Java and J2EE Mini-Project

Project Report

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ISE 6A

Contents

1. PROBLEM STATEMENT

Create a front-end to enter marks of students every semester with a database that updates the CGPA and SGPAs for every old student accordingly. Register new students and create new entries in the database for them. Generate a dashboard for students based on the subjects offered during the semester.

2. INTRODUCTION

This project was developed using Java and its object-oriented programming principles. We used the Java Database Connectivity (JDBC) API, which provides independent connections between Java as a programming language and a wide range of databases, to build our database. The API provides for many basic MySQL operations. We used Java servlet technology to create a web application with the functionalities stated in the above problem statement. Servlets have major advantages as they provide us with better performance, portability, robustness and security.

3. DESIGN

We used the following softwares in developing our project:

- **Eclipse for Java Developers**: It is an integrated development environment (IDE) that provides users with an efficient built in editor which helps us design our project.
- **Apache Tomcat**: It is an open-source implementation of the Java Servlet, JavaServer Pages, Java Expression Language and WebSocket technologies. Tomcat provides a "pure Java" HTTP web server environment in which Java code can run.
- **XAMPP**: It is a free and open-source cross-platform web server solution stack package that provides us with an environment where we can configure Apache Tomcat and SQL services.
- **NGROK**: It is a reverse proxy that creates a secure tunnel from a public endpoint to a locally running web service. We use it to host our web application.

3.1 Database

We created an SQL database to hold a table with the following attributes for each student:

- Name
- University Seat Number (USN)
- Date of Birth
- Current Semester
- Banch
- Current CGPA and
- SGPA (of 8 semesters)

The values - name, USN, date of birth and branch, are to be entered when a student registers and are fixed. While the values - Current Semester, Current CGPA and SGPAs of 8 semesters are to be updated as the student clears each semester.

3.2 Java Server Pages

We created web pages for various purposes as follows:

- A **login** web page for old students to login to their dashboard using their respective USN and date of birth
- A **register** web page to which new students will be directed to for registering their details
- Webpages for the **student dashboard** according to the current semester they are in, where the students can enter their marks obtained in each subject of that semester.

3.2 Servlets

We created three servlet classes as follows:

- **Register**: Handles post requests containing new student details by creating a new entry in the database.
- **Login**: Handles the post requests containing login details of each student, validates the details provided and directs to the corresponding dashboard.
- **Update**: Handles the post requests containing the calculated SGPA of a student and updates the SGPA and CGPA of the student in the database.

4. Implementation

Flowchart of our implementation

The following packages are to imported:

- import java.math.RoundingMode;
- import java.text.DecimalFormat;
- import java.io.IOException;
- import java.sql.DriverManager;
- import javax.servlet.RequestDispatcher;
- import javax.servlet.ServletException;
- import javax.servlet.annotation.WebServlet;
- import javax.servlet.http.HttpServlet;
- import javax.servlet.http.HttpServletRequest;
- import javax.servlet.http.HttpSession;
- import javax.servlet.http.HttpServletResponse;

- import com.mysql.jdbc.Connection;
- import com.mysql.jdbc.PreparedStatement;
- import com.mysql.jdbc.ResultSet;
- import com.mysql.jdbc.Statement;

4.1 Log in

The user enters his/her USN and date of birth, both of which are validated by the following code snippets. If the entered details are present in the database, the user is directed to his/her dashboard based on their current semester, else, the user is directed to the register page.

Front-end login page entry validation (login.jsp)

```html
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<link rel="stylesheet" href="formStyle.css">
<title>Login Form</title>
    <script>
    function validate()
    {
        usn = document.getElementById("usn").value;
        var regex = /^[0-9][a-zA-Z][a-zA-Z][0-9][0-9][a-zA-Z][a-zA-Z][0-9][0-9][0-9]/i;
        if(usn == "")
        {
            alert("please enter the usn");
        }
        if (!regex.test(usn)) {
            alert("wrong usn format");
            return false;
        }
        return true;
    }
    </script>
</head>
<body>
<h1>Login Form</h1>
<div>
<form action="login" onsubmit="return validate()" method="post">
        <table style="with: 50%">
            <tr>
                <td>USN</td>
                <td><input type="text" name="usn" id= "usn"/></td>
            </tr>
            <tr>
                <td>Date of birth</td>
                <td><input type="text" name="dob" /></td>
            </tr>
            </table>
        <input type="submit" value="Login" /></form></div>
</body>
```

Back-end validation of USN and DOB with database and direction to the right dashboard (Login.java)

```java
Class.forName("com.mysql.jdbc.Driver");
            Connection con = (Connection)
    DriverManager.getConnection("jdbc:mysql://localhost:3306/project", "root", "");
            final String usn=request.getParameter("usn");
            final String pwd=request.getParameter("dob");
            final String query = "SELECT count(*) from register WHERE usn=\'"+usn+"\' AND
```

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```
        dob=\'"+pwd+"\' ";
                final PreparedStatement st = (PreparedStatement) con.prepareStatement(query);
                final ResultSet rs = (ResultSet) st.executeQuery(query);
                final RequestDispatcher requestDispatcher;
                if(rs.next())
                {
                    final int count=rs.getInt(1);
                    if(count==1) {
                        final String sem="SELECT semester from register WHERE
usn=\'"+usn+"\'";
                        Statement stmt =  (Statement) con.createStatement();
                        final ResultSet result=(ResultSet) stmt.executeQuery(sem);
                        if(result.next()) {
                        final int semester=result.getInt("semester");
                        request.setAttribute("usn", usn);
                        if(semester>8) {
                            requestDispatcher=request.getRequestDispatcher("/9show.jsp");
                            requestDispatcher.forward(request, response);
                        }
                        else
                        {
                        requestDispatcher=request.getRequestDispatcher("/"+
        String.valueOf(semester)+"sem.jsp");
                        requestDispatcher.forward(request, response);
                        }
                    }
                    }
                    else {
                        requestDispatcher=request.getRequestDispatcher("/register.jsp");
                        requestDispatcher.forward(request, response);
                    }
                }
            }
```

4.2 Register

New users register themselves at the start of the first semester by providing their name, USN, date of birth and the branch they belong to. New entries for each new student are added to the database , as shown in the code snippets below. Once registered, they're redirected to the login page, to login in successfully.

Front-end for registering a student (register.jsp)

```
<body>
<div>
<form action="Register" onsubmit="return validate()" method="post">
        <table style="with: 50%">
            <tr>
            <tr>
                <td>Name</td>
                <td><input type="text" name="name" /></td>
            </tr>
                <td>USN</td>
                <td><input type="text" name="usn" id = "usn"/></td>
            </tr>
            <tr>
                <td>Date of birth(YYYY-MM-DD)</td>
                <td><input type="text" name="dob" /></td>
            </tr>
```

```
            <tr>
                <td>branch</td>
                <td><input type="text" name="branch" /></td>
            </tr>
            </table>
        <input type="submit" value="register" /></form></div>
</body>
```

Back-end adding new entry to database during registration (Register.java)

```java
Class.forName("com.mysql.jdbc.Driver");
        Connection con = (Connection) DriverManager.getConnection("jdbc:mysql://
                    localhost:3306/project", "root", "");
        Statement st=(Statement) con.createStatement();
        final String name=request.getParameter("name");
        final String usn=request.getParameter("usn");
        final String dob=request.getParameter("dob");
        final String sem="1";
        final String branch=request.getParameter("branch");
        final String initialCgpa="0";
        final String initialSgpa="0";
        final RequestDispatcher requestDispatcher;
        int i=st.executeUpdate("
        insert into register(Name,usn,dob,semester,branch,
                        CGPA,SGPA1,SGPA2,SGPA3,SGPA4,SGPA5,SGPA6,SGPA7
                        ,SGPA8)values('"+name+"','"+usn+"','"+dob+"','"+
                        sem+"','"+branch+"','"+initialCgpa+"','"+initialSgpa+"'
                        ,'"+initialSgpa+"','"+initialSgpa+"','"+initialSgpa+"',
                        '"+initialSgpa+"','"+initialSgpa+"','"+initialSgpa+"',
                        '"+initialSgpa+"')");
        System.out.println("Data is successfully inserted!");
        requestDispatcher=request.getRequestDispatcher("/login.jsp");
        requestDispatcher.forward(request, response);
```

4.3 Student Dashboard

Based on the student's current semester, the user is directed to a dashboard that displays the subjects of that particular semester. The user can enter the marks obtained by the student in each of those subjects. Once the submit button is clicked the marks entered by the student along with the SGPA and CGPA calculated is displayed. The SGPA of that particular semester is added to the database and the CGPA is updated for the corresponding student entry. The current semester value is also updated.

Front-end for entering marks (6sem.jsp)

```jsp
<body>
    <h1>Semester 6</h1>
<div>
<form action="Update" method="post">
            <table style="width: 50%">
```

```html
            <tr>
                <td>System Software</td>
                <td><input type="number" id="ss" name="ss"/></td>
            </tr>
            <tr>
                <td>Object Oriented Analysis ans Design Patterns using java</td>
                <td><input type="number" id="ooadp" name="ooadp"/></td>
            </tr>
            <tr>
                <td>Java and J2EE</td>
                <td><input type="number" id="j2ee" name="j2ee"/></td>
            </tr>
            <tr>
                <td>Mini Project</td>
                <td><input type="number" id="mini" name="mini"/></td>
            </tr>
            <tr>
                <td>System Software Lab</td>
                <td><input type="number" id="sslab" name="ssLab"/></td>
            </tr>
            <tr>
                <td>Elective B</td>
                <td><input type="number" id="eb" name="eb"/></td>
            </tr>
            <tr>
                <td>OOADP lab</td>
                <td><input type="number" id="ooadplab" name="ooadplab"/></td>
            </tr>
            <tr>
                <td>Java and J2EE lab</td>
                <td><input type="number" id="j2eelab" name="j2eelab" /></td>
            </tr>
            </table>
            <input type="hidden" id="sgpa1" name="sgpa1">
             <input type="hidden" name="usn" value=<%=request.getAttribute("usn") %>>
             <input type="hidden" name="sem" value="6">
             <button onclick="sgpa()"> submit </button>
            </form></div>
</body>
```

Front-end calculation of SGPA (6sem.jsp and sgpa.js)

```javascript
function sgpa() {
    var sgpaFeild =  document.getElementById("sgpa1");
    var ss=document.getElementById("ss").value;
    var j2ee=document.getElementById("j2ee").value;
    var mini=document.getElementById("mini").value;
    var sslab=document.getElementById("sslab").value;
    var ooadplab=document.getElementById("ooadplab").value;
    var j2eelab=document.getElementById("j2eelab").value;
    var eb=document.getElementById("eb").value;
```

```javascript
    var  ooadp= document.getElementById("ooadp").value;
    count = 0
    ss = 4*getGrade(ss)
    if(ss == 0)
        count++;
    j2ee = 4*getGrade(j2ee)
    if(j2ee == 0)
        count++;
    mini = 6*getGrade(mini)
    if(mini == 0)
        count++;
    sslab = 1*getGrade(sslab)
    if(sslab == 0)
        count++;
    ooadplab = 1*getGrade(ooadplab)
    if(ooadplab == 0)
        count++;
    j2eelab = 1*getGrade(j2eelab)
    if(j2eelab == 0)
        count++;
    eb = 4*getGrade(eb)
    if(eb == 0)
        count++;
    ooadp = 4*getGrade(ooadp)
    if(ooadp == 0)
        count++;
    total = ss + j2ee + mini + ooadplab + ooadp +eb +sslab+j2eelab;
    console.log(total)
    if(count>=4)
        sgpaFeild.value = "Year Back";
    else
        sgpaFeild.value = total/25;
}
```

```javascript
function getGrade(marks)
    {
    if(marks>100 || marks<0){
        alert("Invalid marks");
    }
        if(marks>=90)
            return  "10";
        else if(marks<90 && marks>=80)
            return "9";
        else if(marks<80 && marks>=70)
            return "8";
        else if(marks<70 && marks>=60)
            return "7";
        else if(marks<60 && marks>=50)
            return "6";
```

```
        else if(marks<50 && marks>=40)
            return "5";
        else
            return 0;
    }
```

Back-end updation of CGPA and SGPA (Update.java)

```java
Class.forName("com.mysql.jdbc.Driver");
                Connection con = (Connection) DriverManager.getConnection("jdbc:
                        mysql://localhost:3306/project", "root", "");
                final String usn=request.getParameter("usn");
                final String sgpa=request.getParameter("sgpa1");
                final String sem=request.getParameter("sem");
                final double sgpa1=Double.parseDouble(sgpa);
                final String query1="SELECT CGPA from register WHERE usn=\'"+usn+"\'";
                Statement st =  (Statement) con.createStatement();
                String cgpa="";
                final ResultSet result=(ResultSet) st.executeQuery(query1);
                if(result.next()) {
                    String c=result.getString("CGPA");
                    final int semester=Integer.parseInt(sem);
                    final double cg=Double.parseDouble(c);
                    final double sg=Double.parseDouble(sgpa);
                    final double cgp=((semester-1)*cg+sg)/semester;
                    cgpa=df2.format(cgp);
                }
                final RequestDispatcher requestDispatcher;
                if(!sgpa.equals("Year Back")) {
                    String query="";
                    query=getQuery(sem,cgpa,sgpa,usn);
                    Statement stmt =  (Statement) con.createStatement();
                    int count=stmt.executeUpdate(query);
                }
                else{
                    final String query="Update register set CGPA=\'
                                "+ sgpa +"\' WHERE usn=\'"+usn+"\'";
                    Statement stmt =  (Statement) con.createStatement();
                    int count=stmt.executeUpdate(query);
                }
                request.setAttribute("sem", sem);
                request.setAttribute("cgpa", cgpa);
                request.setAttribute("usn", usn);
                requestDispatcher=request.getRequestDispatcher("/"+sem+"show.jsp");
                requestDispatcher.forward(request, response);
                System.out.println(sgpa);
                System.out.println(usn);
```

Front-end display of CGPA and SGPA (6show.jsp)

```html
<body>
<div>
```

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```
<table>
        <% out.println("<h1>"+request.getParameter("usn")+ "</h1>");%>
        <tr><td>System Software</td>
        <% out.println("<td>"+request.getParameter("ss")+ "</td>");%>
        </tr><tr></tr><td>Object Oriented Analysis and Design Patterns using java</td>
        <% out.println("<td>"+request.getParameter("ooadp")+ "</td>");%>
        </tr><tr><td>Java and J2EE</td>
        <% out.println("<td>"+request.getParameter("j2ee")+ "</td>");%>
        </tr><tr><td>Mini Project</td>
        <% out.println("<td>"+request.getParameter("mini")+ "</td>");%>
        </tr><tr><td>System Software Lab</td>
        <% out.println("<td>"+request.getParameter("ssLab")+ "</td>");%>
        </tr><tr><td>Elective B</td>
        <% out.println("<td>"+request.getParameter("eb")+ "</td>");%>
        </tr><tr><td>OOADP lab</td>
        <% out.println("<td>"+request.getParameter("ooadplab")+ "</td>");%>
        </tr><tr><td>Java and J2EE lab</td>
        <% out.println("<td>"+request.getParameter("j2eelab")+ "</td>");%>
        </tr><tr><td>SGPA</td>
        <% out.println("<td>"+request.getParameter("sgpa1")+ "</td>");%>
        </tr><tr><td>CGPA</td>
        <% out.println("<td>"+request.getAttribute("cgpa")+ "</td>");%>
        </tr>
        </table>
        <a href='login.jsp'>LOGOUT</a>
</div>
</body>
```
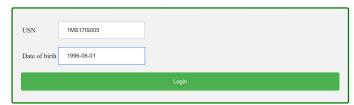
5. Results

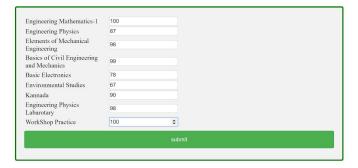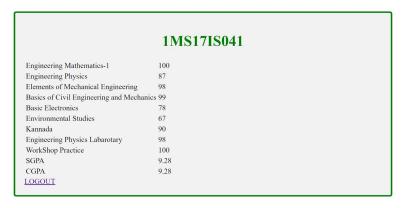The following are some snapshots of our web application ordered as follows:

Login page

Login Form

USN	1MS17IS005
Date of birth	1996-06-01
Login	

Registration page

Semester 1 dashboard

SGPA and CGPA of Semester 1

<div style="border:2px solid green">

1MS17IS041

Engineering Mathematics-1	100
Engineering Physics	87
Elements of Mechanical Engineering	98
Basics of Civil Engineering and Mechanics	99
Basic Electronics	78
Environmental Studies	67
Kannada	90
Engineering Physics Labarotary	98
WorkShop Practice	100
SGPA	9.28
CGPA	9.28
LOGOUT	

</div>

Semester 2 dashboard

Semester 2

Engineering Mathematics-||	
Engineering Chemistry	
Basic Electrical Engineering	
Fundamentals of Computing	
Engineering Design	
Constitution of India	
Professional Communication	
Chemistry Lab	
FOC Lab	

submit

CGPA and SGPA of semester 6

<div style="border:2px solid green">

1MS17IS041

System Software	90
Object Oriented Analysis ans Design Patterns using java	98
Java and J2EE	78
Mini Project	98
System Software Lab	98
Elective B	99
OOADP lab	98
Java and J2EE lab	91
SGPA	9.68
CGPA	9.2
LOGOUT	

</div>

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Dashboard after completion of 8 semesters

1MS17IS005

GRADUATED!!!!

LOGOUT

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Database contents