Httpeservlet.java

index.html

```html
<form method="post" action="check">
Name <input type="text" name="user" >
<input type="submit" value="submit">
</form>
```

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MyServlet.java
```java
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;

public class MyServlet extends HttpServlet {

protected void doPost(HttpServletRequest request, HttpServletResponse response)
throwsServletException, IOException {

response.setContentType("text/html;charset=UTF-8");

PrintWriterout = response.getWriter();
     try {
          String user=request.getParameter("user");
out.println("<h2> Welcome "+user+"</h2>");
     } finally {
out.close();
     }
   }
}
```
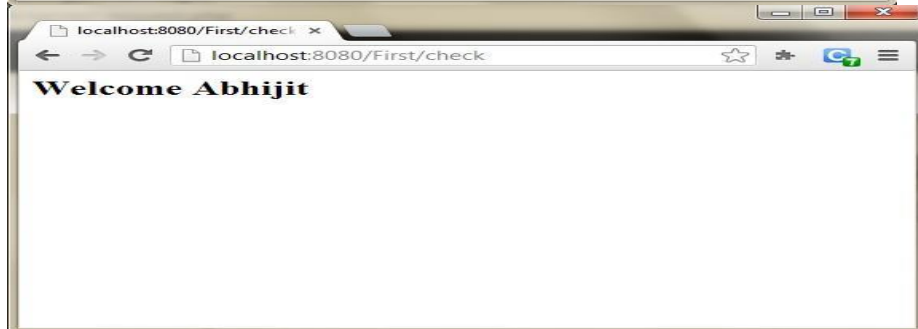
web.xml
```xml
<servlet>
<servlet-name>check</servlet-name>
<servlet-class>MyServlet</servlet-class>
</servlet>
<servlet-mapping>
<servlet-name>check</servlet-name>
<url-pattern>/check</url-pattern>
</servlet-mapping>
```

Output :

Do get() using httpservlet

index.html
```html
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>Http Servlet Demo</title>
</head>
<body>
<a href="welcome">Click to call Servlet</a>
</body>
</html>
```

ServletInterface.java

```java
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
public class ServletInterface extends HttpServlet
{
    private String mymsg;
    public void init () throws ServletException
    {
        mymsg = "Http Servlet Demo";
    }
    public void doGet (HttpServletRequest request, HttpServletResponse response) throws
ServletException, IOException
    {
        // Setting up the content type of web page
        response.setContentType ("text/html");
         // Writing the message on the web page
        PrintWriter out = response.getWriter ();
        out.println ("<h1>" + mymsg + "</h1>");
        out.println ("<p>" + "Hello Friends!" + "</p>");
    }

 public void destroy ()
    {
        // Leaving empty. Use this if you want to perform
        // something at the end of Servlet life cycle.
    }
}
```
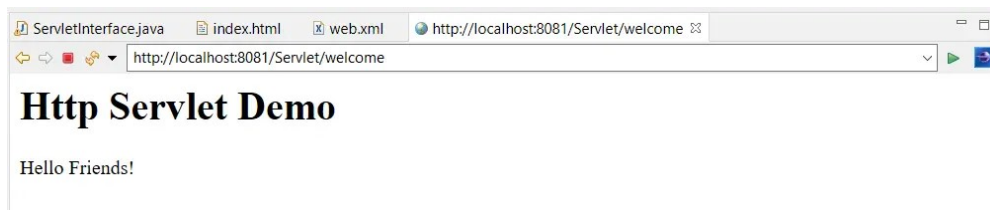
web.xml
```xml
<web-app>
<welcome-file-list>
<welcome-file>index.html</welcome-file>
<welcome-file>index.htm</welcome-file>
<welcome-file>index.jsp</welcome-file>
<welcome-file>default.html</welcome-file>
<welcome-file>default.htm</welcome-file>
<welcome-file>default.jsp</welcome-file>
</welcome-file-list>
<servlet>
<servlet-name>MyHttpServlet</servlet-name>
<servlet-class>ServletInterface</servlet-class>
</servlet>
<servlet-mapping>
<servlet-name>MyHttpServlet</servlet-name>
<url-pattern>/welcome</url-pattern>
</servlet-mapping>
</web-app>
```

Output
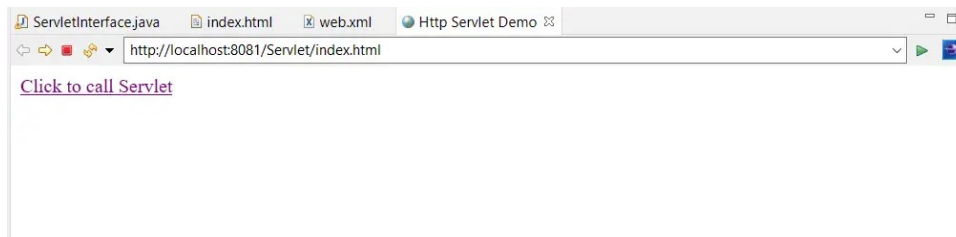
Click the link on the above screen

Explain different approaches for using the get and post method.

Approach1:

By keeping the service method in our servlet program

```
public class MyServlet extends Httpservlet
{
 public void service (HttpServletRequest req, HttpServletResponse res) throws IOException,
ServletException
    {
       //request procrssing logic
    }
}
```
The service(-,-) method of our servlet program can process both get and post-methods-based
requests. But keeping request processing logic in the service(-,-) method is not industry-standard,
so try to keep request processing logic in doXXX methods.

Approach2:
By overriding both doGet() and doPost() methods, keep request processing logic in one method
and call that method from another method.

```
public class MyServlet extends Httpservlet
{
   public void doGet (HttpServletRequest request, HttpServletResponse response) throws
IOException, ServletException
    {
       //request procrssing logic
    }

   public void doPost (HttpServletRequest request, HttpServletResponse response) throws
IOException, ServletException
    {
       doGet (request, response);
    }
}
```

Here servlet program can process both Get and Post method-based requests. Here, the request
processing logic is not duplicated.

Approach3:
keep request processing logic in a user-defined method and call that method from both the
doGet() and the doPost() methods.

```
public class MyServlet extends Httpservlet
{
```

```java
    public void xyz (HttpServletRequest request, HttpServletResponse response) throws
IOException, ServletException
    {
      //request procrssing logic
    }
    public void doGet (HttpServletRequest request, HttpServletResponse response) throws
IOException, ServletException
    {
      xyz(request, response);
    }
    public void doPost (HttpServletRequest request, HttpServletResponse response) throws
IOException, ServletException
    {
      xyz(request, response);
    }
}
```

Something about web.xml
Servlet Mapping Example
```
<servlet>
  <servlet-name>watermelon</servlet-name>
  <servlet-class>myservlets.watermelon</servlet-class>
</servlet>
<servlet>
  <servlet-name>garden</servlet-name>
  <servlet-class>myservlets.garden</servlet-class>
</servlet>
<servlet>
  <servlet-name>list</servlet-name>
  <servlet-class>myservlets.list</servlet-class>
</servlet>
<servlet>
  <servlet-name>kiwi</servlet-name>
  <servlet-class>myservlets.kiwi</servlet-class>
</servlet>
<servlet-mapping>
  <servlet-name>watermelon</servlet-name>
  <url-pattern>/fruit/summer/*</url-pattern>
</servlet-mapping>
<servlet-mapping>
  <servlet-name>garden</servlet-name>
  <url-pattern>/seeds/*</url-pattern>
</servlet-mapping>
<servlet-mapping>
  <servlet-name>list</servlet-name>
  <url-pattern>/seedlist</url-pattern>
</servlet-mapping>
<servlet-mapping>
  <servlet-name>kiwi</servlet-name>
  <url-pattern>*.abc</url-pattern>
</servlet-mapping>
```

url-patterns and Servlet Invocation	
URL	**Servlet Invoked**
http://host:port/mywebapp/fruit/summer/index.html	watermelon
http://host:port/mywebapp/fruit/summer/index.abc	watermelon
http://host:port/mywebapp/seedlist	list

http://host:port/mywebapp/seedlist/index.html	The default servlet, if configured, or an HTTP 404 File Not Found error message. If the mapping for the list servlet had been /seedlist*, the list servlet would be invoked.
http://host:port/mywebapp/seedlist/pear.abc	kiwi If the mapping for the list servlet had been /seedlist*, the list servlet would be invoked.
http://host:port/mywebapp/seeds	garden
http://host:port/mywebapp/seeds/index.html	garden
http://host:port/mywebapp/index.abc	kiwi

ServletServlet can be used to create a default mappings for servlets. For example, to create a default mapping to map all servlets to /myservlet/*, so the servlets can be called using http://host:port/web-app-name/myservlet/com/foo/FooServlet, add the following to your web.xml file. (The web.xml file is located in the WEB-INF directory of your Web application.)

```
<servlet>
  <servlet-name>ServletServlet</servlet-name>
  <servlet-class>weblogic.servlet.ServletServlet</servlet-class>
</servlet>
<servlet-mapping>
<servlet-name>ServletServlet</servlet-name>
  <url-pattern>/myservlet/*</url-pattern>
</servlet-mapping>
```

To set up a user-defined default servlet:

1. Define your servlet. Add a servlet-mapping with url-pattern = "/" as follows:

```
<servlet-mapping>
<servlet-name>MyOwnDefaultServlet</servlet-name>
<url-pattern>/myservlet/*(</url-pattern>
</servlet-mapping>
```

2. If you still want the FileServlet to serve files with other extensions:
   a. Define a servlet and give it a <servlet-name>, for example myFileServlet.
   b. Define the <servlet-class> as weblogic.servlet.FileServlet.
   c. Using the <servlet-mapping> element, map file extensions to the myFileServlet (in addition to the mappings for your default servlet). For example, if you want the myFileServlet to serve.gif files, map *.gif to the myFileServlet.

Note: The FileServlet includes the SERVLET_PATH when determining the source filename if the docHome parameter (deprecated in this release) is not specified. As a result, it is possible to explicitly serve only files from specific directories by mapping the FileServlet to /dir/*, etc.

Example of Configuring Servlet Initialization Attributes in web.xml

```xml
<servlet>
 <servlet-name>HelloWorld2</servlet-name>
 <servlet-class>examples.servlets.HelloWorld2</servlet-class>
 <init-param>
  <param-name>greeting</param-name>
  <param-value>Welcome</param-value>
 </init-param>
 <init-param>
  <param-name>person</param-name>
  <param-value>WebLogic Developer</param-value>
 </init-param>
</servlet>
```

Request Dispatcher **forward**
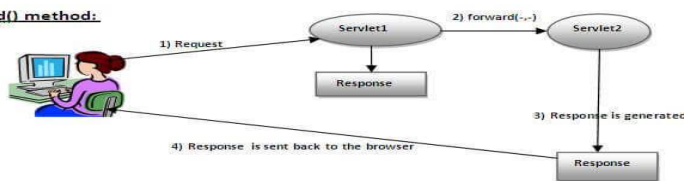

```java
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;

public class GFG extends HttpServlet {
        public void doPost(HttpServletRequest request,
                                        HttpServletResponse response)
        {
                // Perform all the work as per your
                // application's architecture
                try {
                        RequestDispatcher requestDispatcher;

                        // path is a string specifying the pathname to
                        // the resource. If it is relative, it must be
                        // relative against the current servlet
                        requestDispatcher=request.getRequestDispatcher("path");
                        requestDispatcher.forward(request, response);
                }
                catch (ServletException servletException) {
                }
                catch (IOException ioException) {
                }
                catch (IllegalStateException illegalStateException) {
                }
        }
}
```

Servletconfig

web.xml
```xml
<web-app>
<servlet>
<servlet-name>MyServlet</servlet-name>
<servlet-class>MyServlet</servlet-class>
<init-param>
<param-name>driver</param-name>
<param-value>sun.jdbc.odbc.JdbcOdbcDriver</param-value>
</init-param>
<init-param>
<param-name>url</param-name>
<param-value>jdbc:odbc:sri</param-value>
</init-param>
<init-param>
<param-name>user</param-name>
<param-value>system</param-value>
</init-param>
<init-param>
<param-name>password</param-name>
<param-value>servlet</param-value>
</init-param>
</servlet>
<servlet-mapping>
<servlet-name>MyServlet</servlet-name>
<url-pattern>/config</url-pattern>
</servlet-mapping>
</web-app>
```

MyServlet.java
```java
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletConfig;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
public class MyServlet extends HttpServlet
{
   protected void doGet (HttpServletRequest request, HttpServletResponse response) throws
ServletException, IOException
   {
      response.setContentType ("text/html");
      PrintWriter out = response.getWriter ();
      ServletConfig config = getServletConfig ();
```

```
        String logicalName = config.getServletName ();
        String driver = config.getInitParameter ("driver");
        String url = config.getInitParameter ("url");
        String user = config.getInitParameter ("user");
        String password = config.getInitParameter ("password");
        out.println ("<html><body><h1>");
        out.println ("Logical Name : " + logicalName + "<br><br>");
        out.println ("Driver : " + driver + "<br><br>");
        out.println ("Url : " + url + "<br><br>");
        out.println ("Password : " + password + "<br><br>");
        out.println ("</h1></body></html>");
    }
}
```


← → C ⓘ localhost:8082/Servlet/config

Logical Name : MyServlet

Driver : sun.jdbc.odbc.JdbcOdbcDriver

Url : jdbc:odbc:sri

Password : servlet

Servletconfig.java

web.xml
```xml
<web-app...>
<servlet>
     <servlet-name>register</servlet-name>
     <jsp-file>/register/start.jsp</jsp-file>
   </servlet>

        <servlet>
        <servlet-name>check</servlet-name>
        <servlet-class>MyServlet</servlet-class>
        <init-param>
        <param-name>email</param-name>
        <param-value>we</param-value>
        </init-param>
        </servlet>
        <servlet-mapping>
        <servlet-name>check</servlet-name>
        <url-pattern>/check</url-pattern>
        </servlet-mapping>
        <welcome-file-list>
        <welcome-file>index.html</welcome-file>
        </welcome-file-list>
        </web-app>
```

MyServletclass :
```java
        import java.io.*;
        importjavax.servlet.*;
        importjavax.servlet.http.*;

        public class MyServletextendsHttpServlet {

        protected void doGet(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriterout = response.getWriter();
        ServletConfigsc=getServletConfig();
        out.println(sc.getInitParameter("email"));
           }
        }
```

Servletcontext

web.xml
```xml
<web-app>
<display-name>Context Application</display-name>
<context-param>
<param-name>a</param-name>
<param-value>apple</param-value>
</context-param>
<context-param>
<param-name>b</param-name>
<param-value>bombay</param-value>
</context-param>
<servlet>
<servlet-name>MyServlet</servlet-name>
<servlet-class>MyServlet</servlet-class>
</servlet>
<servlet-mapping>
<servlet-name>MyServlet</servlet-name>
<url-pattern>/context</url-pattern>
</servlet-mapping>
</web-app>
```

MyServlet.java
```java
import java.io.IOException;
import java.io.PrintWriter;
import java.util.Enumeration;
import javax.servlet.ServletContext;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
public class MyServlet extends HttpServlet
{
    protected void doGet (HttpServletRequest request, HttpServletResponse response) throws
ServletException, IOException
    {
        response.setContentType ("text/html");
        PrintWriter out = response.getWriter ();
        ServletContext context = getServletConfig ().getServletContext ();
        String logicalName = context.getServletContextName ();
        String a = context.getInitParameter ("a");
        String b = context.getInitParameter ("b");
        Enumeration e = context.getInitParameterNames ();
        context.setAttribute ("c", "cat");
        context.setAttribute ("d", "dog");
```

```
out.println ("<html><body><h1><br>");
out.println ("Logical Name : " + logicalName);
out.println ("<br>");
out.println ("a for ... " + a);
out.println ("<br>");
out.println ("b for ... " + b);
out.println ("<br>");
while (e.hasMoreElements ())
{
 out.println (e.nextElement () + "<br>");
}
out.println ("c for ... " + context.getAttribute ("c"));
out.println ("<br>");
out.println ("d for ... " + context.getAttribute ("d") + "<br>");
e = context.getAttributeNames ();
while (e.hasMoreElements ())
{
 out.println ("</h1></body></html>");
}
}
}
}
```

Logical Name : Context Application
a for ... apple
b for ... bombay
a
b
c for ... cat
d for ... dog

Servletcontext.java
web.xml
<web-app ...>

<context-param>
<param-name>driverName</param-name>
<param-value>sun.jdbc.JdbcOdbcDriver</param-value>
</context-param>

<servlet>
<servlet-name>hello</servlet-name>
<servlet-class>MyServlet</servlet-class>
</servlet>

<servlet-mapping>
<servlet-name>hello</servlet-name>
<url-pattern>/hello</url-pattern>
</servlet-mapping>

</web-app>

MyServletclass :
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;

public class *MyServlet*extendsHttpServlet {

protected void doGet(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriter*out* = response.getWriter();
ServletContextsc = getServletContext();
out.println(sc.getInitParameter("driverName"));
    }
}

SET an Attribute.java

```java
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;

public class FirstextendsHttpServlet {

protected void doPost(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");

PrintWriterout = response.getWriter();
ServletContextsc = getServletContext();
sc.setAttribute("user","Abhijit");        //setting attribute on context scope
   }
}
```
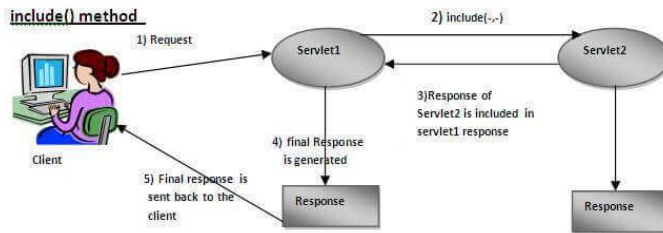
GET an Attribute.java

```java
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;

public class SecondextendsHttpServlet {

protected void doPost(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriterout = response.getWriter();
ServletContextsc = getServletContext();

    String str = sc.getAttribute("user");  //getting attribute from context scope

out.println("Welcome"+str);  // Prints : Welcome Abhijit
   }
}
```

Request Dispatcher include


```java
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;

public class Demo extends HttpServlet {
        public void doPost(HttpServletRequest request,
                                        HttpServletResponse response)
        {
                // Perform all the work as
                // per your application's architecture
                try {
                        RequestDispatcher requestDispatcher;

                        // path is a string specifying the pathname to
                        // the resource. If it is relative, it must be
                        // relative against the current servlet
                        requestDispatcher=request.getRequestDispatcher("path");
                        requestDispatcher.include(request, response);
                }
                catch (ServletException servletException) {
                }
                catch (IOException ioException) {
                }
        }
}
```

Attributes in Servlet

GetAttributeServlet.java

```java
import javax.servlet.ServletConfig;
import javax.servlet.ServletContext;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;
import java.io.IOException;
import java.io.PrintWriter;
public class GetServletAttribute extends HttpServlet{
    protected void doGet(HttpServletRequest req, HttpServletResponse resp) throws
ServletException, IOException {
        // get application-scoped attribute
     String applicationScope = (String)req.getServletContext().getAttribute("name");
        // get session scoped attribute
        HttpSession session = req.getSession();
        String sessionScope = (String)session.getAttribute("name");
        // get request scoped attribute
        String requestScope = (String)req.getAttribute("name");
        // print response
        resp.setContentType("text/html");
        PrintWriter out = resp.getWriter();
        out.write("<html><body>");
        out.write("<h2>Servlet attributes example: applicationScope, sessionScope and
requestScope</h2>");
        out.write("<p>applicationScope: " + applicationScope + "</p>");
        out.write("<p>sessionScope: " + sessionScope + "</p>");
        out.write("<p>requestScope: " + requestScope + "</p>");
        if(session != null) {
        session.removeAttribute("name");}
    }
}
```

SetAttributeServlet.java

```java
import javax.servlet.RequestDispatcher;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
```

```java
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;
import java.io.IOException;
public class SetServletAttribute extends HttpServlet{
    protected void doGet(HttpServletRequest req, HttpServletResponse resp) throws
ServletException, IOException {
        // set application scoped attribute
        req.getServletContext().setAttribute("name", "application scoped attribute");
        // set session scoped attribute
        HttpSession session = req.getSession();
        session.setAttribute("name", "session scoped attribute");
        // set request scoped attribute
        req.setAttribute("name", "request scoped attribute");
        // send redirect to other servlet
        RequestDispatcher rd = req.getRequestDispatcher("servlet2");
        rd.forward(req, resp);
    }
}
```
web.xml

```xml
<xml version="1.0" encoding="UTF-8"?>
<web-app xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://java.sun.com/xml/ns/javaee"
xsi:schemaLocation="http://java.sun.com/xml/ns/javaee http://java.sun.com/xml/ns/javaee/web-
app_3_0.xsd" id="WebApp_ID" version="3.0">
<display-name>ServletAttributesExample</display-name>
<welcome-file-list>
<welcome-file> index.html</welcome-file>
<welcome-file> index.htm</welcome-file>
<welcome-file> index.jsp</welcome-file>
<welcome-file> default.html</welcome-file>
<welcome-file> default.htm</welcome-file>
<welcome-file> default.jsp</welcome-file>
</welcome-file-list>

<servlet>
<servlet-name>SetServletAttribute</servlet-name>
<servlet-class>SetServletAttribute</servlet-class>
</servlet>
<servlet>
<servlet-name>GetServletAttribute</servlet-name>
<servlet-class>GetServletAttribute</servlet-class>
</servlet>

<servlet-mapping>
```
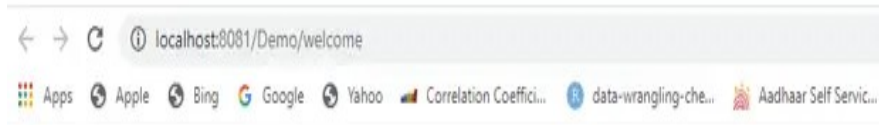
```xml
<servlet-name>SetServletAttribute</servlet-name>
<url-pattern>/welcome</url-pattern>
</servlet-mapping>
<servlet-mapping>
<servlet-name>GetServletAttribute</servlet-name>
<url-pattern>/servlet2</url-pattern>
</servlet-mapping>
</web-app>
```


Servlet attributes example: applicationScope, sessionScope and requestScope

applicationScope: application scoped attribute

sessionScope: session scoped attribute

requestScope: request scoped attribute

Request Dispatcher

index.html
```
<form action="servlet1" method="post">
Name:<input type="text" name="userName"/><br/>
Password:<input type="password" name="userPass"/><br/>
<input type="submit" value="login"/>
</form>
```

Login.java
```java
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;

public class Login extends HttpServlet {
public void doPost(HttpServletRequest request, HttpServletResponse response)
      throws ServletException, IOException {
   response.setContentType("text/html");
   PrintWriter out = response.getWriter();

   String n=request.getParameter("userName");
   String p=request.getParameter("userPass");

   if(p.equals("servlet")){
      RequestDispatcher rd=request.getRequestDispatcher("servlet2");
      rd.forward(request, response);
   }
   else{
      out.print("Sorry UserName or Password Error!");
      RequestDispatcher rd=request.getRequestDispatcher("/index.html");
      rd.include(request, response);

      }
   }

}
```

WelcomeServlet.java
```java
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;

public class WelcomeServlet extends HttpServlet {
```

```java
    public void doPost(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {

    response.setContentType("text/html");
    PrintWriter out = response.getWriter();

    String n=request.getParameter("userName");
    out.print("Welcome "+n);
    }
}
```

web.xml
```xml
<web-app>
<servlet>
<servlet-name>Login</servlet-name>
<servlet-class>Login</servlet-class>
</servlet>
<servlet>
<servlet-name>WelcomeServlet</servlet-name>
<servlet-class>WelcomeServlet</servlet-class>
</servlet>


<servlet-mapping>
<servlet-name>Login</servlet-name>
<url-pattern>/servlet1</url-pattern>
</servlet-mapping>
<servlet-mapping>
<servlet-name>WelcomeServlet</servlet-name>
<url-pattern>/servlet2</url-pattern>
</servlet-mapping>

<welcome-file-list>
<welcome-file>index.html</welcome-file>
</welcome-file-list>
</web-app>
```

Send redirect

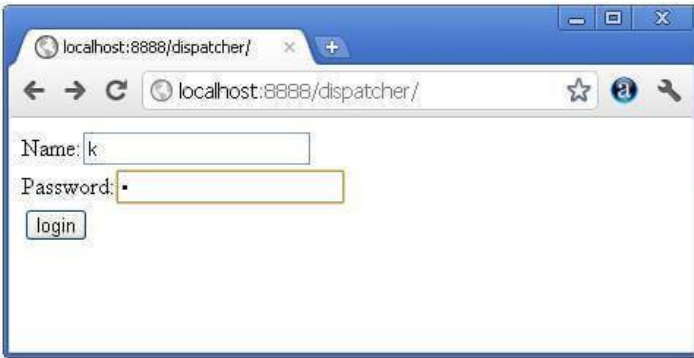index.html
```
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>sendRedirect example</title>
</head>
<body>


<form action="MySearcher">
<input type="text" name="name">
<input type="submit" value="Google Search">
</form>

</body>
</html>
```
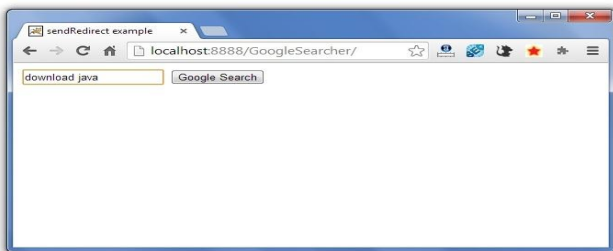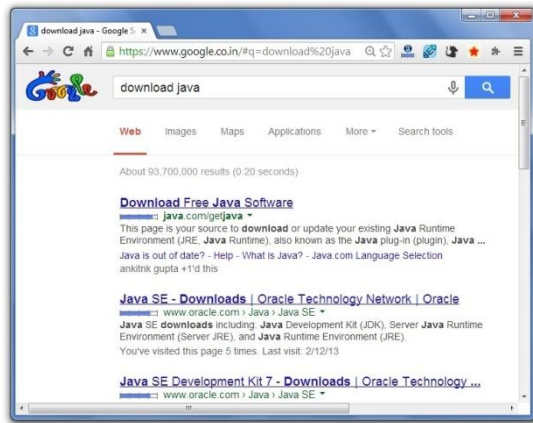
MySearcher.java
```java
import java.io.IOException;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

public class MySearcher extends HttpServlet {
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {

        String name=request.getParameter("name");
        response.sendRedirect("https://www.google.co.in/#q="+name);
    }
}
```

Httpservletmethods.java
Session and cookies

```java
importjavax.servlet.ServletException;
importjavax.servlet.http.Cookie;
importjavax.servlet.http.HttpServlet;
importjavax.servlet.http.HttpServletRequest;
importjavax.servlet.http.HttpServletResponse;

public class ServletInfo extends HttpServlet {
        private static final long serialVersionUID = -2383814320847175129L;

        @Override
protected void doGet(HttpServletRequest request, HttpServletResponse response)
                        throws ServletException, IOException {

                PrintWriterpr = response.getWriter();
                pr.println("=== Paths ===\n");
                pr.println("Request URL : " + request.getRequestURL());
                pr.println("Request URI : " + request.getRequestURI());
                pr.println("Servlet path : " + request.getServletPath());
                pr.println("\n=== Headers ===\n");
                Enumeration<String> e = request.getHeaderNames();
                while(e.hasMoreElements()){
                        String param = (String) e.nextElement();
                        pr.println(param + " : " + request.getHeader(param));
                }
                pr.println("\n=== Parameters ===\n");
                Map<String, String[]>paramsMap = request.getParameterMap();
                for (String key : paramsMap.keySet()) {
                        pr.println(key + " : " + request.getParameter(key));
                }
                pr.println("\n=== Session ===\n");
                // returns 0:0:0:0:0:0:0:1 if executed from localhost
                pr.println("Client IP address : " + request.getRemoteAddr());
                pr.println("Session ID : " + request.getRequestedSessionId());
                // Cookie objects the client sent with this request
                Cookie[] cookies = request.getCookies();
                if (cookies != null) {
                        for (Cookie cookie : cookies) {
                                pr.print(cookie.getName() + ";");
                        }
                }
        }

}
```

Requestdispacher.java

index.html
```
<form method="post" action="Validate">
Name:<input type="text" name="user" /><br/>
Password:<input type="password" name="pass" ><br/>
<input type="submit" value="submit">
</form>
```

Validate.java
```
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;

public class ValidateextendsHttpServlet {

protected void doPost(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriter out = response.getWriter();
    try {
        String name = request.getParameter("user");
        String password = request.getParameter("pass");

    if(password.equals("studytonight"))
    {
    RequestDispatcherrd = request.getRequestDispatcher("Welcome");
    rd.forward(request, response);
        }
        else
        {
    out.println("<font color='red'><b>You have entered incorrect password</b></font>");
    RequestDispatcherrd = request.getRequestDispatcher("index.html");
    rd.include(request, response);
        }
    }finally {
    out.close();
        }
    }}
    Welcome.java
    import java.io.*;
    importjavax.servlet.*;
    importjavax.servlet.http.*;
    public class WelcomeextendsHttpServlet {

    protected void doPost(HttpServletRequest request, HttpServletResponse response)
```

```
        throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriterout = response.getWriter();
    try {

out.println("<h2>Welcome user</h2>");
    } finally {
out.close();
    }
  }
}
```

web.xml
```
<web-app>
<servlet>
<servlet-name>Validate</servlet-name>
<servlet-class>Validate</servlet-class>
</servlet>
<servlet>
<servlet-name>Welcome</servlet-name>
<servlet-class>Welcome</servlet-class>
</servlet>
<servlet-mapping>
<servlet-name>Validate</servlet-name>
<url-pattern>/Validate</url-pattern>
</servlet-mapping>
<servlet-mapping>
<servlet-name>Welcome</servlet-name>
<url-pattern>/Welcome</url-pattern>
</servlet-mapping>
<welcome-file-list>
<welcome-file>index.html</welcome-file>
</welcome-file-list>
</web-app>
```

This will be the first screen. You can enter your Username and Password here.

When you click on Submit, Password will be validated, if it is not 'studytonight' , error message will be displayed.

Enter any Username, but enter 'studytonight' as password.

Password will be successfully validated and you will be directed to the Welcome Servlet.

Sendredirect.java

```
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;

public class MyServletextendsHttpServlet {

protected void doGet(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriterout = response.getWriter();
    try {
response.sendRedirect("http:/ /www.spit.ac.in");
}finally {
out.close();
    }
  }
}
```

Httpsession.java

index.html

```html
<form method="post" action="Validate">
  User: <input type="text" name="user" /><br/>
  Password: <input type="text" name="pass" ><br/>
<input type="submit" value="submit">
</form>
```

```xml
web.xml
<web-app..>

<servlet>
<servlet-name>Validate</servlet-name>
<servlet-class>Validate</servlet-class>
</servlet>
<servlet>
<servlet-name>Welcome</servlet-name>
<servlet-class>Welcome</servlet-class>
</servlet>

<servlet-mapping>
<servlet-name>Validate</servlet-name>
<url-pattern>/Validate</url-pattern>
</servlet-mapping>
<servlet-mapping>
<servlet-name>Welcome</servlet-name>
<url-pattern>/Welcome</url-pattern>
</servlet-mapping>

<welcome-file-list>
<welcome-file>index.html</welcome-file>
</welcome-file-list>

</web-app>
```

```java
Validate.java
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;

public class ValidateextendsHttpServlet {
```

```java
protected void doPost(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");

    String name = request.getParameter("user");
    String pass = request.getParameter("pass");

if(pass.equals("1234"))
    {
        //creating a session
HttpSessionsession = request.getSession();
session.setAttribute("user", name);
response.sendRedirect("Welcome");
    }
  }
}


Welcome.java
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;

public class WelcomeextendsHttpServlet {

protected void doGet(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriterout = response.getWriter();
HttpSessionsession = request.getSession();
    String user = (String)session.getAttribute("user");
out.println("Hello "+user);
  }}
Cookies.java

index.html
<form method="post" action="validate">
 Name:<input type="text" name="user" /><br/>
 Password:<input type="text" name="pass" ><br/>
<input type="submit" value="submit">
</form>


web.xml
<web-app...>
```

```xml
<servlet>
<servlet-name>validate</servlet-name>
<servlet-class>MyServlet</servlet-class>
</servlet>
<servlet-mapping>
<servlet-name>validate</servlet-name>
<url-pattern>/validate</url-pattern>
</servlet-mapping>

<servlet>
<servlet-name>First</servlet-name>
<servlet-class>First</servlet-class>
</servlet>
<servlet-mapping>
<servlet-name>First</servlet-name>
<url-pattern>/First</url-pattern>
</servlet-mapping>

<welcome-file-list>
<welcome-file>index.html</welcome-file>
</welcome-file-list>

</web-app>
```

```java
MyServlet.java
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;

public class MyServletextendsHttpServlet {

protected void doPost(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");

String name = request.getParameter("user");
String pass = request.getParameter("pass");

if(pass.equals("1234"))
    {
        Cookie ck = new Cookie("username",name);
response.addCookie(ck);
```

```java
response.sendRedirect("First");
        }
    }
}


First.java
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;

public class FirstextendsHttpServlet {

protected void doGet(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriter out = response.getWriter();
Cookie[] cks = request.getCookies();
out.println("Welcome "+cks[0].getValue());
    }
}
```

Case Study with GET Methods

- add two numbers

index.html

```html
<html>
<head>
<title>Add Two numbers</title>
</head>
<body>
        <h3>Add Two Numbers</h3>
        <form action='add'>
                <p>Enter First Number: <input type="text" name='first'></p>
                <p>Enter Second Number: <input type="text" name='second'></p>
                <p><input type='submit' value='submit'></p>
        </form>
</body>
</html>
```

http://localhost:8080/chapter2/add?first=10&second=15

```java
String a = request.getParameter("first");
```

```java
package testPackage;

import java.io.*;
importjavax.servlet.*;
importjavax.servlet.annotation.*;
importjavax.servlet.http.*;

@WebServlet("/add")
public class AddNumber extends HttpServlet
{
protected void doGet(HttpServletRequest request,HttpServletResponse response)
        throws ServletException, IOException
   {
     String a = request.getParameter("first");
     String b = request.getParameter("second");
if( a == null || a.trim().length() == 0 || b == null || b.trim().length() == 0 )
     {
response.sendRedirect( "addform.html" );
       return;
     }

     int sum = Integer.parseInt(a) + Integer.parseInt(b);

response.setContentType("text/html");
PrintWriter out = response.getWriter();
out.println("<html><head><title>Add</title></head><body>");

out.println("<p>The sum of " + a + " and " + b  + " is " + sum + ".</p>");
out.println("</body></html>");
   }
}
```

Handling HTTP POST Requests

user entry form

```
<html>
<head>
<title>User Entry Form</title>
</head>
<body>
<form method="post" action="entry">
<h3>User Entry Form</h3>
<p>
        Username: <input type="text" name="username"><br><br>
        Password: <input type="password" name="user-password"><br><br>

        Gender: <input type="radio" name="sex" value="male">Male
<input type="radio" name="sex" value="female"> Female <br><br>

        Hobbies:
<input type="checkbox" name="soccer"> Soccer
<input type="checkbox" name="cricket"> Cricket
<input type="checkbox" name="baseball"> Baseball<br><br>

        Address: <textarea rows="3" cols="30"></textarea><br><br>

        Select Your City:
<select name="city">
<option value="sydney">Sydney</option>
<option value="melbourne">Melbourne</option>
<option value="cromwell">Cromwell</option>
</select><br><br>

<input type="submit" value="Submit">
<input type="reset" value="Reset">
</p>
</form>
</body>
</html>
```

```java
packagecom.beginwithjava.servlet;

import java.io.*;
importjavax.servlet.*;
importjavax.servlet.annotation.*;
importjavax.servlet.http.*;

@WebServlet("/entry")
public class EntryForm extends HttpServlet
{
protected void doPost(HttpServletRequest request,   HttpServletResponse response)
        throws ServletException, IOException
    {
response.setContentType("text/html");
PrintWriter out = response.getWriter();
out.println("<html><head><title>Add</title></head><body>");

out.println("<p>Username: "  + request.getParameter("username") + "</p>");
out.println("<p>Password: "    + request.getParameter("user-password")+ "</p>");
out.println("<p>Gender: " + request.getParameter("sex") + "</p>");
out.println("<p>Hobbies:</p>");
String[] sports = request.getParameterValues("sports");
out.println("<ul>");
for (String sport : sports)
     {
out.println("<li>" + sport + "</li>");
     }
out.println("</ul>");

out.println("<p>Address: "+ request.getParameter("address") + "</p>");
out.println("<p>City: " + request.getParameter("city") + "</p>");
out.println("</body></html>");
    }
}
```

GET and POST combined

```java
import java.io.*;

import javax.servlet.*;
import javax.servlet.annotation.*;
import javax.servlet.http.*;

@WebServlet("/add")
public class AddTwoNumbers extends HttpServlet
{
protected void doGet(HttpServletRequest request,
HttpServletResponse response)
        throws ServletException, IOException
    {
response.setContentType("text/html");
PrintWriter out = response.getWriter();

out.println("<html>");
out.println("<head><title>Table Example</title></head>");
out.println("<body>");
out.println("<h3>Add Two Numbers</h3>");
out.println("<form method='post' action='add'>");
out.println("<p>Enter First Number: <input type='text' name='first'></p>");
out.println("<p>Enter Second Number: <input type='text' name='second'></p>");
out.println("<p><input type='submit' value='submit'></p>");
out.println("</form>");
out.println("</body>");
out.println("</html>");


    }

protected void doPost(HttpServletRequest request,HttpServletResponse response)
        throws ServletException, IOException
    {
doGet(request, response);

String a = request.getParameter("first");
     String b = request.getParameter("second");

     int sum = Integer.parseInt(a) + Integer.parseInt(b);

response.setContentType("text/html");
PrintWriter out = response.getWriter();
out.println("<html><head><title>Add</title></head><body>");

out.println("<p>The sum of " + a + " and "
```
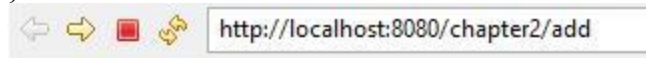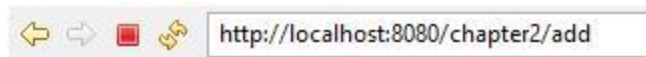
```
                  + b + " is " + sum + ".</p>");

out.println("</body></html>");

    }
}
```

Add Two Numbers

Enter First Number: `15`

Enter Second Number: `6`

`submit`

The sum of 15 and 6 is 21.

Error handler in servlet

Error Handler Servlet Example
This example would give you basic understanding of Exception Handling in Servlet, but you can write more sophisticated filter applications using the same concept −

```java
// Import required java libraries
import java.io.*;
importjavax.servlet.*;
importjavax.servlet.http.*;
import java.util.*;

// Extend HttpServlet class
public class ErrorHandler extends HttpServlet {

   // Method to handle GET method request.
public void doGet(HttpServletRequest request, HttpServletResponse response)
     throws ServletException, IOException {

     // Analyze the servlet exception
Throwablethrowable = (Throwable)
request.getAttribute("javax.servlet.error.exception");
     Integer statusCode = (Integer)
request.getAttribute("javax.servlet.error.status_code");
     String servletName = (String)
request.getAttribute("javax.servlet.error.servlet_name");

     if (servletName == null) {
servletName = "Unknown";
     }
     String requestUri = (String)
request.getAttribute("javax.servlet.error.request_uri");

     if (requestUri == null) {
requestUri = "Unknown";
     }

     // Set response content type
response.setContentType("text/html");

PrintWriter out = response.getWriter();
     String title = "Error/Exception Information";
     String docType =
       "<!doctype html public \"-//w3c//dtd html 4.0 " +
       "transitional//en\">\n";
```

```java
out.println(docType +
    "<html>\n" +
    "<head><title>" + title + "</title></head>\n" +
    "<body bgcolor = \"#f0f0f0\">\n");

    if (throwable == null &&statusCode == null) {
out.println("<h2>Error information is missing</h2>");
out.println("Please return to the <a href=\"" +
response.encodeURL("http://localhost:8080/") +
        "\">Home Page</a>.");
    } else if (statusCode != null) {
out.println("The status code : " + statusCode);
    } else {
out.println("<h2>Error information</h2>");
out.println("Servlet Name : " + servletName + "</br></br>");
out.println("Exception Type : " + throwable.getClass( ).getName( ) + "</br></br>");
out.println("The request URI: " + requestUri + "<br><br>");
out.println("The exception message: " + throwable.getMessage( ));
    }
out.println("</body>");
out.println("</html>");
  }

  // Method to handle POST method request.
public void doPost(HttpServletRequest request, HttpServletResponse response)
    throws ServletException, IOException {

doGet(request, response);
  }
}


web.xml

<servlet>
<servlet-name>ErrorHandler</servlet-name>
<servlet-class>ErrorHandler</servlet-class>
</servlet>

<!-- servlet mappings -->
<servlet-mapping>
<servlet-name>ErrorHandler</servlet-name>
<url-pattern>/ErrorHandler</url-pattern>
</servlet-mapping>

<error-page>
```

```
<error-code>404</error-code>
<location>/ErrorHandler</location>
</error-page>

<error-page>
<exception-type>java.lang.Throwable</exception-type >
<location>/ErrorHandler</location>
</error-page>
```

The status code : 404
The above code may not work with some web browsers. So try with Mozilla and Safari and it should work.

```java
packagecom.wl.cookie;

importjavax.servlet.http.Cookie;
importjava.io.IOException;
importjava.text.SimpleDateFormat;
importjava.util.Date;

public class SendCookieServlet extends javax.servlet.http.HttpServlet {
protected void doPost(javax.servlet.http.HttpServletRequest request,
javax.servlet.http.HttpServletResponse response) throws javax.servlet.ServletException,
IOException {

    }

protected void doGet(javax.servlet.http.HttpServletRequest request,
javax.servlet.http.HttpServletResponse response) throws javax.servlet.ServletException,
IOException {
        // Get the current time and format
        Date date  = new Date();
// Add one in the middle | because " " cannot be stored in the cookie, otherwise it will report an
error.
SimpleDateFormatsimpleDateFormat = new SimpleDateFormat("yyyy-MM-dd|hh:mm:ss");
        String currentTime = simpleDateFormat.format(date);

            // Store the current time in the cookie
        Cookie cookie = new Cookie("lastAccessTime", currentTime);
//      cookie.setMaxAge(10 * 60);
cookie.setPath("/cookie");
response.addCookie(cookie);

    // Get the cookie in the browser request, if there is a description before access, get the time and
display
// If there is no value, it means the first visit, showing the welcome screen
        String lastAccessTime = null;
Cookie[] cookies = request.getCookies();
if(cookie != null){
for (Cookie c : cookies){
if("lastAccessTime".equals(c.getName())){
lastAccessTime = c.getValue();
            }
        }
    }
response.setContentType("text/html;charset=utf-8");
if(lastAccessTime == null){
response.getWriter().write("You are the first visit");
    } else {
```

```
        response.getWriter().write("Your last access time is " + lastAccessTime);
    }
  }
}
```

Generic Servlet

```java
importjavax.servlet.GenericServlet;
importjavax.servlet.ServletException;
importjavax.servlet.ServletRequest;
importjavax.servlet.ServletResponse;
importjava.io.IOException;


public class SimpleServlet extends GenericServlet {

public void service(ServletRequest request, ServletResponse response)
      throws ServletException, IOException {

  String yesOrNoParam = request.getParameter("param");

if("yes".equals(yesOrNoParam) ){
response.getWriter().write("<html><body>You said yes!</body></html>");
 }

if("no".equals(yesOrNoParam) ){

response.getWriter().write("<html><body>You said no!</body></html>");
 }
}}
```

Generic first program

```java
import java.io.*;
import javax.servlet.*;

public class First extends GenericServlet{
public void service(ServletRequestreq,ServletResponse res)
throwsIOException,ServletException{

res.setContentType("text/html");
PrintWriter out=res.getWriter();
out.print("<html><body>");
out.print("<b>hello generic servlet</b>");
out.print("</body></html>");

}
}
```

Generic servlet

Index.html
```
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>Generic Servlet Demo</title>
</head>
<body>
<a href="welcome">Click to call Servlet</a>
</body>
</html>
```

Examplegeneric.java
```
import java.io.*;
importjavax.servlet.*;

public class ExampleGeneric extends GenericServlet{
public void service(ServletRequestreq,ServletResponse res)
throwsIOException,ServletException{
res.setContentType("text/html");
PrintWriterpwriter=res.getWriter();
pwriter.print("<html>");
pwriter.print("<body>");
pwriter.print("<h2>Generic Servlet Example</h2>");
pwriter.print("<p>Hello BeginnersBook Readers!</p>");
pwriter.print("</body>");
pwriter.print("</html>");
 }
}
```

Web.xml
```
<web-app>
<display-name>BeginnersBookServlet</display-name>
<welcome-file-list>
<welcome-file>index.html</welcome-file>
<welcome-file>index.htm</welcome-file>
<welcome-file>index.jsp</welcome-file>
<welcome-file>default.html</welcome-file>
<welcome-file>default.htm</welcome-file>
<welcome-file>default.jsp</welcome-file>
</welcome-file-list>
```
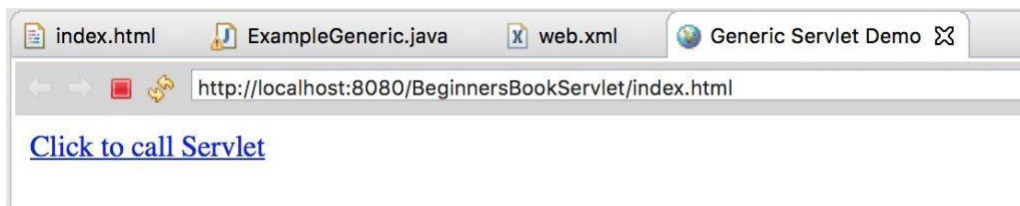
```
<servlet>
<servlet-name>MyGenericServlet</servlet-name>
<servlet-class>ExampleGeneric</servlet-class>
</servlet>


<servlet-mapping>
<servlet-name>MyGenericServlet</servlet-name>
<url-pattern>/welcome</url-pattern>
</servlet-mapping>

</web-app>
```

Output

Database connection Create statement/execute query/

```java
/STEP 1. Import required packages import java.sql.*;
public class JDBCExample {
   // JDBC driver name and database URL
   static final String JDBC_DRIVER = "com.mysql.jdbc.Driver";
   static final String DB_URL = "jdbc:mysql://localhost/EMP";

   // Database credentials
   static final String USER = "username";
   static final String PASS = "password";

   public static void main(String[] args) {
   Connection conn = null;
   Statement stmt = null;
    try{
      //STEP 2: Register JDBC driver
      Class.forName("com.mysql.jdbc.Driver");
//Class.forName(JDBC_DRIVER);
 //STEP 3: Open a connection System.out.println("Connecting to database...");
      conn = DriverManager.getConnection(DB_URL, USER, PASS);
      // conn = DriverManager.getConnection(DB_URL, "", "");
 //STEP 4: Execute a query System.out.println("Creating statement...");
stmt = conn.createStatement();
String sql = "UPDATE Employees set age=30 WHERE id=103";
 // Let us check if it returns a true Result Set or not.
Boolean ret = stmt.execute(sql);
System.out.println("Return value is : " + ret.toString() );
     // Let us update age of the record with ID = 103;
      int rows = stmt.executeUpdate(sql);
     System.out.println("Rows impacted : " + rows );
 // Let us select all the records and display them.
sql = "SELECT id, first, last, age FROM Employees";
ResultSet rs = stmt.executeQuery(sql);
 Int age, id;
String first, last;
     //STEP 5: Extract data from result set
     while(rs.next()){
        //Retrieve by column name
        id = rs.getInt("id");
        age = rs.getInt("age");
        first = rs.getString("first");
      last = rs.getString("last");
      //Display values
      System.out.print("ID: " + id);
      System.out.print(", Age: " + age);
```

```java
            System.out.print(", First: " + first);
            System.out.println(", Last: " + last);
         }
         //STEP 6: Clean-up environment
         rs.close();
         stmt.close();
         conn.close();
      }catch(SQLException se){
         //Handle errors for JDBC
         se.printStackTrace();
      }catch(Exception e){
         //Handle errors for Class.forName
         e.printStackTrace();
      }finally{
         //finally block used to close resources
         try{
             if(stmt!=null)
                stmt.close();
         }catch(SQLException se2){
         }// nothing we can do try{
             if(conn!=null)
                conn.close();
          }catch(SQLException se){
             se.printStackTrace();
         }//end finally try
      }//end try
      System.out.println("Goodbye!");
   }//end main
}//end
```

Output
Connecting to database...
Creating statement...
Return value is : false Rows
impacted : 1
ID: 100, Age: 18, First: Zara, Last: Ali
ID: 101, Age: 25, First: Mahnaz, Last: Fatma
 ID: 102, Age: 30, First: Zaid, Last: Khan
ID: 103, Age: 30, First: Sumit, Last: Mittal
Goodbye!

Create statement execute update query

```java
//STEP 1. Import required packages import
java.sql.*;

public class JDBCExample {
   // JDBC driver name and database URL
   static final String JDBC_DRIVER = "com.mysql.jdbc.Driver";
   static final String DB_URL = "jdbc:mysql://localhost/EMP";

   // Database credentials
   static final String USER = "username";
   static final String PASS = "password";
   public static void main(String[] args) {
      Connection conn = null;
   Statement stmt = null;
   try{
      //STEP 2: Register JDBC driver
      Class.forName("com.mysql.jdbc.Driver");

      //STEP 3: Open a connection
      System.out.println("Connecting to database...");
      conn = DriverMana ger.getConnection(DB_URL,USER,PASS);
//STEP 4: Execute a query to create statement with required arguments for RS example.
      System.out.println("Creating statement...");
stmt = conn.createStatement(ResultSet.TYPE_SCROLL_INSENSITIVE,
ResultSet.CONCUR_READ_ONLY);
      String sql;
      sql = "SELECT id, first, last, age FROM Employees";
      ResultSet rs = stmt.executeQuery(sql);
      // Move cursor to the last row.
      System.out.println("Moving cursor to the last...");
      rs.last();

      //STEP 5: Extract data from result set
      System.out.println("Displaying record...");
      //Retrieve by column name String
      id = rs.getString("id");
System.out.println("id is "+id);
      //Int id1=Integer.parseInt(id);
          int age = rs.getInt("age");
      String first = rs.getString("first");
      String last = rs.getString("last");

      //Display values System.out.print("ID: " + id);
      System.out.print(", Age: " + age);
```

```java
      System.out.print(", First: " + first);
      System.out.println(", Last: " + last);
      // Move cursor to the first row.
      System.out.println("Moving cursor to the first row...");
      rs.first();

      //STEP 6: Extract data from result set
      System.out.println("Displaying record...");
      //Retrieve by column name
      id = rs.getInt("id");
      age = rs.getInt("age");
      first = rs.getString("first");
      last = rs.getString("last");
      //Display values
      System.out.print("ID: " + id);
      System.out.print(", Age: " + age);
      System.out.print(", First: " + first);
      System.out.println(", Last: " + last);
      // Move cursor to the first row.
      System.out.println("Moving cursor to the next row...");
      rs.next();
//STEP 7: Extract data from result set
System.out.println("Displaying record..."); id = rs.getInt("id");
      age = rs.getInt("age");
      first = rs.getString("first");
      last = rs.getString("last");

      //Display values
      System.out.print("ID: " + id);
      System.out.print(", Age: " + age);
      System.out.print(", First: " + first);
      System.out.println(", Last: " + last);
      //STEP 8: Clean-up environment rs.close();
      stmt.close();
      conn.close();
   }catch(SQLException se){
      //Handle errors for JDBC
      se.printStackTrace();
   }catch(Exception e){
      //Handle errors for Class.forName
      e.printStackTrace();
   }finally{
      //finally block used to close resources try{
         if(stmt!=null)
            stmt.close();
      }catch(SQLException se2){
```

```
    }// nothing we can do try{
        if(conn!=null)
            conn.close();
      }catch(SQLException se){
        se.printStackTrace();

    }//end finally try
  }//end try System.out.println("Goodbye!");
}//end main
}//end JDBCExample
```

Output
Connecting to database...
Creating statement...
Moving cursor to the last... Displaying
record...
ID: 103, Age: 30, First: Sumit, Last: Mittal
Moving cursor to the first row...
Displaying record...
ID: 100, Age: 18, First: Zara, Last: Ali Moving
cursor to the next row...
Displaying record...
ID: 101, Age: 25, First: Mahnaz, Last: Fatma Goodbye!

Update statement using Database

```java
//STEP 1. Import required packages import
java.sql.*;

public class JDBCExample {
  // JDBC driver name and database URL
  static final String JDBC_DRIVER = "com.mysql.jdbc.Driver";
  static final String DB_URL = "jdbc:mysql://localhost/EMP";

  // Database credentials
  static final String USER = "username";
  static final String PASS = "password";
  public static void main(String[] args) {
    Connection conn = null;
  try{
    //STEP 2: Register JDBC driver
    Class.forName("com.mysql.jdbc.Driver");

    //STEP 3: Open a connection
    System.out.println("Connecting to database...");
    conn = DriverManager.getConnection(DB_URL,USER,PASS);

    //STEP 4: Execute a query to create statment with
    // required arguments for RS example.
    System.out.println("Creating statement...");
Statement stmt = conn.createStatement(ResultSet.TYPE_SCROLL_INSENSITIVE,
ResultSet.CONCUR_UPDATABLE);

 //STEP 5: Execute a query
    String sql = "SELECT id, first, last, age FROM Employees";
    ResultSet rs = stmt.executeQuery(sql);
    System.out.println("List result set for reference............ ");
    printRs(rs);

    //STEP 6: Loop through result set and add 5 in age
    //Move to BFR postion so while-loop works properly
    rs.beforeFirst();
    //STEP 7: Extract data from result set
    while(rs.next()){
      //Retrieve by column name
      int newAge = rs.getInt("age") + 5;
      rs.updateDouble( "age", newAge );
      rs.updateRow();
    }
```

```java
System.out.println("List result set showing new ages...");
printRs(rs);
// Insert a record into the table.
//Move to insert row and add column data with updateXXX()
System.out.println("Inserting a new record...");
rs.moveToInsertRow();
rs.updateInt("id",104);
rs.updateString("first","John");
rs.updateString("last","Paul");
rs.updateInt("age",40);
//Commit row
rs.insertRow();
System.out.println("List result set showing new set...");
printRs(rs);
// Delete second record from the table. Set position to second record first
rs.absolute( 2 );
System.out.println("List the record before deleting...");
//Retrieve by column name
 int id = rs.getInt("id");
int age = rs.getInt("age");
String first = rs.getString("first");
String last = rs.getString("last");
//Display values
System.out.print("ID: " + id);
System.out.print(", Age: " + age);
System.out.print(", First: " + first);
System.out.println(", Last: " + last);

//Delete row
 rs.deleteRow();
System.out.println("List result set after deleting one records...");
printRs(rs);

//STEP 8: Clean-up environment
rs.close();
stmt.close();
conn.close();
}catch(SQLException se){
  //Handle errors for JDBC
  se.printStackTrace();
}catch(Exception e){
  //Handle errors for Class.forName
  e.printStackTrace();
}finally{
  //finally block used to close resources try{
```

```java
            if(conn!=null)
                conn.close();
        }catch(SQLException se){
            se.printStackTrace();
        }//end finally try
    }//end try System.out.println("Goodbye!");
}//end main

    public static void printRs(ResultSet rs) throws SQLException{
        //Ensure we start with first row
        rs.beforeFirst();
        while(rs.next()){
            //Retrieve by column name
            int id = rs.getInt("id");
            int age = rs.getInt("age");
            String first = rs.getString("first");
            String last = rs.getString("last");

            //Display values
            System.out.print("ID: " + id);
            System.out.print(", Age: " + age);
            System.out.print(", First: " + first);
            System.out.println(", Last: " + last);
        }
        System.out.println();
    }//end printRs()
}//end JDBCExample
```

Output:
Connecting to database...
Creating statement...
List result set for reference....
ID: 100, Age: 33, First: Zara, Last: Ali
ID: 101, Age: 40, First: Mahnaz, Last: Fatma ID:
102, Age: 50, First: Zaid, Last: Khan
ID: 103, Age: 45, First: Sumit, Last: Mittal

List result set showing new ages... ID: 100,
Age: 38, First: Zara, Last: Ali
ID: 101, Age: 45, First: Mahnaz, Last: Fatma ID:
102, Age: 55, First: Zaid, Last: Khan
ID: 103, Age: 50, First: Sumit, Last: Mittal

Inserting a new record...
List result set showing new set...
ID: 100, Age: 38, First: Zara, Last: Ali

ID: 101, Age: 45, First: Mahnaz, Last: Fatma ID:
102, Age: 55, First: Zaid, Last: Khan
ID: 103, Age: 50, First: Sumit, Last: Mittal ID:
104, Age: 40, First: John, Last: Paul

List the record before deleting...
ID: 101, Age: 45, First: Mahnaz, Last: Fatma List
result set after deleting one records...

ID: 100, Age: 38, First: Zara, Last: Ali ID:
102, Age: 55, First: Zaid, Last: Khan
ID: 103, Age: 50, First: Sumit, Last: Mittal ID:
104, Age: 40, First: John, Last: Paul

Goodbye!

Metadata in Result in database

```
import java.sql.*; class
Rsmd{
public static void main(String args[]){ try{
Class.forName("oracle.jdbc.driver.OracleDriver");
Connection con=DriverManager.getConnection(
"jdbc:oracle:thin:@localhost:1521:xe","system","oracle");
PreparedStatement ps=con.prepareStatement("select * from emp");
ResultSet rs=ps.executeQuery();
ResultSetMetaData rsmd=rs.getMetaData();

System.out.println("Total columns: "+rsmd.getColumnCount());
System.out.println("Column Name of 1st column: "+rsmd.getColumnName(1));
System.out.println("Column Type Name of 1st column: "+rsmd.getColumnTypeName(1));
con.close();
}catch(Exception e)
{ System.out.println(e);}
}
}
```

Output: Total columns: 2
    Column Name of 1st column: ID
    Column Type Name of 1st column: NUMBER

Oracle connection

```java
import java.sql.*;
class OracleCon{
public static void main(String args[]){ try{
//step1 load the driver class
Class.forName("oracle.jdbc.driver.OracleDriver");

//step2 create the connection object

Connection con=DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:xe","system","oracle");

//step3 create the statement object Statement
stmt=con.createStatement();
//step4 execute query
ResultSet rs=stmt.executeQuery("select * from emp");
while(rs.next())
System.out.println(rs.getInt(1)+" "+rs.getString(2)+" "+rs.getString(3));

//step5 close the connection object con.close();
}catch(Exception e)
{ System.out.println(e);}

}
}
```

Mysql create statement

```
import java.sql.*; class
MysqlCon{
public static void main(String args[]){ try{
Class.forName("com.mysql.jdbc.Driver");
Connection con=DriverManager.getConnection(
"jdbc:mysql://localhost:3306/db_name", "root","root");
//here db_name is database name, root is username and password Statement
stmt=con.createStatement();
ResultSet rs=stmt.executeQuery("select * from emp");
while(rs.next())
System.out.println(rs.getInt(1)+" "+rs.getString(2)+" "+rs.getString(3));
con.close();
}catch(Exception e)
{ System.out.println(e);}
}
}
```

Connection with Access withoutdsn.java import
java.sql.*;
class Test{
 public static void main(String ar[]){ try{
   String database="student.mdb";
   //Here database exists in the current directory

String url="jdbc:odbc:Driver={Microsoft Access Driver (*.mdb)}; DBQ=" +
database + ";DriverID=22;READONLY=true";

   Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");
   Connection   c=DriverManager.getConnection(url);
   Statement st=c.createStatement();
   ResultSet rs=st.executeQuery("select * from login");

    while(rs.next()){
     System.out.println(rs.getString(1));
    }

}catch(Exception ee){System.out.println(ee);}

}}

Connection with Access Withdsn.java import
java.sql.*;
class Test{
 public static void main(String ar[]){ try{
   String url="jdbc:odbc:mydsn";
   Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");
   Connection c=DriverManager.getConnection(url);
   Statement st=c.createStatement();
   ResultSet rs=st.executeQuery("select * from login");

   while(rs.next()){
     System.out.println(rs.getString(1));
   }

}catch(Exception ee)
{System.out.println(ee);}

}}

Statementinterface.java

```java
import java.sql.*;
class FetchRecord{
public static void main(String args[])throws Exception{
Class.forName("oracle.jdbc.driver.OracleDriver");
Connection con=DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:xe","system","oracle");
Statement stmt=con.createStatement();

int result=stmt.executeUpdate("delete from emp765 where id=33");
System.out.println(result+" records affected");
con.close();
}}
```

```java
Resultset.java
import java.sql.*;
class FetchRecord{
public static void main(String args[])throws Exception{

Class.forName("oracle.jdbc.driver.OracleDriver");
Connection con=DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:xe","syste
m","oracle");
Statement stmt
=con.createStatement(ResultSet.TYPE_SCROLL_SENSITIVE,ResultSet.CONCUR_UP
DATABLE);
ResultSet rs=stmt.executeQuery("select * from emp765");

//getting the record of 3rd row
rs.absolute(3);
System.out.println(rs.getString(1)+" "+rs.getString(2)+" "+rs.getString(3));
con.close();
}}
```

Preparedstatement.java
create table emp(id number(10),name varchar2(50));

import java.sql.*; class
InsertPrepared{
public static void main(String args[]){ try{
Class.forName("oracle.jdbc.driver.OracleDriver");
Connection con=DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:xe","syste
m","oracle");

PreparedStatement stmt=con.prepareStatement("insert into Emp values(?,?)");
stmt.setInt(1,101);
//1 specifies the first parameter in the query
stmt.setString(2,"Ratan");
int i=stmt.executeUpdate();
System.out.println(i+" records inserted");

con.close();

}catch(Exception e){ System.out.println(e);}

}
}

PreparedStatement stmt=con.prepareStatement("update emp set name=? where id=?");
stmt.setString(1,"Sonoo");//1 specifies the first parameter in the query i.e. name
stmt.setInt(2,101);

int i=stmt.executeUpdate();
System.out.println(i+" records updated");

insert records until user press n

```java
import java.sql.*;
import java.io.*;
class RS{
public static void main(String args[])throws Exception{
Class.forName("oracle.jdbc.driver.OracleDriver");
Connection con=DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:xe","system","oracle");
PreparedStatement ps=con.prepareStatement("insert into emp130 values(?,?,?)");
BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
Int id;
String name, s;
Float salary;
do{
System.out.println("enter id:");
id=Integer.parseInt(br.readLine());
System.out.println("enter name:");
name=br.readLine();
System.out.println("enter salary:");
salary=Float.parseFloat(br.readLine());
ps.setInt(1,id);
ps.setString(2,name);
ps.setFloat(3,salary);
int i=ps.executeUpdate();
System.out.println(i+" records affected");

System.out.println("Do you want to continue: y/n");
s=br.readLine();
if(s.startsWith("n"))
{ break;
}
}while(true);

con.close();
}}
```

Try catch block

```java
import java.sql.*;
import java.util.*;
class Main
{
    public static void main(String a[])
    {
        //Creating the connection
        String url = "jdbc:oracle:thin:@localhost:1521:xe";
        String user = "system";
        String pass = "12345";

        //Entering the data
        Scanner k = new Scanner(System.in);
        System.out.println("enter name");
         String name = k.next();
        System.out.println("enter roll no");
        int roll = k.nextInt();
        System.out.println("enter class");
        String cls = k.next();

        //Inserting data using SQL query
        String sql = "insert into student1 values('"+name+"',"+roll+",'"+cls+"')";
        Connection con=null;
        try
        {
            DriverManager.registerDriver(new oracle.jdbc.OracleDriver());

            //Reference to connection interface
            con = DriverManager.getConnection(url,user,pass);

            Statement st = con.createStatement();
             int m = st.executeUpdate(sql);
            if (m == 1)
                System.out.println("inserted successfully : "+sql);
                else
                System.out.println("insertion failed");

            con.close();
        }
        catch(Exception ex)
        {
            System.err.println(ex);
        }
    }
}
```

Prepare and Create import
java.sql.*;
public class jdbcConn {
    public static void main(String[] args) throws Exception {
        Class.forName("org.apache.derby.jdbc.ClientDriver");
        Connection con = DriverManager.getConnection (
        "jdbc:derby://localhost:1527/testDb","name","pass");
PreparedStatement updateemp = con.prepareStatement(
        "insert into emp values(?,?,?)");

    updateemp.setInt(1,23);
    updateemp.setString(2,"Roshan");
    updateemp.setString(3, "CEO");
    updateemp.executeUpdate();

    Statement stmt = con.createStatement();
    String query = "select * from emp";
    ResultSet rs = stmt.executeQuery(query);
    System.out.println("Id Name Job");

    while (rs.next()) {
      int id = rs.getInt("id");
      String name = rs.getString("name");
      String job = rs.getString("job");
      System.out.println(id + " " + name+" "+job);
    }
  }
}

Result
The above code sample will produce the following result. The result may vary.

Id Name
        Job 23
Roshan CEO

Callable:

```
create or replace procedure "INSERTR" (id IN NUMBER, name IN VARCHAR2)
is
begin
insert into user420 values(id,name);
end;
/
```

```java
import java.sql.*;
public class Proc {
public static void main(String[] args) throws Exception{
Class.forName("oracle.jdbc.driver.OracleDriver");
Connection
con=DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:xe","system","oracle");

CallableStatement stmt=con.prepareCall("{call insertR(?,?)}"); stmt.setInt(1,1011);
stmt.setString(2,"Amit");
stmt.execute();

System.out.println("success");
}
}
```

Callable statement

```
CallableStatement callableStatement =
    connection.prepareCall("{call calculateStatistics(?, ?)}",
    ResultSet.TYPE_FORWARD_ONLY,
    ResultSet.CONCUR_READ_ONLY,
    ResultSet.CLOSE_CURSORS_OVER_COMMIT
);
```

Callable statement with parameter

```
CallableStatement callableStatement = connection.prepareCall("{call calculateStatistics(?, ?)}");

callableStatement.setString(1, "param1");
callableStatement.setInt (2, 123);
```

Batch Updates

```
CallableStatement callableStatement = connection.prepareCall("{call calculateStatistics(?, ?)}");

callableStatement.setString(1, "param1");
callableStatement.setInt (2, 123);
callableStatement.addBatch();
callableStatement.setString(1, "param2");
callableStatement.setInt (2, 456);
callableStatement.addBatch();

int[] updateCounts = callableStatement.executeBatch();
```

OUT Parameters

```
CallableStatement callableStatement = connection.prepareCall("{call calculateStatistics(?, ?)}");

callableStatement.setString(1, "param1");
callableStatement.setInt (2, 123);
callableStatement.registerOutParameter(1, java.sql.Types.VARCHAR);
callableStatement.registerOutParameter(2, java.sql.Types.INTEGER);

ResultSet result = callableStatement.executeQuery();
while(result.next()) { ... }

String out1 = callableStatement.getString(1);
int out2 = callableStatement.getInt (2);
```

Simple example of transaction management in jdbc using Statement

```
import java.sql.*; class
FetchRecords{
public static void main(String args[])throws Exception{
Class.forName("oracle.jdbc.driver.OracleDriver");
Connection con=DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:xe","system","oracle");
con.setAutoCommit(false);

Statement stmt=con.createStatement();
stmt.executeUpdate("insert into user420 values(190,'abhi',40000)");
stmt.executeUpdate("insert into user420 values(191,'umesh',50000)");

con.commit();
con.close();
}}
```

Example of batch processing import
java.sql.*;
class FetchRecords{
public static void main(String args[])throws Exception{
Class.forName("oracle.jdbc.driver.OracleDriver");
Connection con=DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:xe","syste
m","oracle");
con.setAutoCommit(false);

Statement stmt=con.createStatement();
stmt.addBatch("insert into user420 values(190,'abhi',40000)");
stmt.addBatch("insert into user420 values(191,'umesh',50000)");
 stmt.executeBatch();//executing the batch
con.commit();
con.close();
}}

Example of batch processing using PreparedStatement import
java.sql.*;
import java.io.*; class
BP{
public static void main(String args[]){ try{
Class.forName("oracle.jdbc.driver.OracleDriver");
Connection con=DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:xe","syste
m","oracle");
PreparedStatement ps=con.prepareStatement("insert into user420 values(?,?,?)");

BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
while(true){
System.out.println("enter id");
String s1=br.readLine();
int id=Integer.parseInt(s1);

System.out.println("enter name");
 String name=br.readLine();
System.out.println("enter salary");
 String s3=br.readLine();
int salary=Integer.parseInt(s3);
ps.setInt(1,id);
ps.setString(2,name);
ps.setInt(3,salary);

ps.addBatch();
System.out.println("Want to add more records y/n");
String ans=br.readLine();

```java
if(ans.equals("n")){
break;
}

}
ps.executeBatch();
System.out.println("record successfully saved");
con.close();
}catch(Exception e){System.out.println(e);}

}}

//out of syllabus Rowset in Recordset
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.Statement;
import javax.sql.RowSetEvent;
import javax.sql.RowSetListener;
import javax.sql.rowset.JdbcRowSet;
 import javax.sql.rowset.RowSetProvider;

public class RowSetExample {
            public static void main(String[] args) throws Exception {
                    Class.forName("oracle.jdbc.driver.OracleDriver");
    //Creating and Executing RowSet
    JdbcRowSet rowSet = RowSetProvider.newFactory().createJdbcRowSet();
    rowSet.setUrl("jdbc:oracle:thin:@localhost:1521:xe");
    rowSet.setUsername("system");
    rowSet.setPassword("oracle");

rowSet.setCommand("select * from emp400");
rowSet.execute();

    //Adding Listener and moving RowSet
    rowSet.addRowSetListener(new MyListener());
            while (rowSet.next()) {
                    // Generating cursor Moved event
                    System.out.println("Id: " + rowSet.getString(1));
                    System.out.println("Name: " + rowSet.getString(2));
                    System.out.println("Salary: " + rowSet.getString(3));
            }

        }
}
```

```java
class MyListener implements RowSetListener {
public void cursorMoved(RowSetEvent event) {
        System.out.println("Cursor Moved...");
    }

        public void rowChanged(RowSetEvent event) {
                System.out.println("Cursor Changed...");
    }

        public void rowSetChanged(RowSetEvent event) {
                System.out.println("RowSet changed...");
    }
}
```
The output is as follows:
Cursor Moved...
Id: 55
Name: Om Bhim
Salary: 70000
Cursor Moved... Id:
190
Name: abhi
Salary: 40000
Cursor Moved...
Id: 191
Name: umesh
Salary: 50000
Cursor Moved...