1. **WAP to check whether a number is odd or even?**

2. **Write a program to Develop a database application that uses any JDBC driver.**

3. **Develop a Graphical User Interface that performs the following SQL operations: a) Insert b) Delete c)Update**

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
import java.sql.*;

public class SQLGuiApp {
    private JFrame frame;
    private JTextField textFieldId, textFieldName;
    private JButton btnInsert, btnDelete, btnUpdate;
    private Connection connection;

    public SQLGuiApp() {
        initialize();
        connectToDatabase();
    }

    private void initialize() {
        frame = new JFrame("SQL Operations");
        frame.setLayout(new FlowLayout());
        frame.setSize(300, 200);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

        textFieldId = new JTextField(10);
        textFieldName = new JTextField(10);
        btnInsert = new JButton("Insert");
```

```
btnDelete = new JButton("Delete");
btnUpdate = new JButton("Update");

frame.add(new JLabel("ID:"));
frame.add(textFieldId);
frame.add(new JLabel("Name:"));
frame.add(textFieldName);
frame.add(btnInsert);
frame.add(btnDelete);
frame.add(btnUpdate);

btnInsert.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        insertRecord();
    }
});

btnDelete.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        deleteRecord();
    }
});

btnUpdate.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        updateRecord();
    }
});
```

```
        frame.setVisible(true);
    }

    private void connectToDatabase() {
        try {
            connection =
DriverManager.getConnection("jdbc:mysql://localhost:3306/yourdatabase",
"username", "password");
        } catch (SQLException e) {
            e.printStackTrace();
        }
    }

    private void insertRecord() {
        try {
            String sql = "INSERT INTO yourtable (id, name) VALUES (?, ?)";
            PreparedStatement statement = connection.prepareStatement(sql);
            statement.setInt(1, Integer.parseInt(textFieldId.getText()));
            statement.setString(2, textFieldName.getText());
            statement.executeUpdate();
            JOptionPane.showMessageDialog(frame, "Record Inserted");
        } catch (SQLException e) {
            e.printStackTrace();
        }
    }

    private void deleteRecord() {
        try {
            String sql = "DELETE FROM yourtable WHERE id = ?";
            PreparedStatement statement = connection.prepareStatement(sql);
```

```
            statement.setInt(1, Integer.parseInt(textFieldId.getText()));
            statement.executeUpdate();
            JOptionPane.showMessageDialog(frame, "Record Deleted");
        } catch (SQLException e) {
            e.printStackTrace();
        }
    }

    private void updateRecord() {
        try {
            String sql = "UPDATE yourtable SET name = ? WHERE id = ?";
            PreparedStatement statement = connection.prepareStatement(sql);
            statement.setString(1, textFieldName.getText());
            statement.setInt(2, Integer.parseInt(textFieldId.getText()));
            statement.executeUpdate();
            JOptionPane.showMessageDialog(frame, "Record Updated");
        } catch (SQLException e) {
            e.printStackTrace();
        }
    }

    public static void main(String[] args) {
        new SQLGuiApp();
    }
}
```

4. **Develop a simple servlet program which maintains a counter for the number of times it has been accessed since its loading, initialize the counter using deployment descriptor.**

//Servlet Code (CounterServlet.java)

```
import java.io.IOException;
import java.io.PrintWriter;

import jakarta.servlet.ServletConfig;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;

public class CounterServlet extends HttpServlet {

    private int counter;

    // Called once when the servlet is loaded
    @Override
    public void init(ServletConfig config) throws ServletException {
        super.init(config);

        // Read initial counter value from deployment descriptor
        String initialValue = config.getInitParameter("counterStart");

        if (initialValue != null) {
            counter = Integer.parseInt(initialValue);
        } else {
            counter = 0;
        }
    }

    // Called for each request
```

```
    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse
response)
            throws ServletException, IOException {

        counter++; // Increment counter on each access

        response.setContentType("text/html");
        PrintWriter out = response.getWriter();

        out.println("<html><body>");
        out.println("<h2>Servlet Access Counter</h2>");
        out.println("<p>This servlet has been accessed <b>" + counter + "</b>
times.</p>");
        out.println("</body></html>");
    }
}
```

// **Deployment Descriptor (web.xml)**

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

    <servlet>
        <servlet-name>CounterServlet</servlet-name>
        <servlet-class>CounterServlet</servlet-class>

        <!-- Initialization parameter -->
```

```
        <init-param>
            <param-name>counterStart</param-name>
            <param-value>100</param-value>
        </init-param>

        <!-- Load servlet on startup -->
        <load-on-startup>1</load-on-startup>
    </servlet>

    <servlet-mapping>
        <servlet-name>CounterServlet</servlet-name>
        <url-pattern>/counter</url-pattern>
    </servlet-mapping>

</web-app>
```

5. **Create a web form which processes servlet and demonstrates use of cookies and sessions.**

```
import java.io.IOException;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.Cookie;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;

@WebServlet("/form")
```

```
public class FormServlet extends HttpServlet {
    protected void doGet(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
        response.setContentType("text/html");
        response.getWriter().println("<form method='POST'>");
        response.getWriter().println("Name: <input type='text' name='name'><br>");
        response.getWriter().println("Age: <input type='text' name='age'><br>");
        response.getWriter().println("<input type='submit' value='Submit'>");
        response.getWriter().println("</form>");
    }

    protected void doPost(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
        String name = request.getParameter("name");
        String age = request.getParameter("age");

        // Create a session
        HttpSession session = request.getSession();
        session.setAttribute("name", name);
        session.setAttribute("age", age);

        // Create a cookie
        Cookie userCookie = new Cookie("user", name);
        response.addCookie(userCookie);

        response.setContentType("text/html");
        response.getWriter().println("<h1>Welcome, " + name + "!</h1>");
        response.getWriter().println("<p>Your age is " + age + ".</p>");
    }
}
```

6. **Develop a simple JSP program for user registration and then control will be transfer it into second page.**

```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
<head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
    <title>User Registration</title>
</head>
<body>
    <h2>User Registration Form</h2>
    <!-- The form submits data to the 'welcome.jsp' page using the HTTP POST method -->
    <form action="welcome.jsp" method="post">
        <table>
            <tr>
                <td>Enter your Username:</td>
                <td><input type="text" name="username"></td>
            </tr>
            <tr>
                <td>Enter your Email:</td>
                <td><input type="email" name="email"></td>
            </tr>
            <tr>
                <td>Enter your Password:</td>
                <td><input type="password" name="password"></td>
            </tr>
            <tr>
```

```
            <td></td>
            <td><input type="submit" value="Register"></td>
        </tr>
    </table>
</form>
</body>
</html>
```

7. **Develop a simple JSP program for user login form with static and dynamic database.**

```
<%@ page language="java" contentType="text/html; charset=UTF-8"
pageEncoding="UTF-8"%>
<%@ page import="java.sql.*" %>
<!DOCTYPE html>
<html>
<head>
    <title>User Login</title>
</head>
<body>
    <h2>User Login Form</h2>
    <form action="login.jsp" method="post">
        Username: <input type="text" name="username" required><br>
        Password: <input type="password" name="password" required><br>
        <input type="submit" value="Login">
    </form>

    <%
        String username = request.getParameter("username");
        String password = request.getParameter("password");
        if (username != null && password != null) {
```

```
        Connection conn = null;
        PreparedStatement pstmt = null;
        ResultSet rs = null;
        try {
            Class.forName("com.mysql.cj.jdbc.Driver");
            conn =
DriverManager.getConnection("jdbc:mysql://localhost:3306/yourdatabase",
"yourusername", "yourpassword");
            String sql = "SELECT * FROM users WHERE username=? AND
password=?";
            pstmt = conn.prepareStatement(sql);
            pstmt.setString(1, username);
            pstmt.setString(2, password);
            rs = pstmt.executeQuery();
            if (rs.next()) {
                out.println("<h3>Login Successful!</h3>");
            } else {
                out.println("<h3>Invalid Username or Password!</h3>");
            }
        } catch (Exception e) {
            e.printStackTrace();
        } finally {
            if (rs != null) try { rs.close(); } catch (SQLException e) { e.printStackTrace();
}
            if (pstmt != null) try { pstmt.close(); } catch (SQLException e) {
e.printStackTrace(); }
            if (conn != null) try { conn.close(); } catch (SQLException e) {
e.printStackTrace(); }
        }
    }
%>
```

```
</body>
</html>
```

8. **Develop a JSP program to display the grade of a student by accepting the marks of five subjects.**

```
<%@ page language="java" contentType="text/html; charset=UTF-8"
pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
<head>
    <title>Student Grade Calculator</title>
</head>
<body>
    <h2>Student Grade Calculator</h2>
    <form method="post" action="grade.jsp">
        <label for="subject1">Marks in Subject 1:</label>
        <input type="number" name="subject1" required><br>
        <label for="subject2">Marks in Subject 2:</label>
        <input type="number" name="subject2" required><br>
        <label for="subject3">Marks in Subject 3:</label>
        <input type="number" name="subject3" required><br>
        <label for="subject4">Marks in Subject 4:</label>
        <input type="number" name="subject4" required><br>
        <label for="subject5">Marks in Subject 5:</label>
        <input type="number" name="subject5" required><br>
        <input type="submit" value="Calculate Grade">
    </form>

    <%
        if (request.getMethod().equalsIgnoreCase("post")) {
            int subject1 = Integer.parseInt(request.getParameter("subject1"));
            int subject2 = Integer.parseInt(request.getParameter("subject2"));
            int subject3 = Integer.parseInt(request.getParameter("subject3"));
            int subject4 = Integer.parseInt(request.getParameter("subject4"));
            int subject5 = Integer.parseInt(request.getParameter("subject5"));

            int totalMarks = subject1 + subject2 + subject3 + subject4 + subject5;
            double average = totalMarks / 5.0;
            String grade;

            if (average >= 90) {
                grade = "A";
```

```
            } else if (average >= 80) {
                grade = "B";
            } else if (average >= 70) {
                grade = "C";
            } else if (average >= 60) {
                grade = "D";
            } else {
                grade = "F";
            }
        %>
            <h3>Your Grade: <%= grade %></h3>
            <h4>Total Marks: <%= totalMarks %></h4>
            <h4>Average Marks: <%= average %></h4>
        <%
            }
        %>
    </body>
    </html>
```

9. **Write a JSP program to welcome the user with the welcome message.**

```
<%@ page language="java" contentType="text/html; charset=UTF-8"
    pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
<head>
    <meta charset="UTF-8">
    <title>Welcome Page</title>
</head>
<body>

    <!-- Standard HTML Welcome Message -->
    <h1>Welcome to Our Application!</h1>

    <%
        // Java code inside a JSP scriplet to define a variable
```

```
        String userName = "Guest";
        // You could replace "Guest" with logic to retrieve an actual username,
        // for example, from a session attribute or request parameter.

        // Example of checking for a request parameter if you pass the name in the URL:
        // String userNameParam = request.getParameter("name");
        // if (userNameParam != null && !userNameParam.isEmpty()) {
        //     userName = userNameParam;
        // }
    %>

    <!-- Using a JSP Expression (<%= %>) to output the Java variable's value -->
    <p>Hello, <%= userName %>! We are glad you are here.</p>

    <!-- Alternative using Expression Language (EL) for cleaner syntax (requires servlet spec 2.4+) -->
    <%-- To use EL, the variable should be stored in a scope (page, request, session, or application). --%>
    <%-- Example of setting a request attribute: --%>
    <% request.setAttribute("dynamicUser", "Jane Doe"); %>

    <p>Hello again, ${requestScope.dynamicUser}!</p>

</body>
</html>
```

10. **Write a JSP program to demonstrate the declaration, scriplets and expressions.**

```
<%@ page language="java" contentType="text/html; charset=UTF-8" pageEncoding="UTF-8"%>
<!DOCTYPE html>
```

```
<html>
<head>
    <title>JSP Demonstration</title>
</head>
<body>
    <h1>JSP Declaration, Scriptlet, and Expression Example</h1>

    <%
        // Declaration
        String message = "Welcome to JSP!";
        int number = 10;
    %>

    <h2>Using Scriptlet:</h2>
    <%
        // Scriptlet
        for (int i = 1; i <= number; i++) {
            out.println("<p>" + message + " This is message number " + i + ".</p>");
        }
    %>

    <h2>Using Expression:</h2>
    <p>The total number of messages displayed is: <%= number %></p>
</body>
</html>
```

11. **Write a JSP program to demonstrate the setAttribute and getAttribute method.**

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

```
<!DOCTYPE html>
<html>
<head>
    <meta charset="UTF-8">
    <title>JSP setAttribute and getAttribute Example</title>
</head>
<body>
    <%
        // Setting an attribute
        String message = "Hello, World!";
        request.setAttribute("greeting", message);
    %>

    <h1>JSP setAttribute and getAttribute Example</h1>
    <p>
        <%
            // Getting the attribute
            String greetingMessage = (String) request.getAttribute("greeting");
            out.println(greetingMessage);
        %>
    </p>
</body>
</html>
```

12. Write a JSP program to demonstrate the use of JSP Page directives.

```
<%@ page language="java" contentType="text/html; charset=UTF-8"
pageEncoding="UTF-8"%>
<%@ page import="java.util.Date" %>
<!DOCTYPE html>
```

```
<html>
<head>
    <title>JSP Page Directives Example</title>
</head>
<body>
    <h1>Welcome to JSP Page Directives Example</h1>
    <p>Current Date and Time: <%= new Date() %></p>
</body>
</html>
```

13. **Write a JSP program to demonstrate the use of JSP file inclusions.**

```
<%@ page contentType="text/html;charset=UTF-8" language="java" %>
<%@ include file="header.jsp" %>
<html>
<head>
    <title>JSP File Inclusions</title>
</head>
<body>
    <h1>Welcome to JSP File Inclusions Example</h1>
    <p>This is the main content of the page.</p>
    <jsp:include page="footer.jsp" />
</body>
</html>
```