
# CSM3023 WEB BASED APPLICATION DEVELOPMENT (K1)

**BACHELOR OF COMPUTER SCIENCE (MOBILE COMPUTING) WITH HONORS**

**SEMESTER 2 2023/2024**

## LAB 6 – JSP: Saving and Retrieving Data from Database

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Task 1

Coding :

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@page language="java"%>
<%@page import="java.sql.*"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>JSP Page</title>
    </head>
    <body>
        <h1>Lab 6 - Task 1 - Sample Insertion records into MySQL through JSP's page</h1>
        <%
            int result;

            //Step 1: Load JDBC driver...
            Class.forName("com.mysql.cj.jdbc.Driver");
            out.println("Step 1: MySQL driver loaded...!");
        %>
        <br>
        <%
            //Step 2: Establish the connection...
            String myURL = "jdbc:mysql://localhost:3306/csm3023";
            Connection myConnection = DriverManager.getConnection(myURL, "root", "admin");
            out.println("Step 2: Database is connected..!");
        %>
        <br>
        <%
            //Step 3: Create a PreparedStatement object..
            out.println("Step 3: Prepared Statements created...!");
```

```jsp
            //Prepared SQL Query as a String...
            String sInsertQry = "INSERT INTO firsttable VALUES(?)";

            //Call method preparedStatement
            PreparedStatement myPS = myConnection.prepareStatement(sInsertQry);
        %>
        <br>
        <%
            //Assign each value to respective columns for Books's table.. (C-Create)
            out.println("Step 4: Perform insertion of record..!");
            String name = "Welcome to access MySQL database with JSP....!";
            myPS.setString(1, name);

            result = myPS.executeUpdate();

            if (result > 0){
        %>
        <br>
        <%
                out.println("Step5: Close data connection...!");

                out.println(" ");
                out.println("Database connection is closed...!");

                out.print("<p>" + "The record : (" + name + ") is successfully created...!" + "</p>");
            }
                //Step 5: Close database connection...!
                myConnection.close();
        %>
    </body>
</html>
```

Output:

## Lab 6 - Task 1 - Sample Insertion records into MySQL through JSP's page

Step 1: MySQL driver loaded...!
Step 2: Database is connected..!
Step 3: Prepared Statements created...!
Step 4: Perform insertion of record..!
Step5: Close data connection...! Database connection is closed...!

The record : (Welcome to access MySQL database with JSP....!) is successfully created...!

| | name |
|---|---|
| ▶ | Welcome to access MySQL database with JSP....! |
| | Welcome to access MySQL database with JSP....! |
| | Welcome to access MySQL database with JSP....! |
| | Welcome to access MySQL database with JSP....! |

Task 2 :

Coding :

insertAuthor.jsp

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Semesta Kata</title>
    </head>
    <body>
        <h1>Lab 6 - Task 2 - Perform creating and retrieving records via JSP page</h1>
        <fieldset>
            <legend>Author Registration</legend>
            <form action="processAuthor.jsp" method="post">
                <table>
                    <tr>
                        <td>
                            <label for="authno">Author No</label>
                        </td>
                        <td>
                            <input type="text" id="authno" name="authno" placeholder="E.g. UKxxxxxx">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <label for="name">Name</label>
                        </td>
                        <td>
                            <input type="text" id="name" name="name" placeholder="Enter your name">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <label for="address">Address</label>
                </td>
                <td>
                    <input type="text" id="address" name="address" placeholder=" Enter your address">
                </td>
            </tr>
            <tr>
                <td>
                    <label for="city">City</label>
                </td>
                <td>
                    <input type="text" id="city" name="city" placeholder="Enter your city">
                </td>
            </tr>
            <tr>
                <td>
                    <label for="state">State</label>
                </td>
                <td>
                    <input type="text" id="state" name="state" placeholder="Enter your state">
                </td>
            </tr>
            <tr>
                <td>
                    <label for="zip">Zip</label>
                </td>
                <td>
                    <input type="text" id="zip" name="zip" placeholder="Enter your zip">
                </td>
            </tr>
            <tr>
                <td>
                    <button type="submit" value="Submit">Submit</button>
                        <button type="reset" value="Reset">Cancel</button>
                    </td>
                </tr>
            </table>
        </form>
    </fieldset>
    <footer><p>&copy;2024-Izzul Wafiy</p></footer>
</html>
```

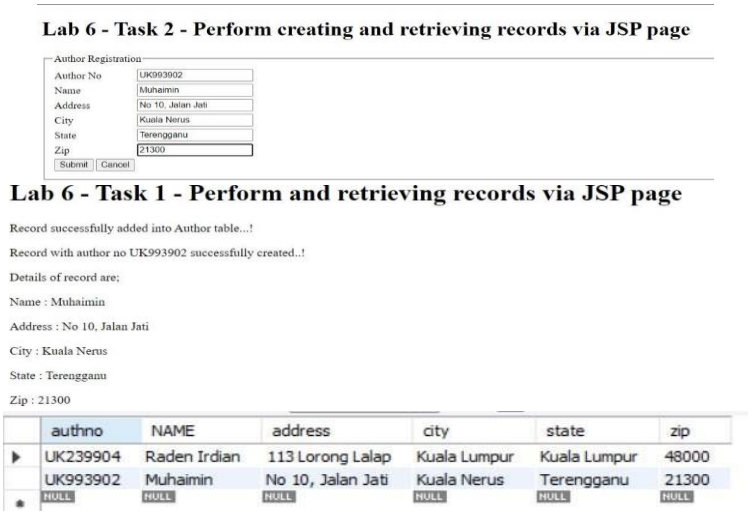
Author.java

```java
package lab6.com;

public class Author {
    private String authno;
    private String name;
    private String address;
    private String city;
    private String state;
    private String zip;

    public String getAuthno() {
        return authno;
    }

    public void setAuthno(String authno) {
        this.authno = authno;
    }

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public String getAddress() {
        return address;
    }

    public void setAddress(String address) {
        this.address = address;
    }

    public String getCity() {
        return city;
    }

    public void setCity(String city) {
        this.city = city;
    }

    public String getState() {
        return state;
    }

    public void setState(String state) {
        this.state = state;
    }

    public String getZip() {
        return zip;
    }

    public void setZip(String zip) {
        this.zip = zip;
    }

}
```

processAuthor.jsp

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@page language="java"%>
<%@page import="java.sql.*"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>JSP Page</title>
    </head>
    <body>
        <h1>Lab 6 - Task 1 - Perform and retrieving records via JSP page</h1>
        <jsp:useBean id="myAuthor" class="lab6.com.Author" scope="request"/>

        <jsp:setProperty name="myAuthor" property="*"/>

        <%
            int result;

            Class.forName("com.mysql.cj.jdbc.Driver");

            String myURL = "jdbc:mysql://localhost:3306/csm3023_lab6";
            Connection myConnection = DriverManager.getConnection(myURL, "root", "admin");

            String sInsertQry = "INSERT INTO author(authno, NAME, address, city, state, zip) VALUES(?, ?, ?, ?, ?, ?)";

            PreparedStatement myPS = myConnection.prepareStatement(sInsertQry);

            myPS.setString(1, myAuthor.getAuthno());
            myPS.setString(2, myAuthor.getNAME());
            myPS.setString(3, myAuthor.getAddress());
            myPS.setString(4, myAuthor.getCity());
            myPS.setString(5, myAuthor.getState());
            myPS.setString(6, myAuthor.getZip());

            result = myPS.executeUpdate();
            if (result > 0){
                out.println("\tRecord successfully added into Author table...!");
                out.print("<p>" + "Record with author no " +myAuthor.getAuthno()
                        + " successfully created..!" + "</p>");
                out.print("<p>" + "Details of record are; " + "</p>");
                out.print("<p>Name : " + myAuthor.getNAME() + "</p>");
                out.print("<p>Address : " + myAuthor.getAddress() + "</p>");
                out.print("<p>City : " + myAuthor.getCity() + "</p>");
                out.print("<p>State : " + myAuthor.getState() + "</p>");
                out.print("<p>Zip : " + myAuthor.getZip() + "</p>");
            }
            //Step5: close database connection..!
                System.out.println("Step 5: Close database connection..!");
                myConnection.close();
                System.out.println(" ");
                System.out.println("Database connection is closed..!");
        %>
    </body>
</html>
```

Output:




Reflection

1. What have you learnt from this exercise?

I have learn how to using JSP to insert records and retrieve them from MySQL database.

2. Define step by step before you successfully perform the transaction in a database.

1. Load JDBC driver.
2. Establish the connection.
3. Create a PreparedStatement object.
4. Execute the query.
5. Close database connection.

Task 3:

Coding:

insertStudent.jsp

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Hero Academy</title>
    </head>
    <body>
        <fieldset>
            <legend>Student Registration</legend>
            <form action="processStudent.jsp" method="post">
                <table>
                    <tr>
                        <td>
                            <label for="stuno">Student No</label>
                        </td>
                        <td>
                            <input type="text" id="stuno" name="stuno" placeholder="E.g.: UKXXXXXX">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <label for="name">Name</label>
                        </td>
                        <td>
                            <input type="text" id="name" name="name" placeholder="Enter your name">
                        </td>
                    </tr>
                    <tr>
                        <td><label for="program">Program</label></td>
                        <td>
```

```jsp
                            <select id="program" name="program">
                                <option value="BSc. Soft. Eng.">BSc. Soft. Eng.</option>
                                <option value="BSc. with IM">BSc. with IM</option>
                                <option value="BSc. in Networking">BSc. in Networking</option>
                                <option value="BSc. in Robotics">BSc. in Robotics</option>
                            </select>
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <button type="submit" value="Submit">Submit</button>
                            <button type="reset" value="Reset">Cancel</button>
                        </td>
                    </tr>
                </table>
            </form>
        </fieldset>
        <footer>
            <p>&copy;2024-Izzul Wafiy</p>
        </footer>
    </body>
</html>
```

Student.java

```java
package lab6.com;

import java.util.regex.Matcher;
import java.util.regex.Pattern;

public class Student {
    //Create attributes...
    private String stuno;
    private String name;
    private String program;

    public String getStuno() {
        Pattern pt = Pattern.compile("[A-Z0-9]*");
        Matcher mt = pt.matcher(stuno);
        boolean bl = mt.matches();
        String valid = "";
        String invalid = "Invalid input please reenter!";
        if(bl == true){
            valid = stuno;
        }else{
            valid = invalid;
        }
        return valid;
    }
    public void setStuno(String stuno) {
        this.stuno = stuno;
    }
    public String getName() {
        return name;
    }
    public void setName(String name) {
        this.name = name;
    }
    public String getProgram() {
        return program;
    }
    public void setProgram(String program) {
        this.program = program;
    }
}
```

processStudent.jsp

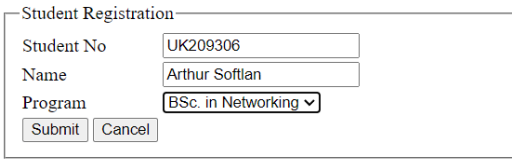
```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@page language="java"%>
<%@page import="java.sql.*"%>
<%@page errorPage="errorStudent.jsp"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>JSP Page</title>
    </head>
    <body>
        <jsp:useBean id="myStudent" class="lab6.com.Student" scope="request"/>
        <jsp:setProperty name="myStudent" property="*"/>

        <%
            int result;

            //Step 1: Load JDBC driver..
            Class.forName("com.mysql.cj.jdbc.Driver");
            System.out.println("Step 1: MySQL driver loaded...!");

            //Step 2: Establish the connection
            String myURL = "jdbc:mysql://localhost:3306/csm3023";
            Connection myConnection = DriverManager.getConnection(myURL, "root", "admin");
            System.out.println("Step 2: Database is connected...!");

            //Step 3: Create a PreparedStatement object...
            System.out.println("Step3: Prepared Statements created...!");
            String sInsertQry = "INSERT INTO student(stuno, stuname, stuprogram) VALUES(?, ?, ?)";
            System.out.println("\tSQL Query: " + sInsertQry);
```

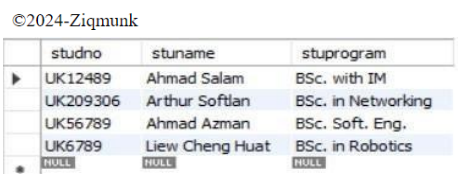
```
            //Call method preparedStatement
            PreparedStatement myPS = myConnection.prepareStatement(sInsertQry);

            //Assign each value to respective columns for Student's table.. (C-Create)
            myPS.setString(1, myStudent.getStuno());
            myPS.setString(2, myStudent.getName());
            myPS.setString(3, myStudent.getProgram());

            result = myPS.executeUpdate();
            if (result > 0){
                out.println("\tRecord successfully added into Student table...!");
                out.print("<p>" + "Record with student no " +myStudent.getStuno()
                        + " successfully created..!" + "</p>");
                out.print("<p>" + "Details of record are; " + "</p>");
                out.print("<p>Student ID : " + myStudent.getStuno() + "</p>");
                out.print("<p>Name : " + myStudent.getName() + "</p>");
                out.print("<p>Program : " + myStudent.getProgram() + "</p>");
            }
            //Step5: close database connection..!
                System.out.println("Step 5: Close database connection..!");
                myConnection.close();
                System.out.println(" ");
                System.out.println("Database connection is closed..!");
        %>
    </body>
</html>
```

errorStudent.jsp

```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>JSP Page</title>
    </head>
    <body>
        <form id="errorFrm" action="insertStudent.jsp" method="post">
            <h1>Lab 6 - Task 1 - Perform creating and retrieving records via JSP page</h1>
            <p>Error occur when inserting record...!</p>
            <p>Error Message: ${exception.getMessage()}</p>
            <br>
        </form>
    </body>
</html>
```

Output:




| studno | stuname | stuprogram |
|---|---|---|
| UK12489 | Ahmad Salam | BSc. with IM |
| UK209306 | Arthur Softlan | BSc. in Networking |
| UK56789 | Ahmad Azman | BSc. Soft. Eng. |
| UK6789 | Liew Cheng Huat | BSc. in Robotics |
| NULL | NULL | NULL |

Record successfully added into Student table...!

Record with student no UK209306 successfully created..!

Details of record are;

Student ID : UK209306

Name : Arthur Softlan

Program : BSc. in Networking

Reflection

1. What have you learnt from this exercise?

I have learnt how to use JSP Standard Action,scriplets and regular expression to insert records and retrieve them from MySQL database.

2. Define step by step before you successfully perform the transaction in a

database.

1. Load JDBC driver.
2. Establish the connection.
3. Create a PreparedStatement object.
4. Execute the query.
5. Close database connection.

Task 4:

Coding:

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@page import="java.sql.*"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Hero Academy Student 2024/2025</title>
        <style>
            table{
                border-collapse: collapse;
            }
            td, th{
                border: 1px solid #999;
                padding: 0.5rem;
                text-align: left;
            }
            th{
                background: gold;
            }
        </style>
    </head>
    <body>
        <h1>Task 4: Retrieving record via JSP page</h1>

        <%
            out.print("<table>");
                out.print("<thead>");
                    out.print("<tr>");
                        out.print("<th>" + "ISBNNo" + "</th>");
                        out.print("<th>" + "Author" + "</th>");
                        out.print("<th>" + "Title" + "</th>");
                    out.print("</tr>");
                out.print("</thead>");
                out.print("<tbody>");
        %>
        <%
            //Step 1: Load JDBC driver..
            Class.forName("com.mysql.cj.jdbc.Driver");
            System.out.println("Step 1: MySQL driver loaded...!");
              //Step 2: Establish the connection
              String myURL = "jdbc:mysql://localhost:3306/csm3023_lab6";
              Connection myConnection = DriverManager.getConnection(myURL, "root", "admin");
              System.out.println("Step 2: Database is connected...!");

              //Step 3: Create a PreparedStatement object...
              Statement myStatement = myConnection.createStatement();

              String myQuery = "SELECT * FROM student";
              ResultSet myResultSet = myStatement.executeQuery(myQuery);

              while(myResultSet.next()){
                  out.print("<tr>");
                      out.print("<td width=\"20%\">" +  myResultSet.getString(1) + "</td>");
                      out.print("<td width=\"40%\">" +  myResultSet.getString(2) + "</td>");
                      out.print("<td width=\"40%\">" +  myResultSet.getString(3) + "</td>");
                  out.print("</tr>");
              }
              //Step5: close database connection..!
                  System.out.println("Step 5: Close database connection..!");
                  myConnection.close();
                  System.out.println(" ");
                  System.out.println("Database connection is closed..!");

                  out.print("</tbody>");
              out.print("</table>");
          %>
      </body>
  </html>
```

Output:

# Task 4: Retrieving record via JSP page

| ISBNNo | Author | Title |
|---|---|---|
| UK12489 | Ahmad Salam | BSc. with IM |
| UK209306 | Arthur Softlan | BSc. in Networking |
| UK56789 | Ahmad Azman | BSc. Soft. Eng. |
| UK6789 | Liew Cheng Huat | BSc. in Robotics |

Reflection

1. What have you learnt from this exercise?

I have learned how to use Java Scriplet to query a list of records.

2. Explain the differences when using Statement() and

PreparedStatement().

The Statement interface is used for executing static SQL statements while The PreparedStatement interface is precompiled and stored in an object.

Besides, Statement() cannot accept parameters at runtime while PreparedStatement() accepts input parameters at runtime (parameterized queries).

Statement() typically used for executing SQL queries that are run only once while PreparedStatement() Ideal for executing the same SQL query multiple times with different parameter values.

Task 5:

Coding:

registerMarathon.jsp

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Superhero Marathon 2025</title>
    </head>
    <body>
        <h1>Superhero Marathon 2025</h1>
        <fieldset>
            <legend>Marathon Registration</legend>
            <form action="processMarathon.jsp" method="post">
                <table>
                    <tr>
                        <td>
                            <label for="icno">IC No</label>
                        </td>
                        <td>
                            <input type="text" id="icno" name="icno" placeholder="E.g.: 921110-10-2514">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <label for="name">Name</label>
                        </td>
                        <td>
                            <input type="text" id="name" name="name" placeholder="Enter your name">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <label for="category">Category</label>
                        </td>
                        <td>
                            <select id=category name="category">
                                <option value="5 KM">5 KM</option>
                                <option value="7 KM">7 KM</option>
                                <option value="10 KM">10 KM</option>
                            </select>
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <button type="submit" value="Submit">Submit</button>
                            <button type="reset" value="Reset">Cancel</button>
                        </td>
                    </tr>
                </table>
            </form>
        </fieldset>
        <footer>
            <p>&copy;Superhero Marathon Asia 2025</p>
        </footer>
    </body>
</html>
```

Marathon.java

```java
package lab6.com;

/**
 *
 * @author Lenovo
 */
public class Marathon {
    private String icno;
    private String name;
    private String category;

    public String getIcno() {
        return icno;
    }

    public void setIcno(String icno) {
        this.icno = icno;
    }

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public String getCategory() {
        return category;
    }

    public void setCategory(String category) {
        this.category = category;
    }

}
```

Database.java

```java
public class Database {
    private static Connection myConnection = null;
    private static String myURL = myURL = "jdbc:mysql://localhost:3306/csm3023_lab6";
    private int result = 0;

    public static Connection getConnection() throws ClassNotFoundException{
        if(myConnection != null){
            return myConnection;
        }
        else try{
            Class.forName("com.mysql.cj.jdbc.Driver");
            myConnection = DriverManager.getConnection(myURL, "root", "admin");
        }
        catch(SQLException e){
            e.printStackTrace();
        }
        return myConnection;
    }

    public void closeConnection() throws ClassNotFoundException
    {
        try{
            myConnection.close();
        }
        catch(SQLException e){
            e.printStackTrace();
        }
```

MarathonDAO.java

```java
*/
import java.sql.Connection;
import java.sql.PreparedStatement;
import java.sql.SQLException;
import lab6.com.Database;

public class MarathonDAO {
    private Connection connection;
    private int result = 0;
    public MarathonDAO() throws ClassNotFoundException{
        connection = Database.getConnection();
    }
    public int addDetails(Marathon marathon){
        try{
            String mySQL = "INSERT INTO marathon(icno, name, category) VALUES (?, ?, ?)";
            PreparedStatement preparedStatement = connection.prepareStatement(mySQL);

            System.out.println("IC no    = " + marathon.getIcno());
            System.out.println("Name     = " + marathon.getName());
            System.out.println("Category= " + marathon.getCategory());

            //Parameters
            preparedStatement.setString(1, marathon.getIcno());
            preparedStatement.setString(2, marathon.getName());
            preparedStatement.setString(3, marathon.getCategory());
            result = preparedStatement.executeUpdate();
        }catch(SQLException e){
            e.printStackTrace();
        }
        return result;
    }
}
```

processMarathon.jsp

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@page language="java"%>
<%@page import="java.sql.*"%>
<%@page import="lab6.com.Database"%>
<%@page import="lab6.com.Marathon"%>
<%@page import="lab6.com.MarathonDAO"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Superhero Marathon 2025</title>
    </head>
    <body>
        <jsp:useBean id="myMarathon" class="lab6.com.Marathon" scope="request"/>
        <jsp:setProperty name="myMarathon" property="*"/>

        <%
            int result;
            //Step 1: create Database object...
            Database myDB = new Database();

            MarathonDAO object1 = new MarathonDAO();

            //Step 2: Add the records...
            result = object1.addDetails(myMarathon);

            //Step 3: Determine whether the transactions is success..
            if(result > 0){
                System.out.println("\tRecord successfully added into Book's table...!");
                out.print("<p>" + "Record with IC No " + myMarathon.getIcno() +
                          " successfully created..!" + "</p>");
                out.print("<p>" + "Details of record are: " + "</p>");
                out.print("<p>Ic NO    : " + myMarathon.getIcno() + "</p>");
                out.print("<p>Name     : " + myMarathon.getName() + "</p>");
                out.print("<p>Category    : " + myMarathon.getCategory() + "</p>");
            }else{
                out.print("<p>Crazyy this is an error! maybe you already registerd before?</p>");
            }

            //Step 4: Close database connection..!
            System.out.println("Step 5: Close database connection...!");
            myDB.closeConnection();
            System.out.println(" ");
            System.out.println("Database connection is closed...!");
        %>
    </body>
</html>
```

Output:

# Superhero Marathon 2025

Marathon Registration

IC No 7201606-01-0376

Name Wan Nur Saitama

Category 7 KM

Submit Cancel

©Superhero Marathon Asia 2025

Record with IC No 7201606-01-0376 successfully created..!

Details of record are:

Ic NO : 7201606-01-0376

Name : Wan Nur Saitama

Category : 7 KM

| icno | name | category |
|---|---|---|
| 021121-01-9738 | sharon | 7 KM |
| 031121-01-0865 | abe | 5 KM |
| 7201606-01-0376 | Wan Nur Saitama | 7 KM |
| 921102-11-9973 | Mat Nor Acan | 7 KM |
| NULL | NULL | NULL |

Reflection

1. What have you learnt from this exercise?

I have learned how to use JavaBeans to perform SQL transaction using PreparedStatement().

2. Describe the benefits of using JavaBeans

JavaBeans allow components to be reused across different parts of a program.

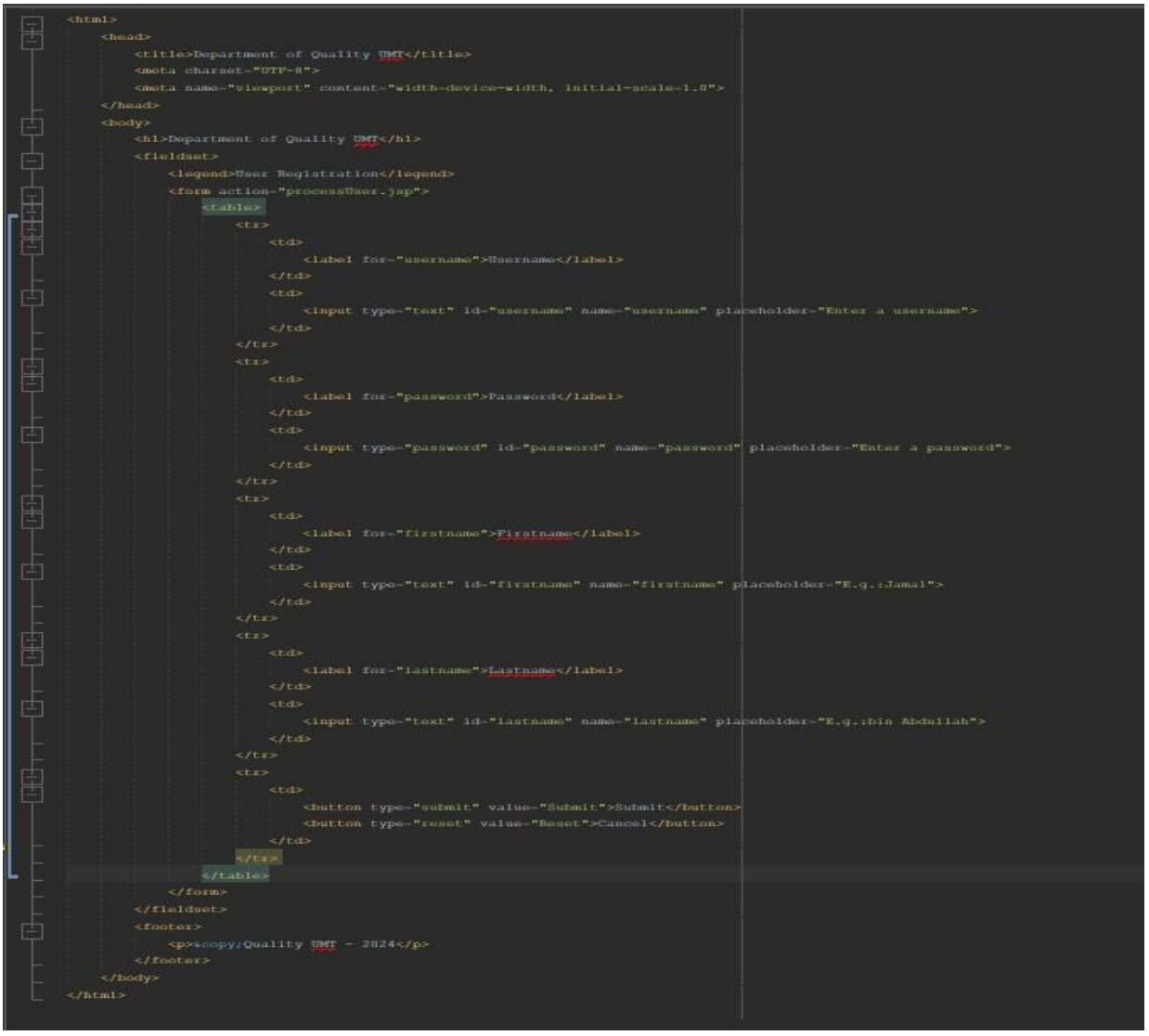
JavaBeans are easy to configure and use.

They work across different platforms.

Exercise:

Coding:

insertUser.html



```
<html>
    <head>
        <title>Department of Quality UMT</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
        <h1>Department of Quality UMT</h1>
        <fieldset>
            <legend>User Registration</legend>
            <form action="processUser.jsp">
                <table>
                    <tr>
                        <td>
                            <label for="username">Username</label>
                        </td>
                        <td>
                            <input type="text" id="username" name="username" placeholder="Enter a username">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <label for="password">Password</label>
                        </td>
                        <td>
                            <input type="password" id="password" name="password" placeholder="Enter a password">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <label for="firstname">Firstname</label>
                        </td>
                        <td>
                            <input type="text" id="firstname" name="firstname" placeholder="E.g.:Jamal">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <label for="lastname">Lastname</label>
                        </td>
                        <td>
                            <input type="text" id="lastname" name="lastname" placeholder="E.g.:bin Abdullah">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <button type="submit" value="Submit">Submit</button>
                            <button type="reset" value="Reset">Cancel</button>
                        </td>
                    </tr>
                </table>
            </form>
        </fieldset>
        <footer>
            <p>&copy;Quality UMT - 2024</p>
        </footer>
    </body>
</html>
```

processUser.jsp

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@page language="java"%>
<%@page import="java.sql.*"%>
<%@page errorPage="login.jsp"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Department of Quality UMT</title>
    </head>
    <body>
        <jsp:useBean id="myUser" class="lab6.com.User" scope="request"/>
        <jsp:setProperty name="myUser" property="*"/>

        <%
            int result;

            //Step 1: Load JDBC driver...
            Class.forName("com.mysql.cj.jdbc.Driver");
            System.out.println("Step 1: MySQL driver loaded...!");

            //Step 2: Establish the connection
            String myURL = "jdbc:mysql://localhost:3306/com3023_Lab6";
            Connection myConnection = DriverManager.getConnection(myURL, "root", "admin");
            System.out.println("Step 2: Database is connected...!");

            //Step 3: Create a PreparedStatement object...
            System.out.println("Step3: Prepared Statement created...!");
            String sInsertQry = "INSERT INTO userprofile(username, password, firstname, lastname) VALUES(?, ?, ?, ?)";
            System.out.println("\tSQL Query: " + sInsertQry);

            //Call method prepareStatement
            PreparedStatement myPS = myConnection.prepareStatement(sInsertQry);

            //Assign each value to respective columns for Student's table.. (C-Create)
            myPS.setString(1, myUser.getUsername());
            myPS.setString(2, myUser.getPassword());
            myPS.setString(3, myUser.getFirstname());
            myPS.setString(4, myUser.getLastname());

            result = myPS.executeUpdate();
            if (result > 0){
                out.println("\tRecord successfully added into User table...!");
                out.print("<p>" + "Record with Username " +myUser.getUsername()
                        + " successfully created..!" + "</p>");
                out.print("<p>" + "Details of record are; " + "</p>");
                out.print("<p>Username : " + myUser.getUsername() + "</p>");
                out.print("<p>Firstname : " + myUser.getFirstname() + "</p>");
                out.print("<p>Lastname : " + myUser.getLastname() + "</p>");
            }
            //Step5: close database connection...!
                System.out.println("Step 5: Close database connection...!");
                myConnection.close();
                System.out.println(" ");
                System.out.println("Database connection is closed...!");
        %>
    </body>
</html>
```

Login.jsp

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Department of Quality UMT</title>
    </head>
    <body>
        <h1>Department of Quality UMT</h1>
        <fieldset>
            <legend>User Login</legend>
            <form action="doLogin.jsp">
                <table>
                    <tr>
                        <td>
                            <label for="username">Username</label>
                        </td>
                        <td>
                            <input type="text" id="username" name="username" placeholder="Enter a username">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <label for="password">Password</label>
                        </td>
                        <td>
                            <input type="password" id="password" name="password" placeholder="Enter a password">
                        </td>
                    </tr>
                    <tr>
                        <td>
                            <button type="submit" value="Submit">Submit</button>
                            <button type="reset" value="Reset">Cancel</button>
                        </td>
                    </tr>
                </table>
            </form>
        </fieldset>
        <%
           String errorMessage = request.getParameter("error");
           if (errorMessage != null && !errorMessage.isEmpty()) {
               out.println("<p style='color: red'>" + errorMessage + "</p>");
           }
        %>
        <footer>
            <p>&copy;Quality UMT - 2024</p>
        </footer>
    </body>
</html>
```

doLogin.jsp

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@ page import="java.sql.*, lab6.com.User" %>
<%@ page import="java.io.*, java.util.*" %>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Department of Quality UMT</title>
    </head>
    <body>
        <h1>Department of Quality UMT</h1>
        <%
            // Retrieve username and password from the request
            String username = request.getParameter("username");
            String password = request.getParameter("password");

            // Check if username and password are not null and not empty
            if (username != null && !username.isEmpty() && password != null && !password.isEmpty()) {
                // Establish database connection
                Connection conn = null;
                PreparedStatement pstmt = null;
                ResultSet rs = null;
                try {
                    Class.forName("com.mysql.cj.jdbc.Driver");
                    String myURL = "jdbc:mysql://localhost:3306/csm3023_lab6";
                    conn = DriverManager.getConnection(myURL, "root", "admin");

                    // Query to check if the username and password are valid
                    String query = "SELECT * FROM userprofile WHERE username = ? AND password = ?";
                    pstmt = conn.prepareStatement(query);
                    pstmt.setString(1, username);
                    pstmt.setString(2, password);
                    rs = pstmt.executeQuery();

                    if (rs.next()) {
                        // If user exists and credentials are valid, redirect to main.jsp
                        User user = new User();
                        user.setUsername(rs.getString("username"));
                        user.setFirstname(rs.getString("firstname"));
                        user.setLastname(rs.getString("lastname"));

                        // Set user object in session for later use
                        session.setAttribute("user", user);
                        response.sendRedirect("main.jsp");
                    } else {
                        // If invalid username or password, redirect back to login.jsp with error message
                        response.sendRedirect("login.jsp?error=Invalid+username+or+password");
                    }
                } catch (Exception e) {
                    e.printStackTrace();
                } finally {
                    // Close resources
                    if (rs != null) rs.close();
                    if (pstmt != null) pstmt.close();
                    if (conn != null) conn.close();
                }
            } else {
                // If username or password is empty, redirect back to login.jsp with error message
                response.sendRedirect("login.jsp?error=Username+and+password+are+required");
            }
        %>
    </body>
</html>
```

User.java

```java
*/
public class User {
    private String username;
    private String password;
    private String firstname;
    private String lastname;

    public String getUsername() {
        return username;
    }

    public void setUsername(String username) {
        this.username = username;
    }

    public String getPassword() {
        return password;
    }

    public void setPassword(String password) {
        this.password = password;
    }

    public String getFirstname() {
        return firstname;
    }

    public void setFirstname(String firstname) {
        this.firstname = firstname;
    }

    public String getLastname() {
        return lastname;
    }

    public void setLastname(String lastname) {
        this.lastname = lastname;
    }


}
```

Output:

**Department of Quality UMT**

User Registration

Username: abetop
Password: ••••••••••
Firstname: Zikri
Lastname: bin Ameer
Submit Cancel

©Quality UMT - 2024

Record successfully added into User table...!

Record with Username abetop successfully created..!

Details of record are;

Username : abetop

Firstname : Zikri

Lastname : bin Ameer

| username | password | firstname | lastname |
|---|---|---|---|
| abetop | @abetop123 | Zikri | bin Ameer |
| Lutfil Haziq | !abang123 | Lutfil Haziq | Bin Mustafa |
| NULL | NULL | NULL | NULL |

**Department of Quality UMT**

User Login

Username: abetop
Password: ••••••••••
Submit Cancel

©Quality UMT - 2024

# Welcome, Zikri bin Ameer

Your username is: abetop

Logout

# Department of Quality UMT

User Login

Username abangtop

Password •••••••

Submit Cancel



# Department of Quality UMT

User Login

Username Enter a username

Password Enter a password

Submit Cancel

Invalid username or password