Lab Design and Implementation of User Module Using JSP

For the complete project, please see my github: <https://github.com/LeslieLiuZJNU/homework-jee-experiment-jsp>

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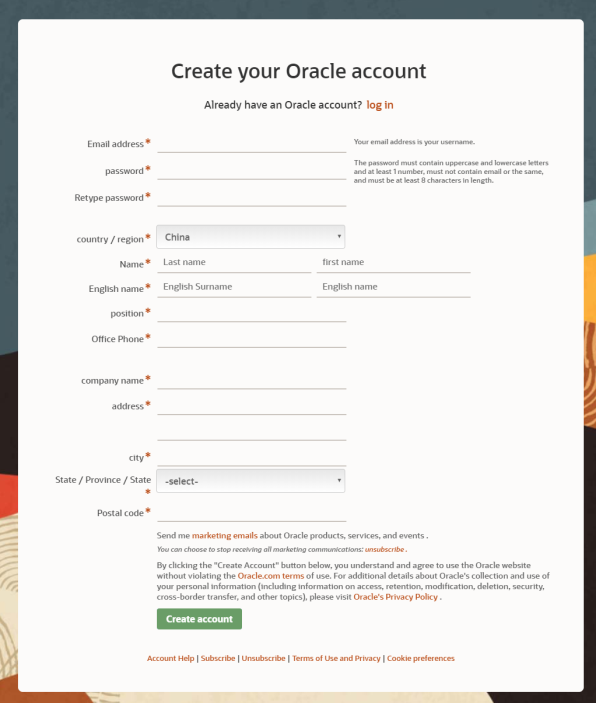
1. **Objectives and Preparations**
   * + 1. **Objectives**

* To use HTML form
* To use 9 implicit objects
* To explore how and when to use request, session, and application to store and transfer data.
* To master the method of data verification on server-side
* To explore the principle and development process of Web application
* To design and implement User Module including Registration, Logining, and Resetting personal information etc.
  + - 1. **Preparations**
* HTML Form
* Syntax of JSP
* Implicit objects of JSP

1. **Requirements Analysis and Overall Design**

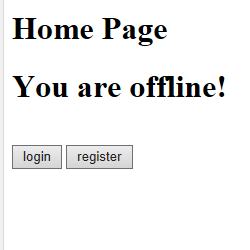
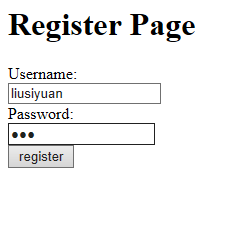
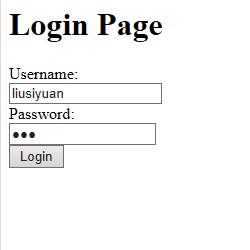
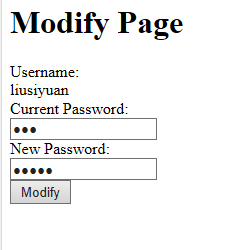
You can customize your user module or refer to Oracle’s user module. The website is

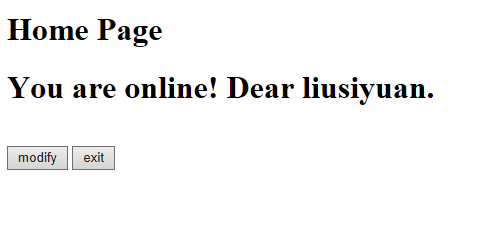
<https://profile.oracle.com/myprofile/account/create-account.jspx?source=:ow:o:h:nav:OHP0625ViewAccountsButton>.



1) Registration, 2) Logining, and 3) Resetting personal information are required in your user module. Other functionalities are also permitted.

1. **Design Interface**



1. **Design Database**

Basically, three implicit objects: ***request***, ***session*** and ***application***.

* + - 1. One-off data is stored in ***request***, for example, submitted information from page.
      2. Login status is stored in ***session***, taking the place of ***cookie***.
      3. Error report signals are stored in ***session***, for example, “failed to register”, “username doesn’t exist”, “wrong password”, ect.
      4. Registered information(username and password) is stored in ***application*** for long-term storage, in the form of ***Map***.

1. **Password Encryption**
   * + 1. One-way encryption
          1. Hash

Store the **hash** codes of the password

* + - * 1. Salt

In order to avoid [Credential Stuffing](https://en.wikipedia.org/wiki/Credential_stuffing) with [Rainbow table](https://en.wikipedia.org/wiki/Rainbow_table), add some **salt** to hashing

* + - 1. Asymmetric encryption

**RSA** algorithm with public key and private key

* + - 1. Protocol

**HTTPS**

1. **Codding and Debugging**

**index.jsp**

<body>

<h1>Home Page</h1>

<%

**if** (session.getAttribute("loginStatus") == **null** || !session.getAttribute("loginStatus").equals("Online")) {

%>

<h1>You are offline!</h1>

<br>

<a href=*"login.jsp"*><button>login</button></a>

<a href=*"register.jsp"*><button>register</button></a>

<%

} **else** {

%>

<h1>

You are online! Dear

<%=session.getAttribute("cachedUsername")%>.

</h1>

<br>

<a href=*"modify.jsp"*><button>modify</button></a>

<a href=*"check-exit.jsp"*><button>exit</button></a>

<%

}

%>

</body>

**register.jsp**

<%

String registerStatus = (String) session.getAttribute("registerStatus");

%>

<body>

<h1>Register Page</h1>

<form action=*"check-register.jsp"* method=*"post"*>

<label for=*"username"*>Username: </label><br> <input type=*"text"*

name=*"username"*

value=*"*<%out.print(session.getAttribute("cachedUsername") == **null** ? "" : session.getAttribute("cachedUsername"));%>*"* /><br>

<label for=*"password"*>Password: </label><br> <input

type=*"password"* name=*"password"* /><br> <input type=*"submit"*

value=*"register"* />

</form>

<%

**if** (registerStatus == **null**)

;

**else** **if** (registerStatus.equals("emptyUsername")) {

%>

<label style="color: *red*">Empty username!</label>

<%

} **else** **if** (registerStatus.equals("emptyPassword")) {

%>

<label style="color: *red*">Empty password!</label>

<%

} **else** **if** (registerStatus.equals("existingUsername")) {

%>

<label style="color: *red*">Username already exists!</label>

<%

}

%>

</body>

<%

session.setAttribute("registerStatus", **null**);

session.setAttribute("cachedUsername", **null**);

%>

**check-register.jsp**

//Get data

String username = request.getParameter("username");

String password = request.getParameter("password");

//Record the username currently in use

session.setAttribute("cachedUsername", username);

//Check if data is empty

**if** (username.isEmpty()) {

session.setAttribute("registerStatus", "emptyUsername");

response.sendRedirect("register.jsp");

} **else** **if** (password.isEmpty()) {

session.setAttribute("registerStatus", "emptyPassword");

response.sendRedirect("register.jsp");

}

//Check if the username already exists

**else** **if** (application.getAttribute("passwordOf" + username) != **null**) {

session.setAttribute("registerStatus", "existingUsername");

response.sendRedirect("register.jsp");

} **else** {

//Get hash codes for passwords

Integer passwordHashCode = password.hashCode();

//Store and redirect

application.setAttribute("passwordOf" + username, passwordHashCode);

session.setAttribute("registerStatus", **null**);

response.sendRedirect("login.jsp");

}

**login.jsp**

<%

String loginStatus = (String) session.getAttribute("loginStatus");

%>

<body>

<h1>Login Page</h1>

<form action=*"check-login.jsp"* method=*"post"*>

<label for=*"username"*>Username: </label><br> <input type=*"text"*

name=*"username"*

value=*"*<%out.print(session.getAttribute("cachedUsername") == **null** ? "" : session.getAttribute("cachedUsername"));%>*"* /><br>

<label for=*"password"*>Password: </label><br> <input

type=*"password"* name=*"password"* /><br> <input type=*"submit"*

value=*"Login"* />

</form>

<%

**if** (loginStatus == **null**)

;

**else** **if** (loginStatus.equals("wrongUsername")) {

%>

<label style="color: *red*">Username does not exist!</label>

<%

} **else** **if** (loginStatus.equals("wrongPassword")) {

%>

<label style="color: *red*">Password is not correct!</label>

<%

}

%>

</body>

<%

**if** (session.getAttribute("loginStatus") == **null** || !session.getAttribute("loginStatus").equals("Online"))

session.setAttribute("loginStatus", "Offline");

session.setAttribute("cachedUsername", **null**);

%>

**check-login.jsp**

<%@ page language=*"java"* contentType=*"text/html; charset=UTF-8"*

pageEncoding=*"UTF-8"*%>

<!DOCTYPE html>

<%

//Get data

String username = request.getParameter("username");

String password = request.getParameter("password");

//Record the username currently in use

session.setAttribute("cachedUsername", username);

//Get hash codes for passwords

Integer passwordHashCode = password.hashCode();

Integer storedPasswordHashCode = (Integer) application.getAttribute("passwordOf" + username);

//Check login and redirect

**if** (storedPasswordHashCode == **null**) {

session.setAttribute("loginStatus", "wrongUsername");

response.sendRedirect("login.jsp");

} **else** **if** (!storedPasswordHashCode.equals(passwordHashCode)) {

session.setAttribute("loginStatus", "wrongPassword");

response.sendRedirect("login.jsp");

} **else** {

session.setAttribute("loginStatus", "Online");

response.sendRedirect("index.jsp");

}

%>

**modify.jsp**

<%

String modifyStatus = (String) session.getAttribute("modifyStatus");

%>

<body>

<h1>Modify Page</h1>

<form action=*"check-modify.jsp"* method=*"post"*>

<label>Username: </label><br> <label>

<%

out.print(session.getAttribute("cachedUsername") == **null** ? "" : session.getAttribute("cachedUsername"));

%>

</label><br> <label for=*"cPassword"*>Current Password: </label><br> <input

type=*"password"* name=*"cPassword"* /><br> <label for=*"nPassword"*>New

Password: </label><br> <input type=*"password"* name=*"nPassword"* /><br>

<input type=*"submit"* value=*"Modify"* />

</form>

<%

**if** (modifyStatus == **null**)

;

**else** **if** (modifyStatus.equals("emptyCPassword")) {

%>

<label style="color: *red*">Current password is empty!</label>

<%

} **else** **if** (modifyStatus.equals("emptyNPassword")) {

%>

<label style="color: *red*">New password is empty!</label>

<%

} **else** **if** (modifyStatus.equals("wrongCPassword")) {

%>

<label style="color: *red*">Current password is not correct!</label>

<%

}

%>

</body>

<%

session.setAttribute("modifyStatus", **null**);

%>

**check-modify.jsp**

//Get data

String cPassword = request.getParameter("cPassword");

String nPassword = request.getParameter("nPassword");

//Get the username currently in use

String username = (String) session.getAttribute("cachedUsername");

Integer storedPasswordHashCode = (Integer) application.getAttribute("passwordOf" + username);

//Check if the passwords are empty

**if** (cPassword == **null**) {

session.setAttribute("modifyStatus", "emptyCPassword");

response.sendRedirect("modify.jsp");

} **else** **if** (nPassword == **null**) {

session.setAttribute("modifyStatus", "emptyNPassword");

response.sendRedirect("modify.jsp");

} **else** {

Integer cPasswordHashCode = (Integer) cPassword.hashCode();

//Check if current password is correct

**if** (!storedPasswordHashCode.equals(cPasswordHashCode)) {

session.setAttribute("modifyStatus", "wrongCPassword");

response.sendRedirect("modify.jsp");

} **else** {

Integer nPasswordHashCode = nPassword.hashCode();

//Store and redirect

application.setAttribute("passwordOf" + username, nPasswordHashCode);

session.setAttribute("modifyStatus", **null**);

response.sendRedirect("index.jsp");

}

}

**check-exit.jsp**

session.setAttribute("loginStatus", "Offline");

response.sendRedirect("index.jsp");

1. **Results and Summary**

In conclusion, this project want us to get a clear knowledge of **how** those implicit objects **work**s and **when to use** them.

I failed with RSA encryption because I don’t have a good command of JavaScript. So, I finish this experiment with simple hash encryption method.