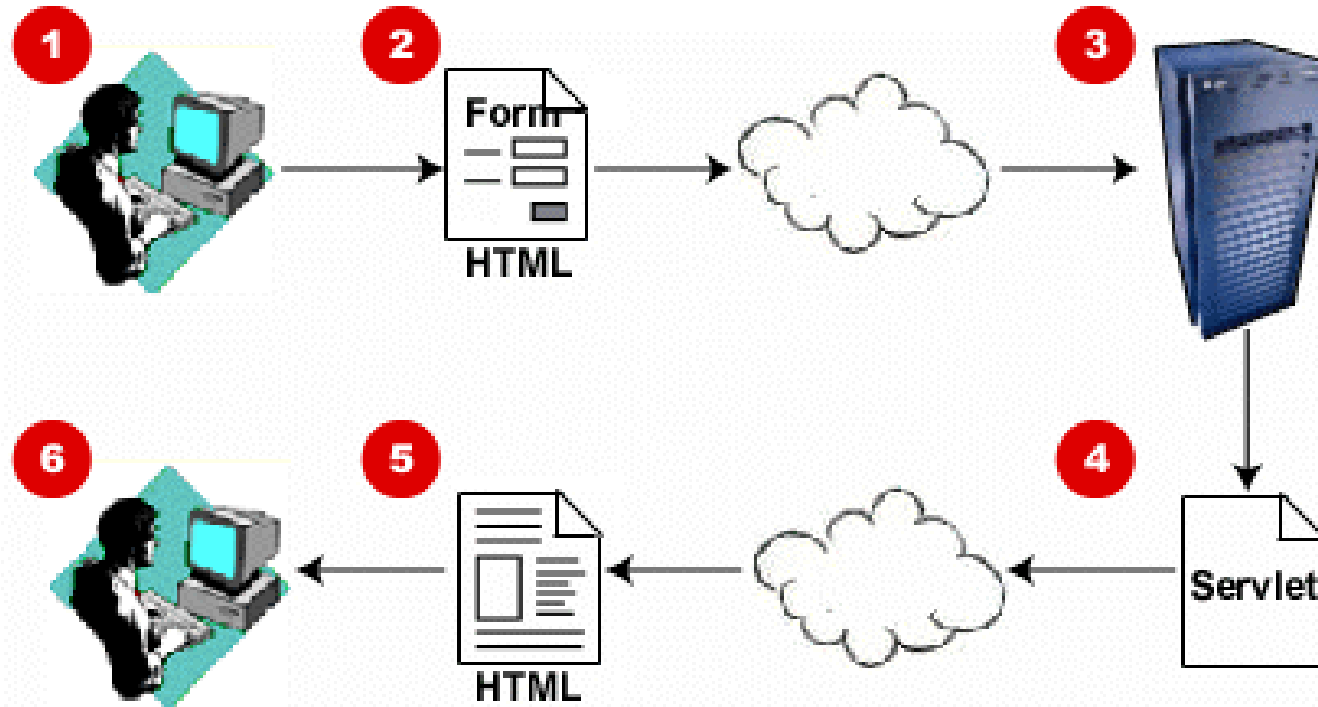




# Servlets and JDBC

# Servlets



# A form

Observe the URL.

Chapter 1

localhost:8081/GetExample.html

Please enter your name and password then press start

Name:

Password:

# The HTML source

```
<html>
  <head>
    <title>Chapter 1</title>
  </head>
  <body><font size="4">
    <center>Please enter your name and password then press start<br>

    <form method="GET" action="http://localhost:8081/servlet/GetDemo" >
      Name: <input name="uname" value="" type="text" size="20"> <br>
      Password: <input name="userpw" value="" type="password" size=10>
        <input value="Start" type="submit" > <br>
    </form>

  </center>
  <hr>
</body>
</html>
```

```
import java.io.*;  
import java.net.*;
```

# A servlet

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

```
public class GetDemo extends HttpServlet {  
  
    protected void processRequest(HttpServletRequest request,  
                                   HttpServletResponse response)  
        throws ServletException, IOException {  
        response.setContentType("text/html");  
        PrintWriter out = response.getWriter();  
  
        String username = request.getParameter("uname");  
        String password = request.getParameter("userpw");
```

```
    out.println("<HTML>");
    out.println("<HEAD><TITLE>GetDemo Output</TITLE></HEAD>");
    out.println("<BODY>");
    out.println("Hello " + username + "<br>");
    out.println("Your password was: " + password + "<br>");
    out.println("</BODY>");
    out.println("</HTML>");
    out.close();
}

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

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

public String getServletInfo() { return "Short description"; }
}
```

# Servlet Container

You need a servlet container for this. E.g. Apache Tomcat.

- ➡ Download the preconfigured Apache Tomcat from the course website.
- ➡ Unzip
  - Will create two directories, "**apache-tomcat-6.0.18**" and "**development**"
- ➡ Starting/Stopping Tomcat
  - If you are working on Windows, open file **apache-tomcat-6.0.18\bin\startup.bat** and modify line:  
**set JAVA\_HOME=C:\Program Files\Java\jdk...**  
to reflect your local path of java jdk. (Do the same for the **shutdown.bat**)
  - If you are working on the lab machines (Linux) execute first  
**chmod +x apache-tomcat-6.0.18/bin/\*.sh**

# Servlet Container

- Then start Apache Tomcat by double clicking on **apache-tomcat-6.0.18\bin\startup.bat**  
(In Windows)  
or execute  
**apache-tomcat-6.0.18/bin/startup.sh**  
(in Linux)
- To stop Tomcat execute the **shutdown.bat** in Windows, **shutdown.sh** in Linux.



# Servlet Container

- Your HTML files should go under:  
**apache-tomcat-6.0.18/webapps/ROOT**
- To open a HTML file in the browser, specify e.g.  
**http://localhost:8081/GetExample.html**
- Your Java classes should go under:  
**apache-tomcat-6.0.18/webapps/ROOT/WEB-INF/classes**
- Any jar file (such as **ojdbc6.jar** for Oracle JDBC) should go under:  
**apache-tomcat-6.0.18/webapps/ROOT/WEB-INF/lib**

# Servlet Container

- Copy/sftp the **/opt/oracle/drivers/ojdbc6.jar** to your development directory.
- To compile, **cd** to the '**development**' directory and execute the following:

(In Linux)

```
javac -d ../apache-tomcat-6.0.18/webapps/ROOT/WEB-INF/classes -  
  classpath ../apache-tomcat-6.0.18/lib/servlet-api.jar:ojdbc6.jar  
  *.java
```

(In Windows)

```
javac -d ../apache-tomcat-6.0.18\webapps\ROOT\WEB-INF\classes -  
  classpath ../apache-tomcat-6.0.18\lib\servlet-api.jar;ojdbc6.jar  
  *.java
```

These commands will copy your **.class** files to the **../apache-tomcat-6.0.18\webapps\ROOT\WEB-INF\classes** directory.

# Connection manager

```
import java.sql.*;
import java.util.*;

public class ConnectionManager {
    private static ConnectionManager instance = null;
    private Stack<Connection> connections;

    private ConnectionManager () {
        connections = new Stack<Connection>();
        try {
            DriverManager.registerDriver (new oracle.jdbc.driver.OracleDriver());
        } catch (Exception ex) {
            System.out.println(ex);
        }
    }

    public static ConnectionManager getInstance() {
        if (instance == null) instance = new ConnectionManager();
        return instance;
    }
}
```

# Connection manager

```
public Connection getConnection() {
    Connection conn = null;

    if (!connections.empty())
        conn = (Connection) connections.pop();
    else { //No one left in the stack, create a new one
        try {
            conn = DriverManager.getConnection
                ("jdbc:oracle:thin:@localhost:1522:studentdb", "userid", "password");
            //("jdbc:oracle:thin:@localhost:1521:xe", "userid", "password");
        } catch (SQLException ex) {
            System.out.println("SQLException: " + ex);
        }
    }
    return conn;
}

public void returnConnection(Connection conn) {
    if (conn != null) connections.push(conn);
}
}
```

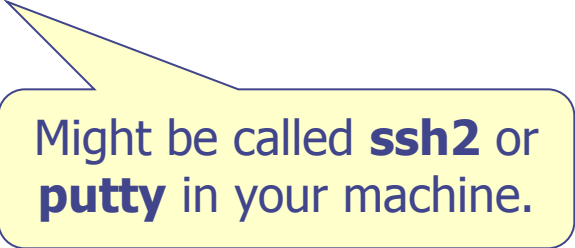
For Oracle at UVic,  
using ssh tunnel.

For Oracle Express,  
if installed on your  
machine (no ssh  
tunnel).

# SSH Tunnel

In order to be able to connect to ORACLE at UVic remotely from your machine at home execute (in your machine):

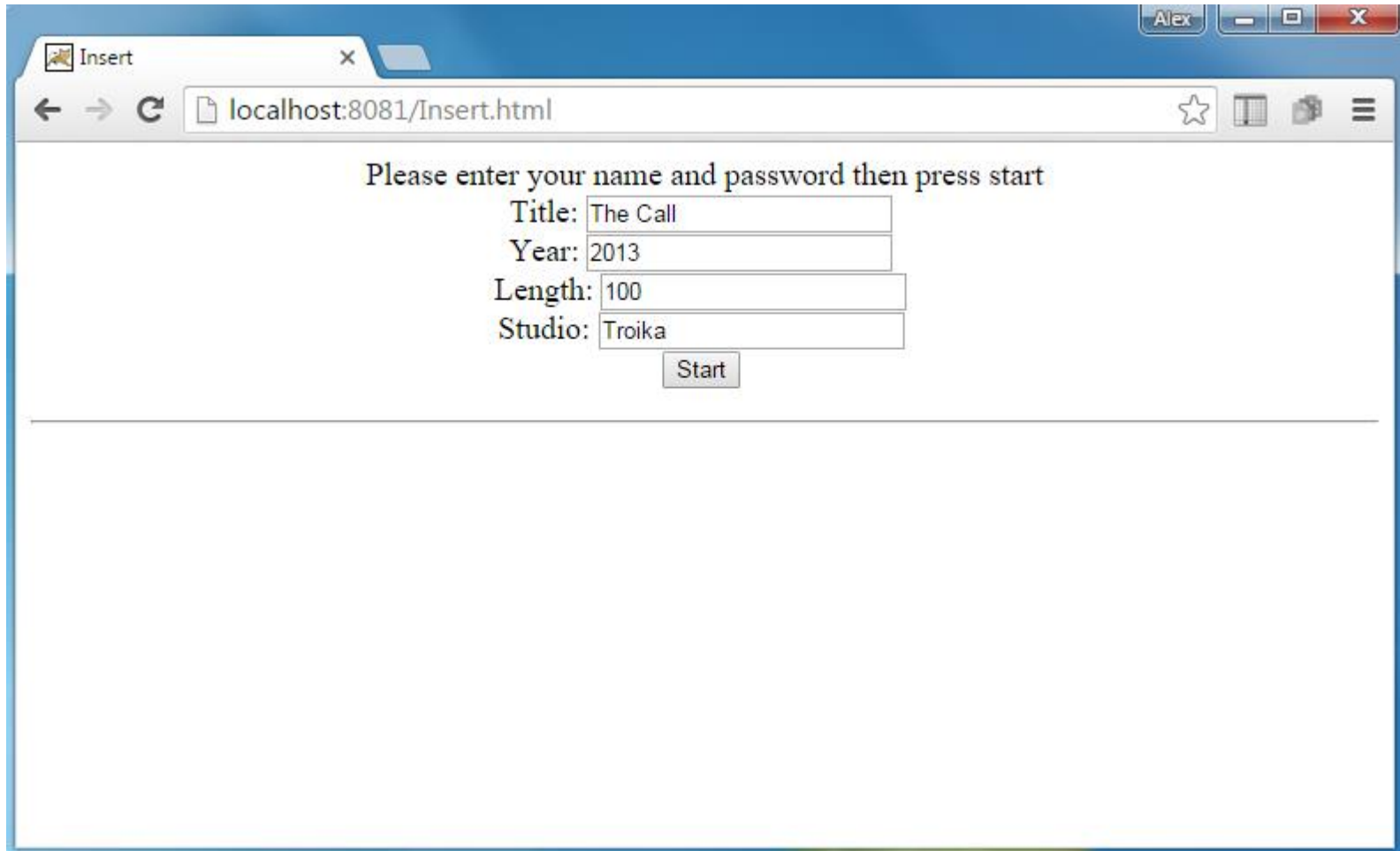
```
ssh -L 1522:studentdb.csc.uvic.ca:1521 <yourusername>@linux.csc.uvic.ca
```



Might be called **ssh2** or **putty** in your machine.

# Insert Form

First, create the database as described in sql1.pdf



A screenshot of a web browser window titled 'Insert'. The address bar shows 'localhost:8081/Insert.html'. The page content includes a prompt 'Please enter your name and password then press start' and a form with four input fields: 'Title' (containing 'The Call'), 'Year' (containing '2013'), 'Length' (containing '100'), and 'Studio' (containing 'Troika'). A 'Start' button is positioned below the 'Studio' field. The browser's window title bar shows the name 'Alex' and standard minimize, maximize, and close buttons.

Please enter your name and password then press start

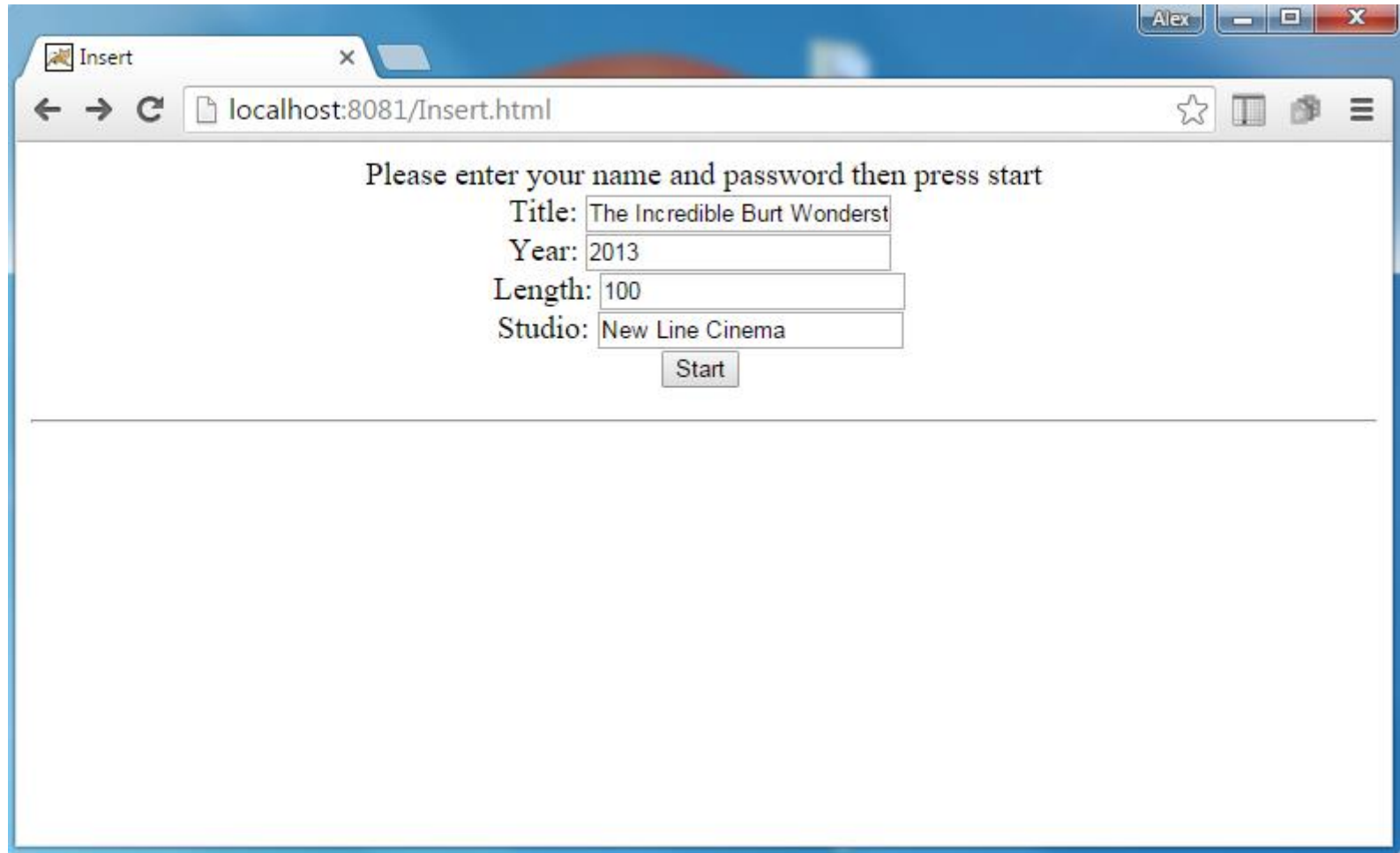
Title:

Year:

Length:

Studio:

# Another insertion



A screenshot of a web browser window. The title bar shows a tab labeled 'Insert' and window controls. The address bar shows 'localhost:8081/Insert.html'. The page content includes a prompt 'Please enter your name and password then press start' and a form with four input fields: 'Title' (containing 'The Incredible Burt Wonderst'), 'Year' (containing '2013'), 'Length' (containing '100'), and 'Studio' (containing 'New Line Cinema'). A 'Start' button is positioned below the 'Studio' field. A horizontal line is visible below the form.

Please enter your name and password then press start

Title:

Year:

Length:

Studio:

# The HTML source

```
<html>
  <head>
    <title>Insert</title>
  </head>
  <body><font size="4">
    <center>Please enter your name and password then press start<br>
      <form method="GET" action="http://localhost:8081/servlet/Insert" >
        Title: <input type="text" name="title" value="" /> <br>
        Year: <input type="text" name="year" value="" /> <br>
        Length: <input type="text" name="length" value="" /> <br>
        Studio: <input type="text" name="studio" value="" /> <br>
        <input type="submit" value="Start" >   <br>
      </form>
    </center>
    <hr>
  </body>
</html>
```



# Insert Servlet

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

```
public class Insert extends HttpServlet
{
    void processRequest(    HttpServletRequest request,
                          HttpServletResponse response)
                          throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out = response.getWriter();

        String title = request.getParameter("title");
        String year = request.getParameter("year");
        String length = request.getParameter("length");
        String studioName = request.getParameter("studio");

        String statementString =
            "INSERT INTO Movies(title, year, length, studioName) " +
            "VALUES( '" + title + "'," + year + "," + length + "','" + studioName + "')";

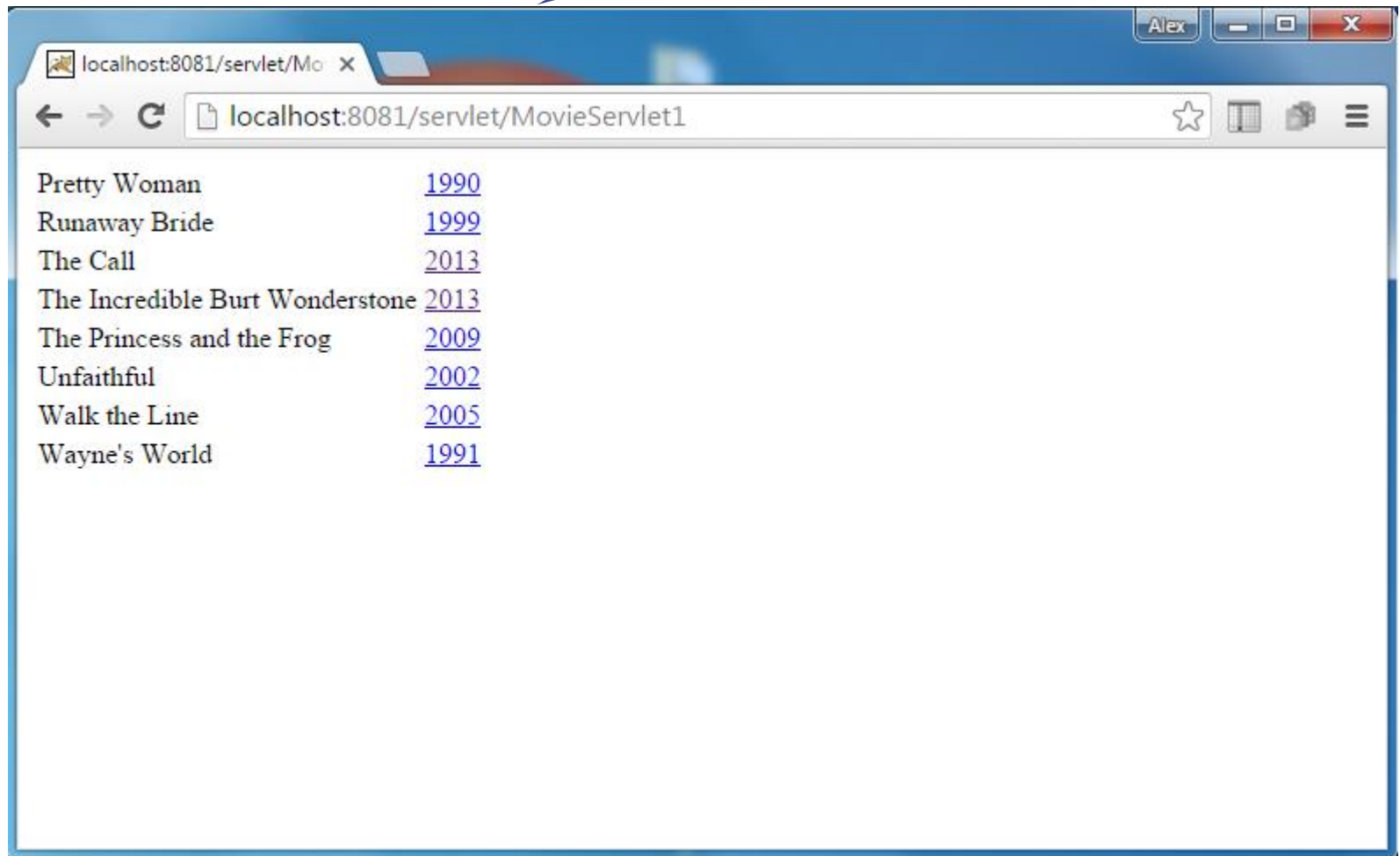
        Connection conn = ConnectionManager.getInstance().getConnection();
        try {
            Statement stmt = conn.createStatement();
            stmt.executeUpdate(statementString);
            stmt.close();
            out.println("Insertion Successful!");
        }
        catch(SQLException e) { out.println(e); }
        ConnectionManager.getInstance().returnConnection(conn);
    }
}
```

# Insert Servlet

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

public String getServletInfo() { return "Insert"; }
}
```

Servlets can also be called from the address line, without a form.



# MovieServlet1

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

public class MovieServlet1 extends HttpServlet {
    void processRequest( HttpServletRequest request,
                        HttpServletResponse response)
                        throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out = response.getWriter();

        Connection conn = DriverManager.getInstance().getConnection();
        try {
            Statement stmt = conn.createStatement();
            ResultSet rset = stmt.executeQuery(
                "SELECT title, year " +
                "FROM Movies");
```

# MovieServlet1

```
        out.println("<table>");
        while (rset.next()) {
            out.println(
                "<tr>" +
                "<td>" + rset.getString("title") + "</td>" +
                "<td><A href=\"http://localhost:8081/servlet/MovieServlet2?year=\"" +
                rset.getString("year") + "\">" + rset.getString("year") + "</A>" + "</td>" +
                "</tr>");
        }
        out.println("</table>");
        stmt.close();
    }

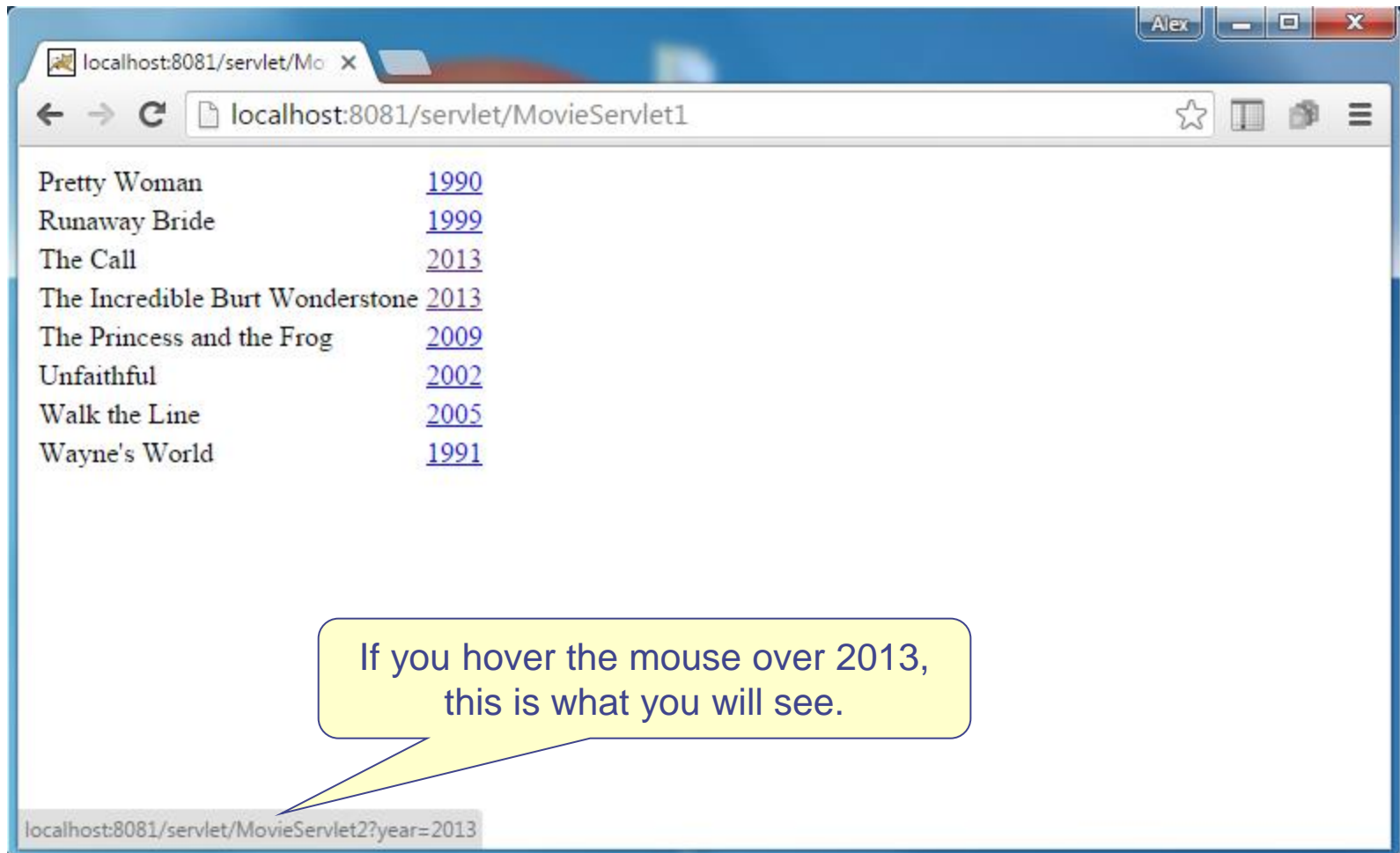
    catch(SQLException e) { out.println(e); }

    ConnectionManager.getInstance().returnConnection(conn);
}

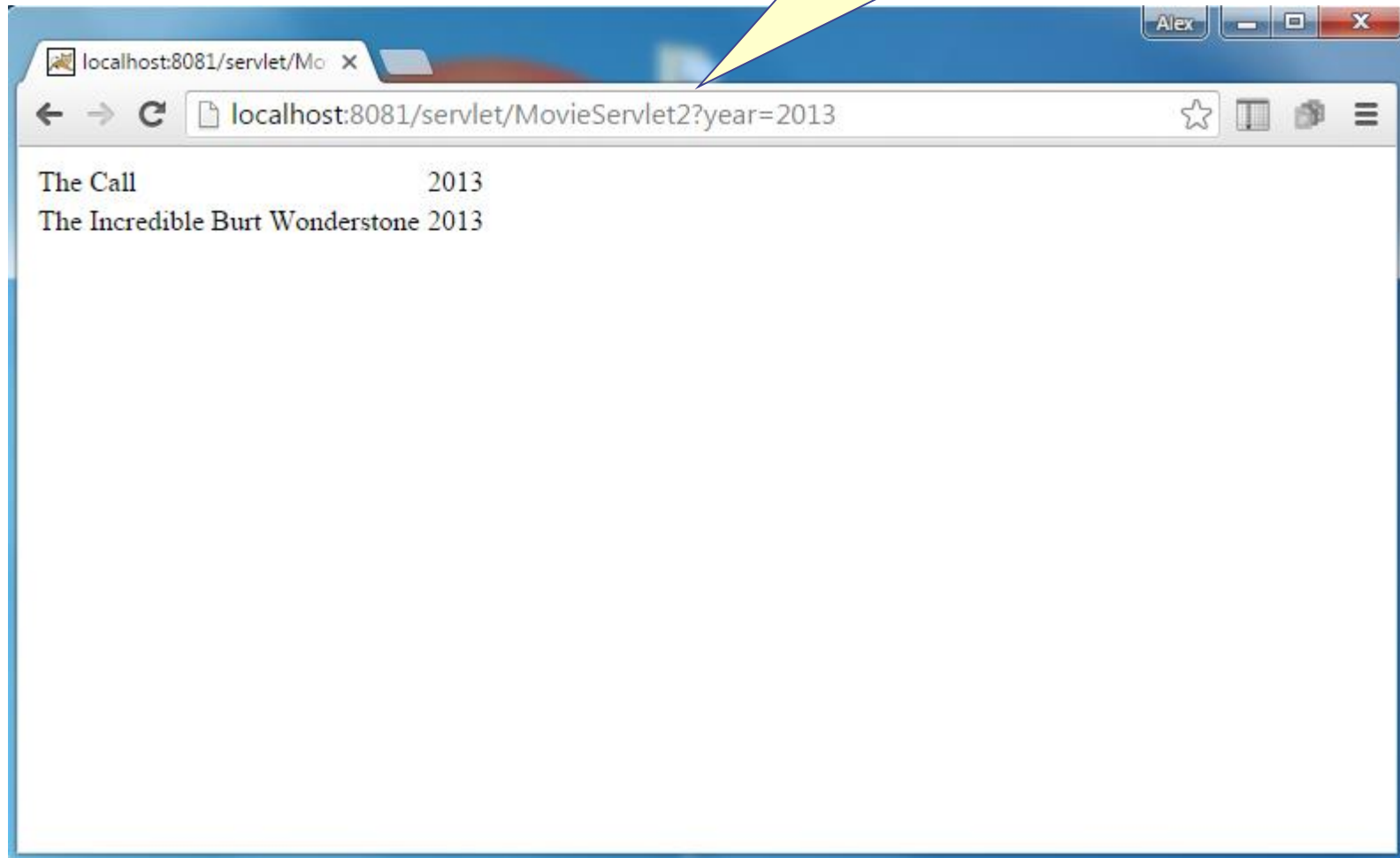
protected void doGet(HttpServletRequest request,
                      HttpServletResponse response) throws ServletException, IOException {
    processRequest(request, response);
}

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

public String getServletInfo() { return "Movie Servlet 1"; }
}
```



Another way to pass parameters to servlets. For more than one parameter, use & subsequently.



# MovieServlet2

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

public class MovieServlet2 extends HttpServlet {
    void processRequest(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out = response.getWriter();
        String year = request.getParameter("year");

        Connection conn = ConnectionManager.getInstance().getConnection();
        try { Statement stmt = conn.createStatement();
            ResultSet rset = stmt.executeQuery(
                "SELECT title, year " +
                "FROM Movies " +
                "WHERE year = " + year);
```



```

        out.println("<table>");
        while (rset.next()) {
            out.println("<tr>");
            out.print (
                "<td>" + rset.getString("title") + "</td>" +
                "<td>" + rset.getString("year") + "</td>");
            out.println("</tr>");
        }
        out.println("</table>");
        stmt.close();
    }
    catch(SQLException e) { out.println(e); }
    ConnectionManager.getInstance().returnConnection(conn);
}

```

```

protected void doGet(HttpServletRequest request, HttpServletResponse response)
    throws ServletException, IOException {
    processRequest(request, response); }
protected void doPost(HttpServletRequest request, HttpServletResponse response)
    throws ServletException, IOException {
    processRequest(request, response); }
public String getServletInfo() { return "Short description"; }
}

```