

Umrabulo Session #09 --- (MS#09)

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Module: INT316D

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Introduction

In this **MS#09** we show the student how to create a secured web application.

Problem statement

Company **ABC** requires its employees to have their body temperatures captured before entering the company's premises. Temperature readings below **38°C** are classified as **low**, whilst anything else is classified as **high**. The company needs a secure and database driven web application that will help with the monitoring of body temperatures of its employees as they report for duty. The web application is required to work with two roles, a **security officer** and a **manager**. A security officer must be able to perform the following task:

- Capture the body temperature of employees as they report for work. The application must determine whether an employee's temperature is **low** or **high**. The **temperature reading**, together with the employee's **name** and **id** must be stored in the database.

A manager must be able to perform the following tasks:

- Get and display the number of employees with **low** temperature readings.
- Get and display the number of employees with **high** temperature readings.

To do

Create such a web application for **ABC**. When creating the database, use the following details:

- Username: **app**
- Password: **123**
- Database name: **ABC_DB**

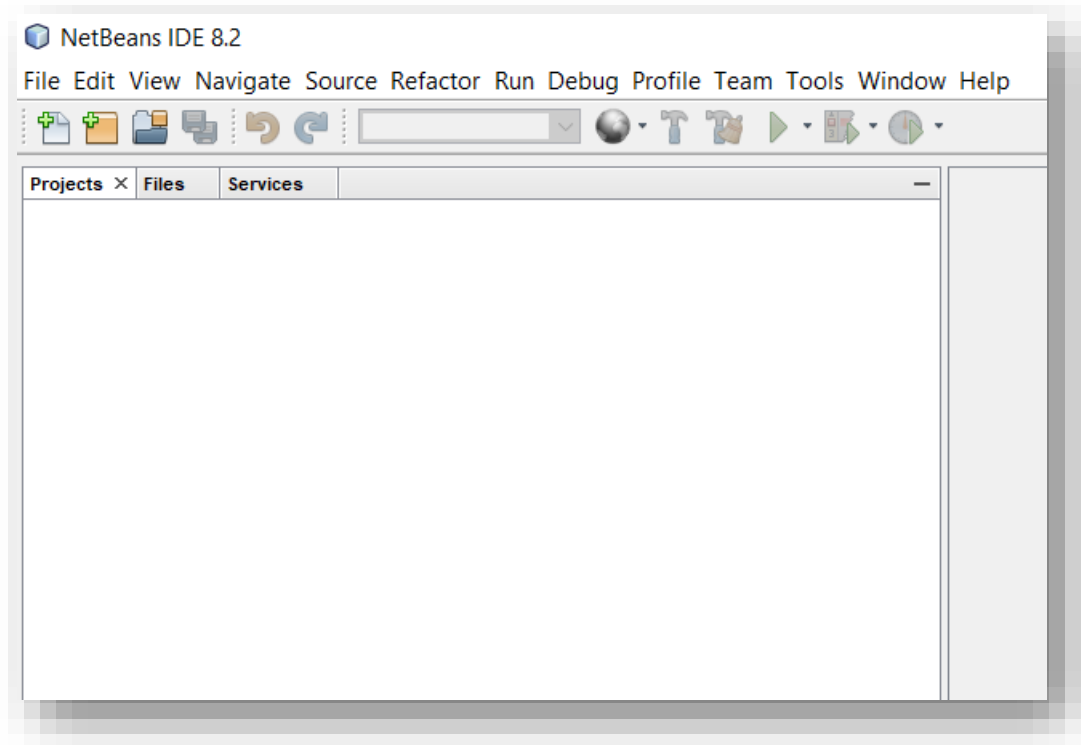
Let the system have three users as shown in the table below.

No.	Username	Password	Role(s)
1	Mulumba	123	Officer
2	Sipho	123	Manager
3	Thato	123	Manager and officer

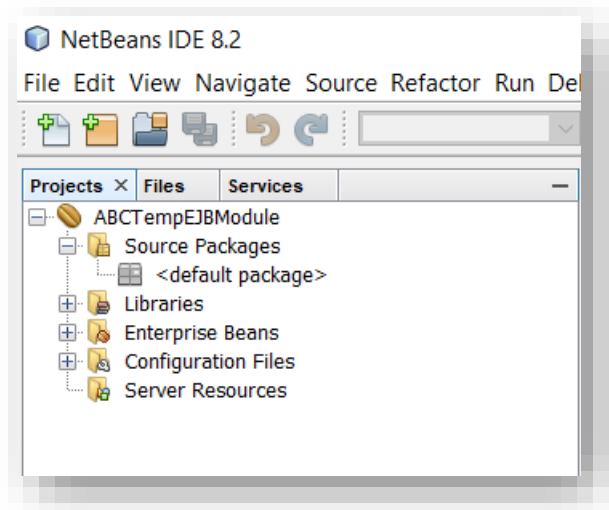
Solution

Phase 1: Create an EJB project

Launch NetBeans.



Create an EJB project called **ABCTempEJBModule**.



Create an entity called **Employee**. Use the **jdbc_/default** Data Source.

New File

Steps

1. Choose File Type
2. Name and Location
3. **Provider and Database**

Provider and Database

Persistence Unit Name:

Specify the persistence provider and database for entity classes.

Persistence Provider:

Data Source:

☒ Use Java Transaction APIs

Table Generation Strategy: ☒ Create ☐ Drop and Create ☐ None

< Back Next > **Finish** Cancel Help

Click on **Finish**.

```
1 package za.ac.tut.model.entity;
2
3 import java.io.Serializable;
4 import javax.persistence.Entity;
5 import javax.persistence.Id;
6
7 /**
8  *
9  * @author MemaniV
10 */
11 @Entity
12 public class Employee implements Serializable {
13
14     private static final long serialVersionUID = 1L;
15     @Id
16     private Long id;
17     private String name;
18     private Double tempReading;
```

Create business logic for the entity.

```
1 package za.ac.tut.model.bl;
2
3 import javax.ejb.Local;
4 import za.ac.tut.model.entity.Employee;
5
6 /**
7  *
8  * @author MemaniV
9  */
10 @Local
11 public interface EmployeeFacadeLocal {
12
13     void create(Employee employee);
14
15     Long determineNumberOfHighTemperatureEmployees();
16
17     Long determineNumberOfLowTemperatureEmployees();
18 }
```

```
1 package za.ac.tut.model.bl;
2
3 import javax.ejb.Stateless;
4 import javax.persistence.EntityManager;
5 import javax.persistence.PersistenceContext;
6 import javax.persistence.Query;
7 import za.ac.tut.model.entity.Employee;
8
9 /**
10  *
11  * @author MemaniV
12  */
13 @Stateless
14 public class EmployeeFacade extends AbstractFacade<Employee> implements EmployeeFacadeLocal {
15
16     @PersistenceContext(unitName = "ABCTempEJBModulePU")
17     private EntityManager em;
18
19     @Override
20     protected EntityManager getEntityManager() {
21         return em;
22     }
23 }
```

```

28      @Override
29      public Long determineNumberOfHighTemperatureEmployees() {
30          Query query = em.createQuery("SELECT COUNT(e) FROM Employee e WHERE e.tempReading > 38");
31          Long cnt = (Long)query.getSingleResult();
32          return cnt;
33      }
34
35      @Override
36      public Long determineNumberOfLowTemperatureEmployees() {
37          Query query = em.createQuery("SELECT COUNT(e) FROM Employee e WHERE e.tempReading <= 36");
38          Long cnt = (Long)query.getSingleResult();
39          return cnt;
40      }
41  }
42
43

```

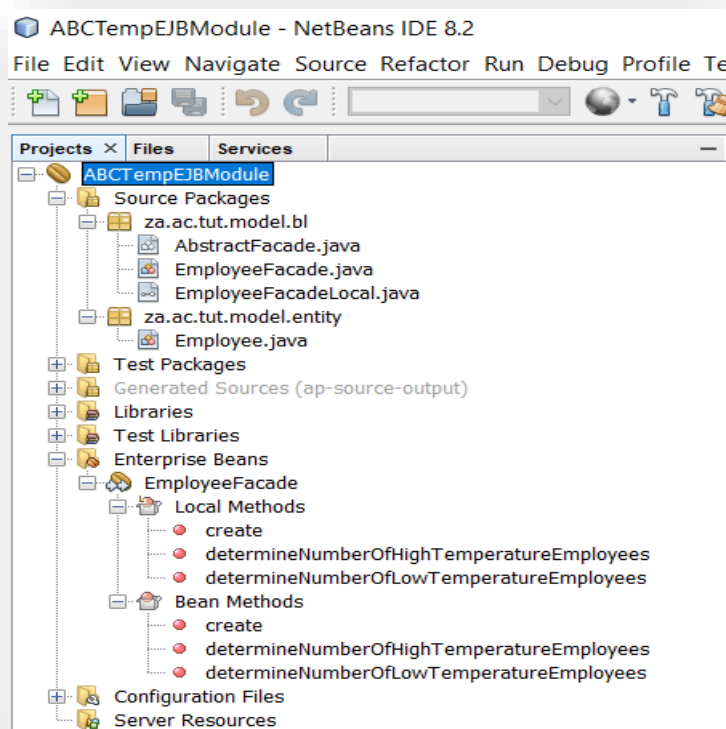
Clean and Build the EJB project.

```

Output - ABCTempEJBModule (clean,build)
BUILD SUCCESSFUL (total time: 1 second)
Note: C:\Users\memaniv\Documents\NetBeansProjects\ABCTempEJBModule\src\java\za\ac\tut\model\bl\AbstractFacade
Note: Recompile with -Xlint:unchecked for details.
1 warning
compile:
library-inclusion-in-archive:
Created dir: C:\Users\memaniv\Documents\NetBeansProjects\ABCTempEJBModule\dist
Building jar: C:\Users\memaniv\Documents\NetBeansProjects\ABCTempEJBModule\dist\ABCTempEJBModule.jar
dist:
BUILD SUCCESSFUL (total time: 1 second)

```

View the entire project structure



Phase 2: Create web project

Create a Web project called **ABCTempWebApp**.



Modify the **index** page.

```
1 <!DOCTYPE html>
2 <html>
3   <head>
4     <title>Welcome Page</title>
5     <meta charset="UTF-8">
6     <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   </head>
8   <body>
9     <h1>Welcome</h1>
10    <p>
11      Welcome to our web app. Click <a href="menu.html">here</a> to view menu.
12    </p>
13  </body>
14 </html>
15
```

Create the **menu** page.

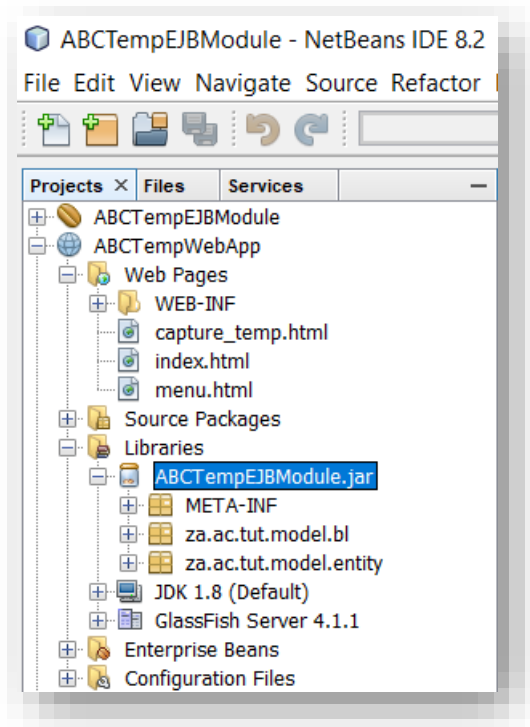
```
1 <!DOCTYPE html>
2 <html>
3   <head>
4     <title>Menu Page</title>
5     <meta charset="UTF-8">
6     <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   </head>
8   <body>
9     <h1>Menu</h1>
10    <p>
11      Please select one of the following options:
12    </p>
13    <ol>
14      <li><a href="capture_employee_details.html">Capture an employee's details</a></li>
15      <li><a href="get_low_temp_cnt.html">Get count of employees with recorded low temperatures</a></li>
16      <li><a href="get_high_temp_cnt.html">Get count of employees with recorded high temperatures</a></li>
17    </ol>
18  </body>
19 </html>
```

Create the **employee_details** page.

```
1  <!DOCTYPE html>
2  <html>
3  <head>
4    <title>Capture Employee Details Page</title>
5    <meta charset="UTF-8">
6    <meta name="viewport" content="width=device-width, initial-scale=1.0">
7  </head>
8  <body>
9    <h1>Capture employee details</h1>
10   <p>
11     Please enter employee details below:
12   </p>
```

```
13   <form action="EmployeeDetailsServlet.do" method="POST">
14     <table>
15       <tr>
16         <td>Temperature reading:</td>
17         <td><input type="text" name="temp_value" required="" /></td>
18       </tr>
19       <tr>
20         <td>Employee ID:</td>
21         <td><input type="text" name="id" required="" /></td>
22       </tr>
23       <tr>
24         <td>Employee name:</td>
25         <td><input type="text" name="name" required="" /></td>
26       </tr>
27       <tr>
28         <td></td>
29         <td><input type="submit" value="SUBMIT" /></td>
30       </tr>
31     </table>
32   </form>
33 </body>
34 </html>
```

Add the **ABCTempEJBModule.jar** to the library of **ABCTempWebApp**.



Create the **EmployeeDetailsServlet** class.




```

19  @Override
20  protected void doPost(HttpServletRequest request, HttpServletResponse response)
21      throws ServletException, IOException {
22      String tempValueStr = request.getParameter("temp_value");
23      Double tempValue = Double.parseDouble(tempValueStr);
24      String idStr = request.getParameter("id");
25      Long id = Long.parseLong(idStr);
26      String name = request.getParameter("name");
27
28      Employee employee = createEmployee(tempValue, id, name);
29      efl.create(employee);
30
31      RequestDispatcher disp = request.getRequestDispatcher("capture_employee_details_outcome.jsp");
32      disp.forward(request, response);
33  }
34
35  private Employee createEmployee(Double tempValue, Long id, String name) {
36      Employee emp = new Employee();
37      emp.setName(name);
38      emp.setId(id);
39      emp.setTempReading(tempValue);
40      return emp;
41  }
42  }

```

Create the `capture_employee_details_outcome` page.

```

1  <!--
2      Document   : capture_employee_details_outcome
3      Created on : 21 May 2024, 10:07:03 PM
4      Author    : MemaniV
5  -->
6
7  <%%page contentType="text/html" pageEncoding="UTF-8"%>
8  <!DOCTYPE html>
9  <html>
10     <head>
11         <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
12         <title>Capture Employee Details Outcome Page</title>
13     </head>
14     <body>
15         <h1>Capture employee details outcome</h1>
16         <p>
17             The employee's details have been successfully captured.
18         </p>

```

```

19      <p>
20          Please click <a href="menu.html">here</a> to go back to the menu page.
21      </p>
22      <p>
23          Please click <a href="index.html">here</a> to go to the main page.
24      </p>
25      <p>
26          Click <a href="LogoutServlet.do">here</a> to logout.
27      </p>
28  </body>
29  </html>
30

```

Create the `get_low_temp_cnt` page.

```

1  <!DOCTYPE html>
2  <html>
3      <head>
4          <title>Get Low Temperatures Count Page</title>
5          <meta charset="UTF-8">
6          <meta name="viewport" content="width=device-width, initial-scale=1.0">
7      </head>
8      <body>
9          <h1>Get low temperatures count</h1>
10         <p>
11             Please click on the button below.
12         </p>
13         <form action="GetLowTemperaturesCountServlet.do" method="GET">
14             <table>
15                 <tr>
16                     <td></td>
17                     <td><input type="submit" value="LOW TEMP COUNT"/></td>
18                 </tr>
19             </table>
20         </form>
21     </body>
22 </html>

```

Create the **GetLowTemperaturesCountServlet** class.

```
1 package za.ac.tut.web;
2
3 import java.io.IOException;
4 import javax.ejb.EJB;
5 import javax.servlet.RequestDispatcher;
6 import javax.servlet.ServletException;
7 import javax.servlet.http.HttpServlet;
8 import javax.servlet.http.HttpServletRequest;
9 import javax.servlet.http.HttpServletResponse;
10 import za.ac.tut.model.bl.EmployeeFacadeLocal;
11
12 /**
13  *
14  * @author MemaniV
15  */
16 public class LowTemperaturesCountServlet extends HttpServlet {
17     @EJB EmployeeFacadeLocal efl;
```

```
18     @Override
19     protected void doGet(HttpServletRequest request, HttpServletResponse response)
20         throws ServletException, IOException {
21         Long lowCnt = efl.cntEmployeesWithLowTemperatures();
22         request.setAttribute("lowCnt", lowCnt);
23
24         RequestDispatcher disp = request.getRequestDispatcher("low_temp_cnt_outcome.jsp");
25         disp.forward(request, response);
26     }
27
28 }
29
```

Create the `get_low_temp_cnt_outcome` page

```
1 <%--
2     Document    : get_low_temp_cnt_outcome
3     Created on  : 21 May 2024, 10:22:46 PM
4     Author     : MemaniV
5 --%>
6
7 <%@page contentType="text/html" pageEncoding="UTF-8"%>
8 <!DOCTYPE html>
9 <html>
10 <head>
11     <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
12     <title>Get Low Temperatures Count Outcome Page</title>
13 </head>
14 <body>
15     <h1>Get low temperatures count outcome</h1>
16     <%
17         Long lowCnt = (Long)request.getAttribute("lowCnt");
18     %>
19     <p>
20         There are <b><%=lowCnt%></b> employees with low temperature readings.
21     </p>
```

```
22 <p>
23     Please click <a href="menu.html">here</a> to go back to the menu page.
24 </p>
25 <p>
26     Please click <a href="index.html">here</a> to go to the main page.
27 </p>
28 <p>
29     Click <a href="LogoutServlet.do">here</a> to logout.
30 </p>
31 </body>
32 </html>
33
```

Create the **get_high_temp_cnt** page.

```
1  <!DOCTYPE html>
2  <html>
3  <head>
4      <title>Get High Temperatures Count Page</title>
5      <meta charset="UTF-8">
6      <meta name="viewport" content="width=device-width, initial-scale=1.0">
7  </head>
8  <body>
9      <h1>Get high temperatures count</h1>
10     <p>
11         Please click on the button below.
12     </p>
13     <form action="GetHighTemperaturesCountServlet.do" method="GET">
14         <table>
15             <tr>
16                 <td></td>
17                 <td><input type="submit" value="HIGH TEMP COUNT"/></td>
18             </tr>
19         </table>
20     </form>
21 </body>
22 </html>
```

Create the **GetHighTemperaturesCountServlet** class

```
1  package za.ac.tut.web;
2
3  import java.io.IOException;
4  import javax.ejb.EJB;
5  import javax.servlet.RequestDispatcher;
6  import javax.servlet.ServletException;
7  import javax.servlet.http.HttpServlet;
8  import javax.servlet.http.HttpServletRequest;
9  import javax.servlet.http.HttpServletResponse;
10 import za.ac.tut.model.bl.EmployeeFacadeLocal;
11
12 /**
13  *
14  * @author Memani V
15  */
16 public class GetHighTemperaturesCountServlet extends HttpServlet {
17     @EJB EmployeeFacadeLocal efl;
```

```

18      @Override
19      protected void doGet(HttpServletRequest request, HttpServletResponse response)
20          throws ServletException, IOException {
21          Long highCnt = efl.determineNumberOfHighTemperatureEmployees();
22          request.setAttribute("highCnt", highCnt);
23
24          RequestDispatcher disp = request.getRequestDispatcher("get_high_temp_cnt_outcome.jsp");
25          disp.forward(request, response);
26      }
27
28  }
29

```

Create the `get_high_temp_cnt_outcome` page

```

1  <%--
2      Document   : get_high_temp_cnt_outcome
3      Created on : 21 May 2024, 10:39:16 PM
4      Author    : MemaniV
5  --%>
6
7  <%@page contentType="text/html" pageEncoding="UTF-8"%>
8  <!DOCTYPE html>
9  <html>
10     <head>
11         <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
12         <title>Get High Temperatures Count Page</title>
13     </head>
14     <body>
15         <h1>Get high temperatures count</h1>
16         <%
17             Long highCnt = (Long)request.getAttribute("highCnt");
18         %>
19         <p>
20             There are <b><%=highCnt%></b> employees with high temperature readings.
21         </p>

```

```

22     <p>
23         Please click <a href="menu.html">here</a> to go back to the menu page.
24     </p>
25     <p>
26         Please click <a href="index.html">here</a> to go to the main page.
27     </p>
28     <p>
29         Click <a href="LogoutServlet.do">here</a> to logout.
30     </p>
31 </body>
32 </html>
33

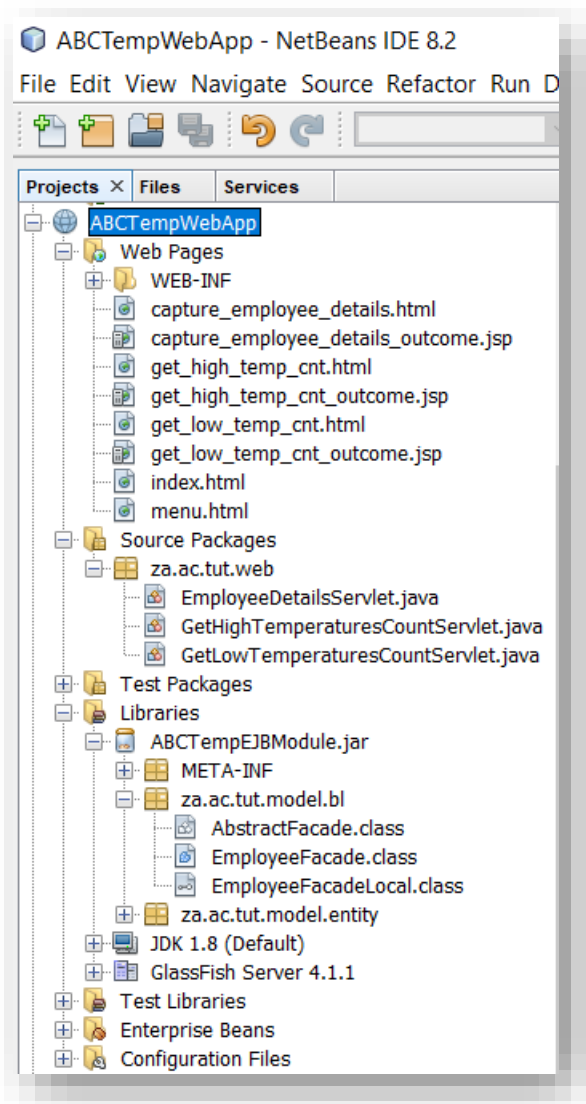
```

Clean and build the project.



```
Output - ABCTempWebApp (clean, dist) H
Compiling 3 source files to C:\Users\memaniv\Documents\NetBeansProjects\ABCTempWebApp\build\web\WEB-INF\classes
compile:
compile-jsp:
Created dir: C:\Users\memaniv\Documents\NetBeansProjects\ABCTempWebApp\dist
Building jar: C:\Users\memaniv\Documents\NetBeansProjects\ABCTempWebApp\dist\ABCTempWebApp.war
do-dist:
dist:
BUILD SUCCESSFUL (total time: 1 second)
```

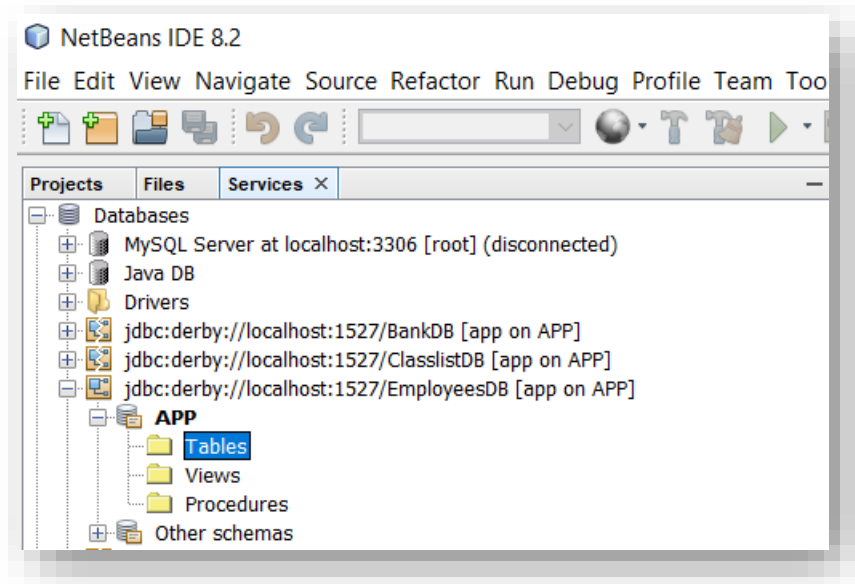
View the entire web project.



Phase 3: Create database

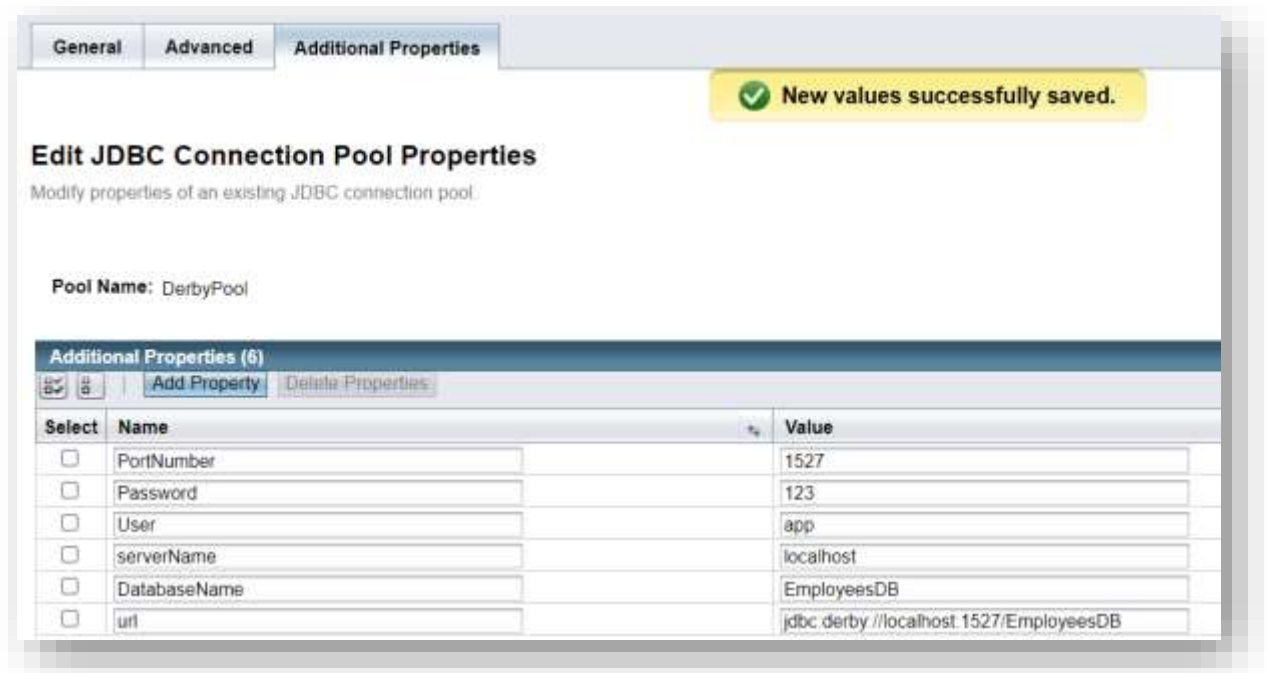
Create a database called **EmployeesDB** with the following properties:

- **Username:** app
- **Password:** 123



Phase 4: Create database connectivity with GlassFish

Modify the DerbyPool



Ping the pool to see if works.

Edit JDBC Connection Pool

Modify an existing JDBC connection pool. A JDBC connection pool is a group of reusable connections for a particular database.

[Load Defaults](#) [Flush](#) [Ping](#)

General Settings

Pool Name: DerbyPool

Resource Type: javax.sql.DataSource
Must be specified if the datasource class implements more than 1 of the interface.

Datasource Classname: org.apache.derby.jdbc.ClientDataSource
Vendor-specific classname that implements the DataSource and/or XADataSource APIs

Driver Classname:

Check if the data resource, **jdbc/_default** is pointing to the **DerbyPool**.

Edit JDBC Resource

Edit an existing JDBC data source.

[Load Defaults](#)

JNDI Name: jdbc/_default

Logical JNDI Name: java:comp/DefaultDataSource

Pool Name: DerbyPool
Use the [JDBC Connection Pools](#) page to create new pools

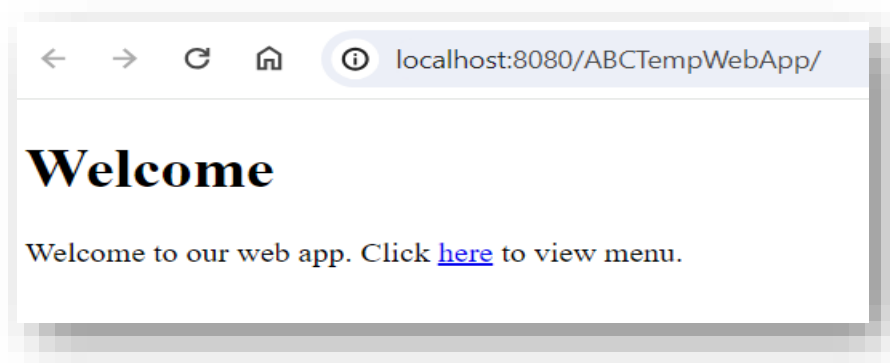
Deployment Order: 100
Specifies the loading order of the resource at server startup. Lower numbers are loaded first.

Description:

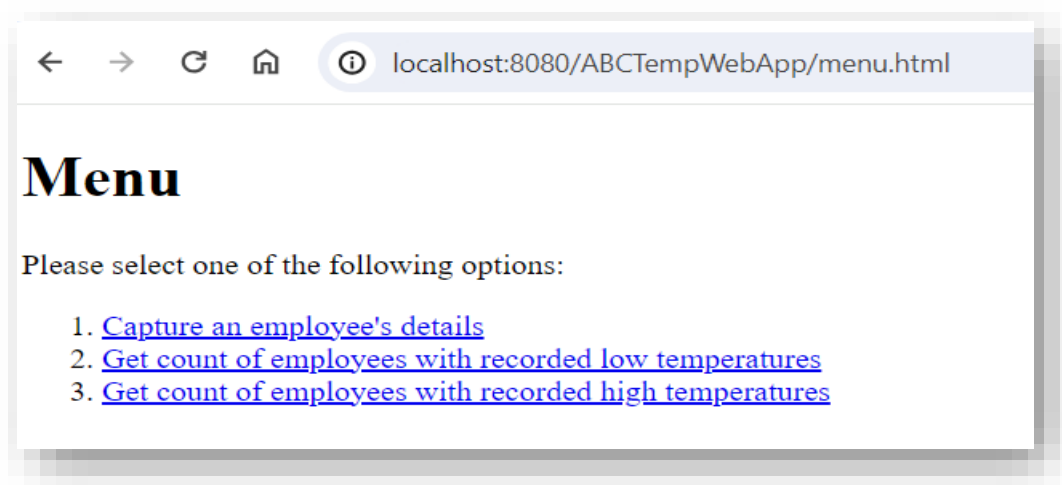
Status: ☒ Enabled

Phase 5: Test web application

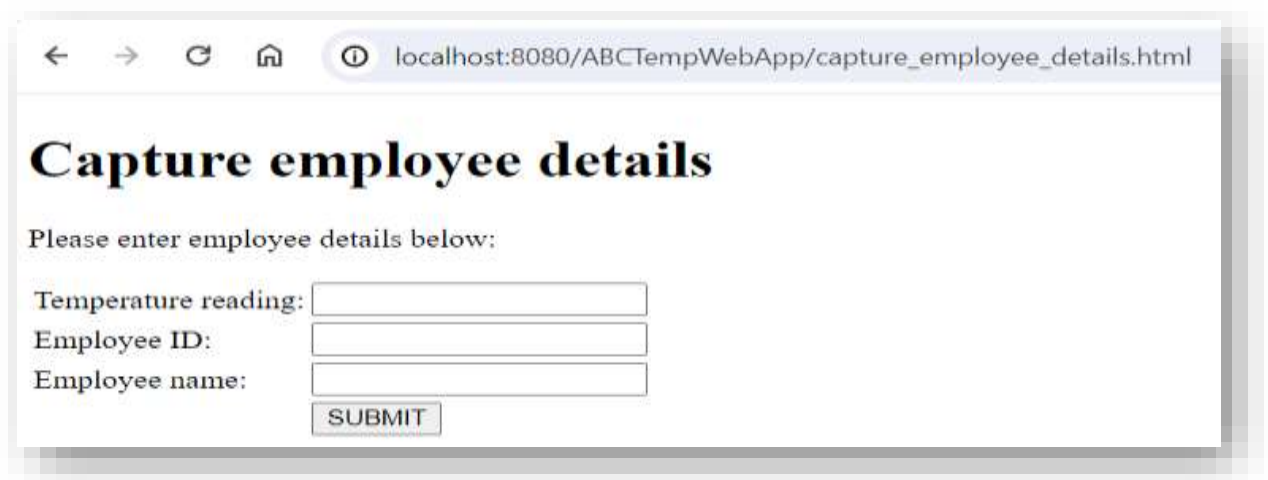
Launch the web application.



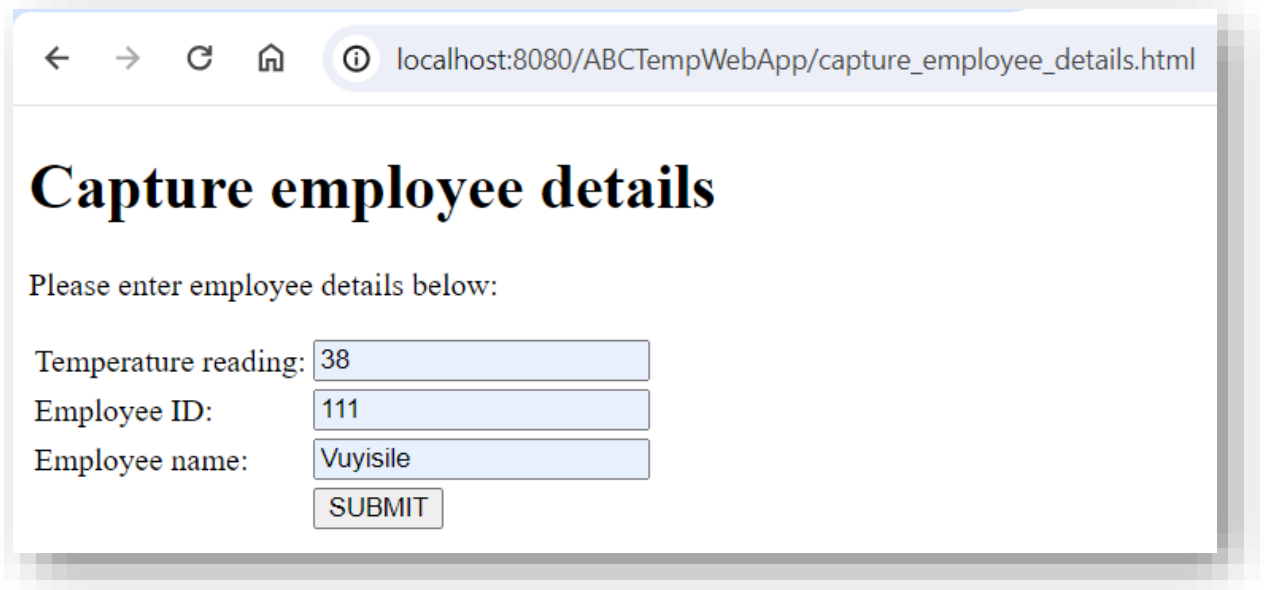
Click on the link.



Click on the first link.



Enter employee details.



← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/capture_employee_details.html

Capture employee details

Please enter employee details below:

Temperature reading:

Employee ID:

Employee name:

Click on the button.

here to go back to the menu page or [here](#) to the main page.'" data-bbox="134 448 891 652"/>

← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/EmployeeDetailsServlet.do

Capture employee details outcome

The employee's details have been successfully captured.

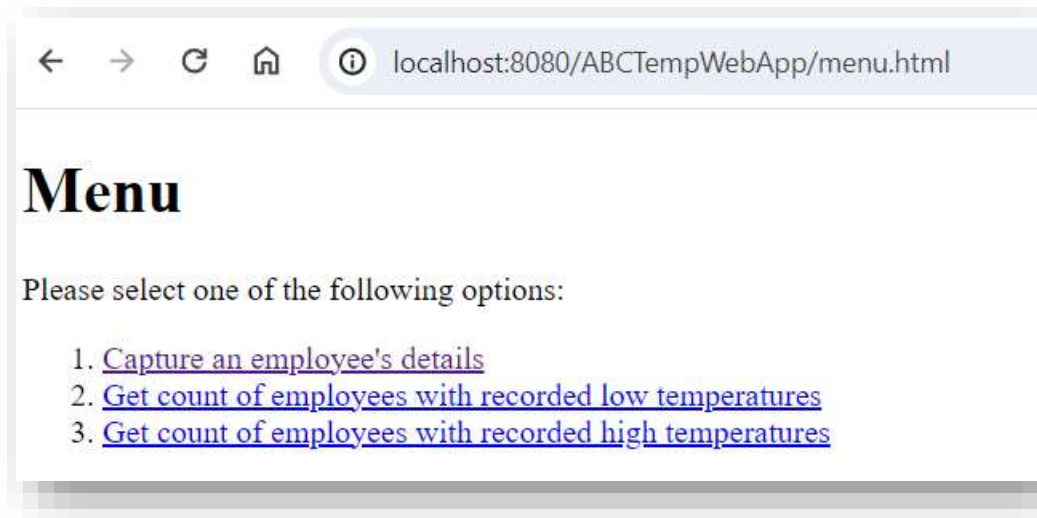
Please click [here](#) to go back to the menu page or [here](#) to the main page.

Add three more employees. View the database.

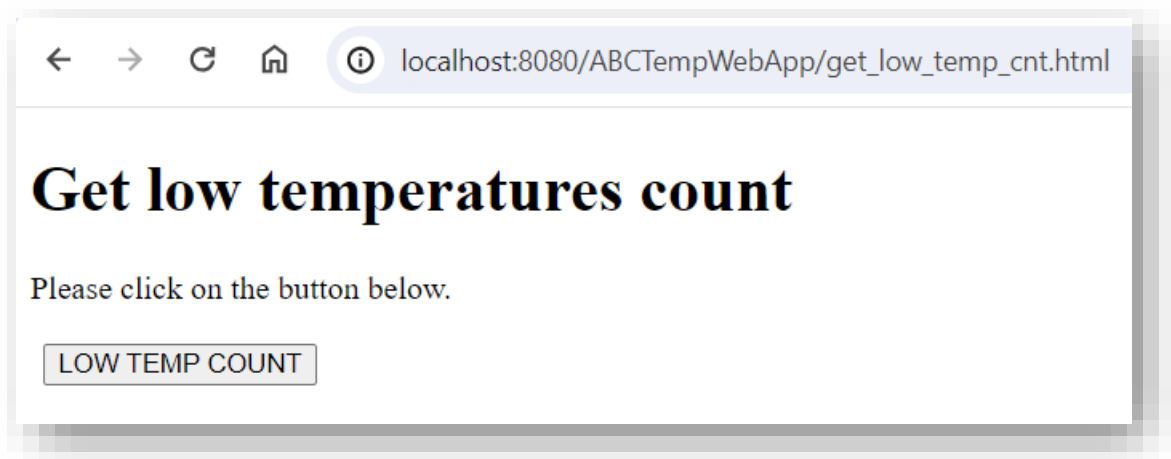


#	ID	NAME	TEMPREADING
1	111	Vuyisile	36.0
2	222	Thabo	40.0
3	333	Tutsi	36.0
4	444	Papa	25.0

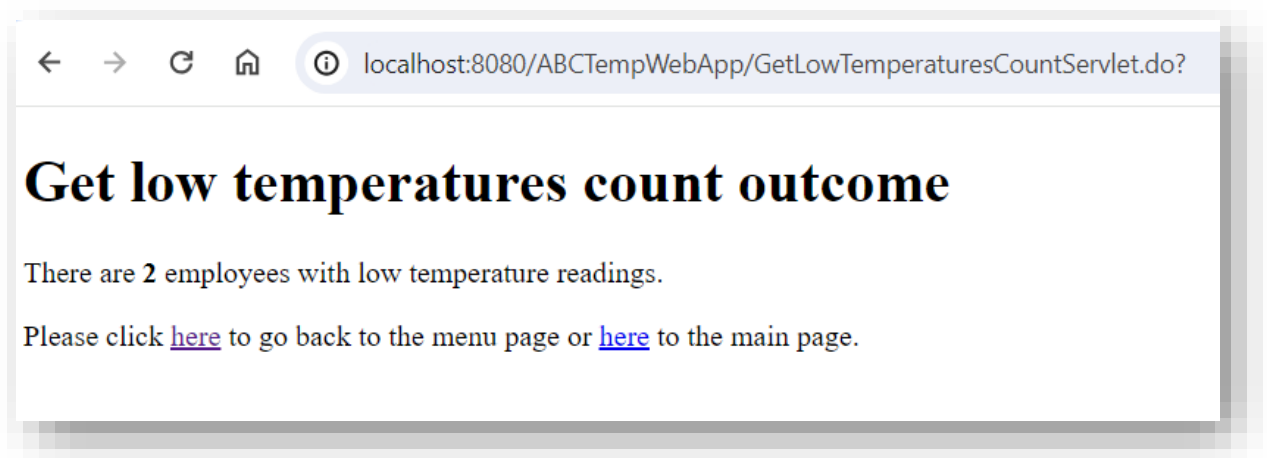
Go back to the menu page.



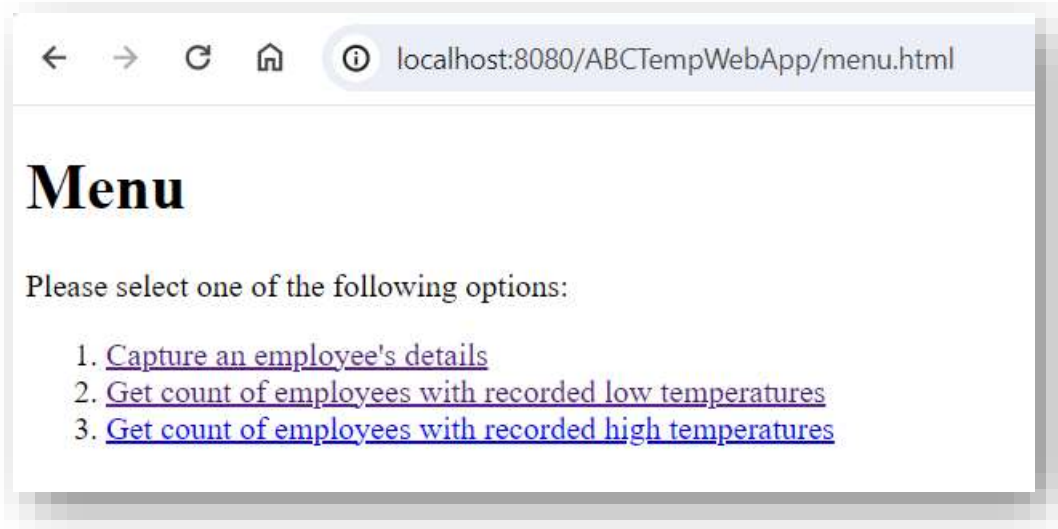
Click on the low temperatures link.



Click on the button.



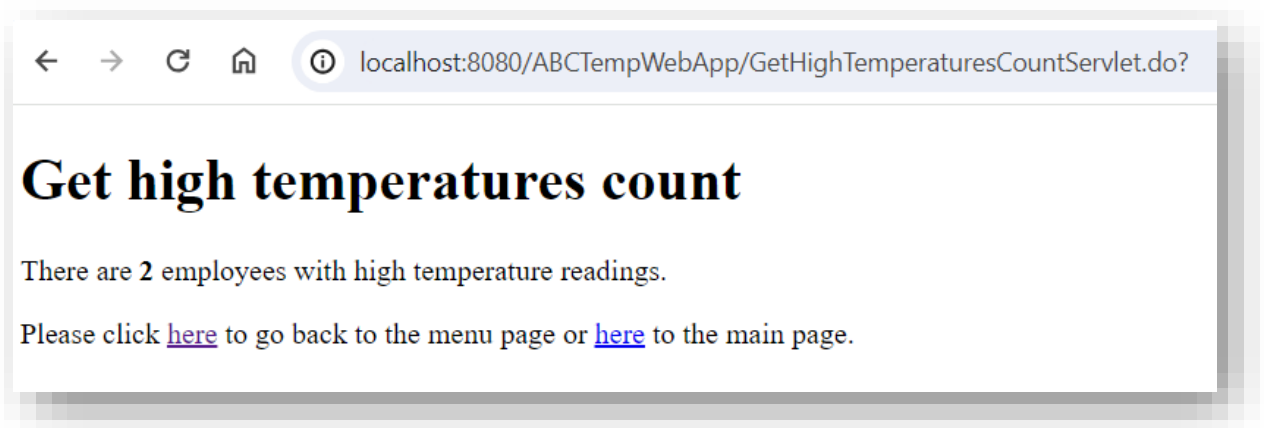
Go back to the menu page.



Click on the high temperatures link.



Click on the button.



Phase 6: Include security

Open the **Admin Console** of **GlassFish**.



Under Common Tasks, expand the **server-config | Security | Realms | file**.

Edit Realm
Edit an existing security (authentication) realm.
[Manage Users](#)

Configuration Name: server-config

Realm Name: file
Class Name: com.sun.enterprise.security.auth.realm.file.FileRealm

Properties specific to this Class

JAAS Context: * fileRealm
Identifier for the login module to use for this realm

Key File: * \${com.sun.aas.instanceRoot}/config/keyfile
Full path and name of the file where the server will store the key

Assign Groups:
Comma-separated list of group names

Additional Properties (0)

Click on **Manage Users**.

File Users
Manage user accounts for the currently selected security realm.

Configuration Name: server-config

Realm Name: file

File Users (0)
[New...](#) [Delete](#)

Select	User ID	Group List:
No items found.		

Click on **New**.

New File Realm User

Create new user accounts for the currently selected security realm.

Configuration Name: server-config

Realm Name: file

User ID: *

Name can be up to 255 characters, must contain only letters, digits, underscore, dash, or dot characters

Group List:

Separate multiple groups with colon

New Password:

Confirm New Password:

Use the following table to create system users.

No.	Username	Password	Role(s)
1	Mulumba	123	Officer
2	Sipho	123	Manager
3	Thato	123	Manager and officer

New File Realm User

Create new user accounts for the currently selected security realm.

Configuration Name: server-config

Realm Name: file

User ID: *

Name can be up to 255 characters, must contain only letters, digits, underscore, dash, or dot characters

Group List:

Separate multiple groups with colon

New Password:

Confirm New Password:

Click on the **OK** button.

File Users

Manage user accounts for the currently selected security realm.

Configuration Name: server-config

Realm Name: file

File Users (1)		
New... Delete		
Select	User ID	Group List:
<input type="checkbox"/>	Mulumba	Officer

Add a second user.

New File Realm User

Create new user accounts for the currently selected security realm.

Configuration Name: server-config

Realm Name: file

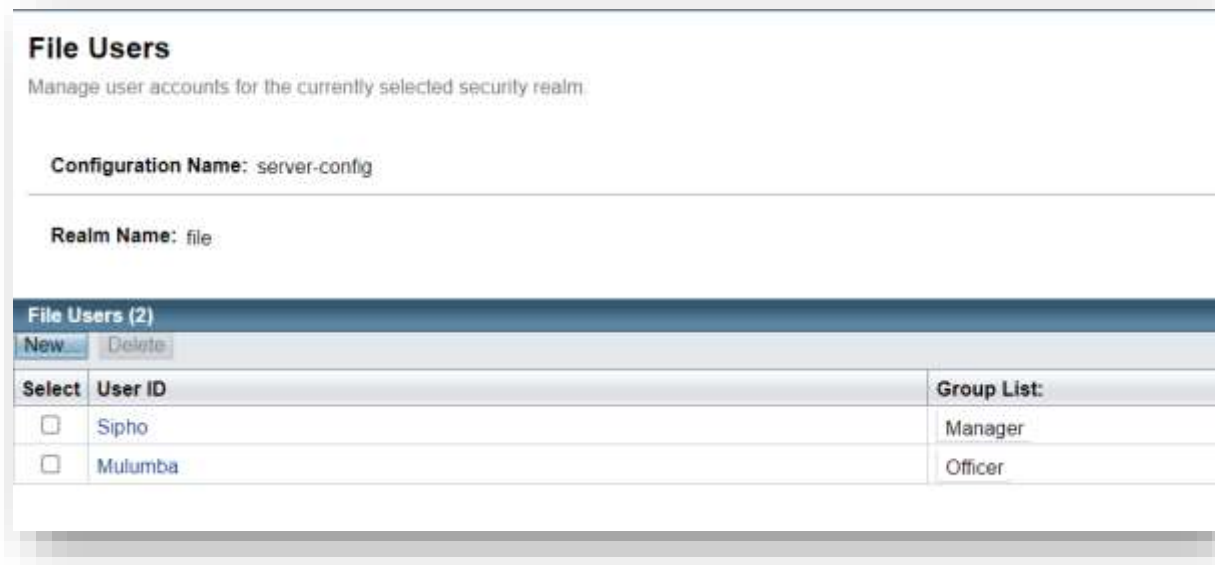
User ID:
Name can be up to 255 characters, must contain only letters, digits, underscore, dash, or dot characters

Group List:
Separate multiple groups with colon

New Password:

Confirm New Password:

Click on the OK button.



File Users
Manage user accounts for the currently selected security realm.

Configuration Name: server-config

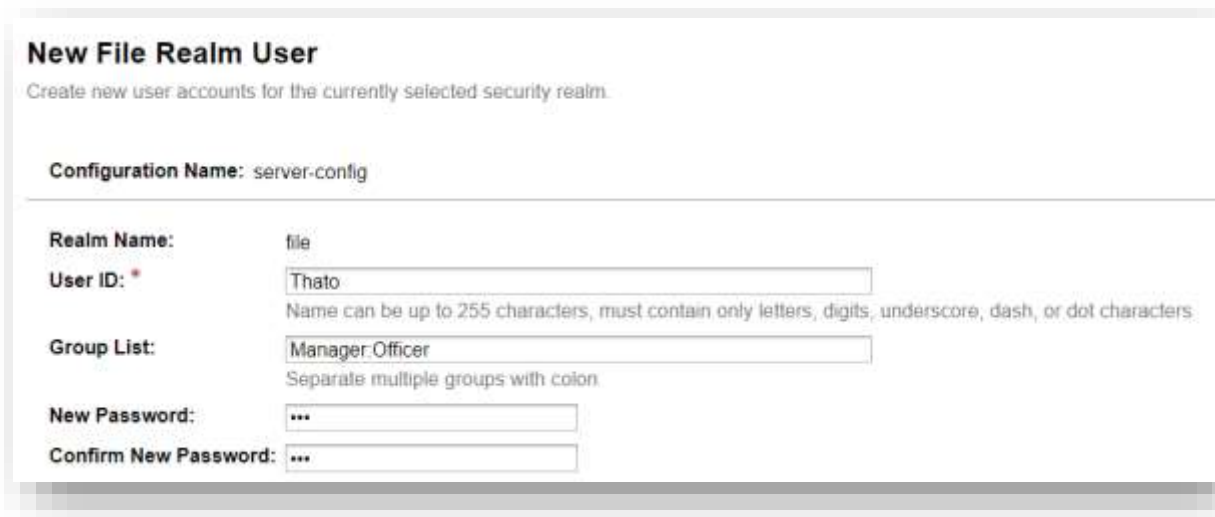
Realm Name: file

File Users (2)

New Delete

Select	User ID	Group List:
<input type="checkbox"/>	Sipho	Manager
<input type="checkbox"/>	Mulumba	Officer

Add the third user.



New File Realm User
Create new user accounts for the currently selected security realm.

Configuration Name: server-config

Realm Name: file

User ID: * Thato
Name can be up to 255 characters, must contain only letters, digits, underscore, dash, or dot characters.

Group List: Manager:Officer
Separate multiple groups with colon.

New Password: ***

Confirm New Password: ***

Click on the OK button.

File Users

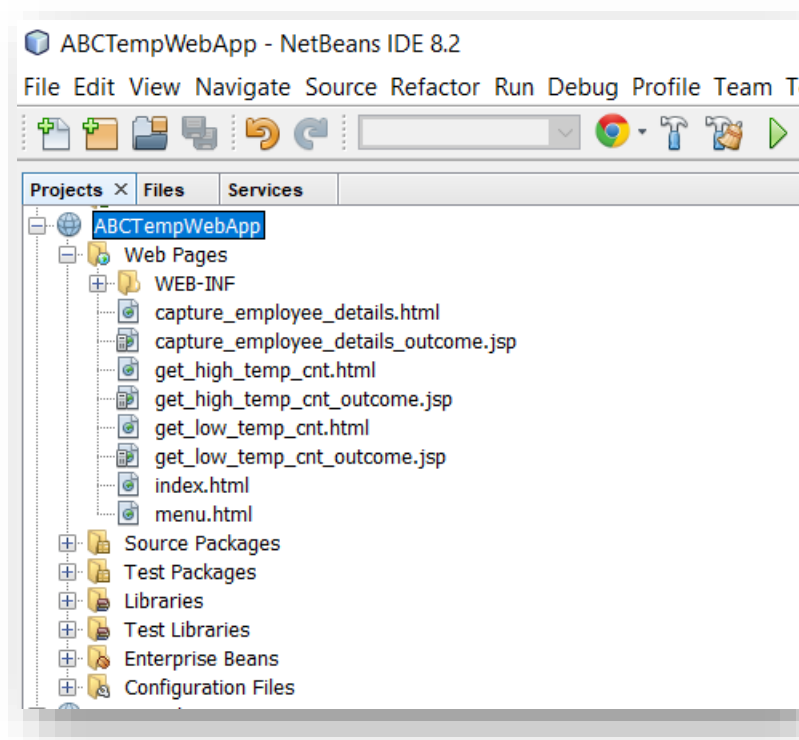
Manage user accounts for the currently selected security realm.

Configuration Name: server-config

Realm Name: file

File Users (3)		
New... Delete		
Select	User ID	Group List:
<input type="checkbox"/>	Sipho	Manager
<input type="checkbox"/>	Mulumba	Officer
<input type="checkbox"/>	Thato	Manager Officer

Go back to the web project.



Create a **login** page.

```
1 <!--
2     Document    : login
3     Created on  : 21 May 2024, 11:47:59 PM
4     Author     : MemaniV
5 -->
6
7 <%@page contentType="text/html" pageEncoding="UTF-8"%>
8 <!DOCTYPE html>
9 <html>
10 <head>
11     <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
12     <title>Login Page</title>
13 </head>
14 <body>
15     <h1>Login</h1>
16     <p>
17         Please provide your login details below.
18     </p>
```

```
19 <form action="j_security_check" method="POST">
20     <table>
21     <tr>
22         <td>Username:</td>
23         <td><input type="text" name="j_username" required=""/></td>
24     </tr>
25     <tr>
26         <td>Password:</td>
27         <td><input type="password" name="j_password" required=""/></td>
28     </tr>
29     <tr>
30         <td></td>
31         <td><input type="submit" value="SUBMIT"/></td>
32     </tr>
33     </table>
34 </form>
35 </body>
36 </html>
37
```

Create a **login_error** page.

```
1 <!--
2     Document    : login_error
3     Created on  : 21 May 2024, 11:50:57 PM
4     Author     : MemaniV
5 -->
6
7 <%%@page contentType="text/html" pageEncoding="UTF-8"%>
8 <!DOCTYPE html>
9 <html>
10 <head>
11     <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
12     <title>Login Error Page</title>
13 </head>
14 <body>
15     <h1>Login error</h1>
16     <p style="color: red;">
17         Invalid login details! Please enter valid details.
18     </p>
```

```
19 <form action="j_security_check" method="POST">
20     <table>
21     <tr>
22         <td>Username:</td>
23         <td><input type="text" name="j_username" required=""/></td>
24     </tr>
25     <tr>
26         <td>Password:</td>
27         <td><input type="password" name="j_password" required=""/></td>
28     </tr>
29     <tr>
30         <td></td>
31         <td><input type="submit" value="SUBMIT"/></td>
32     </tr>
33     </table>
34 </form>
35 </body>
36 </html>
37
```

Create an `access_denied` page.

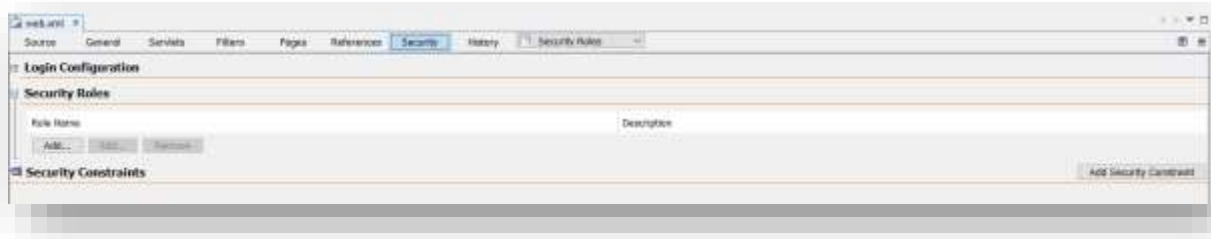
```
1 <!--
2     Document    : access_denied
3     Created on  : 21 May 2024, 11:54:10 PM
4     Author     : MemaniV
5 -->
6
7 <@page contentType="text/html" pageEncoding="UTF-8"%>
8 <!DOCTYPE html>
9 <html>
10 <head>
11     <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
12     <title>Access Denied Page</title>
13 </head>
14 <body>
15     <h1>Access denied</h1>
16     <p style="color:red;">
17         You are not authorized/allowed to access this page!!!
18     </p>
```

```
19 <p>
20     Please click <a href="menu.html">here</a> to go back to the menu page.
21 </p>
22 <p>
23     Please click <a href="index.html">here</a> to go to the main page.
24 </p>
25 <p>
26     Click <a href="LogoutServlet.do">here</a> to logout.
27 </p>
28 </body>
29 </html>
30
```

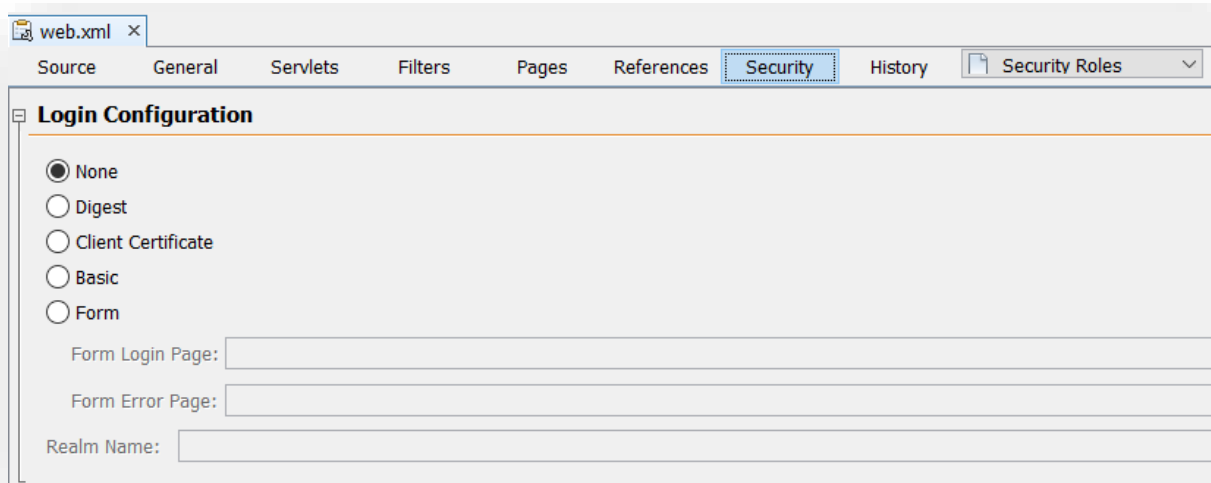
Create the **LogoutServlet** class.

```
11  /**
12   *
13   * @author MamanIV
14   */
15  public class LogoutServlet extends HttpServlet {
16      @Override
17      protected void doGet(HttpServletRequest request, HttpServletResponse response)
18          throws ServletException, IOException {
19      HttpSession session = request.getSession();
20      session.invalidate();
21
22      RequestDispatcher disp = request.getRequestDispatcher("index.html");
23      disp.forward(request, response);
24  }
25  }
26  }
```

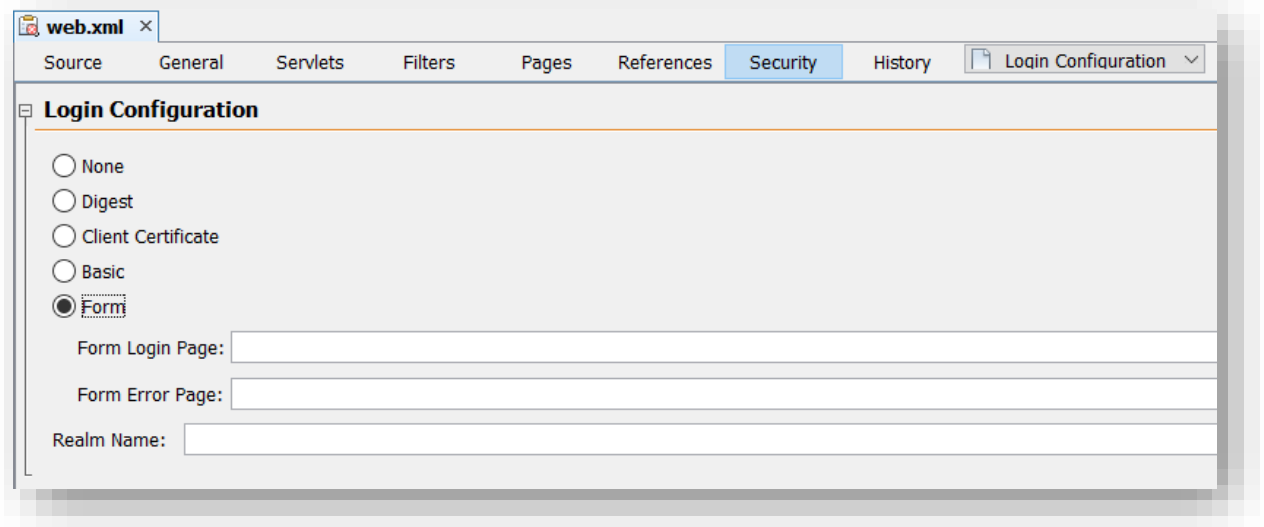
Open the **DD (web.xml)** file and select the **Security** tab.



Expand **Login Configuration**.



Select **Form**.



The screenshot shows the 'web.xml' editor with the 'Security' tab selected. Under 'Login Configuration', the 'Form' radio button is selected. The 'Form Login Page', 'Form Error Page', and 'Realm Name' fields are empty.

web.xml ×

Source General Servlets Filters Pages References **Security** History Login Configuration ▾

Login Configuration

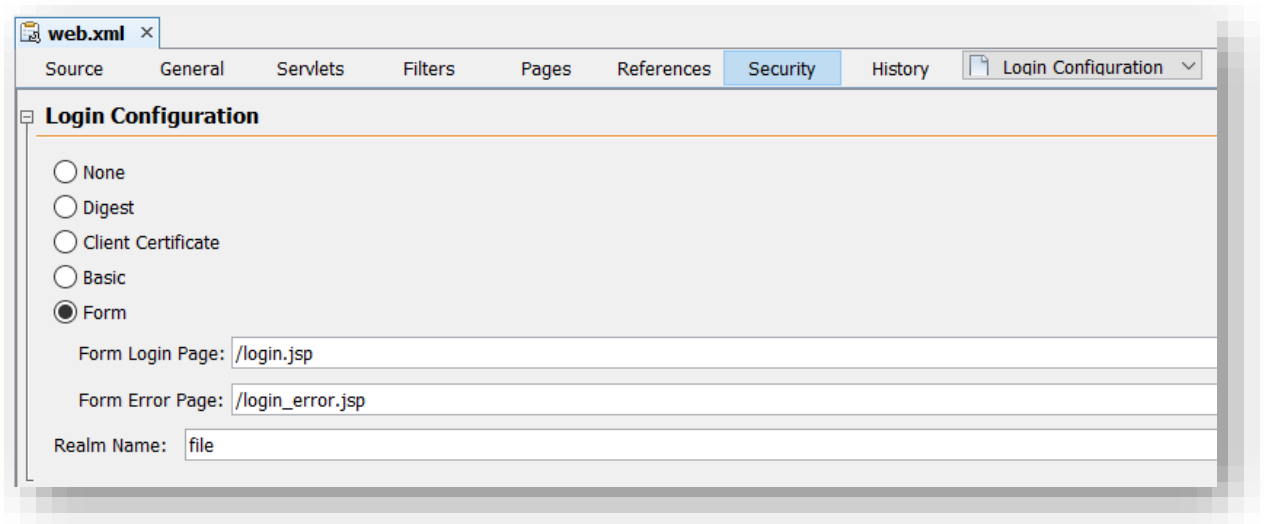
☐ None
☐ Digest
☐ Client Certificate
☐ Basic
☒ **Form**

Form Login Page:

Form Error Page:

Realm Name:

Browse to the **login** and **login error** pages, respectively. Name the Realm as **file**.



The screenshot shows the 'web.xml' editor with the 'Security' tab selected. Under 'Login Configuration', the 'Form' radio button is selected. The 'Form Login Page' is '/login.jsp', the 'Form Error Page' is '/login_error.jsp', and the 'Realm Name' is 'file'.

web.xml ×

Source General Servlets Filters Pages References **Security** History Login Configuration ▾

Login Configuration

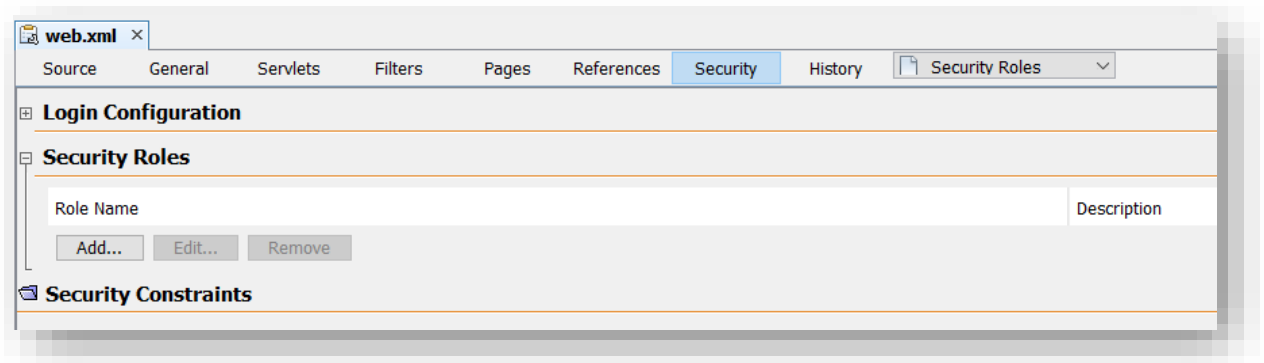
☐ None
☐ Digest
☐ Client Certificate
☐ Basic
☒ **Form**

Form Login Page:

Form Error Page:

Realm Name:

Minimize **Login Configuration**.



The screenshot shows the 'web.xml' editor with the 'Security' tab selected. The 'Login Configuration' section is minimized. The 'Security Roles' section is expanded, showing a table with 'Role Name' and 'Description' columns. Below the table are 'Add...', 'Edit...', and 'Remove' buttons. The 'Security Constraints' section is also visible.

web.xml ×

Source General Servlets Filters Pages References **Security** History Security Roles ▾

Login Configuration

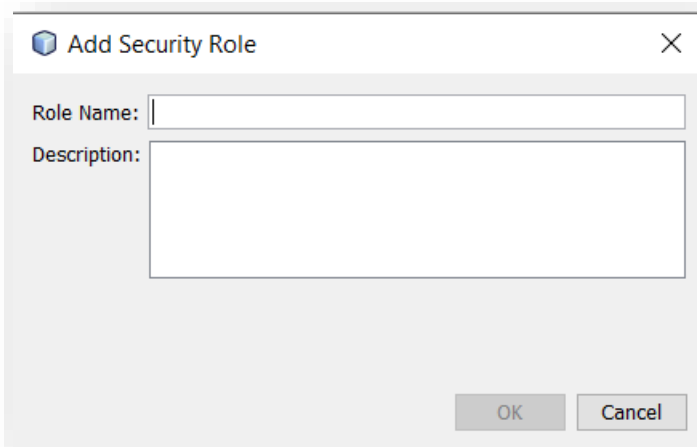
Security Roles

Role Name	Description
-----------	-------------

Security Constraints

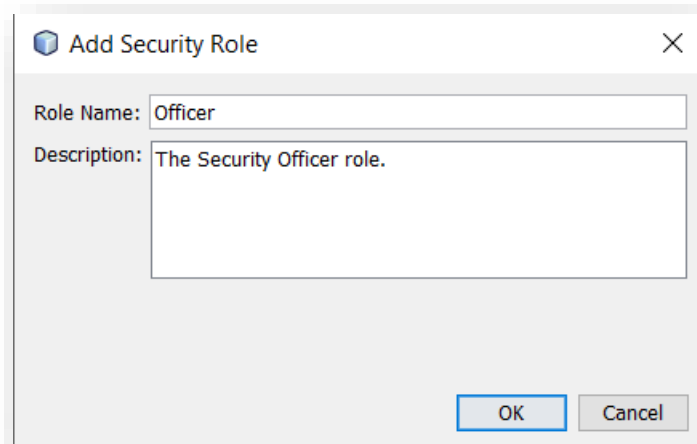
Expand **Security Roles**.

Click on **Add**.



A dialog box titled "Add Security Role" with a close button (X) in the top right corner. It contains two input fields: "Role Name:" with a text box and "Description:" with a larger text area. At the bottom right, there are two buttons: "OK" and "Cancel".

Complete the form.



The same "Add Security Role" dialog box, but now the "Role Name" field contains the text "Officer" and the "Description" field contains the text "The Security Officer role.". The "OK" button is highlighted with a blue border.

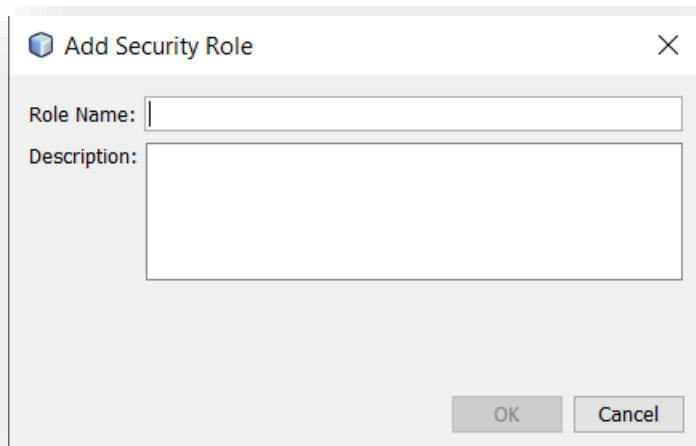
Click OK.



A screenshot of the "web.xml" editor window. The "Security" tab is selected, showing a table of security roles. The table has two columns: "Role Name" and "Description". The first row contains "Officer" and "The Security Officer role.". Below the table are buttons for "Add...", "Edit...", and "Remove".

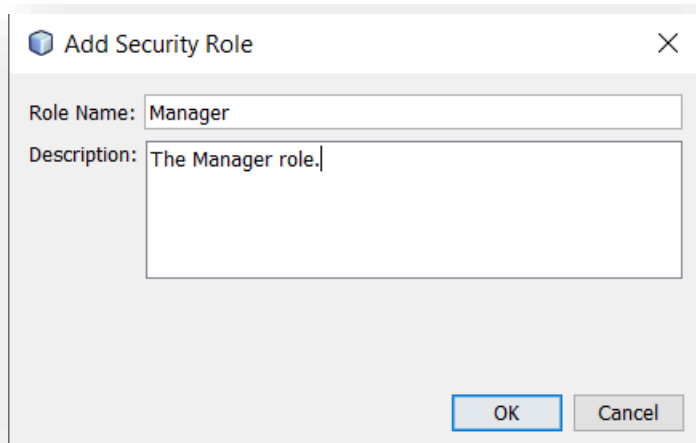
Role Name	Description
Officer	The Security Officer role.

Click on **Add** again.



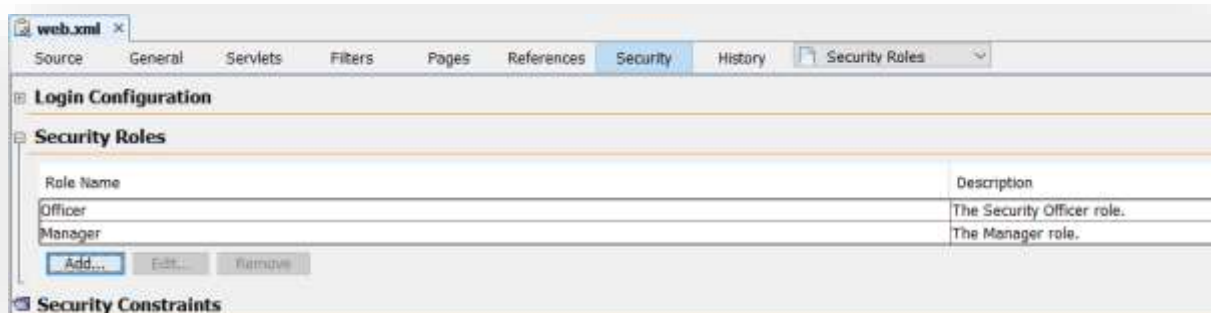
The dialog box is titled "Add Security Role" and has a close button (X) in the top right corner. It contains two input fields: "Role Name:" with a text box and "Description:" with a larger text area. At the bottom right, there are two buttons: "OK" and "Cancel".

Complete the form.



The dialog box is titled "Add Security Role" and has a close button (X) in the top right corner. The "Role Name:" text box contains the text "Manager". The "Description:" text area contains the text "The Manager role.". At the bottom right, there are two buttons: "OK" and "Cancel".

Click OK.



The screenshot shows the "web.xml" editor with the "Security" tab selected. The "Security Roles" section is expanded, showing a table with two columns: "Role Name" and "Description". The table contains two rows: "Officer" with description "The Security Officer role." and "Manager" with description "The Manager role.". Below the table are three buttons: "Add...", "Edit...", and "Remove".

Role Name	Description
Officer	The Security Officer role.
Manager	The Manager role.

Let' add some constraints. Click on **Add Security Constraint**.

Security Constraints

Constraint1

Display Name: Constraint1

Web Resource Collection:

Name	URL Pattern	HTTP Method	Description
AM...			

Buttons: Add, Edit, Remove

☐ Enable Authentication Constraint

Description:

Enable Name(s):

☐ Enable User Data Constraint

Description:

Transport Guarantee: NONE

Buttons: Add, Edit, Remove

Complete the form

Edit Web Resource

Resource Name: OfficerResources

Description: Resources available to an officer.

URL Pattern(s): /capture_employee_details.html

Use comma (,) to separate multiple patterns.

HTTP Method(s): ☒ All HTTP Methods

☐ Selected HTTP Methods

☐ GET ☐ POST

☐ HEAD ☐ PUT

☐ OPTIONS ☐ TRACE

☐ DELETE

Buttons: OK, Cancel

Click OK.

OfficerConstraint

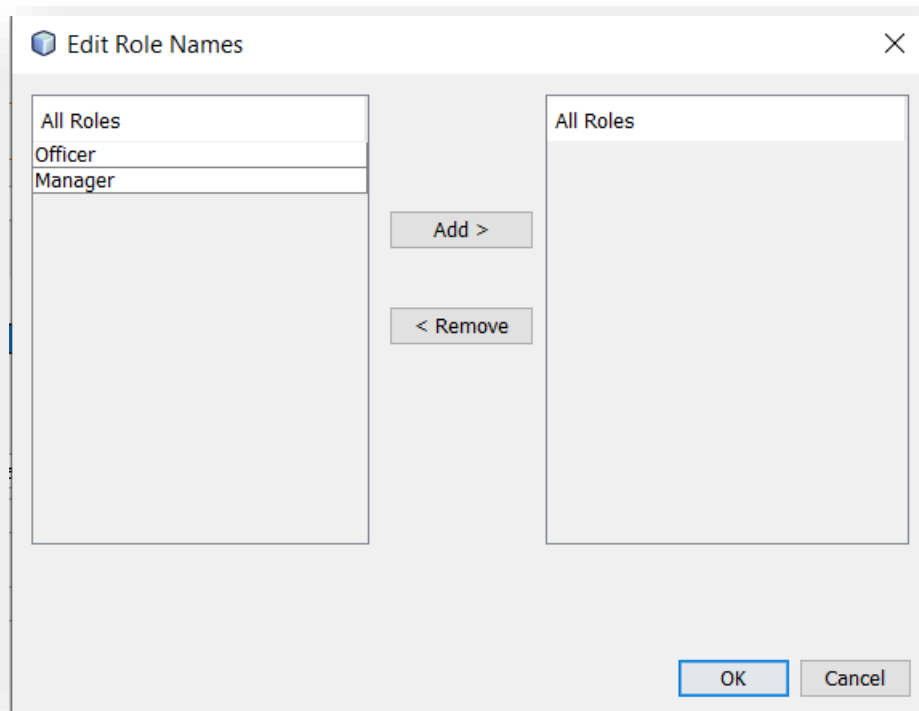
Display Name: OfficerConstraint

Web Resource Collection:

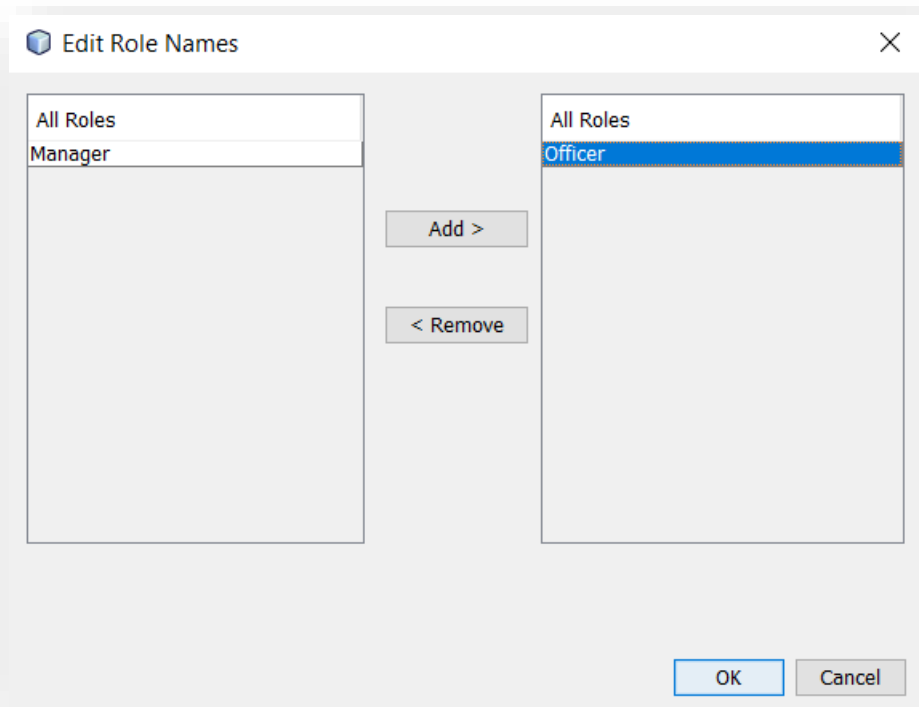
Name	URL Pattern	HTTP Method	Description
OfficerResources	/capture_employee_details.html		Resources available to an officer.

Buttons: Add, Edit, Remove

Click on Add.



Select Officer and click on Add.



Click OK. Select the **Enable Authentication Constraint** checkbox and add the Officer role.

The screenshot shows the 'Security Constraints' dialog box. The 'OfficerConstraint' tab is selected. The 'Display Name' is 'OfficerConstraint'. The 'Web Resource Collection' table has one entry: 'OfficerConstraint' with URL Pattern '/capture_employee_details.html' and HTTP Method blank. Below the table are 'Add...', 'Edit...', and 'Remove' buttons. The 'Enable Authentication Constraint' checkbox is checked, with a description 'The user must be authenticated first.' and 'Role Name(s): Officer'. The 'Enable User Data Constraint' checkbox is unchecked. The 'Transport Guarantee' is set to 'NONE'.

Name	URL Pattern	HTTP Method
OfficerConstraint	/capture_employee_details.html	

☒ Enable Authentication Constraint
Description: The user must be authenticated first.
Role Name(s): Officer

☐ Enable User Data Constraint
Description:
Transport Guarantee: NONE

Add a **Manager** constraint the same way you did the **Officer**.

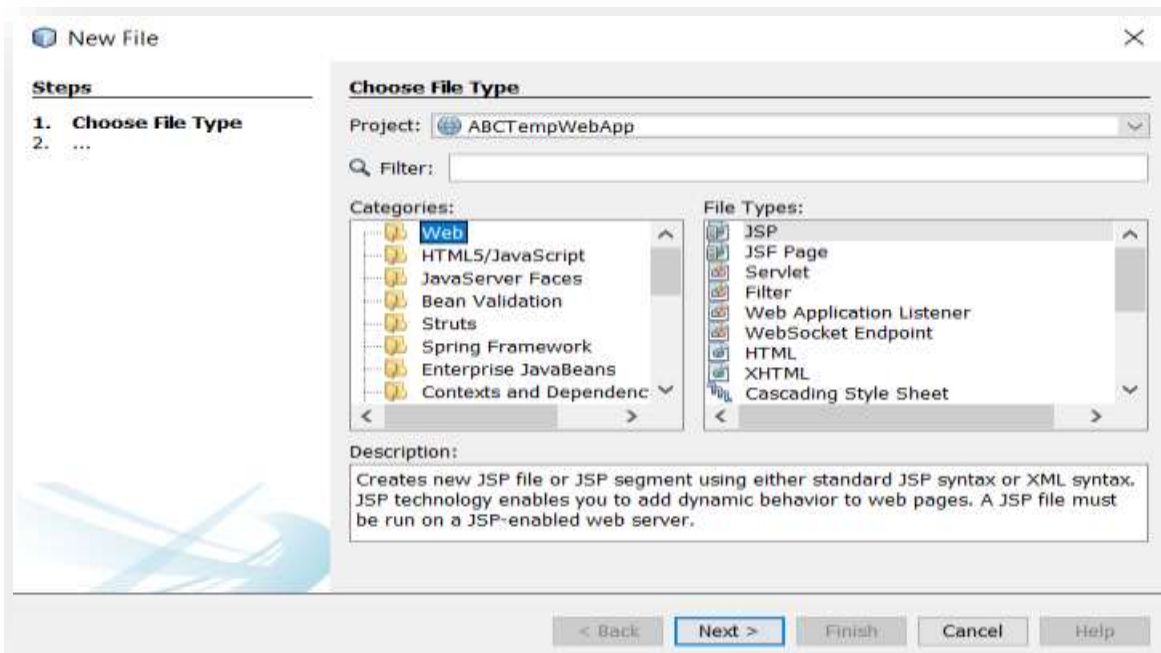
The screenshot shows the 'Security Constraints' dialog box with the 'ManagerConstraint' tab selected. The 'Display Name' is 'ManagerConstraint'. The 'Web Resource Collection' table has one entry: 'ManagerResources' with URL Pattern '/get_high_temp_cnt.html, /get_low_temp_cnt.html' and HTTP Method blank. Below the table are 'Add...', 'Edit...', and 'Remove' buttons. The 'Enable Authentication Constraint' checkbox is checked, with a description 'Authenticate the user.' and 'Role Name(s): Manager'. The 'Enable User Data Constraint' checkbox is unchecked. The 'Transport Guarantee' is set to 'NONE'.

Name	URL Pattern	HTTP Method
ManagerResources	/get_high_temp_cnt.html, /get_low_temp_cnt.html	

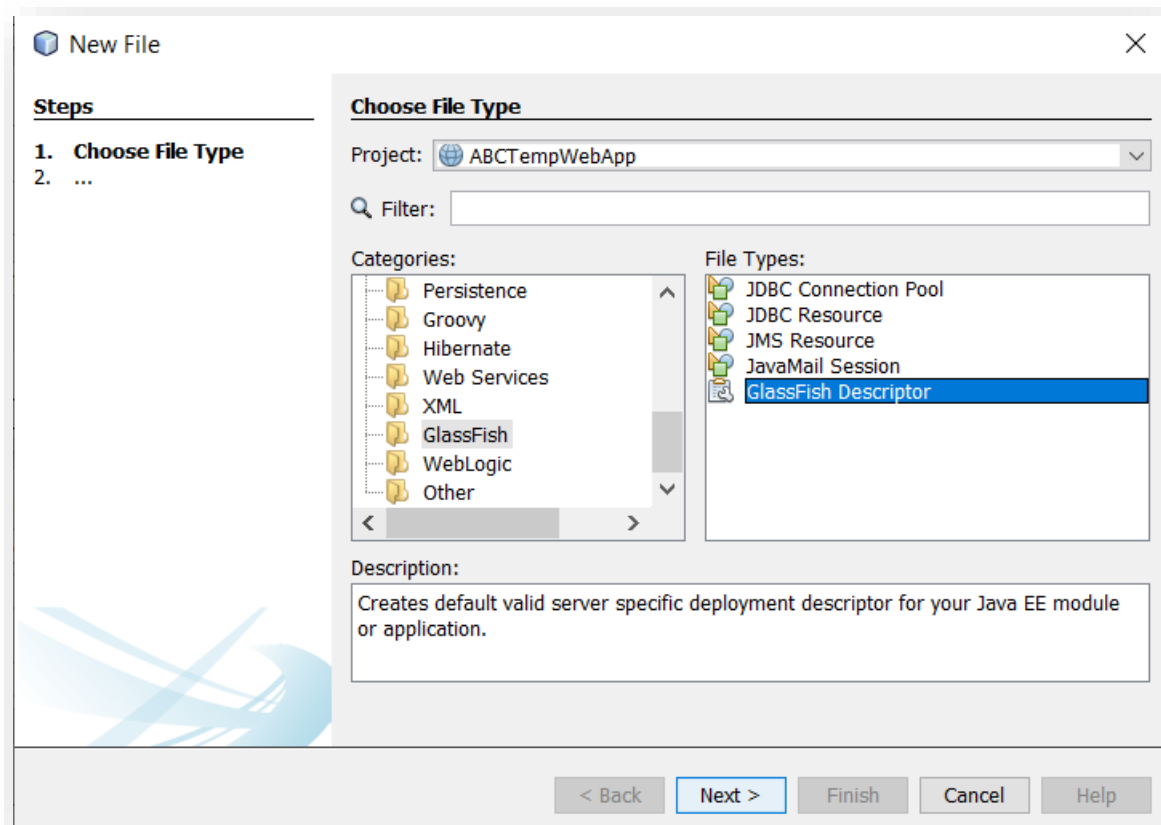
☒ Enable Authentication Constraint
Description: Authenticate the user.
Role Name(s): Manager

☐ Enable User Data Constraint
Description:
Transport Guarantee: NONE

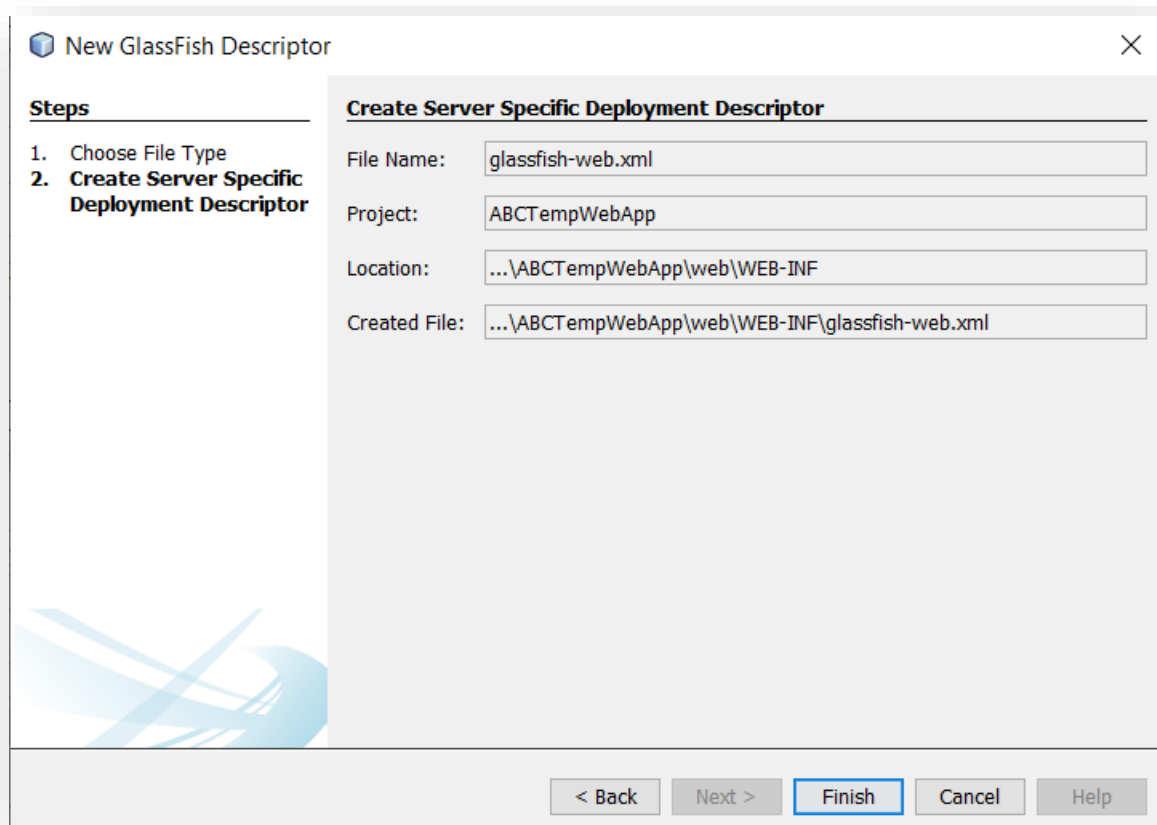
Create a **GlassFish Descriptor** file. This is a file that maps the roles on NetBeans to the ones defined on NetBeans. Right-click on the web project and select **New | Other**.



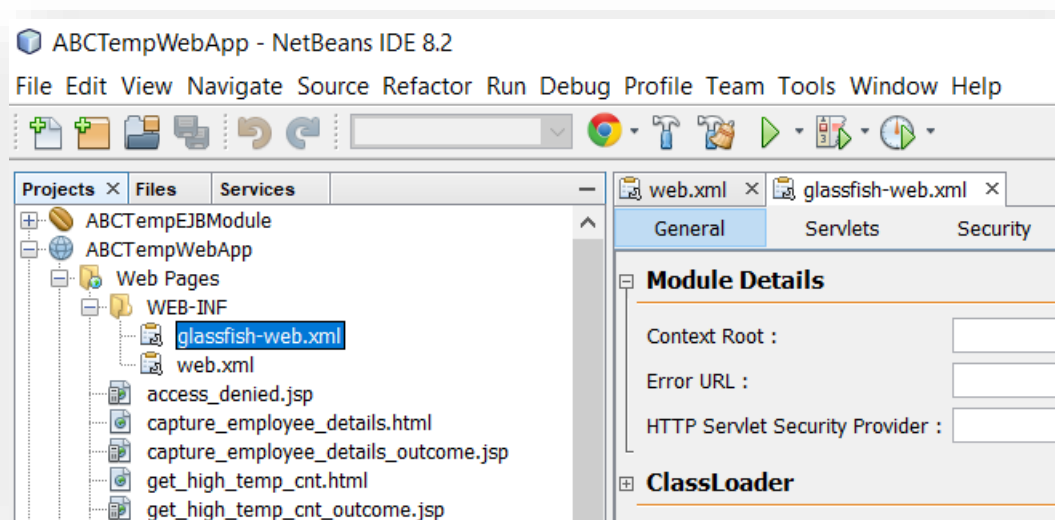
Under Categories select GlassFish, and under File Types select GlassFish Descriptor



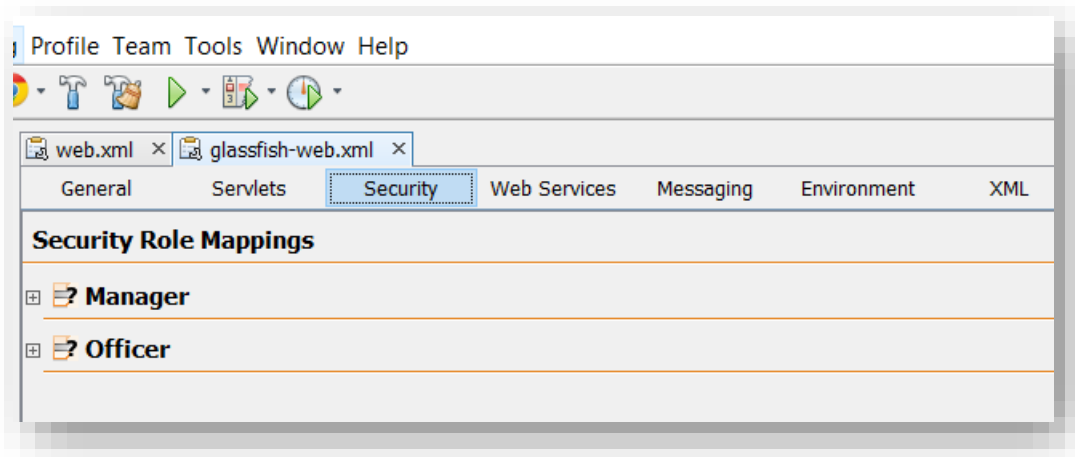
Click Next.



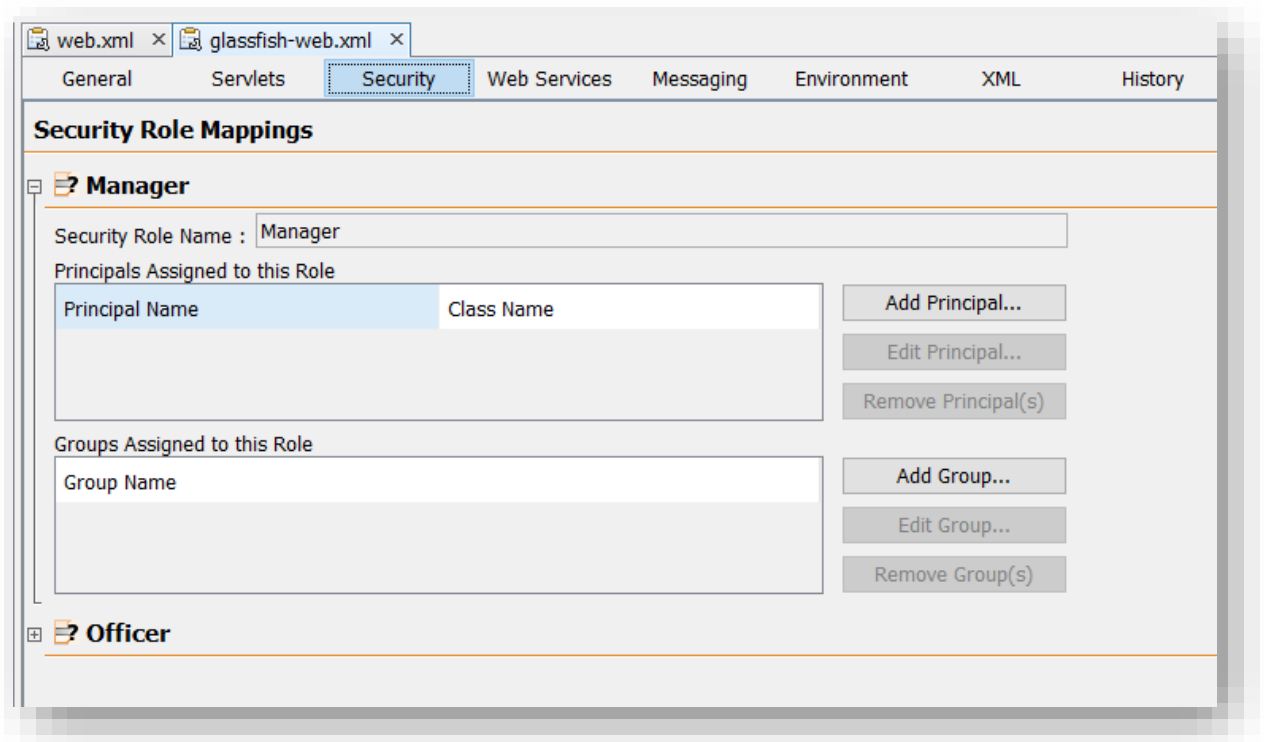
Click **Finish**.



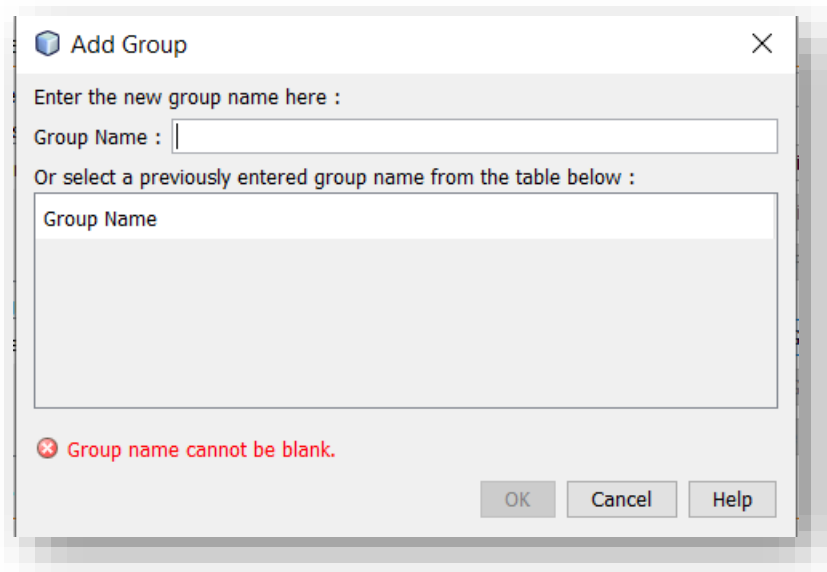
Click on the **Security** tab.



Expand **Manager**.

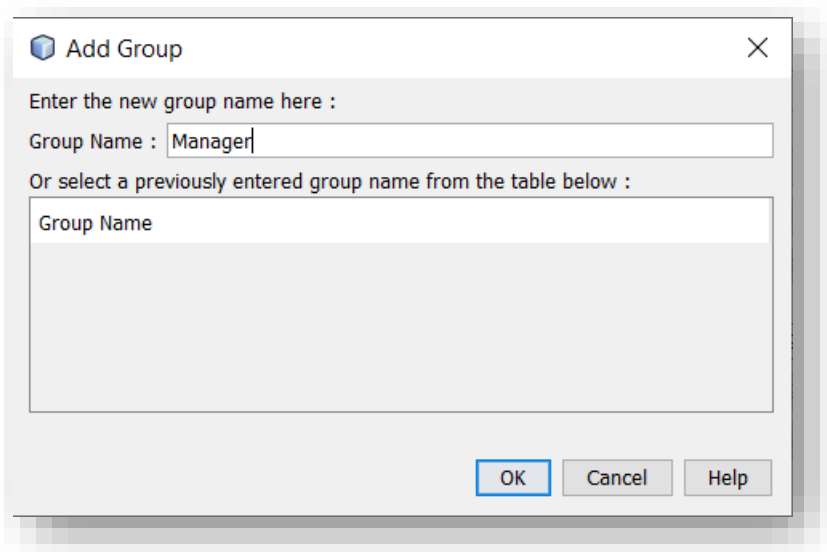


Click on **Add Group**.



The 'Add Group' dialog box is shown. It has a title bar with a blue cube icon and the text 'Add Group'. The main area contains the text 'Enter the new group name here :', followed by a text input field labeled 'Group Name :'. Below this is the text 'Or select a previously entered group name from the table below :', followed by a table with one header 'Group Name' and an empty body. At the bottom left, there is a red error icon and the text 'Group name cannot be blank.'. At the bottom right, there are three buttons: 'OK', 'Cancel', and 'Help'.

Enter Manager. This is to say the role known as **Manager** on **NetBeans** is also known as **Manager** on **GlassFish**.



The 'Add Group' dialog box is shown again. The 'Group Name' input field now contains the text 'Manager'. The error message is no longer present. The 'OK' button is highlighted with a blue border. The other elements of the dialog box remain the same.

Click OK.

The screenshot shows the 'Security Role Mappings' configuration page for the 'Manager' role. The 'Security Role Name' is set to 'Manager'. Under 'Principals Assigned to this Role', there is an empty table with columns 'Principal Name' and 'Class Name'. To the right of this table are buttons for 'Add Principal...', 'Edit Principal...', and 'Remove Principal(s)'. Under 'Groups Assigned to this Role', there is a table with one entry: 'Manager'. To the right of this table are buttons for 'Add Group...', 'Edit Group...', and 'Remove Group(s)'. The 'Add Group...' button is highlighted with a blue border.

web.xml x glassfish-web.xml x

General Servlets **Security** Web Services Messaging Environment XML History

Security Role Mappings

Manager

Security Role Name : Manager

Principals Assigned to this Role

Principal Name	Class Name
----------------	------------

Add Principal...
Edit Principal...
Remove Principal(s)

Groups Assigned to this Role

Group Name
Manager

Add Group...
Edit Group...
Remove Group(s)

Officer

Do the same for the **Officer** role.

The screenshot shows the 'Security Role Mappings' configuration page for the 'Officer' role. The 'Security Role Name' is set to 'Officer'. Under 'Principals Assigned to this Role', there is an empty table with columns 'Principal Name' and 'Class Name'. To the right of this table are buttons for 'Add Principal...', 'Edit Principal...', and 'Remove Principal(s)'. Under 'Groups Assigned to this Role', there is a table with one entry: 'Officer'. To the right of this table are buttons for 'Add Group...', 'Edit Group...', and 'Remove Group(s)'. The 'Add Group...' button is highlighted with a blue border.

Start Page x glassfish-web.xml x

General Servlets **Security** Web Services Messaging Environment XML

Security Role Mappings

Manager

Officer

Security Role Name : Officer

Principals Assigned to this Role

Principal Name	Class Name
----------------	------------

Add Principal...
Edit Principal...
Remove Principal(s)

Groups Assigned to this Role

Group Name
Officer

Add Group...
Edit Group...
Remove Group(s)

Open the **DD** file.

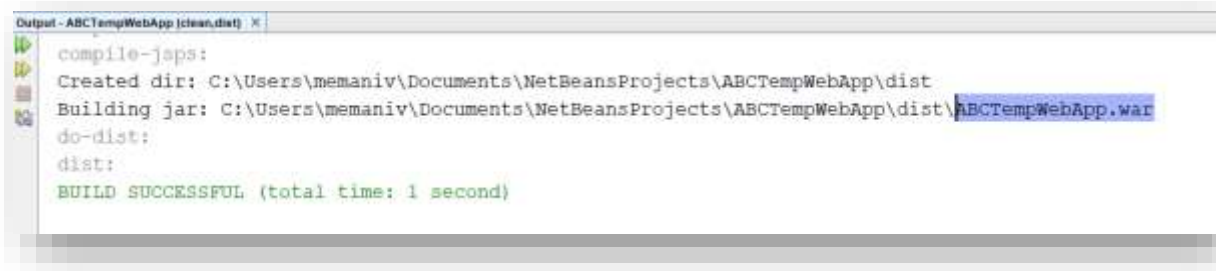
```
65 <login-config>
66     <auth-method>FORM</auth-method>
67     <realm-name>file</realm-name>
68     <form-login-config>
69         <form-login-page>/login.jsp</form-login-page>
70         <form-error-page>/login_error.jsp</form-error-page>
71     </form-login-config>
72 </login-config>
73 <security-role>
74     <description>The Security Officer role.</description>
75     <role-name>Officer</role-name>
76 </security-role>
77 <security-role>
78     <description>The Manager role.</description>
79     <role-name>Manager</role-name>
80 </security-role>
81 </web-app>
```

Add the **access_denied** page on the DD file.

```
73 <security-role>
74     <description>The Security Officer role.</description>
75     <role-name>Officer</role-name>
76 </security-role>
77 <security-role>
78     <description>The Manager role.</description>
79     <role-name>Manager</role-name>
80 </security-role>
81 <error-page>
82     <error-code>403</error-code>
83     <location>/access_denied.jsp</location>
84 </error-page>
85 </web-app>
```

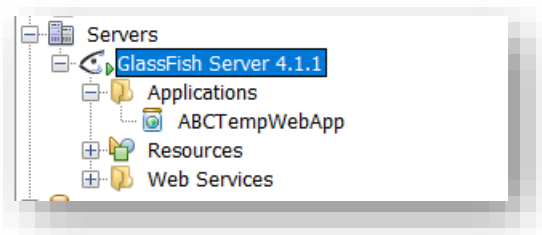
Phase 7: Test project

Clean and build the web project.

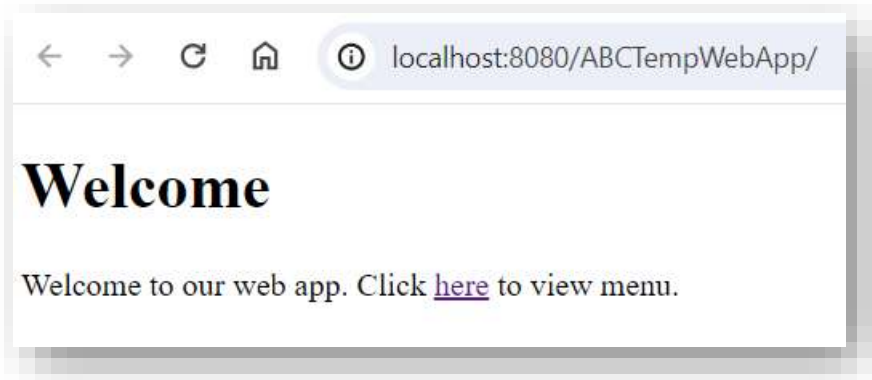


```
Output - ABCTempWebApp [clean, dist] x
compile-jsp:
Created dir: C:\Users\memaniv\Documents\NetBeansProjects\ABCTempWebApp\dist
Building jar: C:\Users\memaniv\Documents\NetBeansProjects\ABCTempWebApp\dist\ABCTempWebApp.war
do-dist:
dist:
BUILD SUCCESSFUL (total time: 1 second)
```

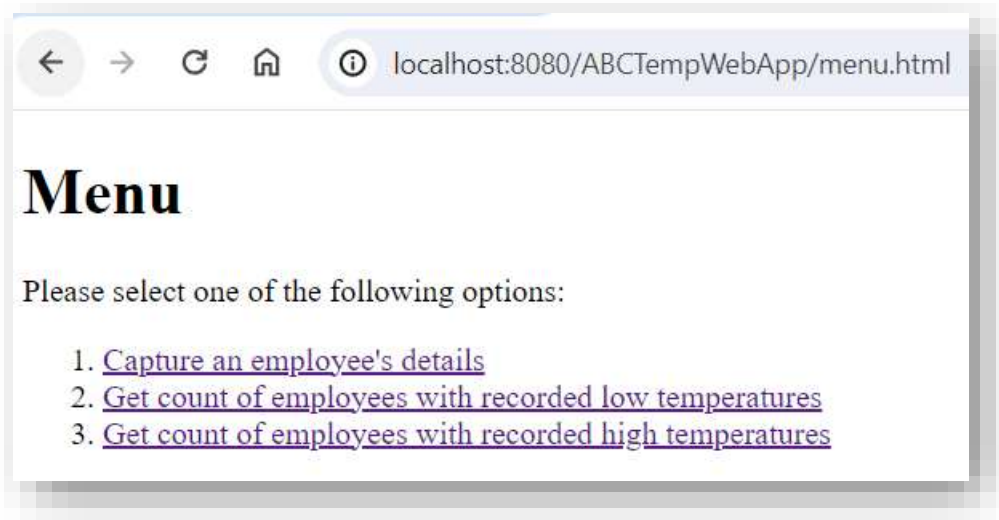
Deploy the project.



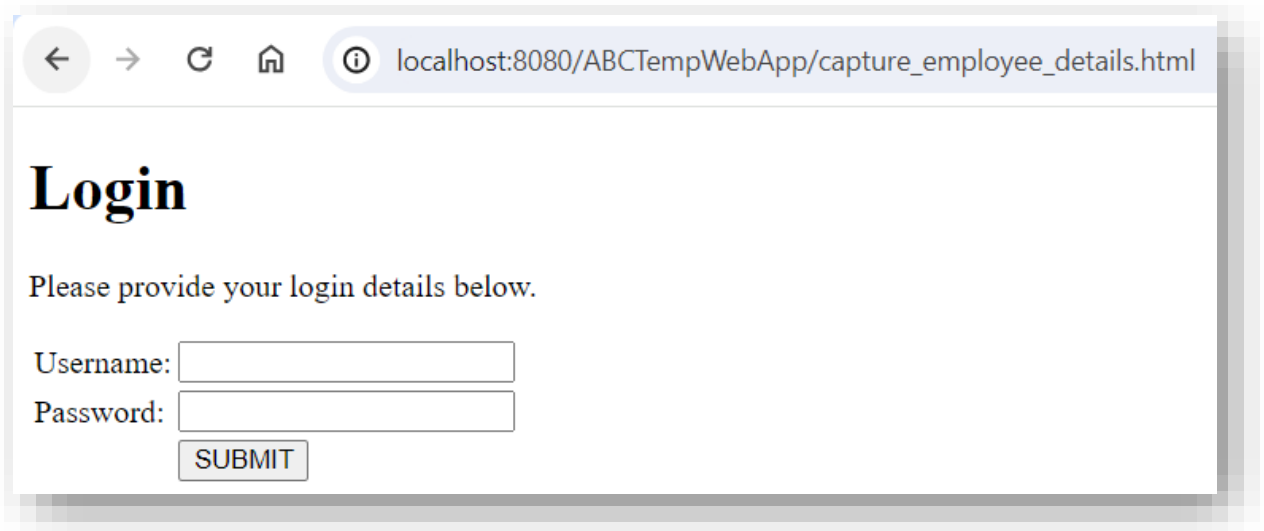
Launch the project.



Click on the link.



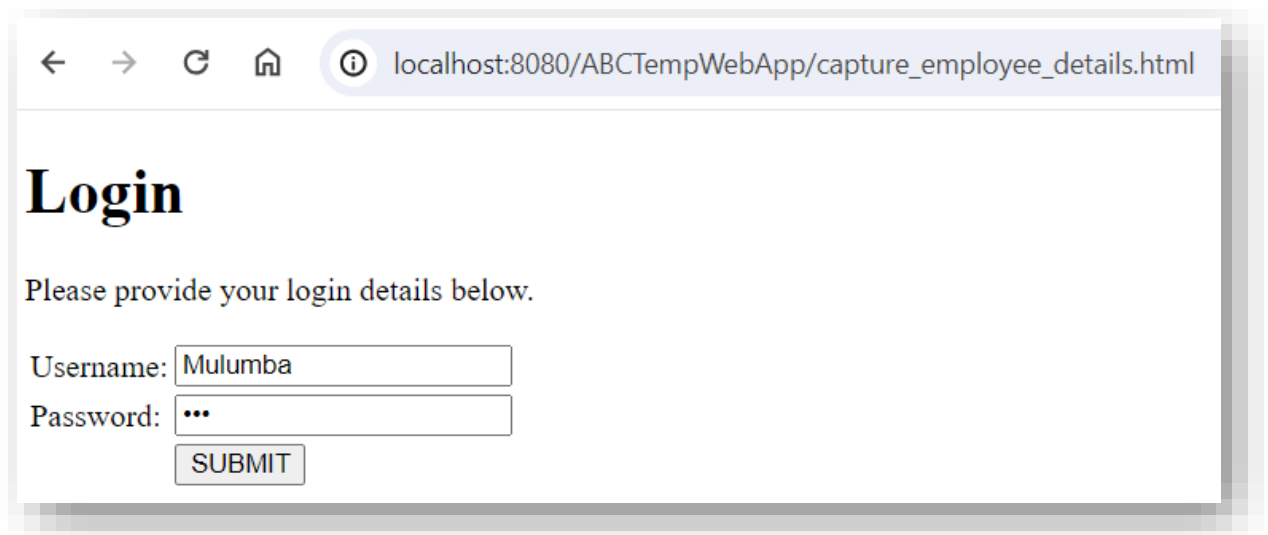
Click on the first link.



Remember our users:

File Users (3)		
New...	Delete	
Select	User ID	Group List:
<input type="checkbox"/>	Sipho	Manager
<input type="checkbox"/>	Mulumba	Officer
<input type="checkbox"/>	Thato	Manager
		Officer

Login with the details of Mulumba whose an Officer. Remember an Officer can capture employee details.



A screenshot of a web browser window. The address bar shows the URL `localhost:8080/ABCTempWebApp/capture_employee_details.html`. The page has a heading **Login** and a subheading "Please provide your login details below." Below this, there are two input fields: "Username:" with the text "Mulumba" and "Password:" with three dots. A "SUBMIT" button is located below the password field.

← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/capture_employee_details.html

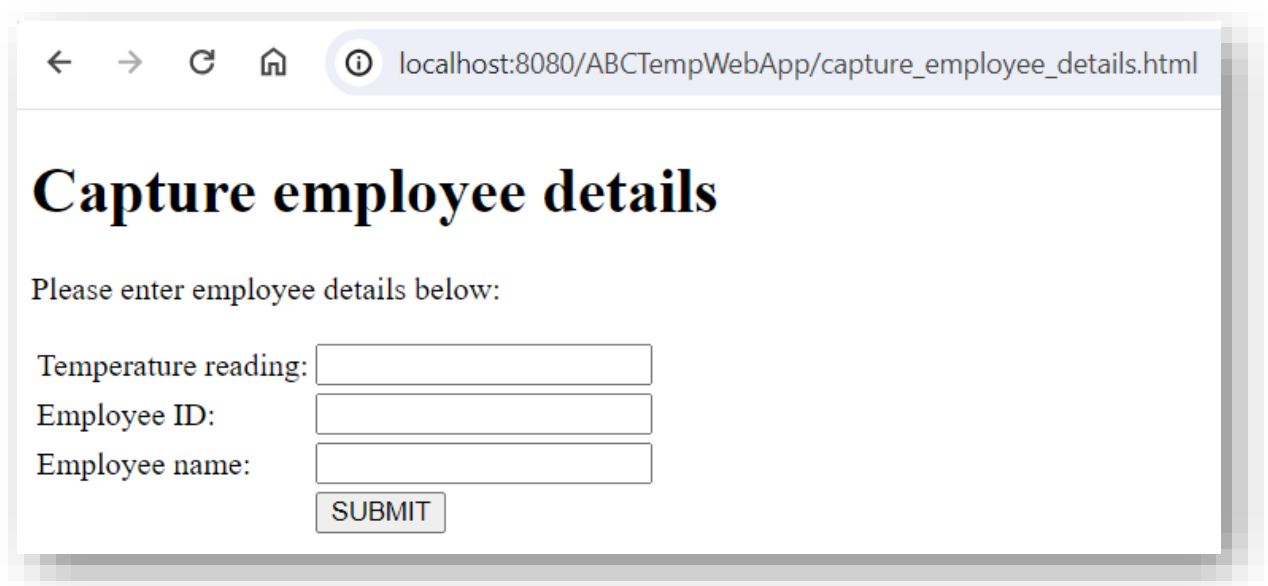
Login

Please provide your login details below.

Username:

Password:

Click SUBMIT



A screenshot of a web browser window. The address bar shows the URL `localhost:8080/ABCTempWebApp/capture_employee_details.html`. The page has a heading **Capture employee details** and a subheading "Please enter employee details below:". Below this, there are three input fields: "Temperature reading:", "Employee ID:", and "Employee name:". A "SUBMIT" button is located below the "Employee name:" field.

← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/capture_employee_details.html

Capture employee details

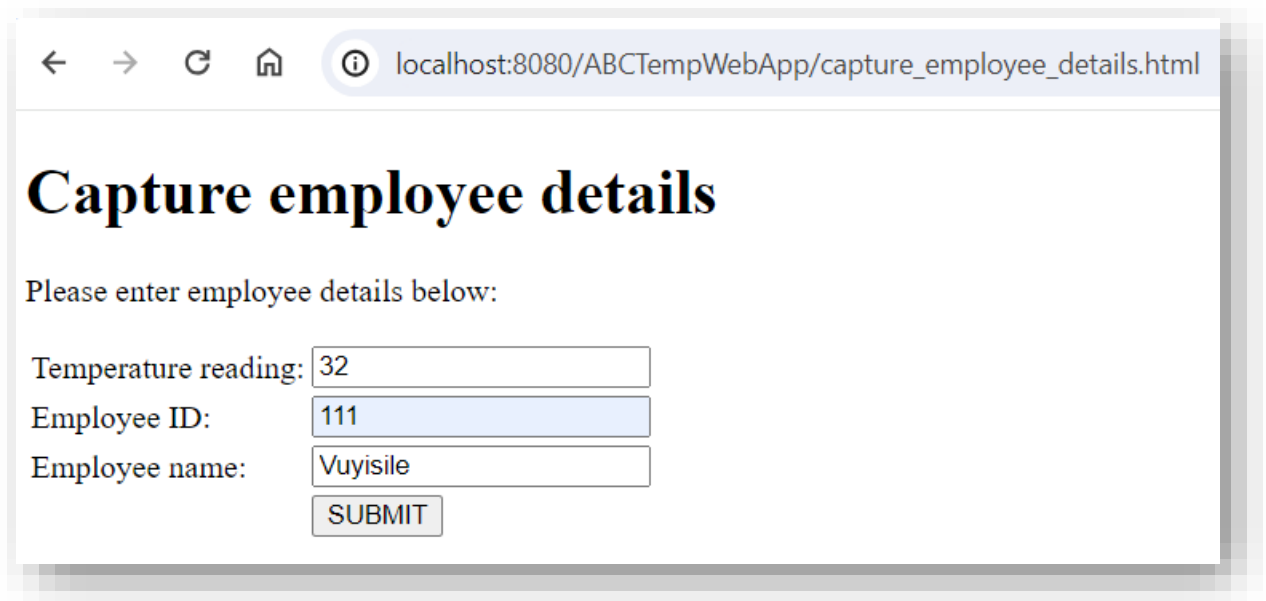
Please enter employee details below:

Temperature reading:

Employee ID:

Employee name:

Complete form.



← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/capture_employee_details.html

Capture employee details

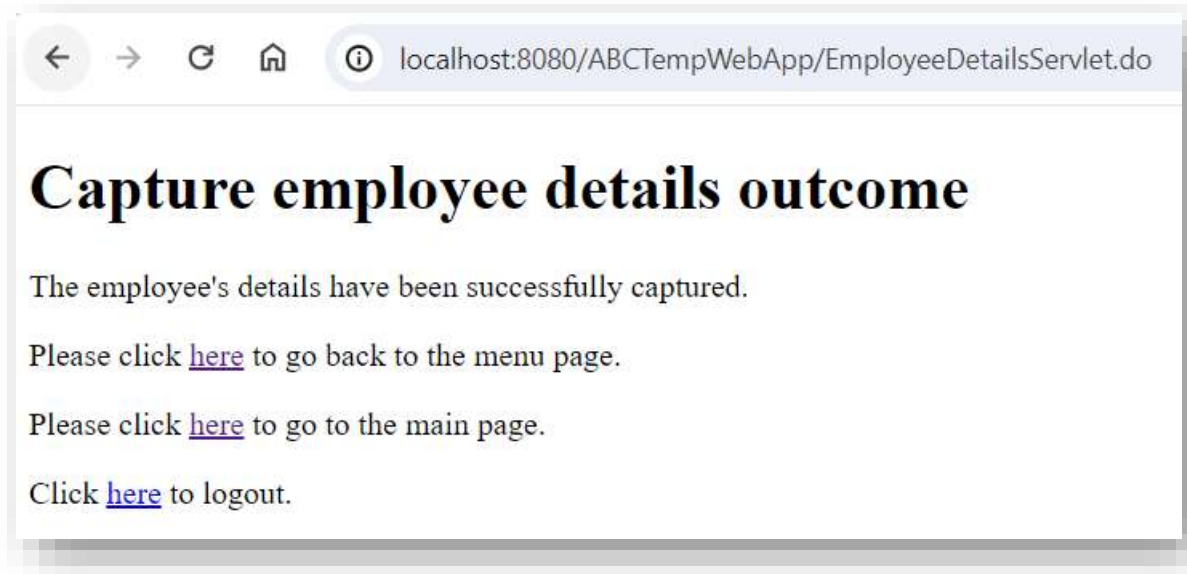
Please enter employee details below:

Temperature reading:

Employee ID:

Employee name:

Click on SUBMIT



← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/EmployeeDetailsServlet.do

Capture employee details outcome

The employee's details have been successfully captured.

Please click [here](#) to go back to the menu page.

Please click [here](#) to go to the main page.

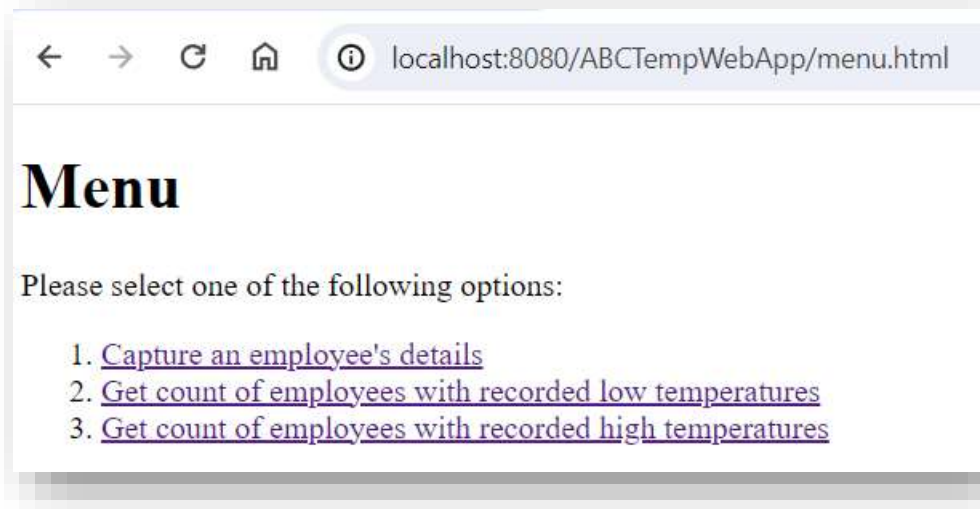
Click [here](#) to logout.

Add four more employees.

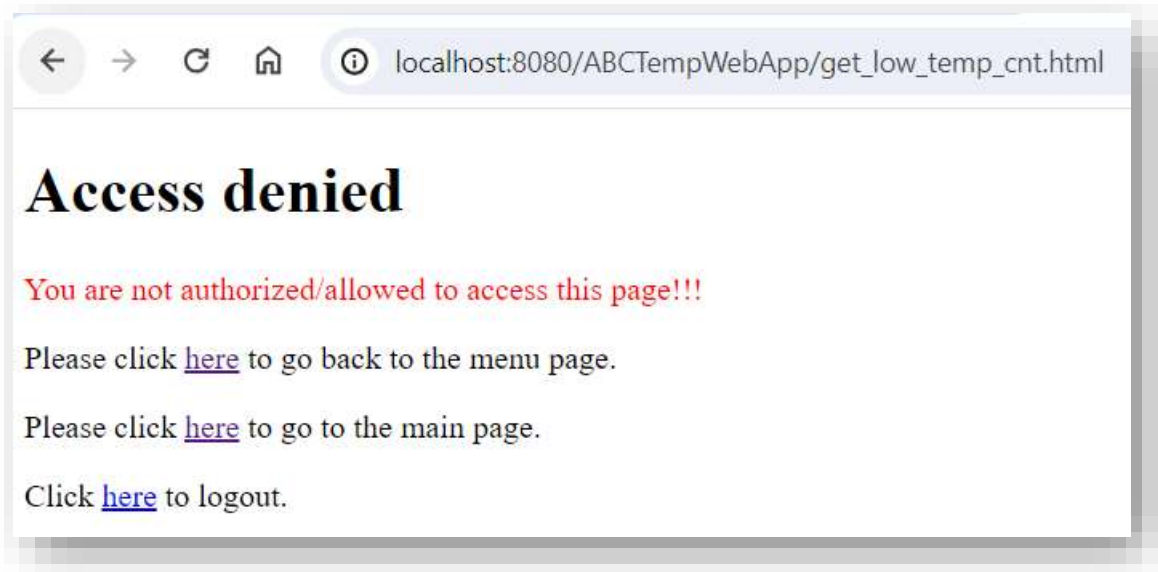


#	ID	NAME	TEMPERATURE
1	111	Vuyisile	32.0
2	222	Khenkhe	26.0
3	333	Lisa	33.0
4	444	Thabo	48.0
5	555	Piso	45.0

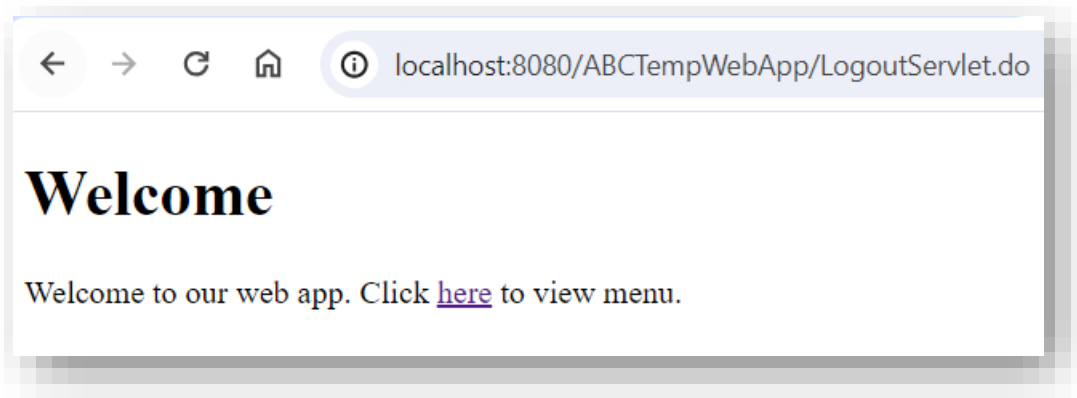
Go back to the menu page.



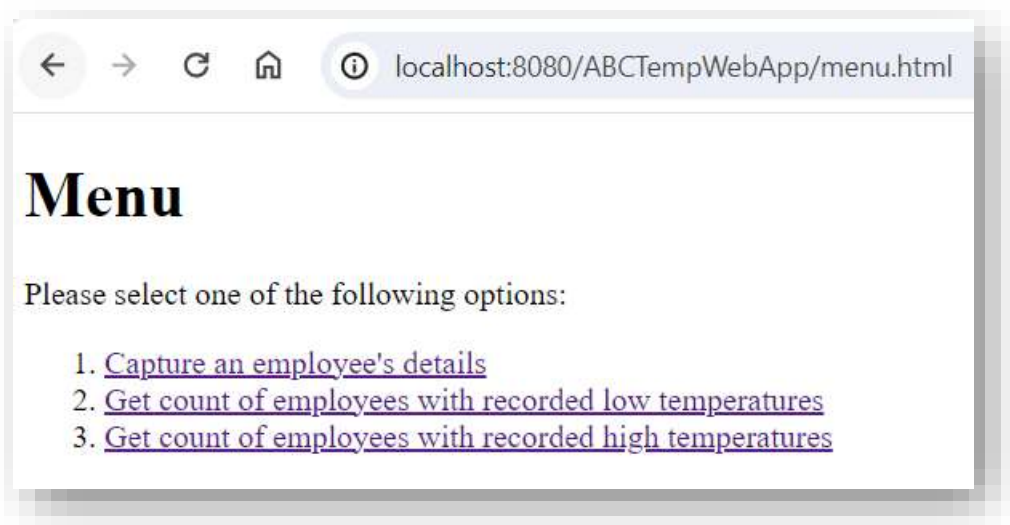
Try to get the number of employees with low temperature readings. Click on the second link.



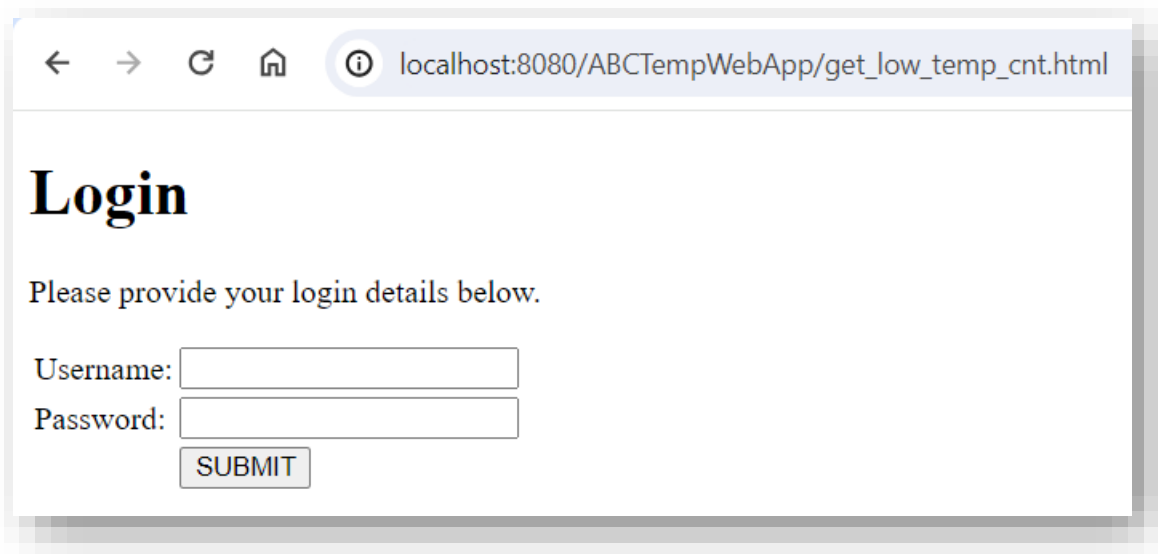
Mulumba is an Officer. He can't view statistics. Logout.



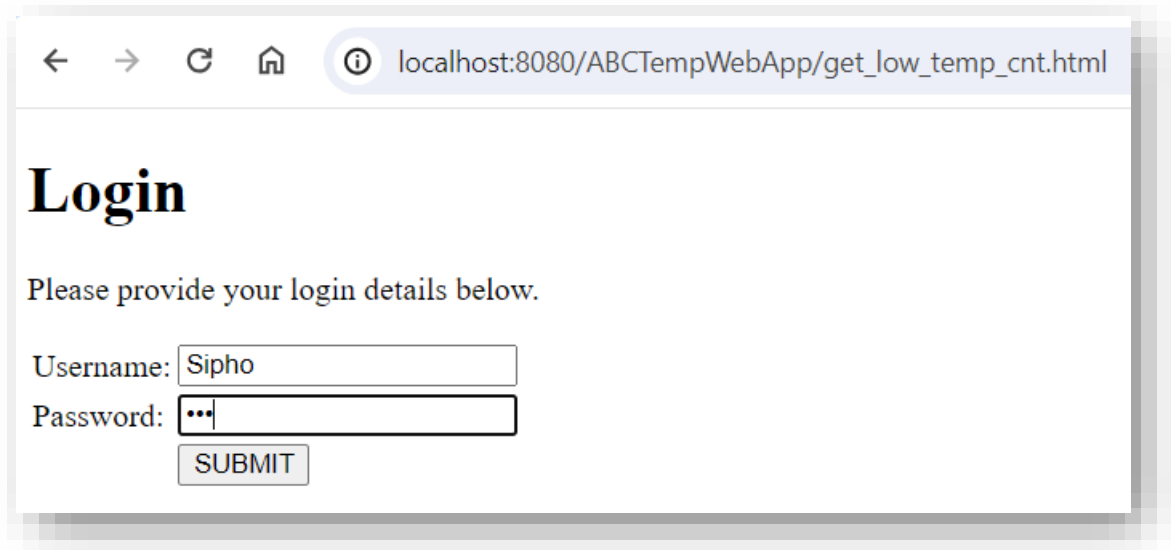
Click on the link.



Click on the second link.



Enter the details of Sipho the Manager.



← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/get_low_temp_cnt.html

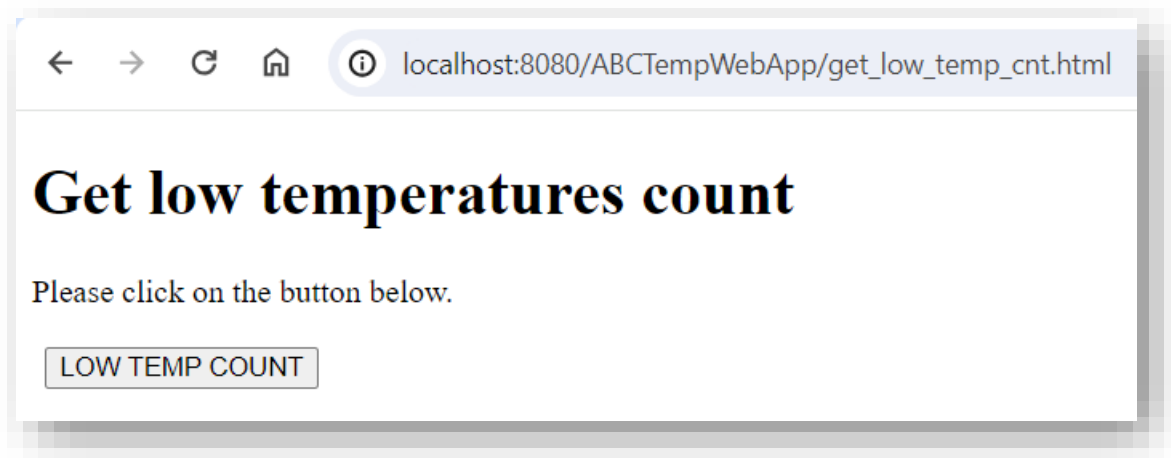
Login

Please provide your login details below.

Username:

Password:

Click on SUBMIT.

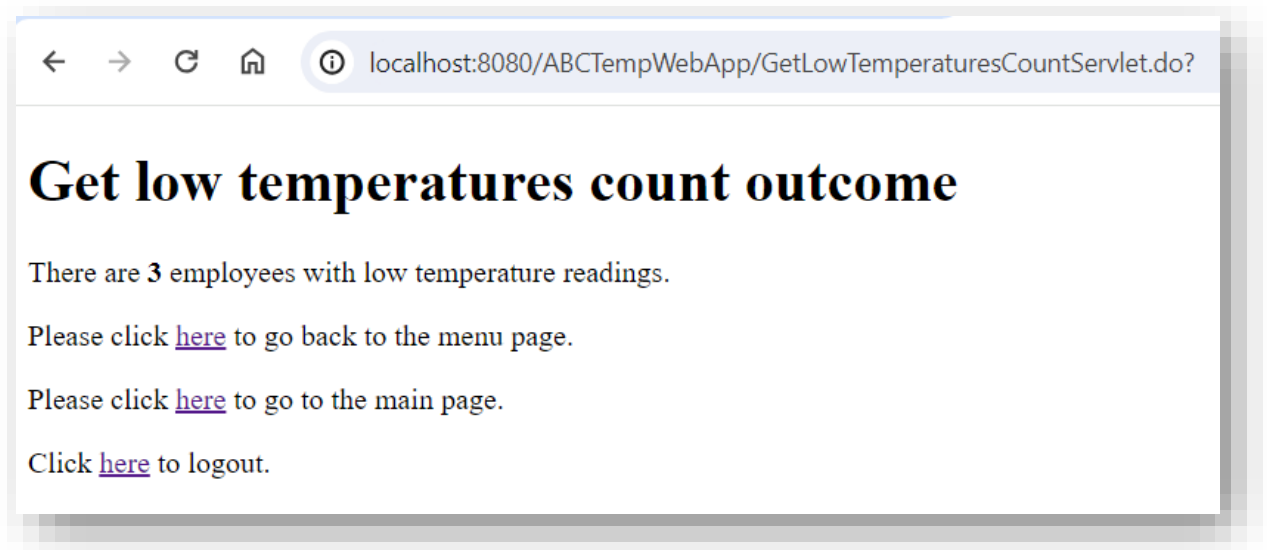


← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/get_low_temp_cnt.html

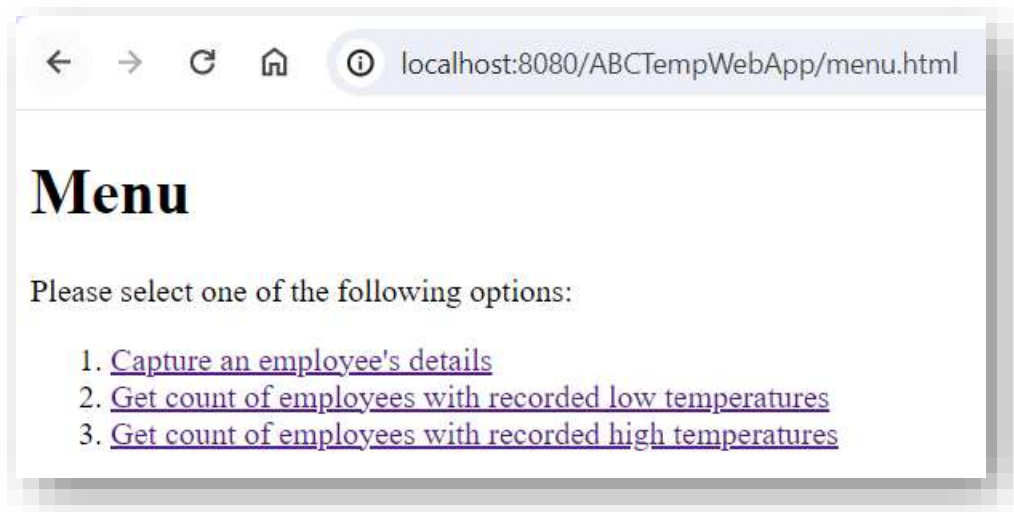
Get low temperatures count

Please click on the button below.

Click on the button.



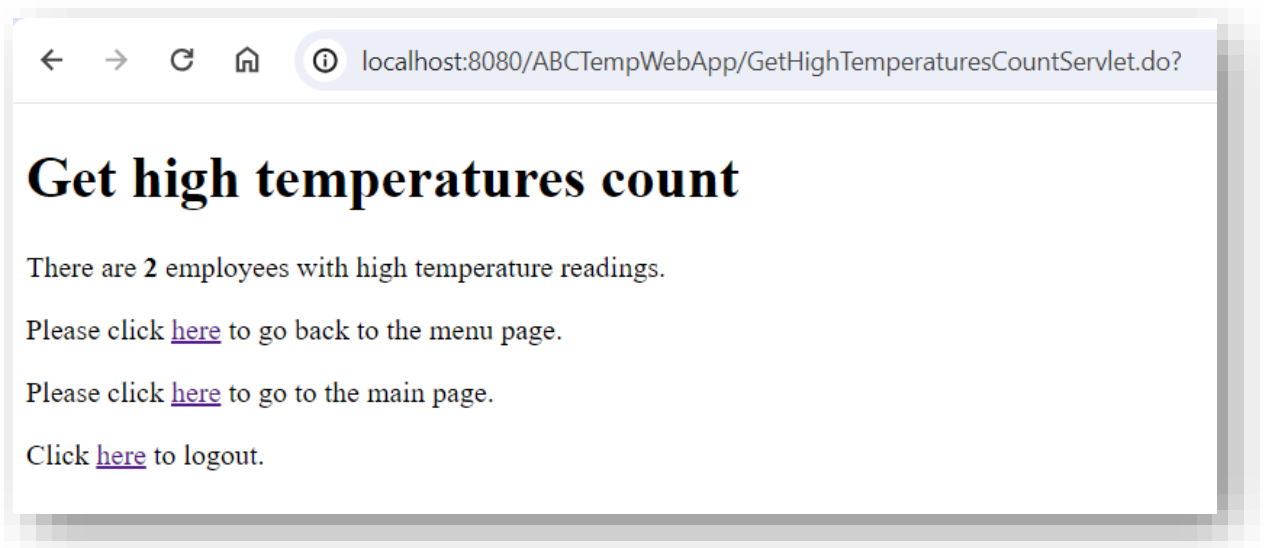
Go back to the menu.



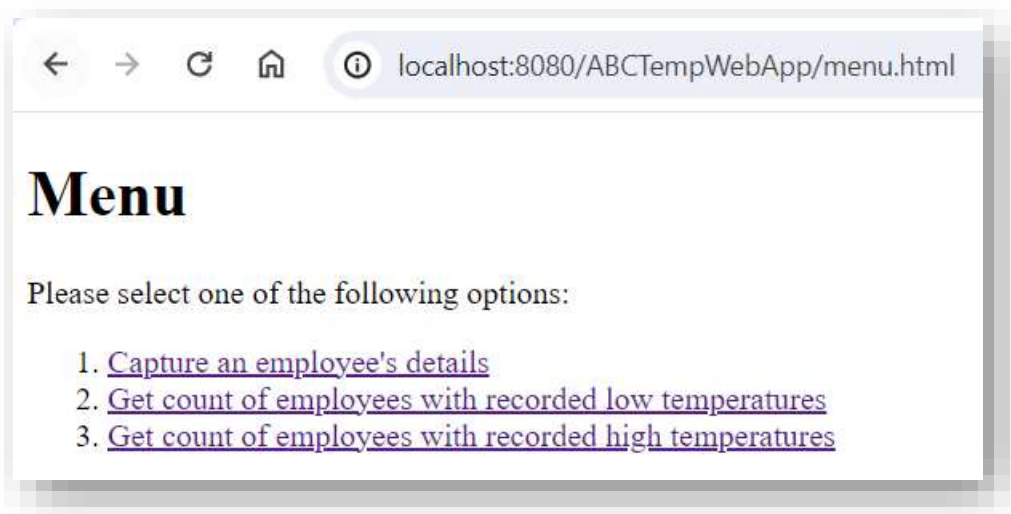
Click on the third link.



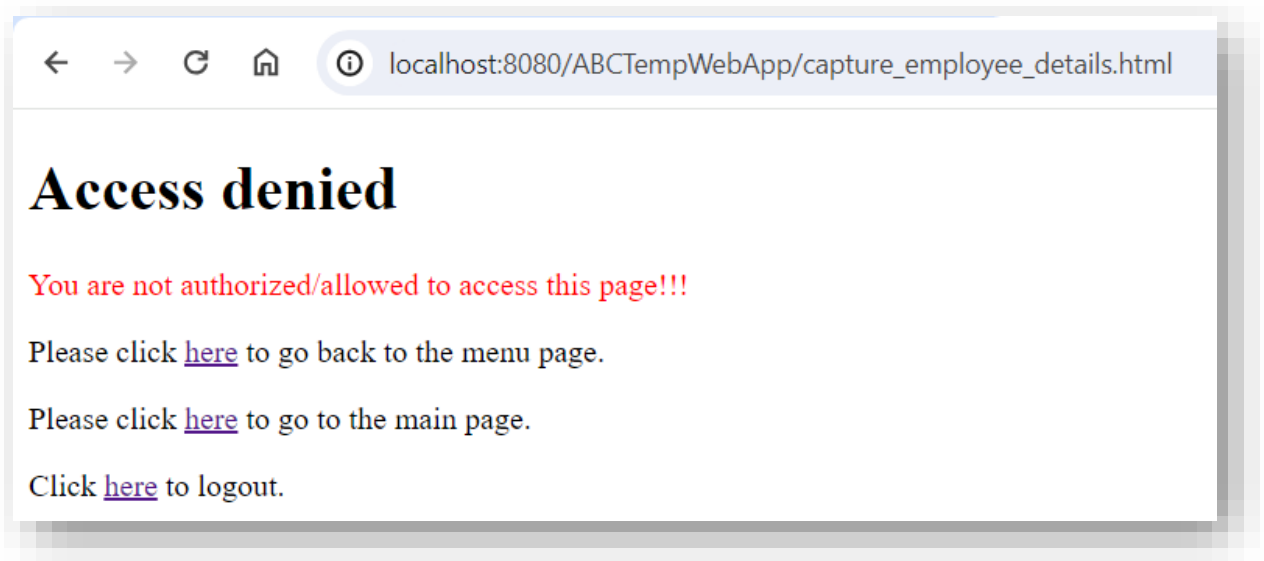
Click on the button.



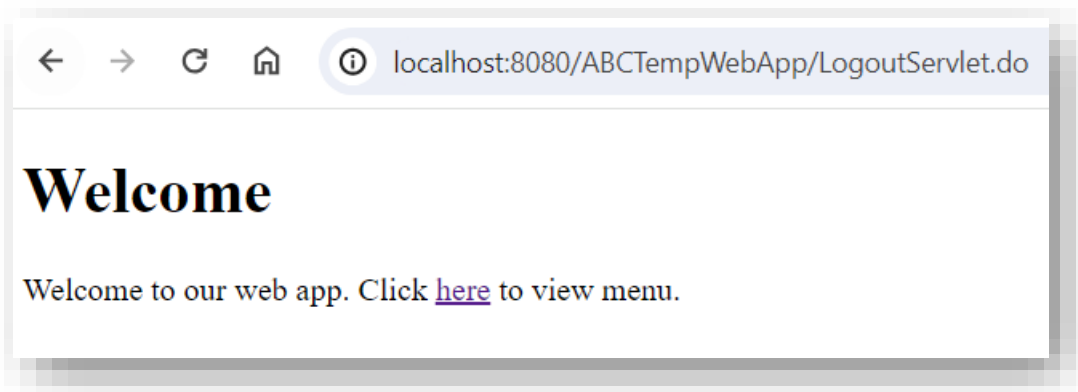
Go back to the menu page.



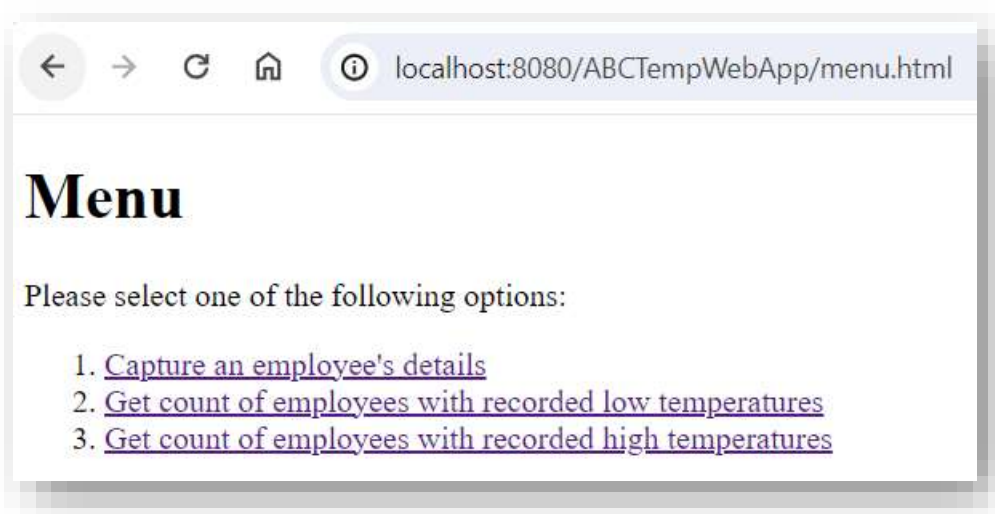
Try to capture an employee's details.



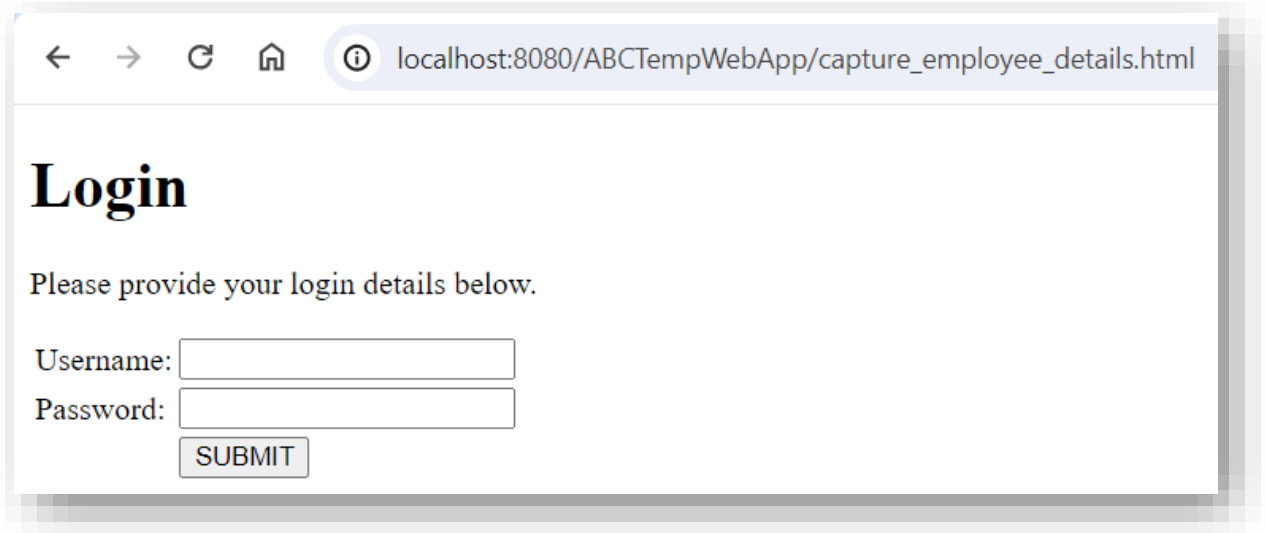
Sipho is a manager. He can only get statistics, not capture employee information. Logout.



Click on the link.



Click on the first link.



← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/capture_employee_details.html

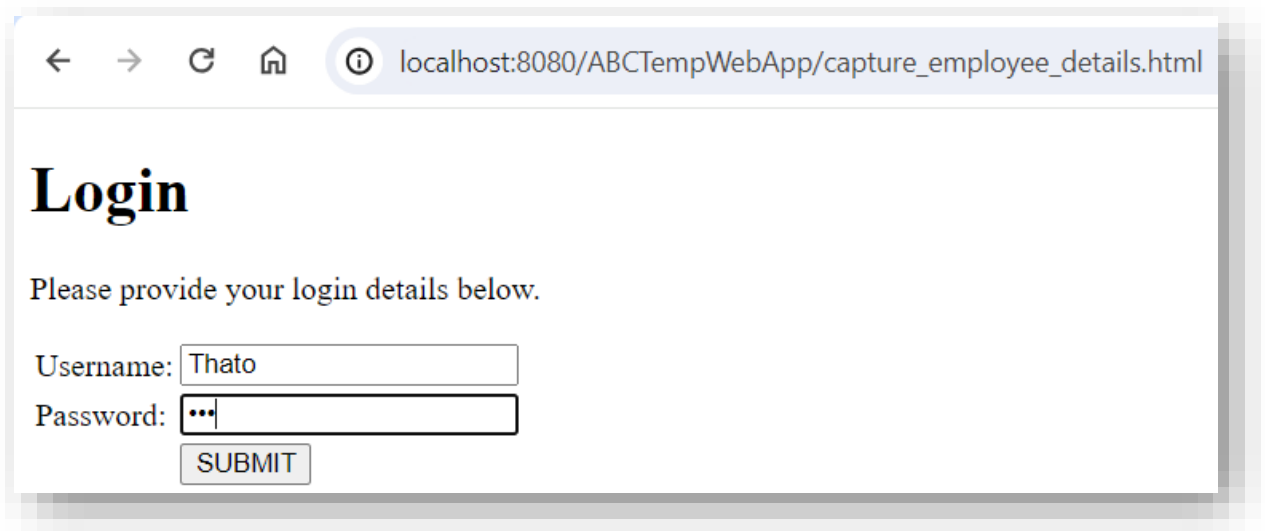
Login

Please provide your login details below.

Username:

Password:

Enter the details of Thato who is a Manager and Officer at the same time.



← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/capture_employee_details.html

Login

Please provide your login details below.

Username:

Password:

Click on the SUBMIT.

← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/capture_employee_details.html

Capture employee details

Please enter employee details below:

Temperature reading:

Employee ID:

Employee name:

Complete the form.

← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/capture_employee_details.html

Capture employee details

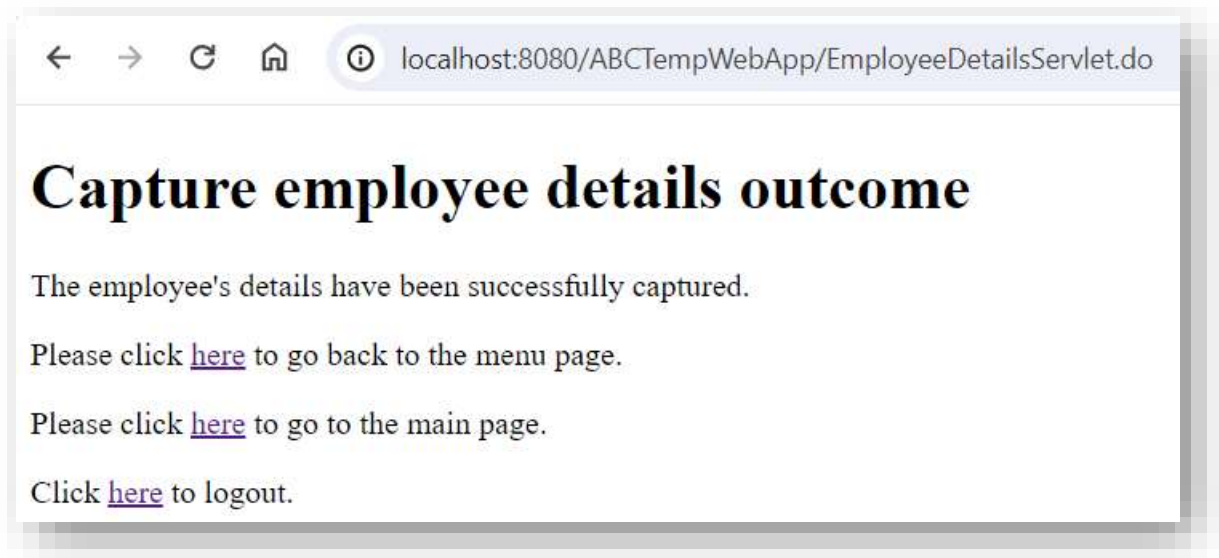
Please enter employee details below:

Temperature reading:

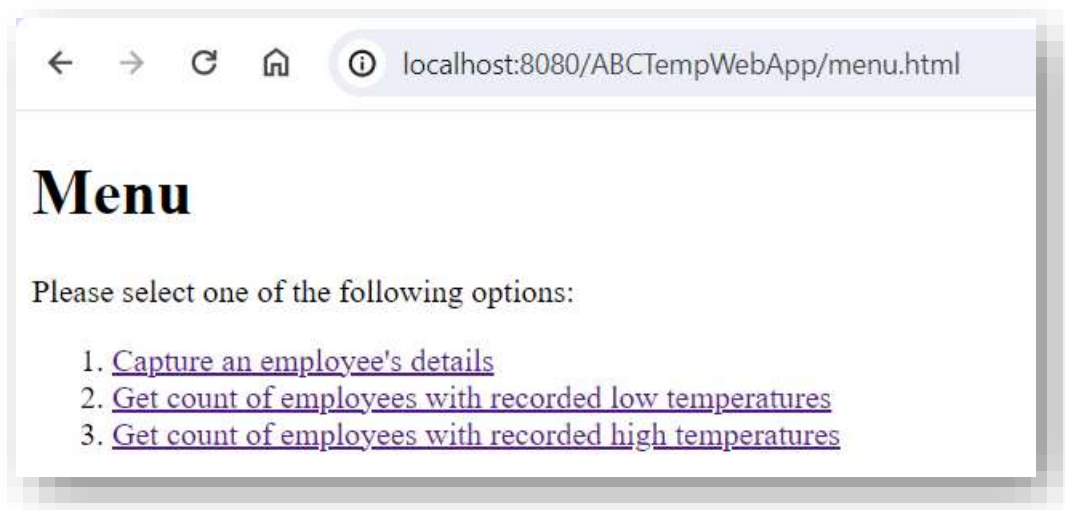
Employee ID:

Employee name:

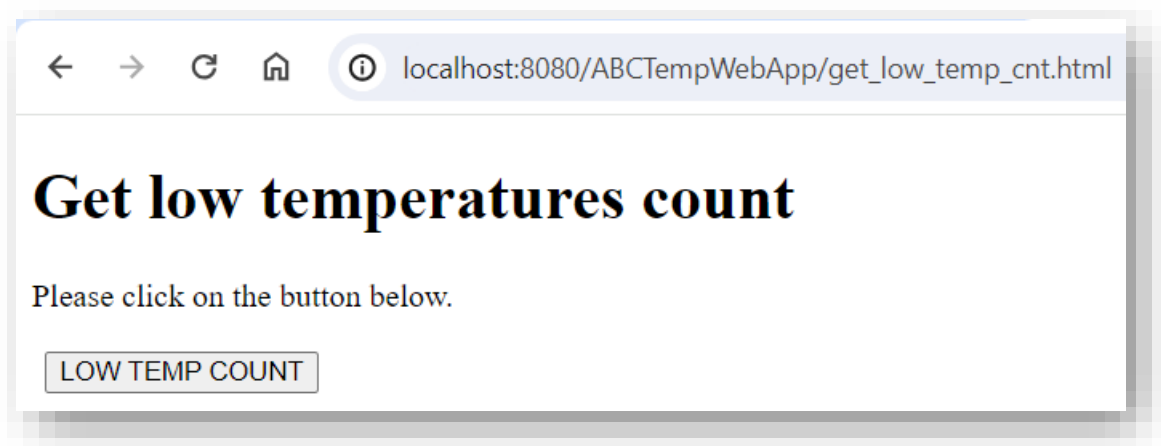
Click on SUBMIT.



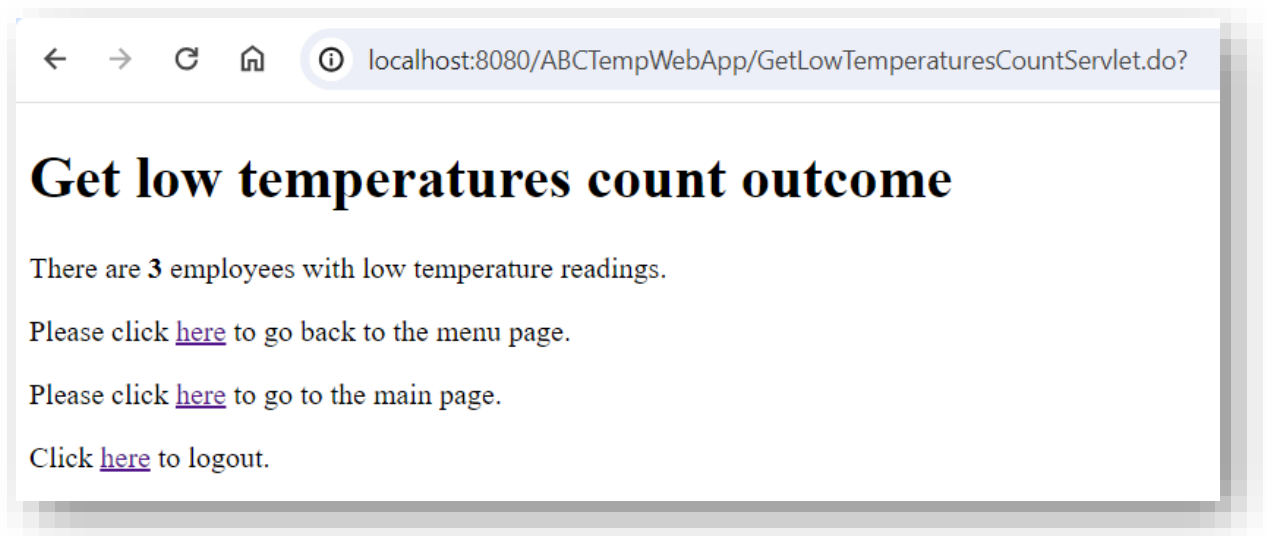
Go back to the menu page.



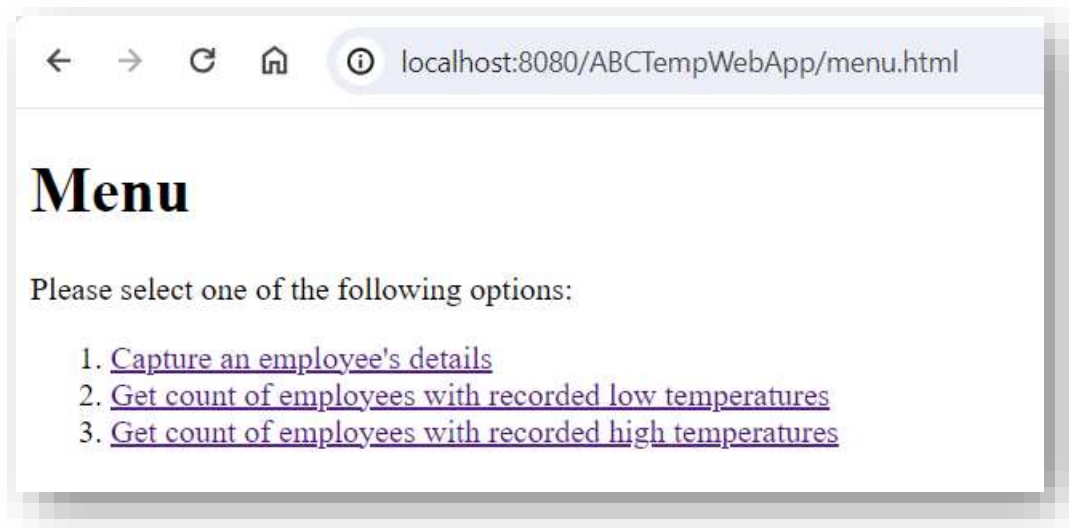
Click on the second link.



Click on the button.



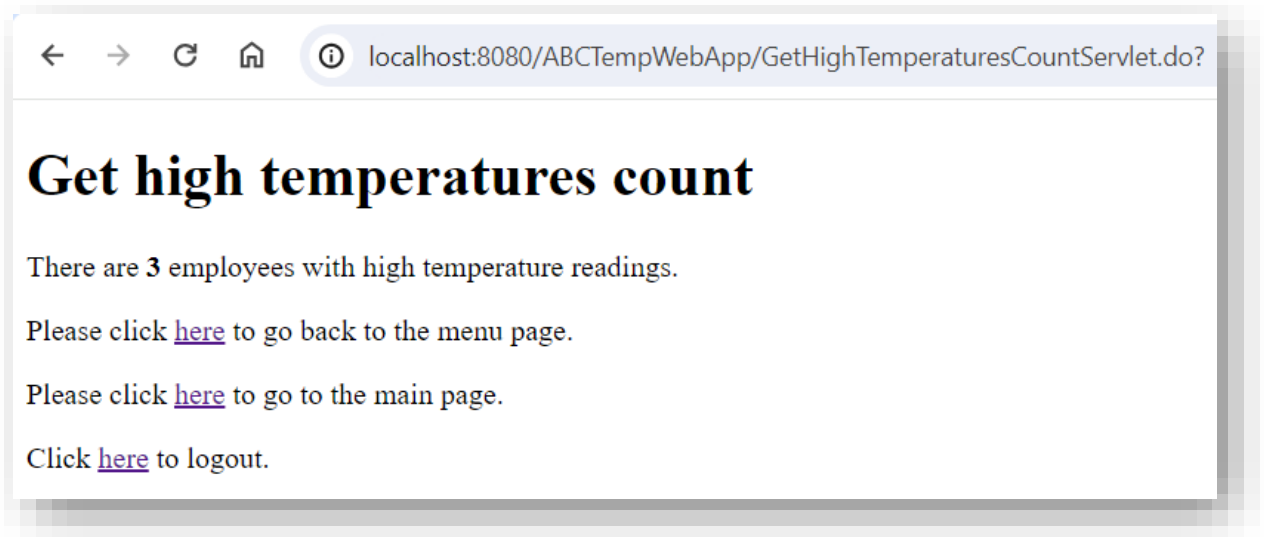
Go back to the menu.



Click on the third link.



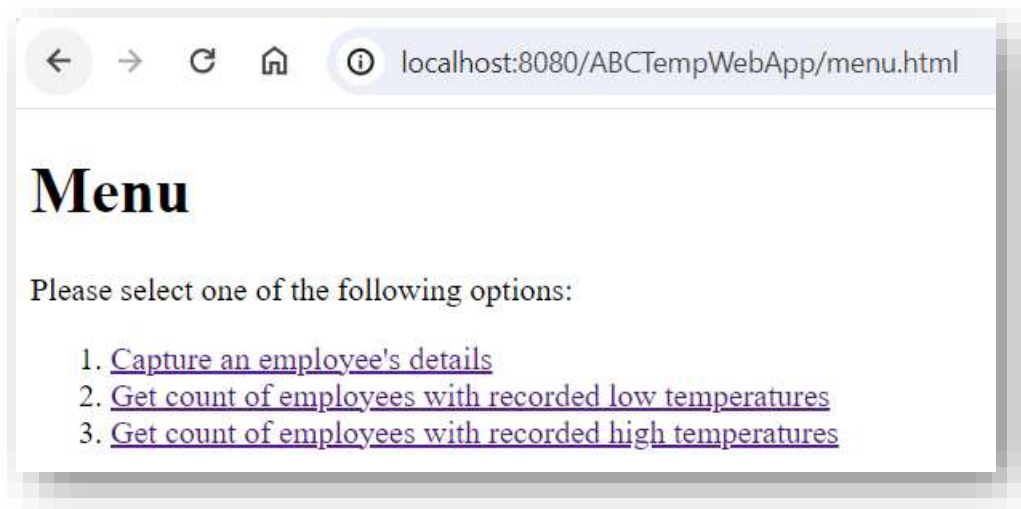
Click on the button.



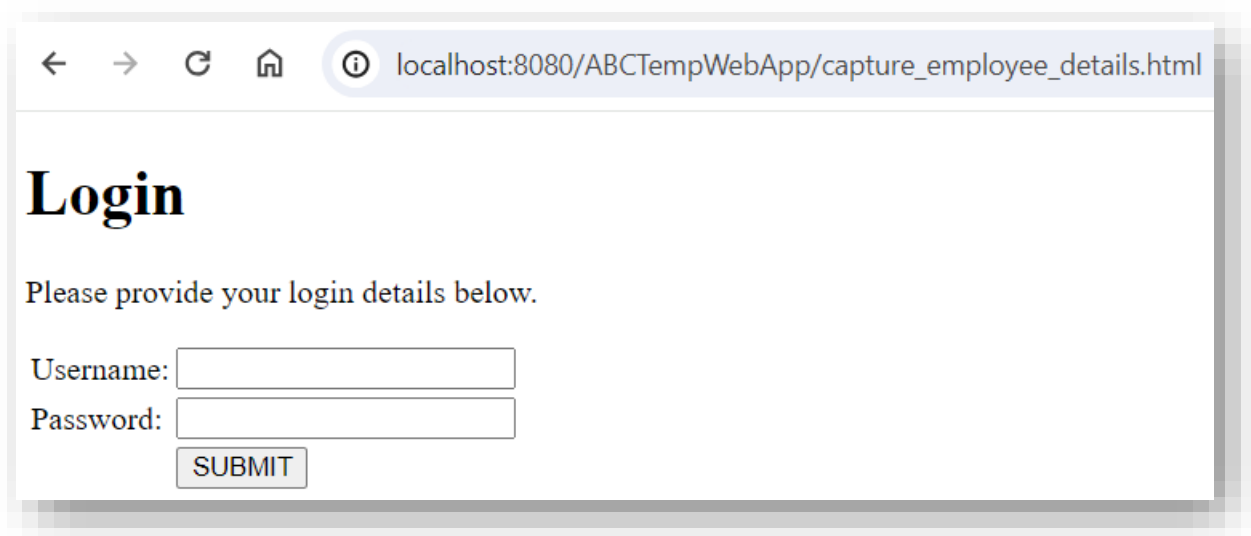
Logout.



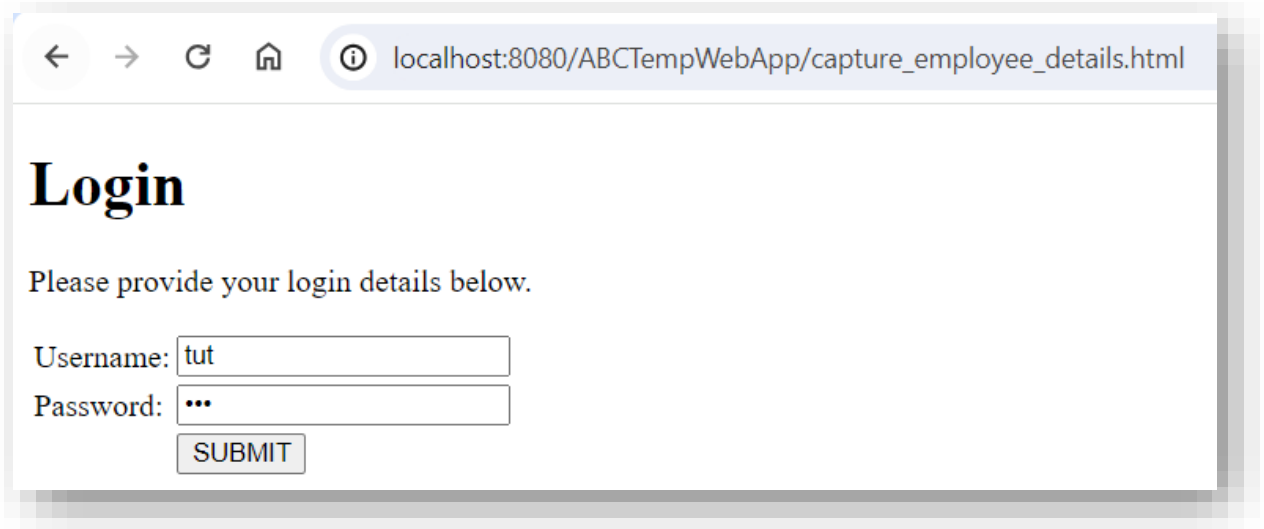
Click on the link.



Click on the first link.



Enter the details of a non-existent user.



← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/capture_employee_details.html

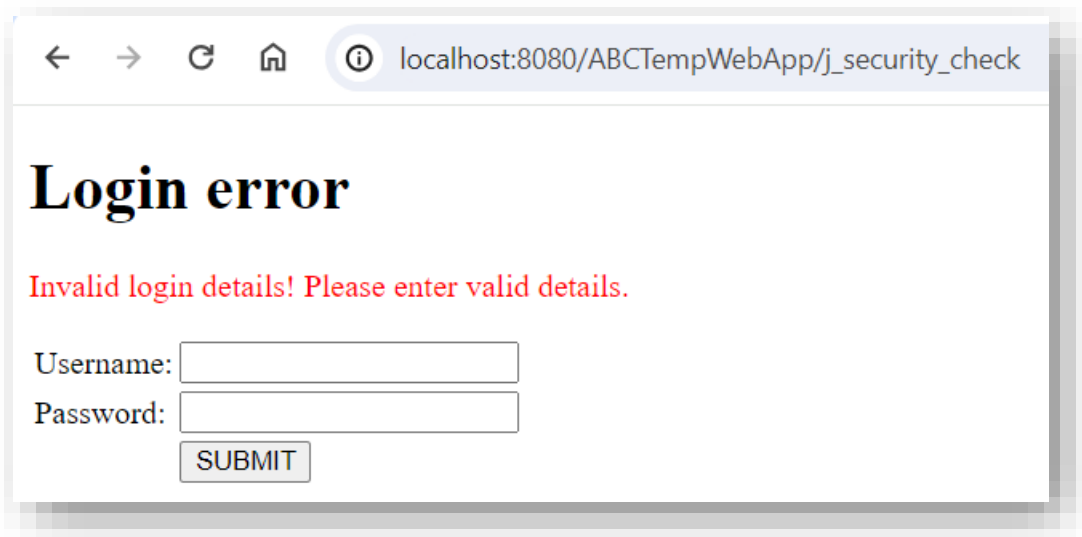
Login

Please provide your login details below.

Username:

Password:

Click on SUBMIT.



← → ↻ 🏠 ⓘ localhost:8080/ABCTempWebApp/j_security_check

Login error

Invalid login details! Please enter valid details.

Username:

Password:

Conclusion

Congratulations! You have managed to create a secured web application. Continue with the good learning. You can access the full source code from **GitHub**. Use the following link:

<https://github.com/memaniv/ABCTempWebApp.git>

Enjoy the rest of the day and God bless you.

DIY

Modify the given example by using a Stateless Session Bean and include the following new feature:

1. Track the outcome for each question answered. Keep the outcomes in a list and also display as part of the summary.