Q.1 Write a Java program to connect to a MySQL database using JDBC.

```
package jdbc_practice;

import java.sql.Connection;

import java.sql.DriverManager;

import java.sql.ResultSet;

import java.sql.SQLException;

import java.sql.Statement;


public class Connection_MYSQL {

    public static void main(String[] args) {

        String dbUrl = "jdbc:mysql://localhost:3306/mydb";

        String dbUser = "root";

        String dbPassword = "Mona";

        try {

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

            Connection conn = DriverManager.getConnection(dbUrl, dbUser, dbPassword);

            Statement stmt = conn.createStatement();

            ResultSet rs = stmt.executeQuery("SELECT * FROM students");

            while (rs.next()) {

                System.out.println(rs.getString(1) + " " + rs.getString(2));

            }

            conn.close();

        } catch (ClassNotFoundException e) {

            System.out.println("MySQL JDBC driver not found.");

        } catch (SQLException e) {

            System.out.println("Error connecting to the database or executing query: " + e.getMessage());

        }

    }

}
```

Output:

1 Medabayani

2 Monalisa

3 Medabayani

4 Monalisa

Q.2 Create a Java class to insert student records into a database table.

```java
package jdbc_practice;

import java.sql.Connection;

import java.sql.DriverManager;

import java.sql.PreparedStatement;

import java.sql.SQLException;

import java.util.Scanner;


public class insert_student {

    public static void main(String[] args) {

        try {

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

            String url = "jdbc:mysql://localhost:3306/mydb";

            String username = "root";

            String password = "Mona";

            Connection con = DriverManager.getConnection(url, username, password);

            Scanner scanner = new Scanner(System.in);

            System.out.print("Enter student ID: ");

            int id = scanner.nextInt();

            System.out.print("Enter student name: ");

            String name = scanner.next();

            System.out.print("Enter student age: ");

            int age = scanner.nextInt();

            String query = "INSERT INTO student (id, name, age) VALUES (?, ?, ?)";

            PreparedStatement pstmt = con.prepareStatement(query);

            pstmt.setInt(1, id);

            pstmt.setString(2, name);

            pstmt.setInt(3, age);
```

```java
        int rowsAffected = pstmt.executeUpdate();

        if (rowsAffected > 0) {

            System.out.println("Student record inserted successfully");

        } else {

            System.out.println("Failed to insert student record");

        }

        con.close();

    } catch (ClassNotFoundException e) {

        System.out.println("MySQL JDBC driver not found!");

    } catch (SQLException e) {

        System.out.println("Error: " + e.getMessage());

    }

  }

}
```

Output:

Enter student ID: 205

Enter student name: Monalisa

Enter student age: 21

Student record inserted successfully

Q.3 Write a JDBC program to fetch and display all student records from the database.

```java
package jdbc_practice;

import java.sql.Connection;

import java.sql.DriverManager;

import java.sql.ResultSet;

import java.sql.SQLException;

import java.sql.Statement;


public class Display_Students {

    public static void main(String[] args) {

        try {

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

```java
        Connection con = DriverManager.getConnection("jdbc:mysql://localhost:3306/mydb", "root",
"Mona");

        Statement stmt = con.createStatement();

        ResultSet rs = stmt.executeQuery("SELECT * FROM student");

        while (rs.next()) {

            System.out.println(rs.getInt(1) + " " + rs.getString(2));

        }

        rs.close();

        stmt.close();

        con.close();

    } catch (ClassNotFoundException e) {

        System.out.println("MySQL JDBC driver not found!");

    } catch (SQLException e) {

        System.out.println("Error: " + e.getMessage());

    }

  }

}
```

Output:

205 Monalisa

206 Medabayani

207 Monalisa

208 Medabayani

Q.4 Develop a program to search a student by ID using JDBC.

```java
package jdbc_practice;

import java.sql.Connection;

import java.sql.DriverManager;

import java.sql.PreparedStatement;

import java.sql.ResultSet;

import java.sql.SQLException;

import java.util.Scanner;
```

```java
public class Search_StudentID {
    public static void main(String[] args) {
        String dbUrl = "jdbc:mysql://localhost:3306/mydb";
        String username = "root";
        String password = "Mona";
        try (Connection conn = DriverManager.getConnection(dbUrl, username, password)) {
            Scanner scanner = new Scanner(System.in);
            System.out.print("Enter student ID: ");
            int studentId = scanner.nextInt();
            scanner.close();
            String query = "SELECT * FROM student WHERE id = ?";
            try (PreparedStatement pstmt = conn.prepareStatement(query)) {
                pstmt.setInt(1, studentId);
                try (ResultSet result = pstmt.executeQuery()) {
                    if (result.next()) {
                        System.out.println("Student found:");
                        System.out.println("ID: " + result.getInt("id"));
                        System.out.println("Name: " + result.getString("name"));
                        System.out.println("Age: " + result.getInt("age"));
                    } else {
                        System.out.println("Student not found.");
                    }
                }
            }
        } catch (SQLException e) {
            System.out.println("Error: " + e.getMessage());
        }
    }
}
```

Output:

Enter student ID: 205

Student found:

ID: 205

Name: Monalisa

Age: 21

Q.5 Write a Java program to delete a student record from the database using JDBC.

package jdbc_practice;

import java.sql.Connection;

import java.sql.DriverManager;

import java.sql.PreparedStatement;

import java.sql.SQLException;

import java.util.Scanner;

public class Delete_Student {

  public static void main(String[] args) {

    String dbUrl = "jdbc:mysql://localhost:3306/mydb";

    String dbUser = "root";

    String dbPassword = "Mona";

    try {

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

      Connection conn = DriverManager.getConnection(dbUrl, dbUser, dbPassword);

      Scanner scanner = new Scanner(System.in);

      System.out.print("Enter the student ID to delete ");

      int studentId = scanner.nextInt();

      String query = "DELETE FROM students WHERE id=?";

      PreparedStatement pstmt = conn.prepareStatement(query);

      pstmt.setInt(1, studentId);

      int rowsAffected = pstmt.executeUpdate();

      if (rowsAffected > 0) {

        System.out.println("Student record deleted successfully");

      } else {

        System.out.println("No student record found with the given ID");

```
        }

        conn.close();

    } catch (ClassNotFoundException e) {

        System.out.println("MySQL JDBC driver not found.");

    } catch (SQLException e) {

        System.out.println("Error connecting to the database or executing query: " + e.getMessage());

    }

  }

}
```

Output:

Enter the student ID to delete: 205

Student record deleted successfully

Q.6 Develop a program to perform all CRUD operations on an Employee table using JDBC.

```
package jdbc_practice;

import java.sql.*;


public class CRUD {

  public static void main(String[] args) {

    try {

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

        Connection conn = DriverManager.getConnection("jdbc:mysql://localhost:3306/mydb",
"root", "Mona");

        createEmployee(conn, 1, "Monalisa", "java developer", 35000);

        readEmployees(conn);

        updateEmployee(conn, 1, 80000);

        readEmployees(conn);

        deleteEmployee(conn, 1);

        conn.close();

    } catch (ClassNotFoundException | SQLException e) {

        e.printStackTrace();

    }
```

```java
    }

    public static void createEmployee(Connection conn, int id, String name, String position, double salary) throws SQLException {

        String query = "INSERT INTO employees (id, name, position, salary) VALUES (?, ?, ?, ?)";

        PreparedStatement pstmt = conn.prepareStatement(query);

        pstmt.setInt(1, id);

        pstmt.setString(2, name);

        pstmt.setString(3, position);

        pstmt.setDouble(4, salary);

        pstmt.executeUpdate();

        System.out.println("Employee created successfully");

    }

    public static void readEmployees(Connection conn) throws SQLException {

        String query = "SELECT * FROM employees";

        Statement stmt = conn.createStatement();

        ResultSet rs = stmt.executeQuery(query);

        while (rs.next()) {

            System.out.println("ID: " + rs.getInt("id"));

            System.out.println("Name: " + rs.getString("name"));

            System.out.println("Position: " + rs.getString("position"));

            System.out.println("Salary: " + rs.getDouble("salary"));

            System.out.println();

        }

    }

    public static void updateEmployee(Connection conn, int id, double salary) throws SQLException {

        String query = "UPDATE employees SET salary = ? WHERE id = ?";

        PreparedStatement pstmt = conn.prepareStatement(query);

        pstmt.setDouble(1, salary);
```

```
        pstmt.setInt(2, id);

        pstmt.executeUpdate();

        System.out.println("Employee updated successfully");

    }


    public static void deleteEmployee(Connection conn, int id) throws SQLException {

        String query = "DELETE FROM employees WHERE id=?";

        PreparedStatement pstmt = conn.prepareStatement(query);

        pstmt.setInt(1, id);

        pstmt.executeUpdate();

        System.out.println("Employee deleted successfully");

    }
}
```

Output:

Employee created successfully

ID: 301

Name: Monalisa

Position: java developer

Salary: 35000.0

Employee updated successfully

ID: 1

Name: Monalisa

Position: java developer

Salary: 80000.0

Employee deleted successfully

Q.7 Create a JDBC-based program to count the total number of rows in a table.

package jdbc_practice;

import java.sql.*;

```java
public class counting_rows {

    public static void main(String[] args) {

        try {

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

            Connection conn = DriverManager.getConnection("jdbc:mysql://localhost:3306/mydb", "root", "Mona");

            Statement stmt = conn.createStatement();

            ResultSet rs = stmt.executeQuery("SELECT COUNT(*) FROM students");

            if (rs.next()) {

                System.out.println("Total number of students: " + rs.getInt(1));

            }

            conn.close();

        } catch (ClassNotFoundException | SQLException e) {

            e.printStackTrace();

        }

    }

}
```

Output:

Total number of students: 4

Q.8 Develop a program to sort student data in ascending order by name using SQL in JDBC.

```java
package jdbc_practice;

import java.sql.*;


public class Sorting_student {

    public static void main(String[] args) {

        try {

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

            Connection conn = DriverManager.getConnection("jdbc:mysql://localhost:3306/mydb", "root", "Mona");

            String query = "SELECT * FROM students ORDER BY name";

            Statement stmt = conn.createStatement();

            ResultSet rs = stmt.executeQuery(query);
```

```
            while (rs.next()) {

                System.out.println("Name: " + rs.getString("name"));

            }

            conn.close();

        } catch (ClassNotFoundException | SQLException e) {

            e.printStackTrace();

        }

    }

}
```

Output:

Name: Medabayani

Name: Medabayani

Name: Monalisa

Name: Monalisa

Q.9 Use PreparedStatement to insert multiple student records into the database.

```
package jdbc_practice;

import java.sql.*;


public class inserting_multiple {

    public static void main(String[] args) {

        try {

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

            Connection conn = DriverManager.getConnection("jdbc:mysql://localhost:3306/mydb", "root", "Mona");

            String query = "INSERT INTO students (name, grade, age) VALUES (?, ?, ?)";

            PreparedStatement pstmt = conn.prepareStatement(query);

            insertStudent(pstmt, "Monalisa", "A", 20);

            insertStudent(pstmt, "Medabayani", "B", 21);

            insertStudent(pstmt, "Monalisa", "A", 19);

            conn.close();

        } catch (ClassNotFoundException | SQLException e) {
```

```
            e.printStackTrace();

        }

    }


    private static void insertStudent(PreparedStatement pstmt, String name, String grade, int age)
throws SQLException {

        pstmt.setString(1, name);

        pstmt.setString(2, grade);

        pstmt.setInt(3, age);

        pstmt.executeUpdate();

        System.out.println("Student record inserted successfully");

    }

}
```

Output:

Student record inserted successfully

Student record inserted successfully

Student record inserted successfully

Q.10 Write a JDBC program to handle exceptions (like invalid ID, connection errors) gracefully.

```
package jdbc_practice;

import java.sql.*;


public class HandleExceptions {

    public static void main(String[] args) {

        try {

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

            Connection conn = DriverManager.getConnection("jdbc:mysql://localhost:3306/mydb",
"root", "Mona");

            Statement stmt = conn.createStatement();

            try {

                ResultSet rs = stmt.executeQuery("SELECT * FROM students WHERE id = 205");

                if (rs.next()) {

                    System.out.println("Student ID: " + rs.getInt("id"));
```

```java
                System.out.println("Student Name: " + rs.getString("name"));
            } else {
                System.out.println("No student record found with the given ID.");
            }
        } catch (SQLException e) {
            System.out.println("Error executing query: " + e.getMessage());
        } finally {
            try {
                stmt.close();
            } catch (SQLException e) {
                System.out.println("Error closing Statement object: " + e.getMessage());
            }
        }
    } catch (ClassNotFoundException e) {
        System.out.println("MySQL JDBC driver not found");
    } catch (SQLException e) {
        System.out.println("Error connecting to the database: " + e.getMessage());
    }
  }
}
```

Output:

Student ID: 205

Student Name: Monalisa