```
<%--
  Created by IntelliJ IDEA.
  User: mhm85
  Date: 10/14/2019
  Time: 3:24 PM
  To change this template use File | Settings | File Templates.
--%>
<%@ page contentType="text/html;charset=UTF-8" language="java" %>
<html>
<head>
    <title>$Title$</title>
</head>
<body>
<form action="doSomething" method="post">
    <input type="hidden" name="fromPage" value="page1">
    <label>First name:</label>
    <input type="text" name="fn" required><br>
    <label>Last name:</label>
    <input type="text" name="ln" required><br>
    <label>Username:</label>
    <input type="text" name="un" required><br>
    <label>Password:</label>
    <input type="password" name="pw" required><br>
    <input type="submit" value="Sign Up">
</form>
</body>
</html>

```

```
<%@ taglib prefix="c" uri="http://java.sun.com/jsp/jstl/core" %>
<%--
  Created by IntelliJ IDEA.
  User: mhm85
  Date: 11/20/2019
  Time: 2:23 PM
  To change this template use File | Settings | File Templates.
--%>
<%@ page contentType="text/html;charset=UTF-8" language="java" %>
<html>
<head>
    <title>Index 2</title>
</head>
<body>
<table border="1">
    <c:forEach items="${users}" var="user" varStatus="loopCounter">
        <tr>
            <td>
                <form action="doSomething" method="post">
                    <input type="hidden" name="fromPage" value='<c:out value="${user.idUser}"/>'>
                    <label>First name:</label><c:out value="${user.fnUser}"/><br>
                    <label>Last name:</label><c:out value="${user.lnUser}"/><br>
                    <label>Username:</label><c:out value="${user.unUser}"/><br>
                    <label>Password:</label><c:out
```

```
value="${user.pwUser}"/><br>
                    <input type="submit" value="
Send">
                </form>
            </td>
            <c:if test="${loopCounter.count % 2 ==
0}">
                <tr></tr>
            </c:if>
        </tr>
    </c:forEach>
</table>
</body>
</html>

```

```
<%@ taglib prefix="c" uri="http://java.sun.com/jsp/jstl/core" %>
<%--
  Created by IntelliJ IDEA.
  User: mhm85
  Date: 10/16/2019
  Time: 3:00 PM
  To change this template use File | Settings | File Templates.
--%>
<%@ page contentType="text/html;charset=UTF-8" language="java" %>
<html>
<head>
    <title>Title</title>
</head>
<body>
${aDude.fnUser} ${aDude.lnUser} <br>
<table border="1">
    <tr>
        <th>Id</th>
        <th>First Name</th>
        <th>Last Name</th>
        <th>Username</th>
        <th>Password</th>
    </tr>
    <c:forEach items="${users}" var="user">
        <tr>
            <td><c:out value="${user.idUser}"/></td>
            <td><c:out value="${user.fnUser}"/></td>
            <td><c:out value="${user.lnUser}"/></td
```

```
>
            <td><c:out value="${user.unUser}"/></td>
            <td><c:out value="${user.pwUser}"/></td>
        </tr>
    </c:forEach>
</table>

</body>
</html>

```

```xml
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
         xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>

    <groupId>groupId</groupId>
    <artifactId>maven_testing</artifactId>
    <version>1.0-SNAPSHOT</version>

    <dependencies>
        <!--<dependency>
            <groupId>javax.servlet</groupId>
            <artifactId>javax.servlet-api</artifactId>
            <version>3.1.0</version>
        </dependency>-->
        <dependency>
            <groupId>mysql</groupId>
            <artifactId>mysql-connector-java</artifactId>
            <version>5.1.48</version>
        </dependency>
        <dependency>
            <groupId>jstl</groupId>
            <artifactId>jstl</artifactId>
            <version>1.2</version>
        </dependency>
    </dependencies>

    <!--<packaging>war</packaging>-->
</project>
```

File - web.xml

```xml
<?xml version="1.0" encoding="UTF-8"?>
<web-app xmlns="http://xmlns.jcp.org/xml/ns/javaee"
         xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee http://xmlns.jcp.org/xml/ns/javaee/web-app_4_0.xsd"
         version="4.0">

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

    <listener>
        <listener-class>MyListener</listener-class>
    </listener>

</web-app>
```

```java
import java.io.Serializable;

public class User implements Serializable {
    private int idUser;
    private String fnUser;
    private String lnUser;
    private String unUser;
    private String pwUser;

    public User(int idUser, String fnUser, String lnUser, String unUser, String pwUser) {
        this.idUser = idUser;
        this.fnUser = fnUser;
        this.lnUser = lnUser;
        this.unUser = unUser;
        this.pwUser = pwUser;
    }

    public User() {
        idUser = 0;
        fnUser = "";
        lnUser = "";
        unUser = "";
        pwUser = "";
    }

    public int getIdUser() {
        return idUser;
    }

    public void setIdUser(int idUser) {
        this.idUser = idUser;
    }

    public String getFnUser() {
        return fnUser;
    }

    public void setFnUser(String fnUser) {
        this.fnUser = fnUser;
    }

    public String getLnUser() {
        return lnUser;
    }

    public void setLnUser(String lnUser) {
        this.lnUser = lnUser;
    }

    public String getUnUser() {
        return unUser;
    }

    public void setUnUser(String unUser) {
        this.unUser = unUser;
    }

    public String getPwUser() {
        return pwUser;
    }

    public void setPwUser(String pwUser) {
        this.pwUser = pwUser;
    }
}
```

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

public class DatabaseTools {
    public static Connection getConnected() {
        Connection conn = null;

        try {
            //Load MySQL database driver
            Class.forName("com.mysql.jdbc.Driver");

            // Connection string
            String dbURL = "jdbc:mysql://localhost:3306/max";

            // Credentials
            String username = "root";
            String password = "mysql";

            // Set connection to database to Connection object
            conn = DriverManager.getConnection(dbURL, username, password);
        } catch (ClassNotFoundException e) {
            e.printStackTrace();
        } catch (SQLException e) {
            e.printStackTrace();
        }

        return conn;
    }

    public static void insert(String fn, String ln,
 String un, String pw) {
        // Connection to database;
        Connection myConn = DatabaseTools.getConnected();

        PreparedStatement ps = null;

        // Insert query
        String queryInsert = "INSERT INTO tbl_users (user_fn, user_ln, user_un, user_pw) VALUES (?, ?, ?, ?);";

        try {
            // Set PreparedStatement object to instance with query
            ps = myConn.prepareStatement(queryInsert);

            // Set values for parameters
            ps.setString(1, fn);
            ps.setString(2, ln);
            ps.setString(3, un);
            ps.setString(4, pw);

            // Execute insert on database
            ps.execute();
        } catch (SQLException e) {
            e.printStackTrace();
        } finally {
            DatabaseTools.closePreparedStatement(ps);
            DatabaseTools.closeConnection(myConn);
        }
```

```java
    }

    public static ArrayList<User> selectAllUsers() {
        // Connection to database
        Connection conn = DatabaseTools.getConnected();

        PreparedStatement ps = null;
        ResultSet rs = null;
        ArrayList<User> myUserList = new ArrayList<User>();

        // Select statement
        String selectQuery = "SELECT user_id, user_fn, user_ln, user_un, user_pw FROM tbl_users;";

        try {
            // Create prepared statemnent object
            ps = conn.prepareStatement(selectQuery);

            // Execute query and return result set
            rs = ps.executeQuery();

            // Loop through all rows in result set
            while (rs.next()) {
                // Create user object to add to list.
                User user = new User();

                // Add values for row of result set
```

```
 to properties of User object
                user.setIdUser(rs.getInt("user_id"));
                user.setFnUser(rs.getString("user_fn"));
                user.setLnUser(rs.getString("user_ln"));
                user.setUnUser(rs.getString("user_un"));
                user.setPwUser(rs.getString("user_pw"));

                // Add user to list
                myUserList.add(user);
            }
        } catch (SQLException e) {
            e.printStackTrace();
        } finally {
            DatabaseTools.closePreparedStatement(ps);
            DatabaseTools.closeResultSet(rs);
            DatabaseTools.closeConnection(conn);
        }

        return myUserList;
    }

    public static void closePreparedStatement(Statement ps) {
        try {
            if (ps != null) {
                ps.close();
            }
```

```java
        } catch (SQLException e) {
            e.printStackTrace();
        }
    }

    public static void closeConnection(Connection conn) {
        try {
            if (conn != null) {
                conn.close();
            }
        } catch (SQLException e) {
            e.printStackTrace();
        }
    }

    public static void closeResultSet(ResultSet rs) {
        try {
            if (rs != null) {
                rs.close();
            }
        } catch (SQLException e) {
            e.printStackTrace();
        }
    }
}

```

File - SecurePassword.java

```java
import java.security.MessageDigest;
import java.security.NoSuchAlgorithmException;

public class SecurePassword {
    public static String lockPassword(String pw) {
        String newPw = null;

        try {
            MessageDigest md = MessageDigest.getInstance("MD5");

            md.update(pw.getBytes());

            byte[] bytes = md.digest();

            StringBuilder sb = new StringBuilder();

            for(int i = 0; i < bytes.length; i++) {
                sb.append(Integer.toString((bytes[i] & 0xff) + 0x100, 16).substring(1));
            }

            newPw = sb.toString();
        } catch (NoSuchAlgorithmException e) {
            e.printStackTrace();
        }

        return newPw;
    }
}

```

```java
import javax.servlet.ServletContextEvent;
import javax.servlet.ServletContextListener;
import javax.servlet.annotation.WebListener;
import javax.servlet.http.HttpSessionAttributeListener;
import javax.servlet.http.HttpSessionEvent;
import javax.servlet.http.HttpSessionListener;
import javax.servlet.http.HttpSessionBindingEvent;
import java.util.ArrayList;

@WebListener()
public class MyListener implements ServletContextListener,
        HttpSessionListener, HttpSessionAttributeListener {

    // Public constructor is required by servlet spec
    public MyListener() {
    }

    // -------------------------------------------------------
    // ServletContextListener implementation
    // -------------------------------------------------------
    public void contextInitialized(ServletContextEvent sce) {
      /* This method is called when the servlet context is
         initialized(when the Web application is
deployed).
         You can initialize servlet context related data here.
      */

      // Get users from database.
      ArrayList<User> users = DatabaseTools.selectAllUsers();

      // Get servlet context from event object and set array list of users as attribute.
      sce.getServletContext().setAttribute("users", users);

    }

    public void contextDestroyed(ServletContextEvent sce) {
      /* This method is invoked when the Servlet Context
         (the Web application) is undeployed or
         Application Server shuts down.
      */
    }

    // -------------------------------------------------------
    // HttpSessionListener implementation
    // -------------------------------------------------------
    public void sessionCreated(HttpSessionEvent se)
```

```
 {
        /* Session is created. */
    }

    public void sessionDestroyed(HttpSessionEvent se) {
        /* Session is destroyed. */
    }

    // -------------------------------------------------------
    // HttpSessionAttributeListener implementation
    // -------------------------------------------------------

    public void attributeAdded(HttpSessionBindingEvent sbe) {
      /* This method is called when an attribute
         is added to a session.
      */
    }

    public void attributeRemoved(HttpSessionBindingEvent sbe) {
      /* This method is called when an attribute
         is removed from a session.
      */
    }

    public void attributeReplaced(HttpSessionBindingEvent sbe) {
      /* This method is invoked when an attibute
         is replaced in a session.
      */
    }
}
```

```java
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 java.io.IOException;
import java.util.ArrayList;

@WebServlet(name = "MyServlet")
public class MyServlet extends HttpServlet {
    protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {

        String url = "";
        String action = request.getParameter("fromPage");

        System.out.println(action);

        if (action.equals("page1")) {
            String fn = request.getParameter("fn");
            String ln = request.getParameter("ln");
            String un = request.getParameter("un");
            String pw = request.getParameter("pw");

            User u1 = new User(111, fn, ln, un, pw);

            request.setAttribute("aDude", u1);

            // Encrypt password
            pw = SecurePassword.lockPassword(pw);

            // Insert user into database
            DatabaseTools.insert(fn, ln, un, pw);

            // Get all users from database
            ArrayList<User> myData = DatabaseTools.selectAllUsers();

            // Set list of users as attribute of request
            request.setAttribute("users", myData);

            url = "/page2.jsp";
        }
        else if (action.equals("1")) {

        }

        getServletContext().getRequestDispatcher(url).forward(request, response);

    }

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

```