import com.google.gwt.user.client.ui.HorizontalPanel;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextBox;

public class HelloWorld implements EntryPoint{

/**
   * A composite of a TextBox and a CheckBox that optionally enables it.
```

```
   */
   private static class OptionalTextBox extends Composite implements
   ClickHandler{

      private TextBox textBox =new TextBox();
      private CheckBox checkBox =new CheckBox();
      private boolean enabled =true;

      public boolean isEnabled(){
         return enabled;
      }

      public void setEnabled(boolean enabled){
         this.enabled = enabled;
      }

      /**
      * Style this widget using .optionalTextWidget CSS class.<br/>
      * Style textbox using .optionalTextBox CSS class.<br/>
      * Style checkbox using .optionalCheckBox CSS class.<br/>
      * Constructs an OptionalTextBox with the given caption
      * on the check.
      * @param caption the caption to be displayed with the check box
      */
      public OptionalTextBox(String caption){
         // place the check above the text box using a vertical panel.
         HorizontalPanel panel =new HorizontalPanel();
         // panel.setBorderWidth(1);
         panel.setSpacing(10);
         panel.add(checkBox);
         panel.add(textBox);

         // all composites must call initWidget() in their constructors.
         initWidget(panel);

         //set style name for entire widget
         setStyleName("optionalTextWidget");

         //set style name for text box
         textBox.setStyleName("optionalTextBox");

         //set style name for check box
         checkBox.setStyleName("optionalCheckBox");
         textBox.setWidth("200");

         // Set the check box's caption, and check it by default.
         checkBox.setText(caption);
         checkBox.setValue(enabled);
         checkBox.addClickHandler(this);
         enableTextBox(enabled,checkBox.getValue());
       }

     public void onClick(ClickEvent event){
        if(event.getSource()== checkBox){
           // When the check box is clicked,
           //update the text box's enabled state.
           enableTextBox(enabled,checkBox.getValue());
        }
     }

     private void enableTextBox(boolean enable,boolean isChecked){
        enable =(enable && isChecked)||(!enable &&!isChecked);
        textBox.setStyleDependentName("disabled",!enable);
       textBox.setEnabled(enable);
     }
   }

   public void onModuleLoad(){
```

```
        // Create an optional text box and add it to the root panel.
        OptionalTextBox otb =new OptionalTextBox("Want to explain the solution?");
        otb.setEnabled(true);
        RootPanel.get().add(otb);
    }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



You can notice following points

- Creation of Custom Widget by extending Composite widget is pretty easy.
- We've created a widget with GWT inbuilt widgets, TextBox and CheckBox thus using the concept of reusability.
- TextBox get disabled/enabled depending on state of checkbox. We've provided an API to enable/disable the control.
- We've exposed internal widgets styles via documented CSS styles.

CHAPTER

13

UIBinder

This section describes the UI Binder under Google Web Toolkit:

The UIBinder under Google Web Toolkit is a framework which allows developers to build GWT applications.

Introduction

- The UiBinder is a framework designed to separate Functionality and View of User Interface.
- The UiBinder framework allows developers to build gwt applications as HTML pages with GWT widgets configured throughout them.
- The UiBinder framework makes easier collaboration with UI designers who are more comfortable with XML, HTML and CSS than Java source code
- The UIBinder provides a declarative way of defining User Interface.
- The UIBinder seperates the programmic logic from UI.
- The UIBinder is similar to what JSP is to Servlets.

UiBinder workflow

Step 1: Create UI Declaration XML File

Create a XML/HTML based User Interface declaration file. We've created a **Login.ui.xml** file in our example.

```
<ui:UiBinder xmlns:ui='urn:ui:com.google.gwt.uibinder'
    xmlns:gwt='urn:import:com.google.gwt.user.client.ui'
    xmlns:res='urn:with:com.tutorialspoint.client.LoginResources'>
    <ui:withtype="com.tutorialspoint.client.LoginResources"field="res">
    </ui:with>
    <gwt:HTMLPanel>
```

```
    ...
    </gwt:HTMLPanel>
</ui:UiBinder>
```

Step 2: Use ui:field for Later Binding

Use ui:field attribute in XML/HTML element to relate UI field in XML with UI field in JAVA file for later binding.

```
<gwt:Label ui:field="completionLabel1"/>
<gwt:Label ui:field="completionLabel2"/>
```

Step 3: Create Java counterpart of UI XML

Create Java based counterpart of XML based layout by extending Composite widget. We've created a**Login.java** file in our example.

```
package com.tutorialspoint.client;
...
public class Login extends Composite{
...
}
```

Step 4: Bind Java UI fields with UiField annotation

use @UiField annotation in **Login.java** to designate counterpart class members to bind to XML-based fields in **Login.ui.xml**

```
public class Login extends Composite{
   ...
   @UiField
   Label completionLabel1;

   @UiField
   Label completionLabel2;
   ...
}
```

Step 5: Bind Java UI with UI XML with UiTemplate annotation

Instruct GWT to bind java based component **Login.java** and XML based layout **Login.ui.xml** using @UiTemplate annotation

```
public class Login extends Composite{

   private static LoginUiBinder uiBinder = GWT.create(LoginUiBinder.class);

   /*
   * @UiTemplate is not mandatory but allows multiple XML templates
   * to be used for the same widget.
   * Default file loaded will be <class-name>.ui.xml
   */
   @UiTemplate("Login.ui.xml")
      interface LoginUiBinder extends UiBinder<Widget,Login>{
   }
   ...
}
```

Step 6: Create CSS File

Create an external CSS file**Login.css** and Java based Resource **LoginResources.java** file equivalent to css styles

```
.blackText {
   font-family:Arial,Sans-serif;
   color:#000000;
   font-size:11px;
   text-align: left;
}
...
```

Step 7: Create Java based Resource File for CSS File

```
package com.tutorialspoint.client;
...
public interface LoginResources extends ClientBundle{
   public interface MyCss extends CssResource{
      String blackText();

      ...
   }

   @Source("Login.css")
   MyCss style();
}
```

Step 8: Attach CSS resource in Java UI Code file.

Attach an external CSS file**Login.css** using Contructor of Java based widget class **Login.java**

```
public Login(){
   this.res = GWT.create(LoginResources.class);
   res.style().ensureInjected();
   initWidget(uiBinder.createAndBindUi(this));
}
```

UIBinder Complete Example

This example will take you through simple steps to show usage of a UIBinder in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
```

```
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>
  <!-- Inherit the UiBinder module.                               -->
  <inherits name="com.google.gwt.uibinder.UiBinder"/>
  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

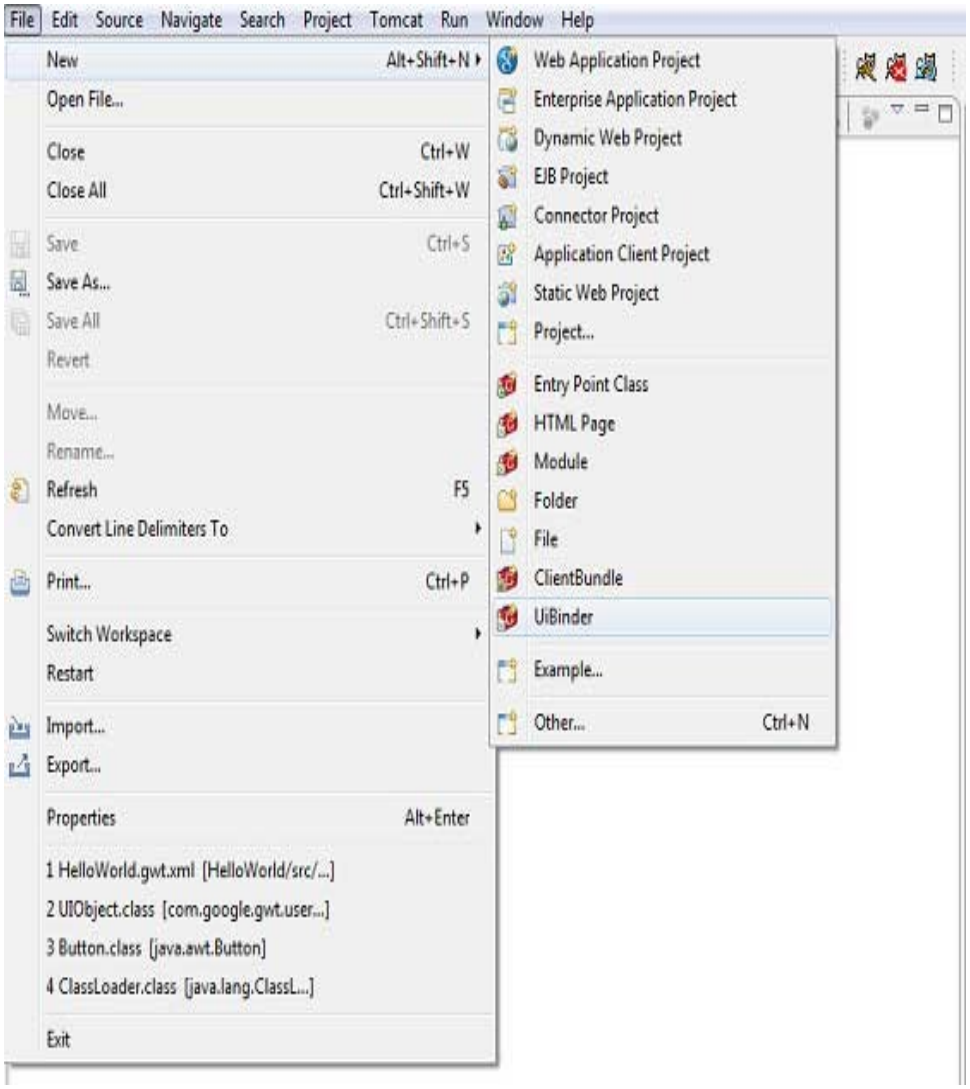
Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

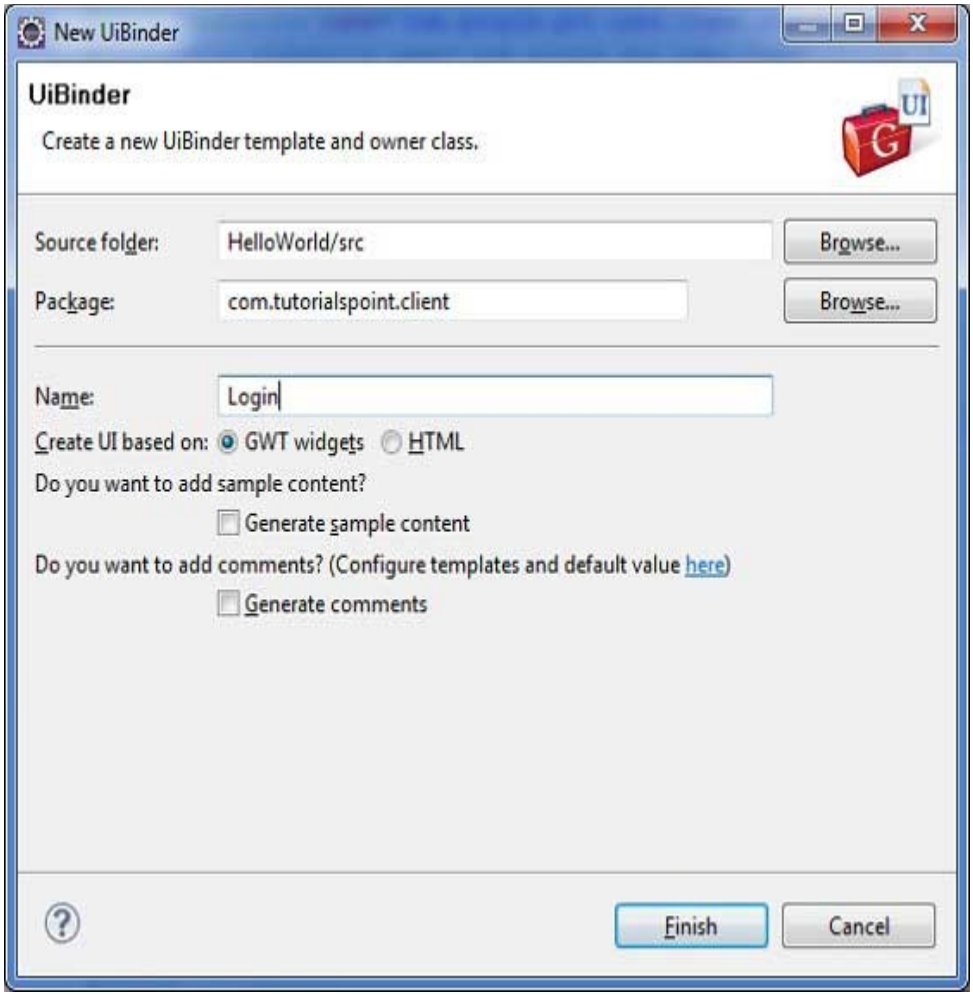
Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<h1>UiBinder Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Now create a new UiBinder template and owner class (File -> New -> UiBinder).



Choose the client package for the project and then name it Login. Leave all of the other defaults.Click Finish button and the plugin will create a new UiBinder template and owner class.



Now create Login.css file in the **src/com.tutorialspoint/client** package and place the following contents in it

```
.blackText {
   font-family:Arial,Sans-serif;
   color:#000000;
   font-size:11px;
   text-align: left;
}

.redText {
   font-family:Arial,Sans-serif;
   color:#ff0000;
   font-size:11px;
   text-align: left;
}

.loginButton {
   border:1px solid #3399DD;
   color:#FFFFFF;
   background:#555555;
   font-size:11px;
   font-weight: bold;
   margin:05px00;
   padding:4px10px5px;
```

```
   text-shadow:0-1px0#3399DD;
}

.box {
   border:1px solid #AACCEE;
   display: block;
   font-size:12px;
   margin:005px;
   padding:3px;
   width:203px;
}

.background {
   background-color:#999999;
   border:1px none transparent;
   color:#000000;
   font-size:11px;
   margin-left:-8px;
   margin-top:5px;
   padding:6px;
}
```

Now create LoginResources.java file in the **src/com.tutorialspoint/client** package and place the following contents in it

```
package com.tutorialspoint.client;

import com.google.gwt.resources.client.ClientBundle;
import com.google.gwt.resources.client.CssResource;

public interface LoginResources extends ClientBundle{
   /**
   * Sample CssResource.
   */
   public interface MyCss extends CssResource{
      String blackText();
      String redText();
      String loginButton();
      String box();
      String background();
   }

   @Source("Login.css")
   MyCss style();
}
```

Replace the contents of Login.ui.xml in **src/com.tutorialspoint/client** package with the following

```
<ui:UiBinder xmlns:ui='urn:ui:com.google.gwt.uibinder'
    xmlns:gwt='urn:import:com.google.gwt.user.client.ui'
    xmlns:res='urn:with:com.tutorialspoint.client.LoginResources'>
    <ui:with type="com.tutorialspoint.client.LoginResources"field="res">
    </ui:with>
    <gwt:HTMLPanel>
       <div align="center">
          <gwt:VerticalPanel res:styleName="style.background">
            <gwt:Label text="Login" res:styleName="style.greyText"/>
            <gwt:TextBoxui:field="loginBox" res:styleName="style.box"/>
            <gwt:Label text="Password" res:styleName="style.greyText"/>
            <gwt:PasswordTextBox ui:field="passwordBox"
            res:styleName="style.box"/>
            <gwt:HorizontalPanel verticalAlignment="middle">
              <gwt:Buttonui:field="buttonSubmit" text="Submit"
              res:styleName="style.loginButton"/>
```

```
            <gwt:CheckBoxui:field="myCheckBox"/>
            <gwt:Label ui:field="myLabel" text="Remember me"
            res:styleName="style.greyText"/>
          </gwt:HorizontalPanel>
          <gwt:Label ui:field="completionLabel1"
          res:styleName="style.greyText"/>
          <gwt:Label ui:field="completionLabel2"
          res:styleName="style.greyText"/>
        </gwt:VerticalPanel>
      </div>
   </gwt:HTMLPanel>
</ui:UiBinder>
```

Replace the contents of Login.java in **src/com.tutorialspoint/client** package with the following

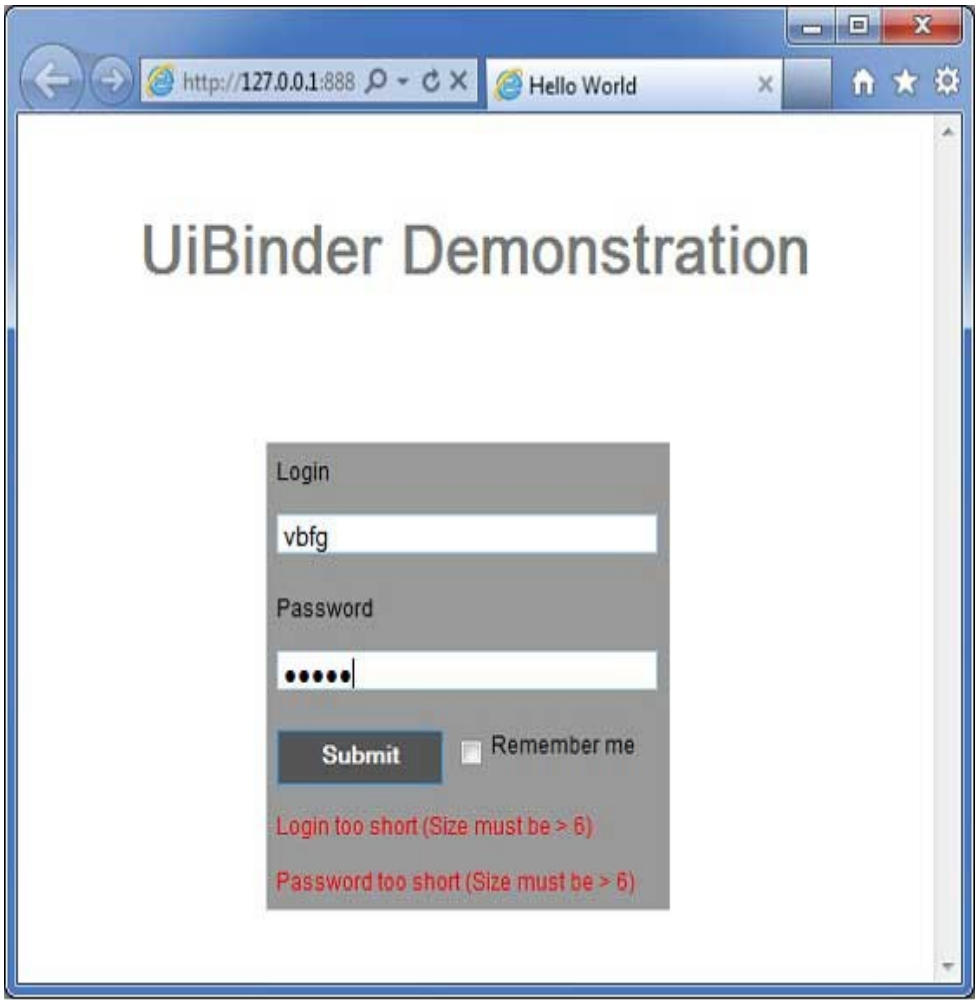
```
package com.tutorialspoint.client;

import com.google.gwt.core.client.GWT;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.logical.shared.ValueChangeEvent;
import com.google.gwt.uibinder.client.UiBinder;
import com.google.gwt.uibinder.client.UiField;
import com.google.gwt.uibinder.client.UiHandler;
import com.google.gwt.uibinder.client.UiTemplate;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.Composite;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.TextBox;
import com.google.gwt.user.client.ui.Widget;

public class Login extends Composite{

   private static LoginUiBinder uiBinder = GWT.create(LoginUiBinder.class);

   /*
    * @UiTemplate is not mandatory but allows multiple XML templates
    * to be used for the same widget.
    * Default file loaded will be <class-name>.ui.xml
   */
   @UiTemplate("Login.ui.xml")
      interface LoginUiBinder extends UiBinder<Widget,Login>{
   }

   @UiField(provided =true)
   final LoginResources res;

   public Login(){
      this.res = GWT.create(LoginResources.class);
      res.style().ensureInjected();
      initWidget(uiBinder.createAndBindUi(this));
   }

   @UiField
   TextBox loginBox;

   @UiField
   TextBox passwordBox;

   @UiField
   Label completionLabel1;

   @UiField
   Label completionLabel2;

   private Boolean tooShort =false;

   /*
```

```
   * Method name is not relevant, the binding is done according to the
    class of the parameter.
   */
   @UiHandler("buttonSubmit")
   void doClickSubmit(ClickEvent event){
      if(tooShort){
         Window.alert("Login Successful!");
      }else{
         Window.alert("Login or Password is too short!");
      }
   }

   @UiHandler("loginBox")
   void handleLoginChange(ValueChangeEvent<String> event){
      if(event.getValue().length()<6){
         completionLabel1.setText("Login too short (Size must be > 6)");
         tooShort =true;
      }else{
         tooShort =false;
         completionLabel1.setText("");
      }
   }

   @UiHandler("passwordBox")
   void handlePasswordChange(ValueChangeEvent<String> event){
      if(event.getValue().length()<6){
         tooShort =true;
         completionLabel2.setText("Password too short (Size must be > 6)");
      }else{
         tooShort =false;
         completionLabel2.setText("");
      }
   }
}
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** which will demonstrate use of UiBinder.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.user.client.ui.RootPanel;

public class HelloWorld implements EntryPoint{
   public void onModuleLoad(){
      RootPanel.get().add(new Login());
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:


http://127.0.0.1:888
Hello World
UiBinder Demonstration
Login
vbfg
Password
Submit
Remember me
Login too short (Size must be > 6)
Password too short (Size must be > 6)

CHAPTER

14

RPC Communication

This section describes RPC Communication under Google Web Toolkit:

A GWT based application is generally consists of a client side module and server side module. Client side code runs in browser and server side code runs in web server. Client side code has to make an HTTP request accross the network to access server side data.

RPC, Remote Procedure Call is the mechansim used by GWT in which client code can directly executes the server side methods.

- GWT RPC is servlet based.
- GWT RPC is asynchronous and client is never blocked during communication.
- Using GWT RPC Java objects can be sent directly between the client and the server (which are automatically serialized by the GWT framework).
- Server-side servlet is termed as service.
- Remote procedure call that is calling methods of server side servlets from client side code is referred to as invoking a service.

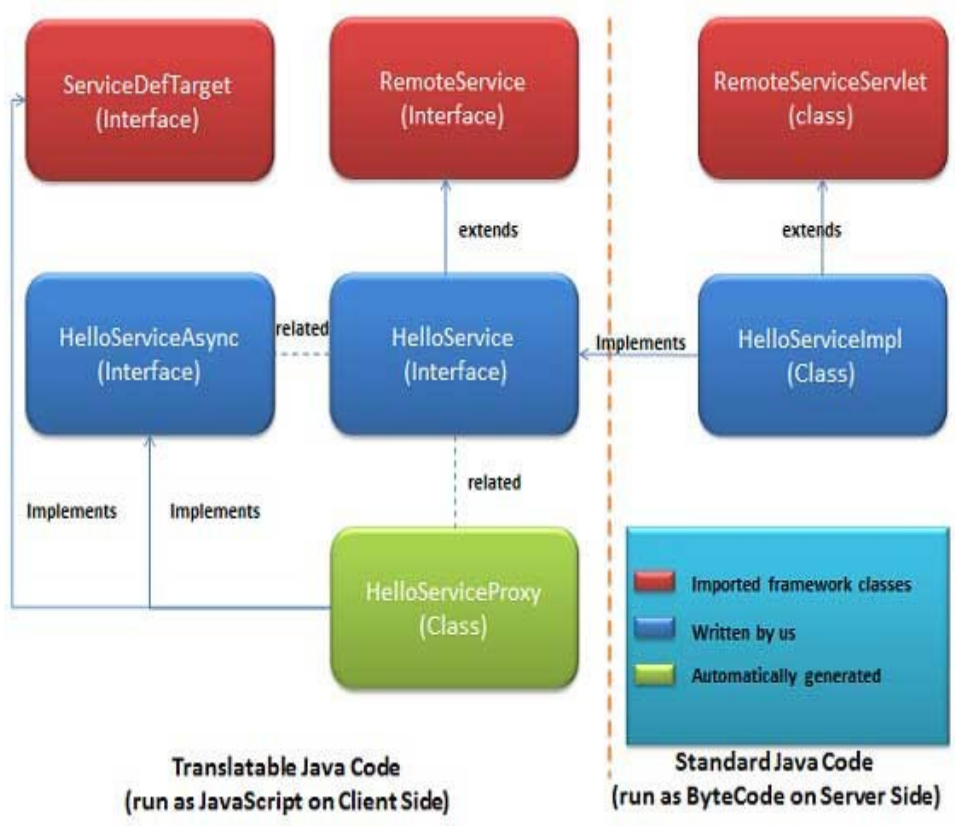
GWT RPC Components

Following are the three components used in GWT RPC communication mechanism

- A remote service (server-side servlet) that runs on the server.
- Client code to invoke that service.
- Java data objects which will be passed between client and server.

GWT client and server both serialize and deserialize data automatically so developers are not required to serialize/deserialize objects and data objects can travel over HTTP.

Following diagram is showing the RPC Architecture.



To start using RPC, we're required to follow the GWT conventions.

RPC Communication workflow

Step 1: Create a Serializable Model Class

Define a java model object at client side which should be serializable.

```
public class Message implements Serializable{
   ...
   private String message;
   public Message(){};

   public void setMessage(String message){
      this.message = message;
   }
   ...
}
```

Step 2: Create a Service Interface

Define an interface for service on client side that extends RemoteService listing all service methods.

Use annotation @RemoteServiceRelativePath to map the service with a default path of remote servlet relative to the module base URL.

```
@RemoteServiceRelativePath("message")
public interface MessageService extends RemoteService {
   Message getMessage(String input);
}
```

Step 2: Create a Async Service Interface

Define an asynchronous interface to service on client side (at same location as service mentioned above) which will be used in the GWT client code.

```
public interface MessageServiceAsync {
   void getMessage(String input, AsyncCallback<Message> callback);
}
```

Step 3: Create a Service Implementation Servlet class

Implement the interface at server side and that class should extends RemoteServiceServlet class.

```
public class MessageServiceImpl extends RemoteServiceServlet
   implements MessageService{
   ...
   public Message getMessage(String input){
      String messageString ="Hello "+ input +"!";
      Message message =new Message();
      message.setMessage(messageString);
      return message;
   }
}
```

Step 4: Update Web.xml to include Servlet declaration

Edit the web application deployment descriptor (web.xml) to include MessageServiceImpl Servlet declaration.

```
<web-app>
   ...
   <servlet>
     <servlet-name>messageServiceImpl</servlet-name>
     <servlet-class>com.tutorialspoint.server.MessageServiceImpl
     </servlet-class>
   </servlet>
   <servlet-mapping>
     <servlet-name>messageServiceImpl</servlet-name>
     <url-pattern>/helloworld/message</url-pattern>
   </servlet-mapping>
</web-app>
```

Step 5: Make the remote procedure call in Application Code

Create the service proxy class.

```
MessageServiceAsync messageService = GWT.create(MessageService.class);
```

Create the AsyncCallback Handler to handle RPC callback in which server returns the Message back to client

```
class MessageCallBack implements AsyncCallback<Message> {

   @Override
   public void onFailure(Throwable caught){
      Window.alert("Unable to obtain server response: "
     + caught.getMessage());
   }

   @Override
   public void onSuccess(Message result){
      Window.alert(result.getMessage());
   }
}
```

Call Remote service when user interacts with UI

```
public class HelloWorld implements EntryPoint{
   ...
   public void onModuleLoad(){
   ...
      buttonMessage.addClickHandler(new ClickHandler(){
      @Override
      public void onClick(ClickEvent event){
         messageService.getMessage(txtName.getValue(),
         new MessageCallBack());
      }});
   ...
   }
}
```

RPC Communication Complete Example

This example will take you through simple steps to show example of a RPC Communication in GWT. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>
  <!-- Inherit the UiBinder module.                               -->
  <inherits name="com.google.gwt.uibinder.UiBinder"/>
  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
   <link rel="stylesheet" href="HelloWorld.css"/>
   <script language="javascript" src="helloworld/helloworld.nocache.js">
   </script>
</head>
<body>

<h1>RPC Communication Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Now create Message.java file in the **src/com.tutorialspoint/client** package and place the following contents in it

```
package com.tutorialspoint.client;

import java.io.Serializable;

public class Message implements Serializable{

   private static final long serialVersionUID =1L;
   private String message;
   public Message(){};

   public void setMessage(String message){
```

```
      this.message = message;
   }

   public String getMessage(){
      return message;
   }
}
```

Now create MessageService.java file in the **src/com.tutorialspoint/client** package and place the following contents in it

```
package com.tutorialspoint.client;

import com.google.gwt.user.client.rpc.RemoteService;
import com.google.gwt.user.client.rpc.RemoteServiceRelativePath;

@RemoteServiceRelativePath("message")
   public interface MessageService extends RemoteService{
      Message getMessage(String input);
   }
```

Now create MessageServiceAsync.java file in the **src/com.tutorialspoint/client** package and place the following contents in it

```
package com.tutorialspoint.client;

import com.google.gwt.user.client.rpc.AsyncCallback;

public interface MessageServiceAsync {
   void getMessage(String input,AsyncCallback<Message> callback);
}
```

Now create MessageServiceImpl.java file in the **src/com.tutorialspoint/server** package and place the following contents in it

```
package com.tutorialspoint.server;

import com.google.gwt.user.server.rpc.RemoteServiceServlet;
import com.tutorialspoint.client.Message;
import com.tutorialspoint.client.MessageService;

public class MessageServiceImpl extends RemoteServiceServlet
implements MessageService{

private static final long serialVersionUID =1L;

public Message getMessage(String input){
   String messageString ="Hello "+ input +"!";
   Message message =newMessage();
   message.setMessage(messageString);
   return message;
  }
}
```

Update the content of the modified web application deployment descriptor **war/WEB-INF/web.xml** to include MessageServiceImpl Servlet declaration .

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE web-app
   PUBLIC "-//Sun Microsystems, Inc.//DTD Web Application 2.3//EN"
   "http://java.sun.com/dtd/web-app_2_3.dtd">

<web-app>
   <!-- Default page to serve -->
   <welcome-file-list>
```

```
      <welcome-file>HelloWorld.html</welcome-file>
   </welcome-file-list>
   <servlet>
      <servlet-name>messageServiceImpl</servlet-name>
      <servlet-class>com.tutorialspoint.server.MessageServiceImpl
      </servlet-class>
   </servlet>

   <servlet-mapping>
      <servlet-name>messageServiceImpl</servlet-name>
      <url-pattern>/helloworld/message</url-pattern>
   </servlet-mapping>
</web-app>
```

Replace the contents of HelloWorld.java in **src/com.tutorialspoint/client** package with the following

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.core.client.GWT;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.event.dom.client.KeyCodes;
import com.google.gwt.event.dom.client.KeyUpEvent;
import com.google.gwt.event.dom.client.KeyUpHandler;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.rpc.AsyncCallback;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HasHorizontalAlignment;
import com.google.gwt.user.client.ui.HorizontalPanel;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextBox;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   private MessageServiceAsync messageService =
   GWT.create(MessageService.class);

   private class MessageCallBack implements AsyncCallback<Message>{
      @Override
      public void onFailure(Throwable caught){
         /* server side error occured */
         Window.alert("Unable to obtain server response: "
         + caught.getMessage());
      }
      @Override
      public void onSuccess(Message result){
         /* server returned result, show user the message */
         Window.alert(result.getMessage());
      }
   }

   public void onModuleLoad(){
      /*create UI */
      final TextBox txtName =new TextBox();
      txtName.setWidth("200");
      txtName.addKeyUpHandler(new KeyUpHandler(){
         @Override
         public void onKeyUp(KeyUpEvent event){
            if(event.getNativeKeyCode()==KeyCodes.KEY_ENTER){
               /* make remote call to server to get the message */
```

```
                messageService.getMessage(txtName.getValue(),
                new MessageCallBack());
            }
         }
      });
      Label lblName =new Label("Enter your name: ");

      Button buttonMessage =new Button("Click Me!");

      buttonMessage.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            /* make remote call to server to get the message */
            messageService.getMessage(txtName.getValue(),
            new MessageCallBack());
      }});

      HorizontalPanel hPanel =new HorizontalPanel();
      hPanel.add(lblName);
      hPanel.add(txtName);
      hPanel.setCellWidth(lblName,"130");

      VerticalPanel vPanel =new VerticalPanel();
      vPanel.setSpacing(10);
      vPanel.add(hPanel);
      vPanel.add(buttonMessage);
      vPanel.setCellHorizontalAlignment(buttonMessage,
      HasHorizontalAlignment.ALIGN_RIGHT);

      DecoratorPanel panel =new DecoratorPanel();
      panel.add(vPanel);

      // Add widgets to the root panel.
      RootPanel.get("gwtContainer").add(panel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:


http://127.0.0.1:888
Hello World
RPC Communication Demonstration
Enter your name:
Peter Rowling
Click Me!
Message from webpage
Hello Peter Rowling!
OK

CHAPTER

15

JUnit Integration

This section describes JUNIT integration with GWT:

GWTprovides execellent support for automated testing of client side code using JUnit testing framework. In this article we'll demonstrate GWT and JUNIT integration.

Download Junit archive

JUnit Official Site: http://www.junit.org
Download Junit-4.10.jar

OS	Archive name
Windows	junit4.10.jar
Linux	junit4.10.jar
Mac	junit4.10.jar

Store the downloaded jar file to some location on your computer. We've stored it at **C:/ > JUNIT**

Locate GWT installation folder

OS	GWT installation folder
Windows	C:\GWT\gwt-2.1.0
Linux	/usr/local/GWT/gwt-2.1.0
Mac	/Library/GWT/gwt-2.1.0

GWTTestCase Class

GWT provides GWTTestCase base class which provides JUnit integration. Running a compiled class which extends GWTTestCase under JUnit launches the HtmlUnit browser which serves to emulate your application behavior during test execution.

GWTTestCase is a derived class from JUnit's TestCase and it can be run using JUnit TestRunner.

Using webAppCreator

GWT provides a special command line tool **webAppCreator** which can generate a starter test case for us, plus ant targets and eclipse launch configs for testing in both development mode and production mode.
Open command prompt and go to **C:\ > GWT_WORKSPACE >** where you want to create a new project with test support.Run the following command

```
C:\GWT_WORKSPACE>C:\GWT\gwt-2.1.0\webAppCreator
                -out HelloWorld
                -junit C:\JUNIT\junit-4.10.jar
                com.tutorialspoint.HelloWorld
```

Noteworthy Points

- We are executing webAppCreator command line utility.
- HelloWorld is the name of the project to be created
- -junit option instructs webAppCreator to add junit suppport to project
- com.tutorialspoint.HelloWorld is the name of the module

Verify the output.

```
Created directory HelloWorld\src
Created directory HelloWorld\war
Created directory HelloWorld\war\WEB-INF
Created directory HelloWorld\war\WEB-INF\lib
Created directory HelloWorld\src\com\tutorialspoint
Created directory HelloWorld\src\com\tutorialspoint\client
Created directory HelloWorld\src\com\tutorialspoint\server
Created directory HelloWorld\src\com\tutorialspoint\shared
Created directory HelloWorld\test\com\tutorialspoint
Created directory HelloWorld\test\com\tutorialspoint\client
Created file HelloWorld\src\com\tutorialspoint\HelloWorld.gwt.xml
Created file HelloWorld\war\HelloWorld.html
Created file HelloWorld\war\HelloWorld.css
Created file HelloWorld\war\WEB-INF\web.xml
Created file HelloWorld\src\com\tutorialspoint\client\HelloWorld.java
Created file
HelloWorld\src\com\tutorialspoint\client\GreetingService.java
Created file
HelloWorld\src\com\tutorialspoint\client\GreetingServiceAsync.java
Created file
```

```
HelloWorld\src\com\tutorialspoint\server\GreetingServiceImpl.java

Created file
HelloWorld\src\com\tutorialspoint\shared\FieldVerifier.java

Created file HelloWorld\build.xml

Created file HelloWorld\README.txt

Created file HelloWorld\test\com\tutorialspoint\HelloWorldJUnit.gwt.xml

Created file
HelloWorld\test\com\tutorialspoint\client\HelloWorldTest.java

Created file HelloWorld\.project

Created file HelloWorld\.classpath

Created file HelloWorld\HelloWorld.launch

Created file HelloWorld\HelloWorldTest-dev.launch

Created file HelloWorld\HelloWorldTest-prod.launch
```

Understanding the test class: HelloWorldTest.java

```
package com.tutorialspoint.client;

import com.tutorialspoint.shared.FieldVerifier;
import com.google.gwt.core.client.GWT;
import com.google.gwt.junit.client.GWTTestCase;
import com.google.gwt.user.client.rpc.AsyncCallback;
import com.google.gwt.user.client.rpc.ServiceDefTarget;

/**
 * GWT JUnit tests must extend GWTTestCase.
 */
public class HelloWorldTest extends GWTTestCase{

  /**
   * must refer to a valid module that sources this class.
   */
   public String getModuleName(){
      return"com.tutorialspoint.HelloWorldJUnit";
   }

  /**
   * tests the FieldVerifier.
   */
   public void testFieldVerifier(){
      assertFalse(FieldVerifier.isValidName(null));
      assertFalse(FieldVerifier.isValidName(""));
      assertFalse(FieldVerifier.isValidName("a"));
      assertFalse(FieldVerifier.isValidName("ab"));
      assertFalse(FieldVerifier.isValidName("abc"));
      assertTrue(FieldVerifier.isValidName("abcd"));
  }

  /**
   * this test will send a request to the server using the greetServer
   *  method in GreetingService and verify the response.
   */
   public void testGreetingService(){
```

```
      /* create the service that we will test. */
      GreetingServiceAsync greetingService =
      GWT.create(GreetingService.class);
      ServiceDefTarget target =(ServiceDefTarget) greetingService;
      target.setServiceEntryPoint(GWT.getModuleBaseURL()
      +"helloworld/greet");

      /* since RPC calls are asynchronous, we will need to wait
       for a response after this test method returns. This line
       tells the test runner to wait up to 10 seconds
       before timing out. */
       delayTestFinish(10000);

       /* send a request to the server. */
       greetingService.greetServer("GWT User",
       new AsyncCallback<String>(){
          public void onFailure(Throwable caught){
             /* The request resulted in an unexpected error. */
             fail("Request failure: "+ caught.getMessage());
          }

          public void onSuccess(String result){
             /* verify that the response is correct. */
             assertTrue(result.startsWith("Hello, GWT User!"));

             /* now that we have received a response, we need to
             tell the test runner that the test is complete.
             You must call finishTest() after an asynchronous test
             finishes successfully, or the test will time out.*/
             finishTest();
          }
       });
    }
}
```

Noteworthy Points

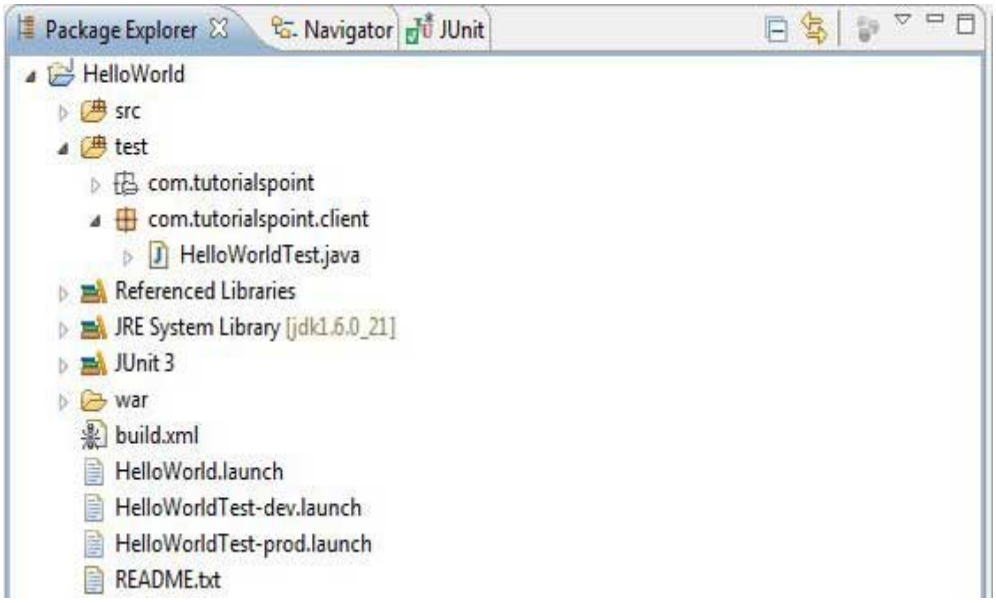
Sr.	Note
1	HelloWorldTest class was generated in the com.tutorialspoint.client package under the HelloWorld/test directory.
2	HelloWorldTest class will contain unit test cases for HelloWorld.
3	HelloWorldTest class extends the GWTTestCase class in the com.google.gwt.junit.client package.
4	HelloWorldTest class has an abstract method (getModuleName) that must return the name of the GWT module. For HelloWorld, this is com.tutorialspoint.HelloWorldJUnit.
5	HelloWorldTest class is generated with two sample test cases testFieldVerifier, testSimple. We've added testGreetingService.
6	These methods use one of the many assert* functions that it inherits from the JUnit Assert class, which is an ancestor of GWTTestCase.
7	The assertTrue(boolean) function asserts that the boolean argument passed in evaluates to true. If not, the test will fail when run in JUnit.

GWT - JUnit Integration Complete Example

This example will take you through simple steps to show example of JUnit Integration in GWT. Follow the following steps to update the GWT application we created above

Step	Description
1	Import the project with a name *HelloWorld* in eclipse using import existing project wizard (**File > Import > General > Existing Projects into workspace**).
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following will be the project structure in eclipse.



Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>
  <!-- Inherit the UiBinder module.                               -->
  <inherits name="com.google.gwt.uibinder.UiBinder"/>
  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>

  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
```

```
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
   <link rel="stylesheet" href="HelloWorld.css"/>
   <script language="javascript" src="helloworld/helloworld.nocache.js">
   </script>
</head>
<body>

<h1>JUnit Integration Demonstration</h1>
<divid="gwtContainer"></div>

</body>
</html>
```

Replace the contents of HelloWorld.java in **src/com.tutorialspoint/client** package with the following

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.core.client.GWT;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.event.dom.client.KeyCodes;
import com.google.gwt.event.dom.client.KeyUpEvent;
import com.google.gwt.event.dom.client.KeyUpHandler;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.rpc.AsyncCallback;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HasHorizontalAlignment;
import com.google.gwt.user.client.ui.HorizontalPanel;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextBox;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      /*create UI */
      final TextBox txtName =new TextBox();
      txtName.setWidth("200");
      txtName.addKeyUpHandler(new KeyUpHandler(){
         @Override
         publicvoid onKeyUp(KeyUpEvent event){
            if(event.getNativeKeyCode()==KeyCodes.KEY_ENTER){
               Window.alert(getGreeting(txtName.getValue()));
            }
         }
      });
      Label lblName =new Label("Enter your name: ");

      Button buttonMessage =new Button("Click Me!");

      buttonMessage.addClickHandler(new ClickHandler(){
```

```
      @Override
         public void onClick(ClickEvent event){
            Window.alert(getGreeting(txtName.getValue()));
      }});

      HorizontalPanel hPanel =new HorizontalPanel();
      hPanel.add(lblName);
      hPanel.add(txtName);
      hPanel.setCellWidth(lblName,"130");

      VerticalPanel vPanel =new VerticalPanel();
      vPanel.setSpacing(10);
      vPanel.add(hPanel);
      vPanel.add(buttonMessage);
      vPanel.setCellHorizontalAlignment(buttonMessage,
      HasHorizontalAlignment.ALIGN_RIGHT);

      DecoratorPanel panel =new DecoratorPanel();
      panel.add(vPanel);

      // Add widgets to the root panel.
      RootPanel.get("gwtContainer").add(panel);
   }

   public String getGreeting(String name){
      return"Hello "+name+"!";
   }
}
```

Replace the contents of HelloWorldTest.java in **test/com.tutorialspoint/client** package with the following

```
package com.tutorialspoint.client;

import com.tutorialspoint.shared.FieldVerifier;
import com.google.gwt.core.client.GWT;
import com.google.gwt.junit.client.GWTTestCase;
import com.google.gwt.user.client.rpc.AsyncCallback;
import com.google.gwt.user.client.rpc.ServiceDefTarget;

/**
 * GWT JUnit tests must extend GWTTestCase.
 */
public class HelloWorldTest extends GWTTestCase{

   /**
   * must refer to a valid module that sources this class.
   */
   public String getModuleName(){
      return"com.tutorialspoint.HelloWorldJUnit";
   }

   /**
   * tests the FieldVerifier.
   */
   public void testFieldVerifier(){
      assertFalse(FieldVerifier.isValidName(null));
      assertFalse(FieldVerifier.isValidName(""));
      assertFalse(FieldVerifier.isValidName("a"));
      assertFalse(FieldVerifier.isValidName("ab"));
      assertFalse(FieldVerifier.isValidName("abc"));
      assertTrue(FieldVerifier.isValidName("abcd"));
   }

   /**
```

```
   * this test will send a request to the server using the greetServer
   *  method in GreetingService and verify the response.
   */
   public void testGreetingService(){
      /* create the service that we will test. */
      GreetingServiceAsync greetingService =
      GWT.create(GreetingService.class);
      ServiceDefTarget target =(ServiceDefTarget) greetingService;
      target.setServiceEntryPoint(GWT.getModuleBaseURL()
      +"helloworld/greet");

      /* since RPC calls are asynchronous, we will need to wait
      for a response after this test method returns. This line
      tells the test runner to wait up to 10 seconds
      before timing out. */
      delayTestFinish(10000);

      /* send a request to the server. */
      greetingService.greetServer("GWT User",
      new AsyncCallback<String>(){
         public void onFailure(Throwable caught){
            /* The request resulted in an unexpected error. */
            fail("Request failure: "+ caught.getMessage());
         }

      public void onSuccess(String result){
         /* verify that the response is correct. */
         assertTrue(result.startsWith("Hello, GWT User!"));

         /* now that we have received a response, we need to
             tell the test runner that the test is complete.
            You must call finishTest() after an asynchronous test
            finishes successfully, or the test will time out.
         */
         finishTest();
        }
      });

      /**
      * tests the getGreeting method.
      */
      public void testGetGreeting(){
         HelloWorld helloWorld =new HelloWorld();
         String name ="Robert";
         String expectedGreeting ="Hello "+name+"!";
         assertEquals(expectedGreeting,helloWorld.getGreeting(name));
      }
   }
}
```

Run test cases in Eclipse using generated launch configurations.

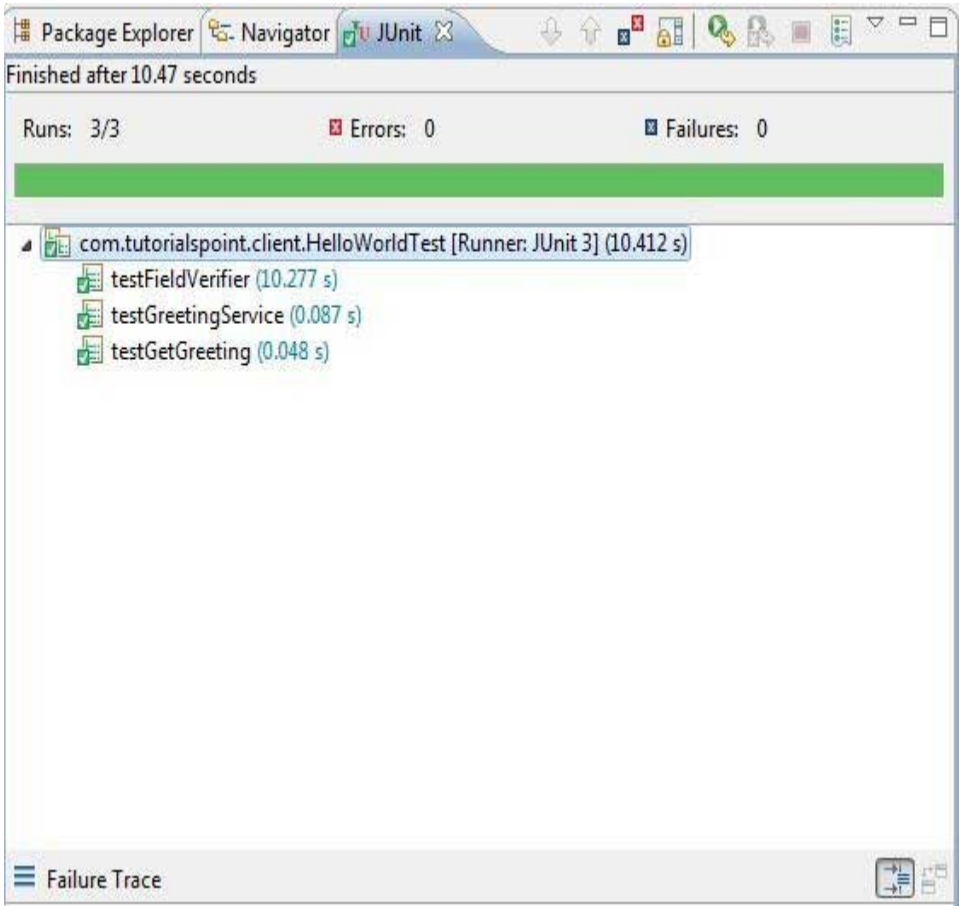
We'll run unit tests in Eclipse using the launch configurations generated by webAppCreator for both development mode and production mode.

RUN THE JUNIT TEST IN DEVELOPMENT MODE.

- From the Eclipse menu bar, select Run > Run Configurations...

- Under JUnit section, select HelloWorldTest-dev
- To save the changes to the Arguments, press Apply
- To run the test, press Run

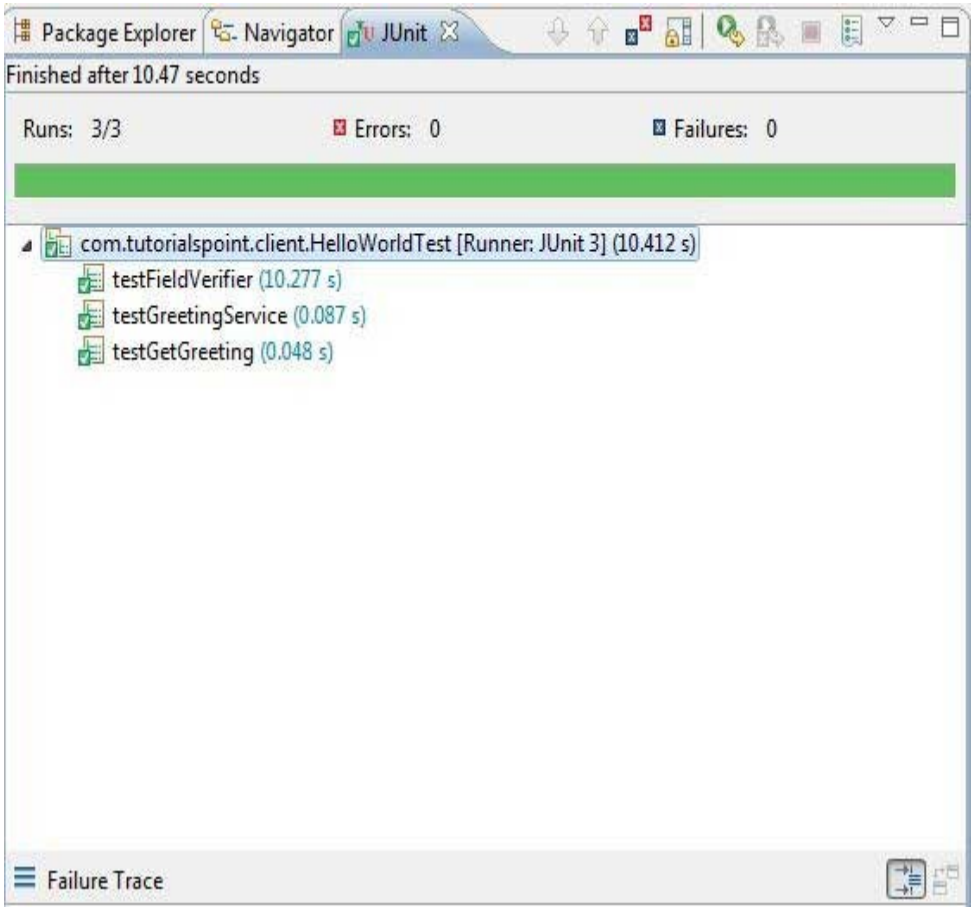
If everything is fine with your application, this will produce following result:



RUN THE JUNIT TEST IN PRODUCTION MODE.

- From the Eclipse menu bar, select Run > Run Configurations...
- Under JUnit section, select HelloWorldTest-prod
- To save the changes to the Arguments, press Apply
- To run the test, press Run

If everything is fine with your application, this will produce following result:


Package Explorer
Navigator
JUnit
Finished after 10.47 seconds
Runs: 3/3
Errors: 0
Failures: 0
com.tutorialspoint.client.HelloWorldTest [Runner: JUnit 3] (10.412 s)
testFieldVerifier (10.277 s)
testGreetingService (0.087 s)
testGetGreeting (0.048 s)
Failure Trace

CHAPTER

16

Debug Application

This section describes the Debugging Application:

GWTprovides execellent capability of debugging client side as well as server side code.

- During development mode, GWT Application is in Java code based and is not translated to JavaScript.
- When an application is running in development mode, the Java Virtual Machine (JVM) is actually executing the application code as compiled Java bytecode, using GWT capability to connect to a browser window.
- GWT uses browser based plugin to connect to JVM.
- So developers are free to use any Java based IDE to debug both client-side GWT Code as well as server-side code.
- In this article we'll demonstrate usage of debugging GWT Client code using Eclipse. We'll do the following tasks
- Set break points in the code and see them in BreakPoint Explorer.
- Step through the code line by line during debugging.
- View the values of variable.
- Inspect the values of all the variables.
- Inspect the value of an expression.
- Display the stack frame for suspended threads.

Debugging Example

This example will take you through simple steps to demonstrate debugging a GWT application. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
   <!-- Inherit the core Web Toolkit stuff.                        -->
   <inherits name='com.google.gwt.user.User'/>

   <!-- Inherit the default GWT style sheet.                       -->
   <inherits name='com.google.gwt.user.theme.clean.Clean'/>

   <!-- Specify the app entry point class.                         -->
   <entry-point class='com.tutorialspoint.client.HelloWorld'/>

   <!-- Specify the paths for translatable code                    -->
   <source path='client'/>
   <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
.gwt-Label{
   font-size:150%;
   font-weight: bold;
   color:red;
   padding:5px;
   margin:5px;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html** to accomodate two buttons.

```
<html>
<head>
<title>Hello World</title>
   <link rel="stylesheet" href="HelloWorld.css"/>
   <script language="javascript" src="helloworld/helloworld.nocache.js">
   </script>
</head>
<body>
```

```
<h1>Debugging Application Demonstration</h1>
<divid="gwtContainer"></div>

</body>
</html>
```

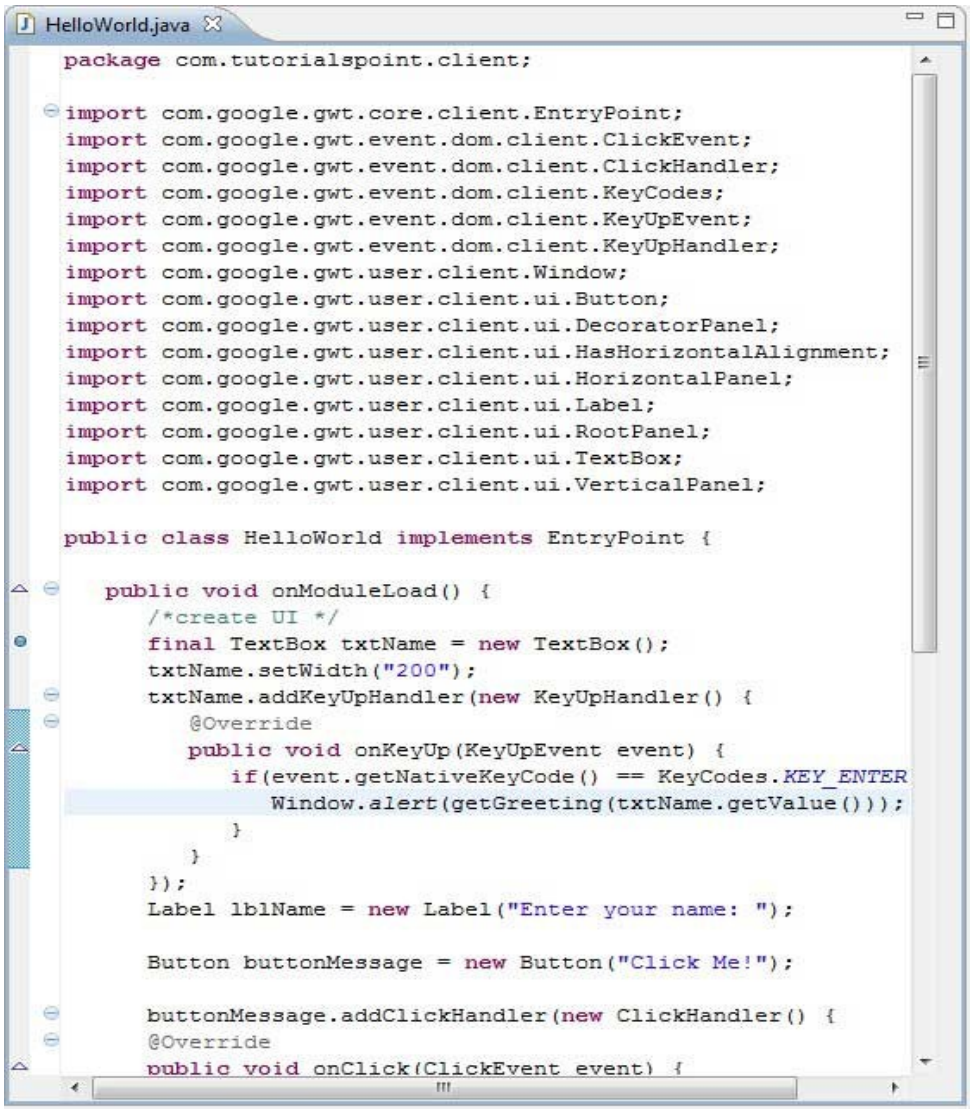
Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** using which we will demonstrate debugging capability of GWT Code.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.event.dom.client.KeyCodes;
import com.google.gwt.event.dom.client.KeyUpEvent;
import com.google.gwt.event.dom.client.KeyUpHandler;
import com.google.gwt.user.client.Window;
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HasHorizontalAlignment;
import com.google.gwt.user.client.ui.HorizontalPanel;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextBox;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   public void onModuleLoad(){
      /*create UI */
      final TextBox txtName =new TextBox();
      txtName.setWidth("200");
      txtName.addKeyUpHandler(new KeyUpHandler(){
         @Override
         public void onKeyUp(KeyUpEvent event){
            if(event.getNativeKeyCode()==KeyCodes.KEY_ENTER){
               Window.alert(getGreeting(txtName.getValue()));
            }
         }
      });
      Label lblName =new Label("Enter your name: ");

      Button buttonMessage =new Button("Click Me!");

      buttonMessage.addClickHandler(new ClickHandler(){
         @Override
         public void onClick(ClickEvent event){
            Window.alert(getGreeting(txtName.getValue()));
      }});

      HorizontalPanel hPanel =new HorizontalPanel();
      hPanel.add(lblName);
      hPanel.add(txtName);
      hPanel.setCellWidth(lblName,"130");

      VerticalPanel vPanel =new VerticalPanel();
      vPanel.setSpacing(10);
      vPanel.add(hPanel);
      vPanel.add(buttonMessage);
      vPanel.setCellHorizontalAlignment(buttonMessage,
      HasHorizontalAlignment.ALIGN_RIGHT);

      DecoratorPanel panel =new DecoratorPanel();
```

```
      panel.add(vPanel);

      // Add widgets to the root panel.
       RootPanel.get("gwtContainer").add(panel);
  }

  public String getGreeting(String name){
     return"Hello "+name+"!";
  }
}
```

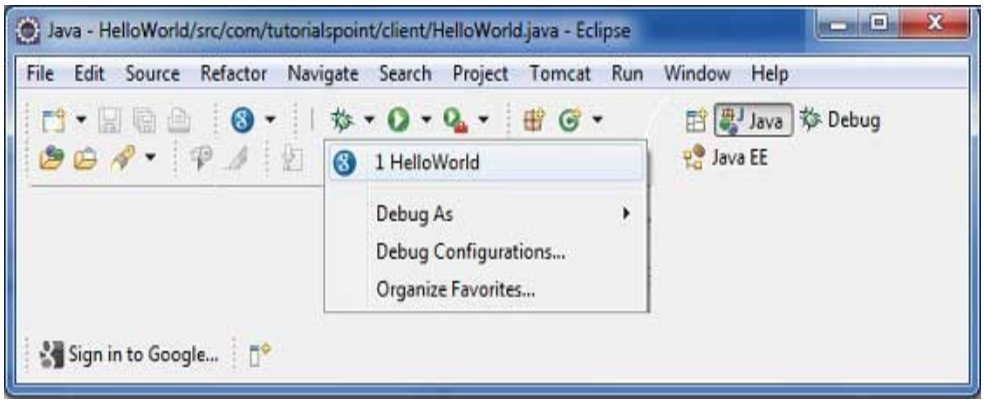
Step 1 - Place BreakPoints

Place a breakpoint on the first line of onModuleLoad() of HelloWorld.java

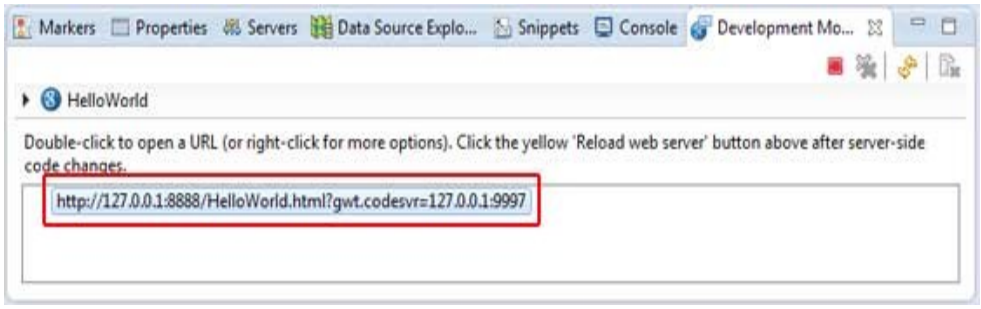


Step 2 - Debug Application

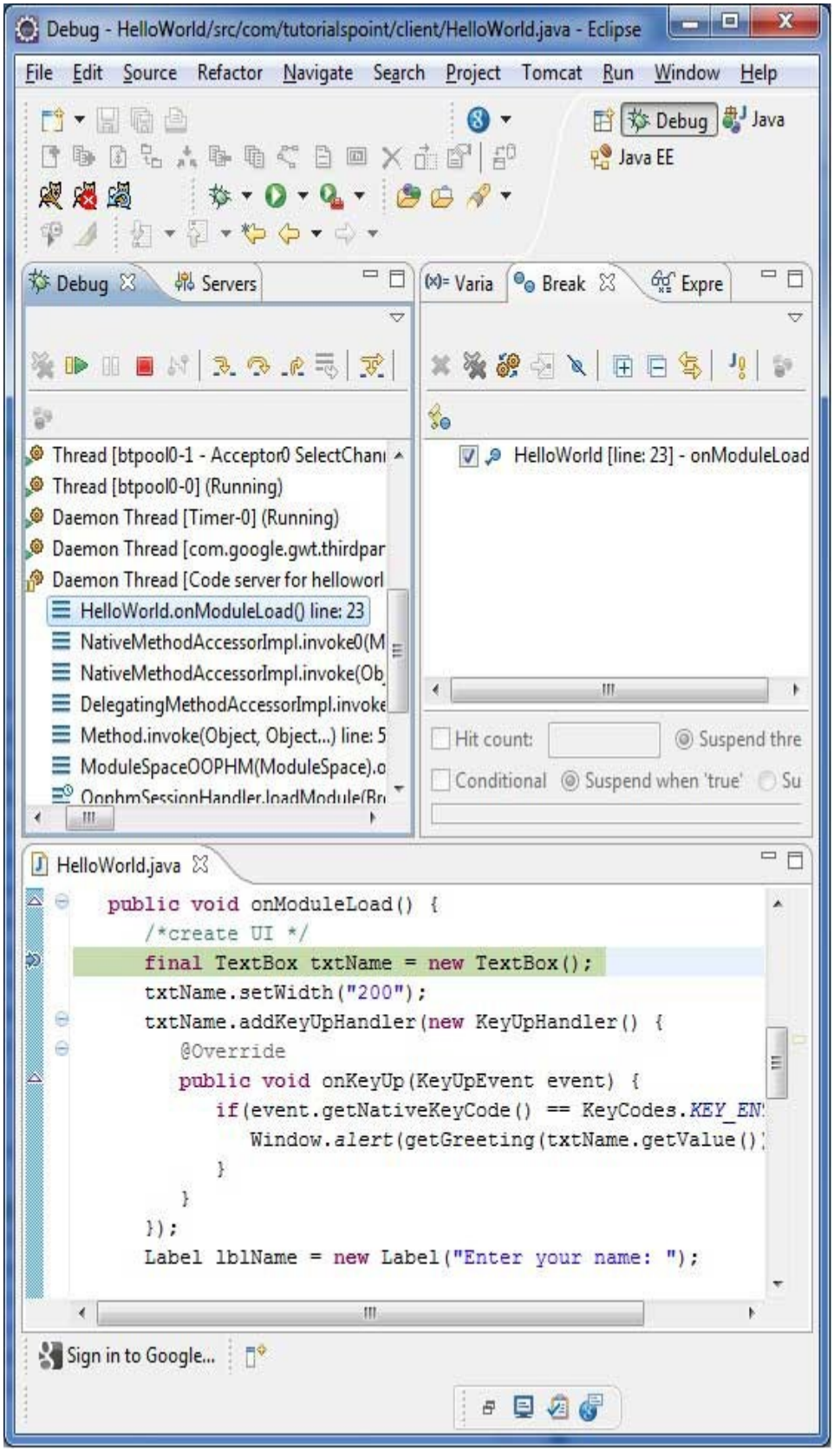
Now click on  Debug application menu and select **HelloWorld** application to debug the application.



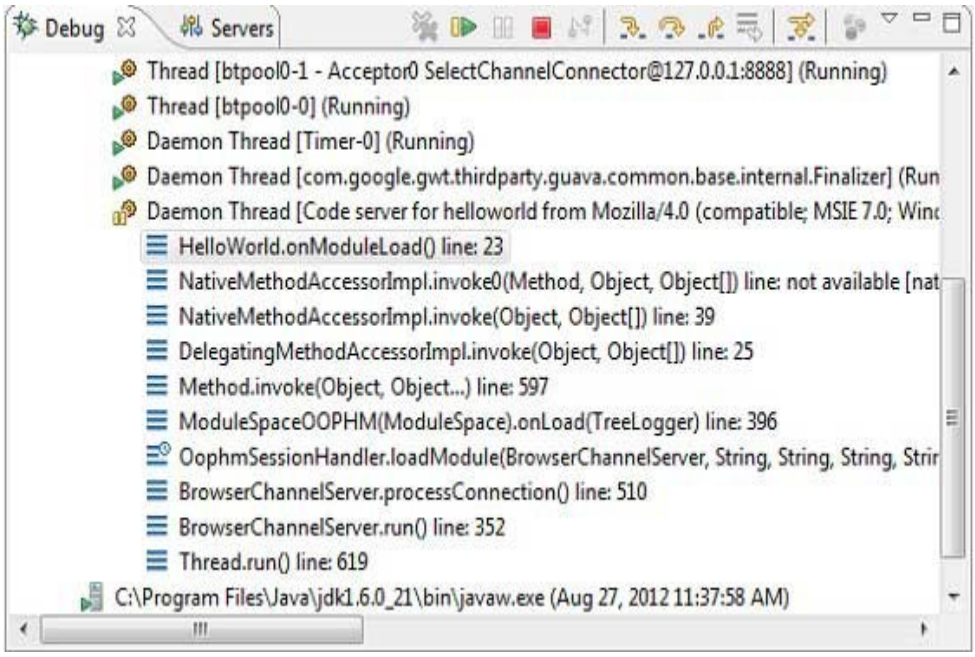
If everything is fine, you must see GWT Development Mode active in Eclipse containing a URL as shown below. Double click the URL to open the GWT application.



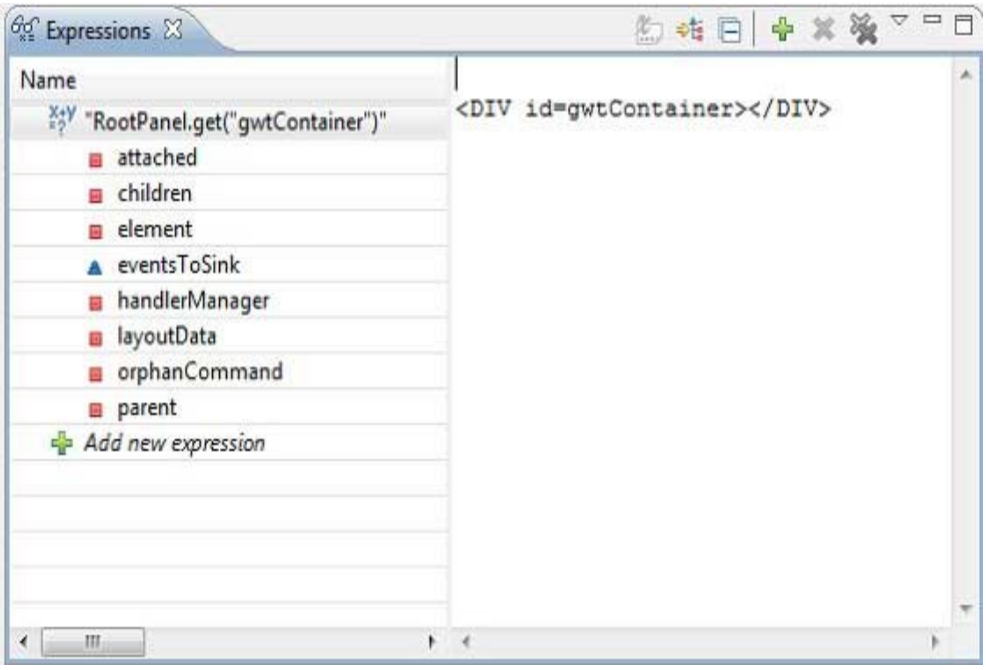
As soon as Application launches, you will see the focus on Eclipse breakpoint as we've placed the breakpoint on first line of entry point method.


Debug - HelloWorld/src/com/tutorialspoint/client/HelloWorld.java - Eclipse
File Edit Source Refactor Navigate Search Project Tomcat Run Window Help
Debug
Java
Java EE
Debug
Servers
Varia
Break
Expre
Thread [btpool0-1 - Acceptor0 SelectChan
Thread [btpool0-0] (Running)
Daemon Thread [Timer-0] (Running)
Daemon Thread [com.google.gwt.thirdpar
Daemon Thread [Code server for helloworl
HelloWorld.onModuleLoad() line: 23
NativeMethodAccessorImpl.invoke0(M
NativeMethodAccessorImpl.invoke(Ob
DelegatingMethodAccessorImpl.invoke
Method.invoke(Object, Object...) line: 5
ModuleSpaceOOPHM(ModuleSpace).o
HelloWorld [line: 23] - onModuleLoad
Hit count:
Suspend thre
Conditional
Suspend when 'true'
HelloWorld.java
public void onModuleLoad() {
/*create UI */
final TextBox txtName = new TextBox();
txtName.setWidth("200");
txtName.addKeyUpHandler(new KeyUpHandler() {
@Override
public void onKeyUp(KeyUpEvent event) {
if(event.getNativeKeyCode() == KeyCodes.KEY_EN
Window.alert(getGreeting(txtName.getValue()
}
}
});
Label lblName = new Label("Enter your name: ");
Sign in to Google...

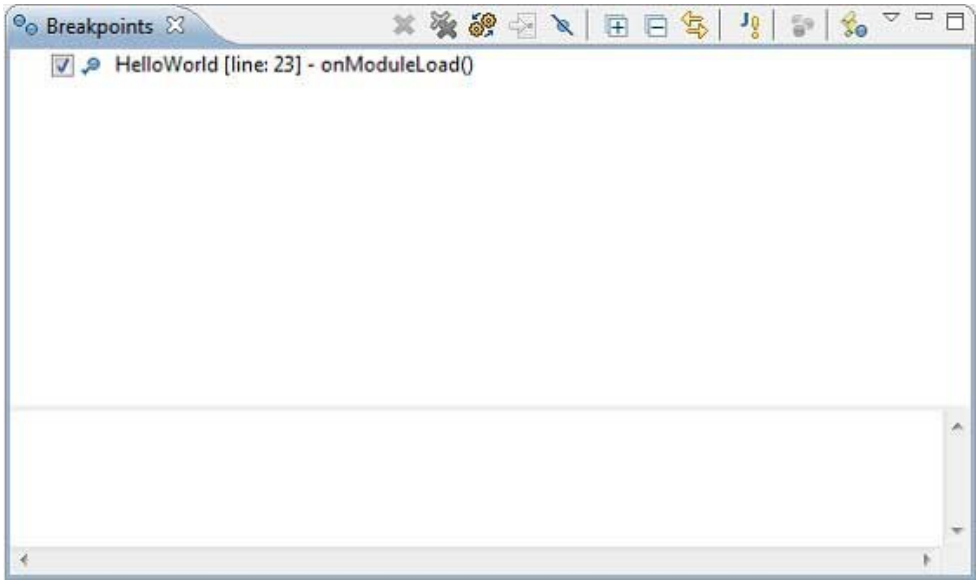
You can see the stacktrace for suspended threads.



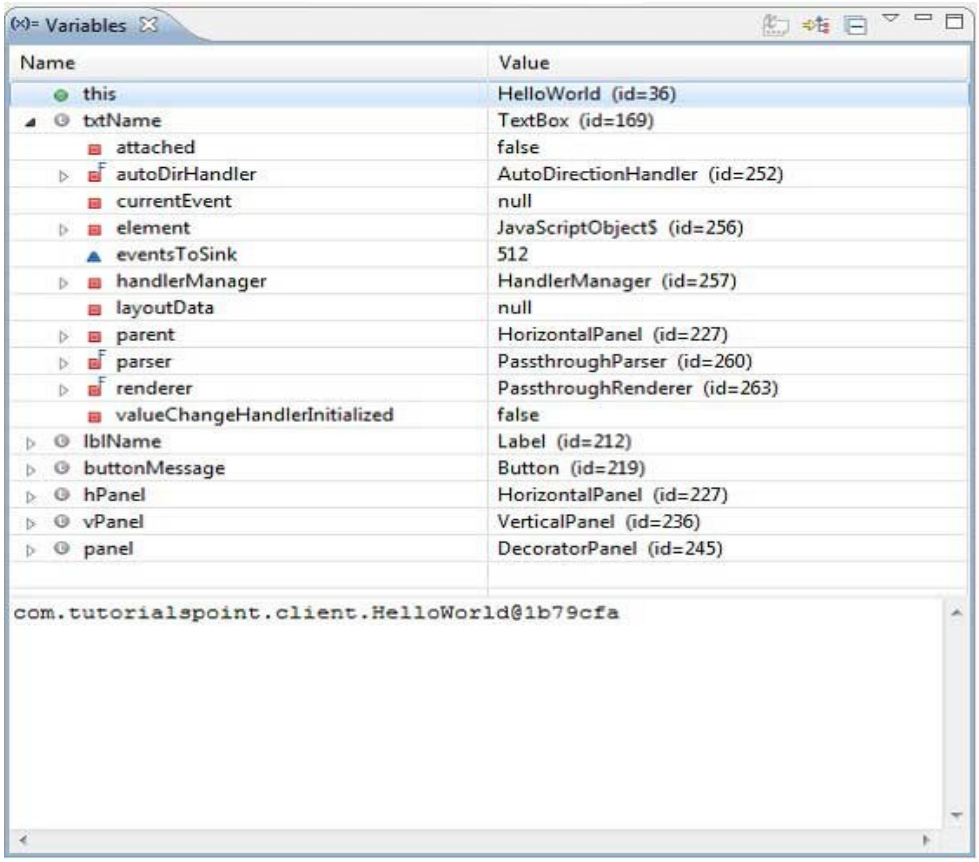
You can see the values for expressions.



You can see the list of breakpoints placed.



Now keep pressing F6 until you reach the last line of onModuleLoad() method. As reference for function keys, F6 inspects code line by line, F5 steps inside further and F8 will resume the application. Now you can see the list of values of all variables of onModuleLoad() method.



Now you can see the GWT client code can be debugged in the same way as a Java Application can be debugged. Place breakpoints to any line and play with debugging capabilities of GWT.

CHAPTER

17

Internationalization

This section describes the concept of Internationalization:

GWT provides three ways to internationalize a GWT application, We'll demonstrate use of Static String Internationalization being most commonly used among projects.

Technique	Description
Static String Internationalization	This technique is most prevalent and requires very little overhead at runtime; is a very efficient technique for translating both constant and parameterized strings;simplest to implement. Static string internationalization uses standard Java properties files to store translated strings and parameterized messages, and strongly-typed Java interfaces are created to retrieve their values.
Dynamic String Internationalization	This technique is very flexible but slower than static string internationalization. Host page contains the localized strings therefore, applications are not required to be recompiled when we add a new locale. If GWT application is to be integrated with an existing server-side localization system, then this technique is to be used.
Localizable Interface	This technique is the most powerful among the three techniques. Implementing Localizable allows us to create localized versions of custom types. It's an advanced internationalization technique.

Workflow of internationalizing a GWT Application

Step 1: Create properties files

Create properties file containing the messages to be used in the application. We've created a**HelloWorldMessages.properties** file in our example.

```
enterName=Enter your name
clickMe=ClickMe
applicationTitle=Application InternationalizationDemonstration
greeting=Hello{0}
```

Create properties files containing translated values specific to locale. We've created a**HelloWorldMessages_de.properties** file in our example. This file contains translations in german language. _de specifies the german locale and we're going to support german language in our application.
If you are creating properties file using Eclipse then change the encoding of the file to UTF-8.Select the file and then right-click in it to open its properties window.Select Text file encoding as **Other UTF-8**. Apply and Save the change.

```
enterName=GebenSieIhrenNamen
clickMe=Klick mich
applicationTitle=Anwendung InternationalisierungDemonstration
greeting=Hallo{0}
```

Step 2: Add i18n module to Module Descriptor XML File

Update module file **HelloWorld.gwt.xml** to include support for german locale

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
   ...
   <extend-property name="locale" values="de"/>
   ...
</module>
```

Step 3: Create Interface equivalent to properties file

Create HelloWorldMessages.java interface by extending Messages interface of GWT to include support for internalization. It should contain same method names as keys in properties file. Place holder would be replaced with String argument.

```
public interface HelloWorldMessages extends Messages{

   @DefaultMessage("Enter your name")
   String enterName();

   @DefaultMessage("Click Me")
   String clickMe();

   @DefaultMessage("Application Internalization Demonstration")
   String applicationTitle();

   @DefaultMessage("Hello {0}")
   String greeting(String name);
}
```

Step 4: Use Message Interface in UI component.

Use object of HelloWorldMessages in HelloWorld to get the messages.

```
public class HelloWorld implements EntryPoint{

   /* create an object of HelloWorldMessages interface
```

```
   using GWT.create() method */
   private HelloWorldMessages messages =
   GWT.create(HelloWorldMessages.class);

   public void onModuleLoad(){
       ...
       Label titleLabel =new Label(messages.applicationTitle());
       //Add title to the application
       RootPanel.get("gwtAppTitle").add(titleLabel);
       ...
   }
}
```

Internationalization - Complete Example

This example will take you through simple steps to demonstrate Internationalization capability of a GWT application. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
   <!-- Inherit the core Web Toolkit stuff.                        -->
   <inherits name='com.google.gwt.user.User'/>

   <!-- Inherit the default GWT style sheet.                       -->
   <inherits name='com.google.gwt.user.theme.clean.Clean'/>

   <!-- Specify the app entry point class.                         -->
   <entry-point class='com.tutorialspoint.client.HelloWorld'/>
   <extend-property name="locale" values="de"/>
   <!-- Specify the paths for translatable code                    -->
   <source path='client'/>
   <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**.

```
<html>
<head>
<title>Hello World</title>
<linkrel="stylesheet"href="HelloWorld.css"/>
  <script language="javascript"src="helloworld/helloworld.nocache.js">
  </script>
  </head>
<body>

<h1 id="gwtAppTitle"></h1>
<div id="gwtContainer"></div>

</body>
</html>
```

Now create HelloWorldMessages.properties file in the **src/com.tutorialspoint/client** package and place the following contents in it

```
enterName=Enter your name
clickMe=ClickMe
applicationTitle=Application InternationalizationDemonstration
greeting=Hello{0}
```

Now create HelloWorldMessages_de.properties file in the **src/com.tutorialspoint/client** package and place the following contents in it

```
enterName=GebenSieIhrenNamen
clickMe=Klick mich
applicationTitle=Anwendung InternationalisierungDemonstration
greeting=Hallo{0}
```

Now create HelloWorldMessages.java class in the **src/com.tutorialspoint/client** package and place the following contents in it

```
package com.tutorialspoint.client;
import com.google.gwt.i18n.client.Messages;

public interface HelloWorldMessages extendsMessages {
   @DefaultMessage("Enter your name")
   String enterName();

   @DefaultMessage("Click Me")
   String clickMe();

   @DefaultMessage("Application Internationalization Demonstration")
   String applicationTitle();

   @DefaultMessage("Hello {0}")
  String greeting(String name);
}
```

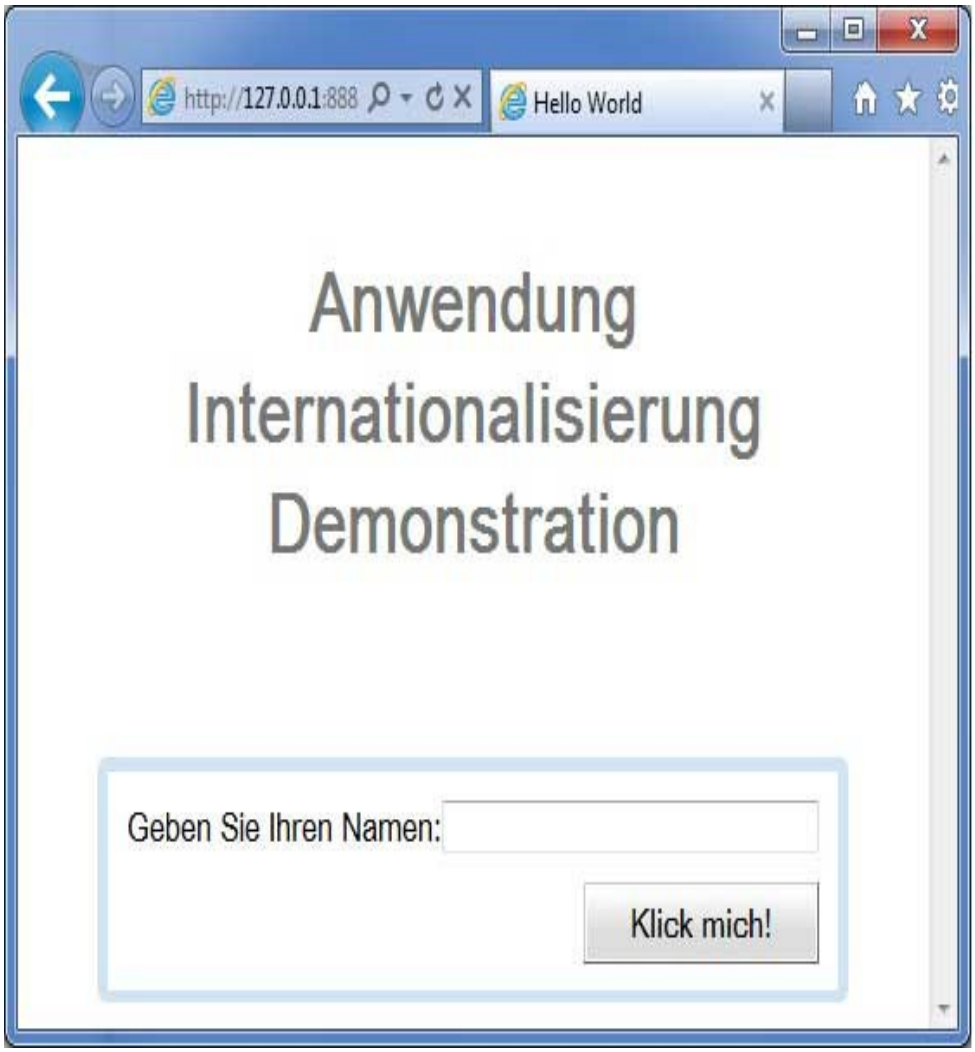
Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** using which we will demonstrate Internationalization capability of GWT Code.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.core.client.GWT;
import com.google.gwt.event.dom.client.ClickEvent;
import com.google.gwt.event.dom.client.ClickHandler;
import com.google.gwt.event.dom.client.KeyCodes;
import com.google.gwt.event.dom.client.KeyUpEvent;
import com.google.gwt.event.dom.client.KeyUpHandler;
import com.google.gwt.user.client.Window;
```

```
import com.google.gwt.user.client.ui.Button;
import com.google.gwt.user.client.ui.DecoratorPanel;
import com.google.gwt.user.client.ui.HasHorizontalAlignment;
import com.google.gwt.user.client.ui.HorizontalPanel;
import com.google.gwt.user.client.ui.Label;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TextBox;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   /* create an object of HelloWorldMessages interface
      using GWT.create() method */
   private HelloWorldMessages messages =
   GWT.create(HelloWorldMessages.class);

   public void onModuleLoad(){
      /*create UI */
   final TextBox txtName =new TextBox();
      txtName.setWidth("200");
      txtName.addKeyUpHandler(new KeyUpHandler(){
         @Override
         public void onKeyUp(KeyUpEvent event){
            if(event.getNativeKeyCode()==KeyCodes.KEY_ENTER){
               Window.alert(getGreeting(txtName.getValue()));
            }
         }
   });
   Label lblName =newLabel(messages.enterName()+": ");

   Button buttonMessage =newButton(messages.clickMe()+"!");

   buttonMessage.addClickHandler(newClickHandler(){
      @Override
      public void onClick(ClickEvent event){
         Window.alert(getGreeting(txtName.getValue()));
      }});

      HorizontalPanel hPanel =new HorizontalPanel();
      hPanel.add(lblName);
      hPanel.add(txtName);

      VerticalPanel vPanel =new VerticalPanel();
      vPanel.setSpacing(10);
      vPanel.add(hPanel);
      vPanel.add(buttonMessage);
      vPanel.setCellHorizontalAlignment(buttonMessage,
      HasHorizontalAlignment.ALIGN_RIGHT);

      DecoratorPanel panel =newDecoratorPanel();
      panel.add(vPanel);
      Label titleLabel =new Label(messages.applicationTitle());
      //Add title to the application
      RootPanel.get("gwtAppTitle").add(titleLabel);
      // Add widgets to the root panel.
      RootPanel.get("gwtContainer").add(panel);
   }

   public String getGreeting(String name){
      return messages.greeting(name +"!");
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:

Now update the URL to contain the locale=de.Set URL: *http://127.0.0.1:8888/HelloWorld.html?gwt.codesvr=127.0.0.1:9997**&locale=de***. If everything is fine with your application, this will produce following result:


http://127.0.0.1:888
Hello World
Anwendung
Internationalisierung
Demonstration
Geben Sie Ihren Namen:
Klick mich!

CHAPTER

18

History Class

This section describes the History Class:

GWT applications are normally single page application running JavaScripts and do not contains lot of pages thus browser do not keep track of user interaction with Application. To use browser's history functionality, application should generate a unique URL fragment for each navigable page.

GWT provides **History Mechanism** to handle this situation.

GWT uses a term **token** which is simply a string that the application can parse to return to a particular state. Application will save this token in browser's history as URL fragment.

For example, a history token named "pageIndex1" would be added to a URL as follows:

```
http://www.tutorialspoint.com/HelloWorld.html#pageIndex0
```

History Management Workflow

Step 1: Enable History support

In order to use GWT History support, we must first embed following iframe into our host HTML page.

```
<iframe src = "javascript:''"
   id = "__gwt_historyFrame"
   style = "width:0;height:0;border:0"></iframe>
```

Step 2: Add token to History

Following example stats how to add token to browser history

```
int index =0;
History.newItem("pageIndex"+ index);
```

Step 3: Retrive token from History

When user uses back/forward button of browser, we'll retrive the token and update our application state accordingly.

```
History.addValueChangeHandler(new ValueChangeHandler<String>(){
   @Override
   public void onValueChange(ValueChangeEvent<String>event){
      String historyToken =event.getValue();
      /* parse the history token */
      try{
         if(historyToken.substring(0,9).equals("pageIndex")){
            String tabIndexToken = historyToken.substring(9,10);
            int tabIndex =Integer.parseInt(tabIndexToken);
            /* select the specified tab panel */
            tabPanel.selectTab(tabIndex);
         }else{
            tabPanel.selectTab(0);
         }
      }catch(IndexOutOfBoundsException e){
         tabPanel.selectTab(0);
      }
   }
});
```

Now let's see the History Class in Action.

History Class - Complete Example

This example will take you through simple steps to demonstrate History Management of a GWT application. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>

  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>
  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>
</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**

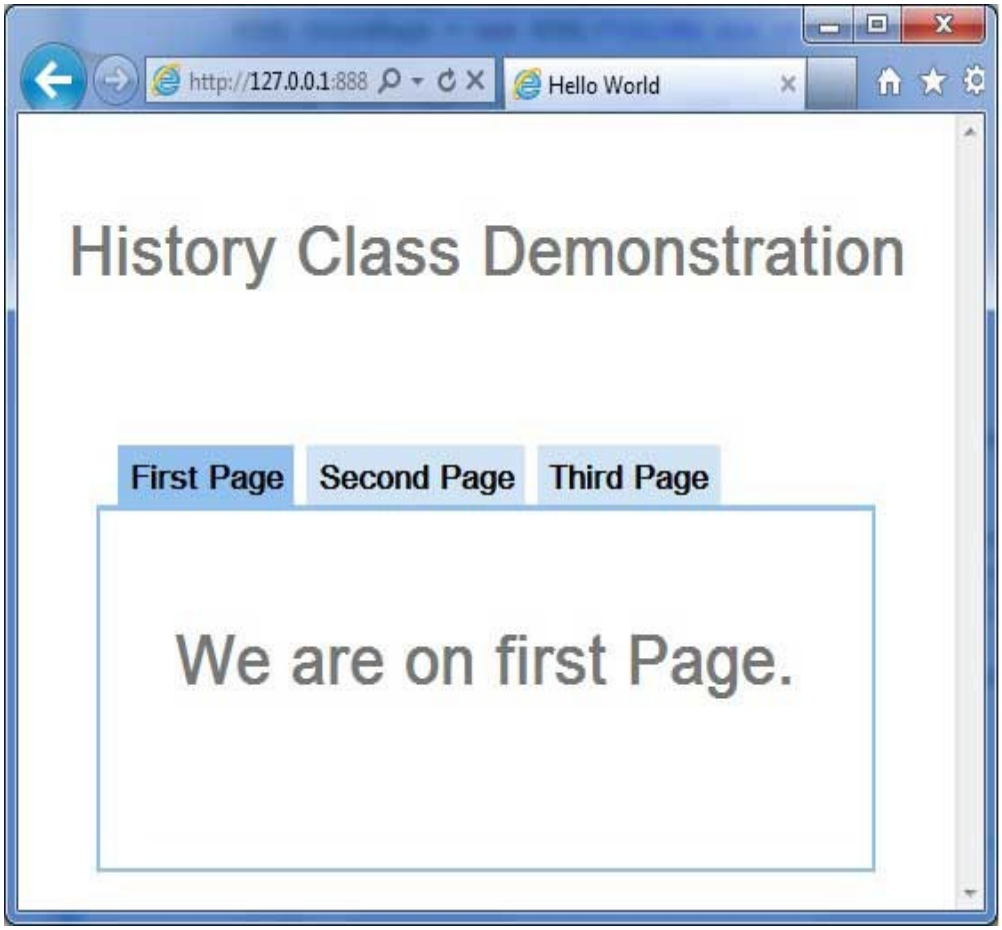
```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<iframe src="javascript:''"
  id="__gwt_historyFrame"
  style="width:0;height:0;border:0"></iframe>
<h1> History Class Demonstration</h1>
<divid="gwtContainer"></div>

</body>
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** using which we will demonstrate History Management in GWT Code.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.logical.shared.SelectionEvent;
import com.google.gwt.event.logical.shared.SelectionHandler;
import com.google.gwt.event.logical.shared.ValueChangeEvent;
import com.google.gwt.event.logical.shared.ValueChangeHandler;
import com.google.gwt.user.client.History;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TabPanel;

public class HelloWorld implements EntryPoint{

   /**
   * This is the entry point method.
   */
   public void onModuleLoad(){
      /* create a tab panel to carry multiple pages */
      finalTabPanel tabPanel =new TabPanel();

      /* create pages */
      HTML firstPage =new HTML("<h1>We are on first Page.</h1>");
      HTML secondPage =new HTML("<h1>We are on second Page.</h1>");
      HTML thirdPage =new HTML("<h1>We are on third Page.</h1>");
```

```
      String firstPageTitle ="First Page";
      String secondPageTitle ="Second Page";
      String thirdPageTitle ="Third Page";
      tabPanel.setWidth("400");

      /* add pages to tabPanel*/
      tabPanel.add(firstPage, firstPageTitle);
      tabPanel.add(secondPage,secondPageTitle);
      tabPanel.add(thirdPage, thirdPageTitle);

      /* add tab selection handler */
      tabPanel.addSelectionHandler(new SelectionHandler<Integer>(){
        @Override
        public void onSelection(SelectionEvent<Integer>event){
          /* add a token to history containing pageIndex
             History class will change the URL of application
             by appending the token to it.
          */
          History.newItem("pageIndex"+event.getSelectedItem());
        }
      });

      /* add value change handler to History
        this method will be called, when browser's
        Back button or Forward button are clicked
        and URL of application changes.
      */
      History.addValueChangeHandler(new ValueChangeHandler<String>(){
        @Override
        public void onValueChange(ValueChangeEvent<String>event){
           String historyToken =event.getValue();
           /* parse the history token */
           try{
              if(historyToken.substring(0,9).equals("pageIndex")){
                 String tabIndexToken = historyToken.substring(9,10);
                 int tabIndex =Integer.parseInt(tabIndexToken);
                 /* select the specified tab panel */
                 tabPanel.selectTab(tabIndex);
              }else{
                 tabPanel.selectTab(0);
              }
           }catch(IndexOutOfBoundsException e){
              tabPanel.selectTab(0);
           }
        }
      });

      /* select the first tab by default */
      tabPanel.selectTab(0);

      /* add controls to RootPanel */
      RootPanel.get().add(tabPanel);
    }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



- Now click on each tab to select different pages.
- You should notice, when each tab is selected ,application url is changed and #pageIndex is added to the url.
- You can also see that browser's back and forward buttons are enabled now.
- Use back and forward button of the browser and you will see the different tabs get selected accordingly.

CHAPTER

19

Bookmark Support

This section describes Bookmarking under Google Web Toolkit:

GWT supports browser history management using a History class for which you can reference *GWT - History Class* chapter.

GWT uses a term **token** which is simply a string that the application can parse to return to a particular state. Application will save this token in browser's history as URL fragment.

In *GWT - History Class* chapter, we handle the token creation and setting in the history by writing code.

In this article, we will discuss a special widget Hyperlink which does the token creation and history management for us automatically and gives application capability of bookmarking.

Bookmarking Example

This example will take you through simple steps to demonstrate Bookmarking of a GWT application. Follow the following steps to update the GWT application we created in *GWT - Create Application*chapter:

Step	Description
1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>
```

```
  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>
  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>

</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<iframe src="javascript:''"
  id="__gwt_historyFrame"
  style="width:0;height:0;border:0"></iframe>
<h1> Bookmarking Demonstration</h1>
<div id="gwtContainer"></div>

</body>
</html>
```

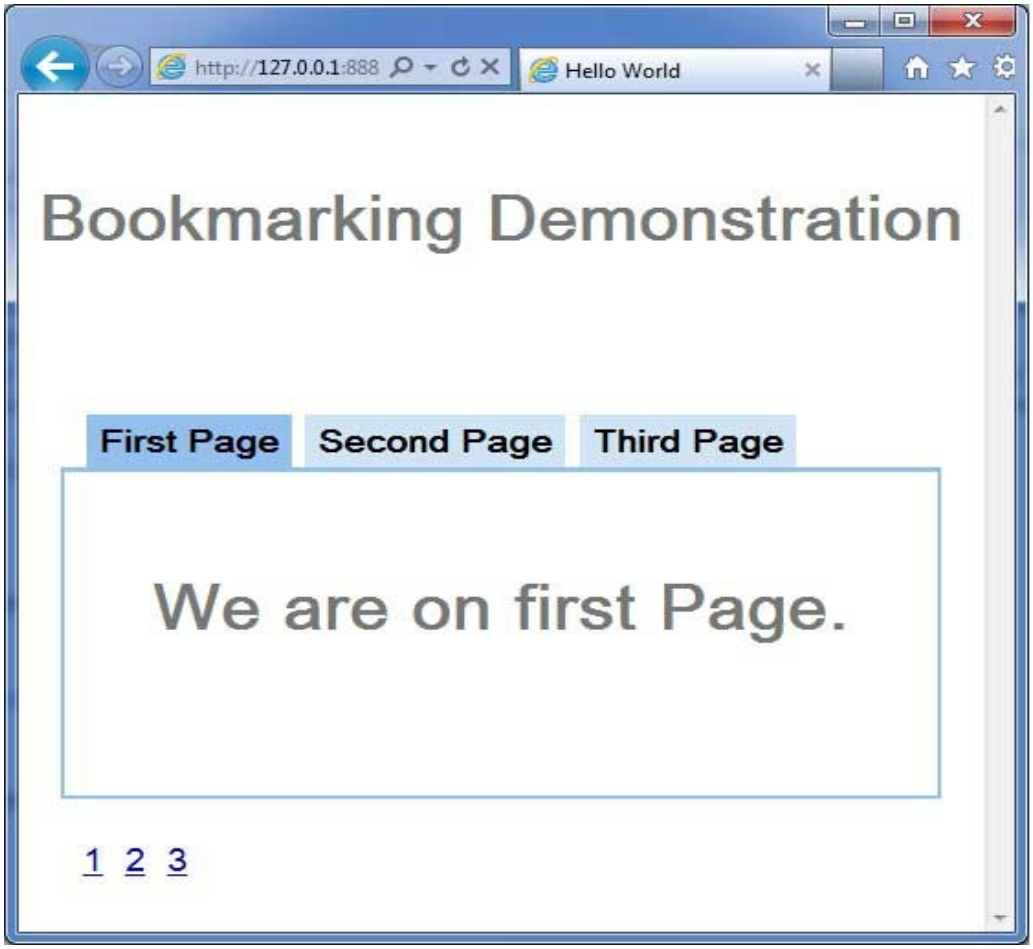
Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** using which we will demonstrate Bookmarking in GWT Code.

```
package com.tutorialspoint.client;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.logical.shared.ValueChangeEvent;
import com.google.gwt.event.logical.shared.ValueChangeHandler;
import com.google.gwt.user.client.History;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.HorizontalPanel;
import com.google.gwt.user.client.ui.Hyperlink;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TabPanel;
import com.google.gwt.user.client.ui.VerticalPanel;
```

```
public class HelloWorld implementsEntryPoint{

   private TabPanel tabPanel;

   private void selectTab(String historyToken){
     /*  parse the history token */
     try{
        if(historyToken.substring(0,9).equals("pageIndex")){
           String tabIndexToken = historyToken.substring(9,10);
           int tabIndex =Integer.parseInt(tabIndexToken);
           /* Select the specified tab panel */
           tabPanel.selectTab(tabIndex);
        } else{
           tabPanel.selectTab(0);
        }
      }catch(IndexOutOfBoundsException e){
          tabPanel.selectTab(0);
      }
   }

  /**
   * This is the entry point method.
   */
  public void onModuleLoad(){
     /* create a tab panel to carry multiple pages */
     tabPanel =newTabPanel();

      /* create pages */
      HTML firstPage =new HTML("<h1>We are on first Page.</h1>");
      HTML secondPage =new HTML("<h1>We are on second Page.</h1>");
      HTML thirdPage =new HTML("<h1>We are on third Page.</h1>");

      String firstPageTitle ="First Page";
      String secondPageTitle ="Second Page";
      String thirdPageTitle ="Third Page";

      Hyperlink firstPageLink =new Hyperlink("1","pageIndex0");
      Hyperlink secondPageLink =new Hyperlink("2","pageIndex1");
      Hyperlink thirdPageLink =new Hyperlink("3","pageIndex2");

      HorizontalPanel linksHPanel =new HorizontalPanel();
      linksHPanel.setSpacing(10);
      linksHPanel.add(firstPageLink);
      linksHPanel.add(secondPageLink);
      linksHPanel.add(thirdPageLink);

      /* If the application starts with no history token,
      redirect to a pageIndex0 */
      String initToken =History.getToken();

      if(initToken.length()==0){
         History.newItem("pageIndex0");
         initToken ="pageIndex0";
      }

      tabPanel.setWidth("400");
      /* add pages to tabPanel*/
      tabPanel.add(firstPage, firstPageTitle);
      tabPanel.add(secondPage,secondPageTitle);
      tabPanel.add(thirdPage, thirdPageTitle);

      /* add value change handler to History
      * this method will be called, when browser's Back button
      * or Forward button are clicked.
      * and URL of application changes.
```

```
      * */
      History.addValueChangeHandler(newValueChangeHandler<String>(){
        @Override
        public void onValueChange(ValueChangeEvent<String>event){
            selectTab(event.getValue());
        }
      });

      selectTab(initToken);

      VerticalPanel vPanel =newVerticalPanel();

      vPanel.setSpacing(10);
      vPanel.add(tabPanel);
      vPanel.add(linksHPanel);

      /* add controls to RootPanel */
      RootPanel.get().add(vPanel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



- Now click on 1, 2 or 3. You can notice that the tab changes with indexes.
- You should notice, when you click on 1,2 or 3 ,application url is changed and #pageIndex is added to the url
- You can also see that browser's back and forward buttons are enabled now.
- Use back and forward button of the browser and you will see the different tabs get selected accordingly.
- Right Click on 1, 2 or 3. You can see options like open, open in new window, open in new tab, add to favourites etc.
- ight Click on 3. Choose add to favourites. Save bookmark as page 3.
- Open favourites and choose page 3. You will see the third tab selected.

CHAPTER

20

Logging Framework

This section describes the Logging Framework:

The logging framework emulates java.util.logging, so it uses the same syntax and has the same behavior as server side logging code

GWT logging is configured using .gwt.xml files.

We can configure logging to be enabled/disabled; we can enable/disable particular handlers, and change the default logging level.

Types of Logger

- Loggers are organized in a tree structure, with the Root Logger at the root of the tree.
- Name of the logger determine the Parent/Child relationships using . to separate sections of the name.
- As an example if we have two loggers Hospital.room1 and Hospital.room2, then they are siblings, with their parent being the logger named Hospital. The Hospital logger (and any logger with a name which does not contain a dot ".") has the Root Logger as a parent.

```
private static Logger room1Logger =
Logger.getLogger("Hospital.room1");
private static Logger room2Logger =
Logger.getLogger("Hospital.room2");
private static Logger hospitalLogger =
Logger.getLogger("Hospital");
private static Logger rootLogger = Logger.getLogger("");
```

Log Handlers

GWT provides default handlers which will show the log entries made using loggers.

Handler	Logs to	Description
SystemLogHandler	stdout	These messages can only be seen in Development Mode in the DevMode window.
DevelopmentModeLogHandler	DevMode Window	Logs by calling method GWT.log. These messages can only be seen in Development Mode in the DevMode window.
ConsoleLogHandler	javascript console	Logs to the javascript console, which is used by Firebug Lite (for IE), Safari and Chrome.
FirebugLogHandler	Firebug	Logs to the firebug console.
PopupLogHandler	popup	Logs to the popup which resides in the upper left hand corner of application when this handler is enabled.
SimpleRemoteLogHandler	server	This handler sends log messages to the server, where they will be logged using the server side logging mechanism.

Configure Logging in GWT Application

HelloWorld.gwt.xml file is to be configured to enable GWT logging as follows:

```
# add logging module
<inherits name="com.google.gwt.logging.Logging"/>
# To change the default logLevel
<set-property name="gwt.logging.logLevel" value="SEVERE"/>
# To enable logging
<set-property name="gwt.logging.enabled" value="TRUE"/>
# To disable a popup Handler
<set-property name="gwt.logging.popupHandler" value="DISABLED"/>
```

Use logger to log user actions

```
/* Create Root Logger */
private static Logger rootLogger = Logger.getLogger("");
...
rootLogger.log(Level.SEVERE,"pageIndex selected: " +
event.getValue());
...
```

Logging Framework Example

This example will take you through simple steps to demonstrate Logging Capability of a GWT application. Follow the following steps to update the GWT application we created in *GWT - Create Application* chapter:

Step	Description

1	Create a project with a name *HelloWorld* under a package *com.tutorialspoint* as explained in the *GWT - Create Application* chapter.
2	Modify *HelloWorld.gwt.xml*, *HelloWorld.css*, *HelloWorld.html* and *HelloWorld.java* as explained below. Keep rest of the files unchanged.
3	Compile and run the application to verify the result of the implemented logic.

Following is the content of the modified module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml**.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                  -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                 -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>
  <inherits name="com.google.gwt.logging.Logging"/>
  <!-- Specify the app entry point class.                   -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>
  <!-- Specify the paths for translatable code              -->
  <source path='client'/>
  <source path='shared'/>
  <set-property name="gwt.logging.logLevel" value="SEVERE"/>
  <set-property name="gwt.logging.enabled" value="TRUE"/>
  <set-property name="gwt.logging.popupHandler" value="DISABLED"/>
</module>
```

Following is the content of the modified Style Sheet file **war/HelloWorld.css**.

```
body{
   text-align: center;
   font-family: verdana, sans-serif;
}
h1{
   font-size:2em;
   font-weight: bold;
   color:#777777;
   margin:40px0px70px;
   text-align: center;
}
```

Following is the content of the modified HTML host file **war/HelloWorld.html**

```
<html>
<head>
<title>Hello World</title>
  <link rel="stylesheet" href="HelloWorld.css"/>
  <script language="javascript" src="helloworld/helloworld.nocache.js">
  </script>
</head>
<body>

<iframe src="javascript:''"
  id="__gwt_historyFrame"
  style="width:0;height:0;border:0"></iframe>
<h1> Logging Demonstration</h1>
<div id="gwtContainer"></div>

</body>
```

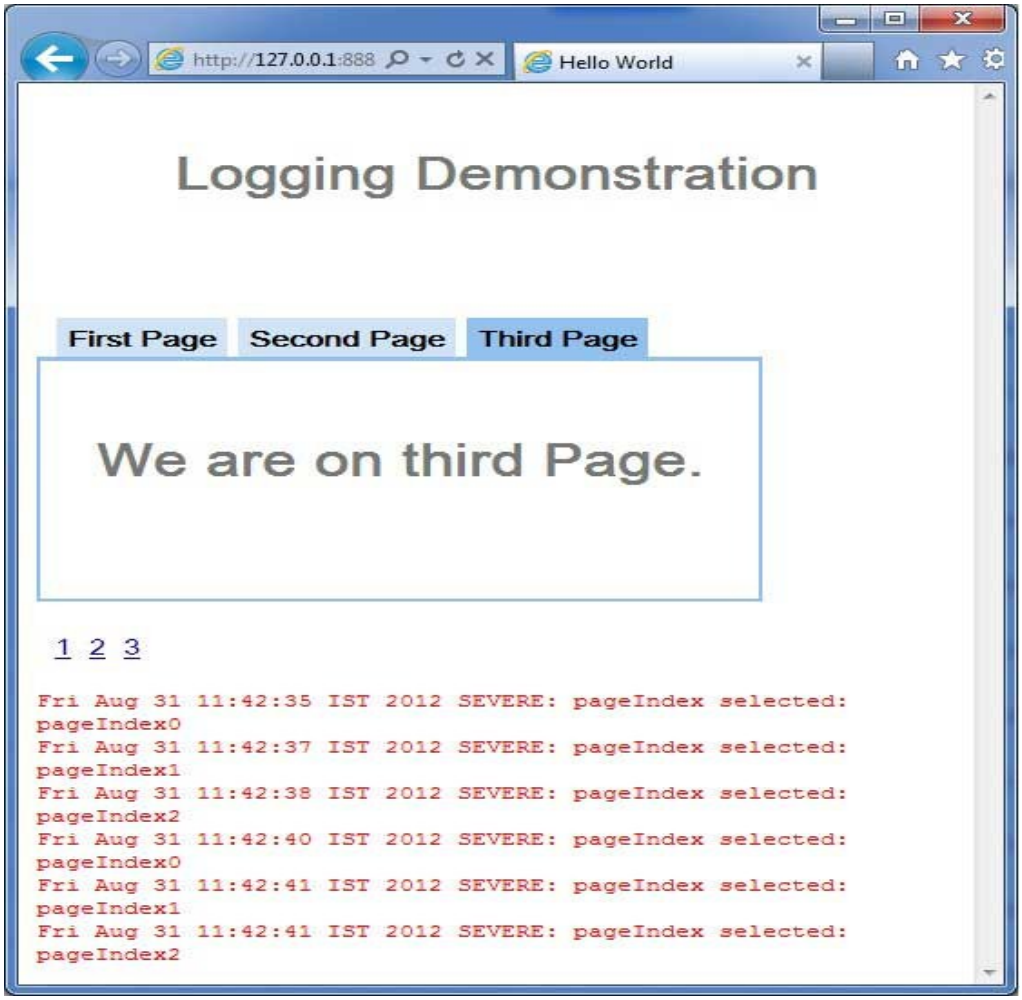
```
</html>
```

Let us have following content of Java file **src/com.tutorialspoint/HelloWorld.java** using which we will demonstrate Bookmarking in GWT Code.

```
package com.tutorialspoint.client;

import java.util.logging.Level;
import java.util.logging.Logger;

import com.google.gwt.core.client.EntryPoint;
import com.google.gwt.event.logical.shared.ValueChangeEvent;
import com.google.gwt.event.logical.shared.ValueChangeHandler;
import com.google.gwt.logging.client.HasWidgetsLogHandler;
import com.google.gwt.user.client.History;
import com.google.gwt.user.client.ui.HTML;
import com.google.gwt.user.client.ui.HorizontalPanel;
import com.google.gwt.user.client.ui.Hyperlink;
import com.google.gwt.user.client.ui.RootPanel;
import com.google.gwt.user.client.ui.TabPanel;
import com.google.gwt.user.client.ui.VerticalPanel;

public class HelloWorld implements EntryPoint{

   private TabPanel tabPanel;
   /* Create Root Logger */
   private static Logger rootLogger =Logger.getLogger("");
   private VerticalPanel customLogArea;

   private void selectTab(String historyToken){
   /*  parse the history token */
   try{
     if(historyToken.substring(0,9).equals("pageIndex")){
        String tabIndexToken = historyToken.substring(9,10);
        int tabIndex =Integer.parseInt(tabIndexToken);
       /* Select the specified tab panel */
        tabPanel.selectTab(tabIndex);
      } else {
         tabPanel.selectTab(0);
      }
   } catch (IndexOutOfBoundsException e){
      tabPanel.selectTab(0);
   }
 }

 /**
  * This is the entry point method.
  */
 public void onModuleLoad(){
 /* create a tab panel to carry multiple pages */
      tabPanel =newTabPanel();

 /* create pages */
      HTML firstPage =new HTML("<h1>We are on first Page.</h1>");
      HTML secondPage =new HTML("<h1>We are on second Page.</h1>");
      HTML thirdPage =new HTML("<h1>We are on third Page.</h1>");

      String firstPageTitle ="First Page";
      String secondPageTitle ="Second Page";
      String thirdPageTitle ="Third Page";
      Hyperlink firstPageLink =newHyperlink("1","pageIndex0");
      Hyperlink secondPageLink =newHyperlink("2","pageIndex1");
      Hyperlink thirdPageLink =newHyperlink("3","pageIndex2");
```

```
      HorizontalPanel linksHPanel =newHorizontalPanel();
      linksHPanel.setSpacing(10);
      linksHPanel.add(firstPageLink);
      linksHPanel.add(secondPageLink);
      linksHPanel.add(thirdPageLink);

      /* If the application starts with no history token,
         redirect to a pageIndex0 */
      String initToken =History.getToken();

      if(initToken.length()==0){
        History.newItem("pageIndex0");
         initToken ="pageIndex0";
      }

      tabPanel.setWidth("400");
      /* add pages to tabPanel*/
      tabPanel.add(firstPage, firstPageTitle);
      tabPanel.add(secondPage,secondPageTitle);
      tabPanel.add(thirdPage, thirdPageTitle);

      /* add value change handler to History
      * this method will be called, when browser's Back button
      * or Forward button are clicked.
      * and URL of application changes.
      * */
      History.addValueChangeHandler(newValueChangeHandler<String>(){
      @Override
       public void onValueChange(ValueChangeEvent<String>event){
          selectTab(event.getValue());
          rootLogger.log(Level.SEVERE,"pageIndex selected: "
          +event.getValue());
       }
      });

      selectTab(initToken);

      VerticalPanel vPanel =newVerticalPanel();

      vPanel.setSpacing(10);
      vPanel.add(tabPanel);
      vPanel.add(linksHPanel);

      customLogArea =newVerticalPanel();
      vPanel.add(customLogArea);

      /* an example of using own custom logging area. */
       rootLogger.addHandler(newHasWidgetsLogHandler(customLogArea));

      /* add controls to RootPanel */
      RootPanel.get().add(vPanel);
   }
}
```

Once you are ready with all the changes done, let us compile and run the application in development mode as we did in GWT - Create Application chapter. If everything is fine with your application, this will produce following result:



Now click on 1, 2 or 3. You can notice, when you click on 1,2 or 3 ,you can see the log is getting printed displaying the pageIndex. Check the Console output in Eclipse. You can see the log is getting printed in Eclipse console as well.

```
Fri Aug 31 11:42:35 IST 2012
SEVERE: pageIndex selected: pageIndex0
Fri Aug 31 11:42:37 IST 2012
SEVERE: pageIndex selected: pageIndex1
Fri Aug 31 11:42:38 IST 2012
SEVERE: pageIndex selected: pageIndex2
Fri Aug 31 11:42:40 IST 2012
SEVERE: pageIndex selected: pageIndex0
Fri Aug 31 11:42:41 IST 2012
SEVERE: pageIndex selected: pageIndex1
Fri Aug 31 11:42:41 IST 2012
```

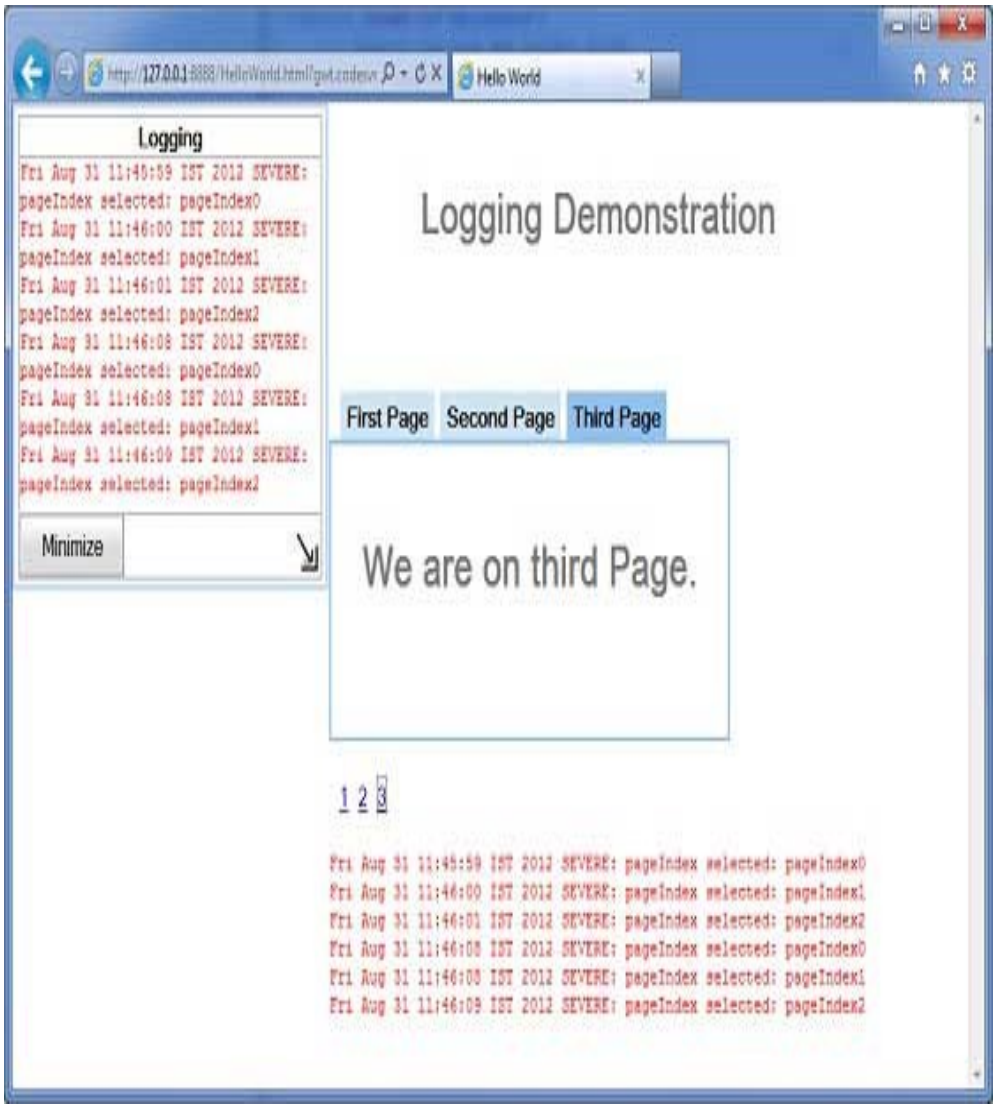
```
SEVERE: pageIndex selected: pageIndex2
```

Now update module descriptor **src/com.tutorialspoint/HelloWorld.gwt.xml** to enable popupHandler.

```
<?xml version="1.0" encoding="UTF-8"?>
<module rename-to='helloworld'>
  <!-- Inherit the core Web Toolkit stuff.                        -->
  <inherits name='com.google.gwt.user.User'/>

  <!-- Inherit the default GWT style sheet.                       -->
  <inherits name='com.google.gwt.user.theme.clean.Clean'/>
  <inherits name="com.google.gwt.logging.Logging"/>
  <!-- Specify the app entry point class.                         -->
  <entry-point class='com.tutorialspoint.client.HelloWorld'/>
  <!-- Specify the paths for translatable code                    -->
  <source path='client'/>
  <source path='shared'/>
  <set-property name="gwt.logging.logLevel"value="SEVERE"/>
  <set-property name="gwt.logging.enabled"value="TRUE"/>
  <set-property name="gwt.logging.popupHandler"value="ENABLED"/>
</module>
```

Once you are ready with all the changes done, reload the application by refreshing the browser window (press F5/reload button of the browser). Notice a popup window is present now in upper left corner of the application.

Now click on 1, 2 or 3. You can notice, when you click on 1,2 or 3 ,you can see the log is getting printed displaying the pageIndex in the popup window.


Hello World
Logging
Fri Aug 31 11:45:59 IST 2012 SEVERE:
pageIndex selected: pageIndex0
Fri Aug 31 11:46:00 IST 2012 SEVERE:
pageIndex selected: pageIndex1
Fri Aug 31 11:46:01 IST 2012 SEVERE:
pageIndex selected: pageIndex2
Fri Aug 31 11:46:08 IST 2012 SEVERE:
pageIndex selected: pageIndex0
Fri Aug 31 11:46:08 IST 2012 SEVERE:
pageIndex selected: pageIndex1
Fri Aug 31 11:46:09 IST 2012 SEVERE:
pageIndex selected: pageIndex2
Minimize
Logging Demonstration
First Page
Second Page
Third Page
We are on third Page.
1 2 3
Fri Aug 31 11:45:59 IST 2012 SEVERE: pageIndex selected: pageIndex0
Fri Aug 31 11:46:00 IST 2012 SEVERE: pageIndex selected: pageIndex1
Fri Aug 31 11:46:01 IST 2012 SEVERE: pageIndex selected: pageIndex2
Fri Aug 31 11:46:08 IST 2012 SEVERE: pageIndex selected: pageIndex0
Fri Aug 31 11:46:08 IST 2012 SEVERE: pageIndex selected: pageIndex1
Fri Aug 31 11:46:09 IST 2012 SEVERE: pageIndex selected: pageIndex2