Servlet Assignment – 2

1) Create a web page with separate forms, and corresponding servlets, to perform each of the following actions:

a. Accept a roll number, and display the following data about the student: name, department, and all courses taken, in tabular form: list the course id, title, credits and grade (show a blank if the grade is null).

b. Accept a word, and find all courses whose title contains that word.

c. Show all students with two or more fail grades; no need to show the courses they have failed, and I don't care if they passed the course subsequently.

Take a roll number, name and department name, and insert a new student record with tot_creds set to 0. Make sure you catch exceptions and report them (and test it with an incorrect department name, to see what happens when a foreign key constraint is violated, and similarly with a duplicate roll number, to see what happens when a primary key constraint is violated). Make sure also to close connections, even if there is an exception.

Ans) //Index.html

```
<!DOCTYPE html>
<html>
<head>
  <title>Servlet Student Database - Assignment 2</title>
</head>
<body>
  <h1>JDBC + Servlet Assignment</h1>

  <h3>1. Get Student Details</h3>
  <form action="StudentDetailsServlet" method="post">
    Roll Number: <input type="text" name="roll_no" required>
    <input type="submit" value="Get Details">
  </form>

  <h3>2. Find Courses by Keyword</h3>
  <form action="CourseSearchServlet" method="post">
    Keyword: <input type="text" name="keyword" required>
    <input type="submit" value="Search">
  </form>

  <h3>3. Students with 2 or more Fail Grades</h3>
  <form action="FailStudentsServlet" method="post">
    <input type="submit" value="Show Failed Students">
  </form>

  <h3>4. Add a New Student</h3>
  <form action="AddStudentServlet" method="post">
    Roll No: <input type="text" name="roll_no" required><br>
    Name: <input type="text" name="name" required><br>
    Department: <input type="text" name="dept_name" required><br>
    <input type="submit" value="Add Student">
  </form>
</body>
</html>
```

//DBConnection.java

```
package com.assignment2.util;
import java.sql.*;

public class DBConnection {
    private static final String URL = "jdbc:mysql://localhost:3306/university";
    private static final String USER = "root";
    private static final String PASS = "password";

    static {
        try {
            Class.forName("com.mysql.cj.jdbc.Driver");
        } catch (ClassNotFoundException e) {
            e.printStackTrace();
        }
    }

    public static Connection getConnection() throws SQLException {
        return DriverManager.getConnection(URL, USER, PASS);
    }
}
```

//StudentDetailsServlet.java

```
package com.assignment2.servlets;

import com.assignment2.util.DBConnection;
import jakarta.servlet.*;
import jakarta.servlet.http.*;
import java.io.*;
import java.sql.*;

public class StudentDetailsServlet extends HttpServlet {
    protected void doPost(HttpServletRequest req, HttpServletResponse res) throws IOException {
        res.setContentType("text/html");
        PrintWriter out = res.getWriter();
        int roll = Integer.parseInt(req.getParameter("roll_no"));

        Connection con = null;
        try {
            con = DBConnection.getConnection();

            PreparedStatement ps1 = con.prepareStatement(
                "SELECT name, dept_name FROM Student WHERE roll_no=?");
            ps1.setInt(1, roll);
            ResultSet rs1 = ps1.executeQuery();

            if (!rs1.next()) {
                out.println("<h3>No student found with Roll No: " + roll + "</h3>");
                return;
            }

            String name = rs1.getString("name");
            String dept = rs1.getString("dept_name");
            out.println("<h2>Student: " + name + " (" + dept + ")</h2>");
            out.println("<table border='1'><tr><th>Course ID</th><th>Title</th><th>Credits</th><th>Grade</th></tr>");

            PreparedStatement ps2 = con.prepareStatement(
                "SELECT c.course_id, c.title, c.credits, t.grade " +
        "FROM Takes t JOIN Course c ON t.course_id = c.course_id WHERE t.roll_no=?");
      ps2.setInt(1, roll);
      ResultSet rs2 = ps2.executeQuery();

      while (rs2.next()) {
        out.println("<tr><td>" + rs2.getString(1) + "</td><td>" +
            rs2.getString(2) + "</td><td>" +
            rs2.getInt(3) + "</td><td>" +
            (rs2.getString(4) == null ? "" : rs2.getString(4)) + "</td></tr>");
      }
      out.println("</table>");
    } catch (Exception e) {
      out.println("<h3>Error: " + e.getMessage() + "</h3>");
    } finally {
      try { if (con != null) con.close(); } catch (SQLException ignored) {}
    }
  }
}
```

//CourseSearchServlet.java

```
package com.assignment2.servlets;

import com.assignment2.util.DBConnection;
import jakarta.servlet.*;
import jakarta.servlet.http.*;
import java.io.*;
import java.sql.*;

public class CourseSearchServlet extends HttpServlet {
  protected void doPost(HttpServletRequest req, HttpServletResponse res) throws
IOException {
    res.setContentType("text/html");
    PrintWriter out = res.getWriter();
    String keyword = req.getParameter("keyword");

    try (Connection con = DBConnection.getConnection()) {
      PreparedStatement ps = con.prepareStatement(
        "SELECT course_id, title, credits FROM Course WHERE title LIKE ?");
```

```
            ps.setString(1, "%" + keyword + "%");
            ResultSet rs = ps.executeQuery();

            out.println("<h2>Courses containing '" + keyword + "':</h2>");
            out.println("<table border='1'><tr><th>Course
ID</th><th>Title</th><th>Credits</th></tr>");

            boolean found = false;
            while (rs.next()) {
                found = true;
                out.println("<tr><td>" + rs.getString(1) + "</td><td>" +
                        rs.getString(2) + "</td><td>" + rs.getInt(3) + "</td></tr>");
            }
            if (!found) out.println("<tr><td colspan='3'>No matching courses found</td></tr>");
            out.println("</table>");
        } catch (SQLException e) {
            out.println("<h3>Error: " + e.getMessage() + "</h3>");
        }
    }
}
```

//FailStudentsServlet.java

```
package com.assignment2.servlets;

import com.assignment2.util.DBConnection;
import jakarta.servlet.*;
import jakarta.servlet.http.*;
import java.io.*;
import java.sql.*;

public class FailStudentsServlet extends HttpServlet {
    protected void doPost(HttpServletRequest req, HttpServletResponse res) throws
IOException {
        res.setContentType("text/html");
        PrintWriter out = res.getWriter();

        try (Connection con = DBConnection.getConnection()) {
            String query = """
                SELECT s.roll_no, s.name, s.dept_name
                FROM Student s
                JOIN Takes t ON s.roll_no = t.roll_no
                WHERE t.grade = 'F'
                GROUP BY s.roll_no, s.name, s.dept_name
                HAVING COUNT(*) >= 2
                """;

            Statement st = con.createStatement();
            ResultSet rs = st.executeQuery(query);

            out.println("<h2>Students with 2 or more Fail Grades</h2>");
            out.println("<table border='1'><tr><th>Roll No</th><th>Name</th><th>Department</th></tr>");

            boolean found = false;
            while (rs.next()) {
                found = true;
                out.println("<tr><td>" + rs.getInt(1) + "</td><td>" +
                        rs.getString(2) + "</td><td>" + rs.getString(3) + "</td></tr>");
            }
            if (!found) out.println("<tr><td colspan='3'>No students found</td></tr>");
            out.println("</table>");
        } catch (SQLException e) {
            out.println("<h3>Error: " + e.getMessage() + "</h3>");
        }
    }
}
```

//AddStudentServlet.java

```
package com.assignment2.servlets;

import com.assignment2.util.DBConnection;
import jakarta.servlet.*;
import jakarta.servlet.http.*;
import java.io.*;
import java.sql.*;
```

```
public class AddStudentServlet extends HttpServlet {
    protected void doPost(HttpServletRequest req, HttpServletResponse res) throws IOException {
        res.setContentType("text/html");
        PrintWriter out = res.getWriter();

        int roll = Integer.parseInt(req.getParameter("roll_no"));
        String name = req.getParameter("name");
        String dept = req.getParameter("dept_name");

        Connection con = null;
        try {
            con = DBConnection.getConnection();
            PreparedStatement ps = con.prepareStatement(
                "INSERT INTO Student (roll_no, name, dept_name, tot_creds) VALUES (?, ?, ?, 0)");
            ps.setInt(1, roll);
            ps.setString(2, name);
            ps.setString(3, dept);

            int rows = ps.executeUpdate();
            if (rows > 0) {
                out.println("<h3>Student added successfully!</h3>");
            }
        } catch (SQLException e) {
            out.println("<h3>Error: " + e.getMessage() + "</h3>");
            if (e.getMessage().contains("Duplicate entry"))
                out.println("<p><b>Primary key violation!</b> Roll number already exists.</p>");
            else if (e.getMessage().contains("foreign key"))
                out.println("<p><b>Foreign key violation!</b> Invalid department name.</p>");
        } finally {
            try { if (con != null) con.close(); } catch (SQLException ignored) {}
        }
    }
}
```