Experiment-7

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Subject Name: Java Lab **Subject Code:** 22CSH-359

Problem-1 (Easy)

1. Aim:

Create a Java program to connect to a MySQL database and fetch data from a single table. The program should: Use DriverManager and Connection objects. Retrieve and display all records from a table named Employee with columns EmpID, Name, and Salary.

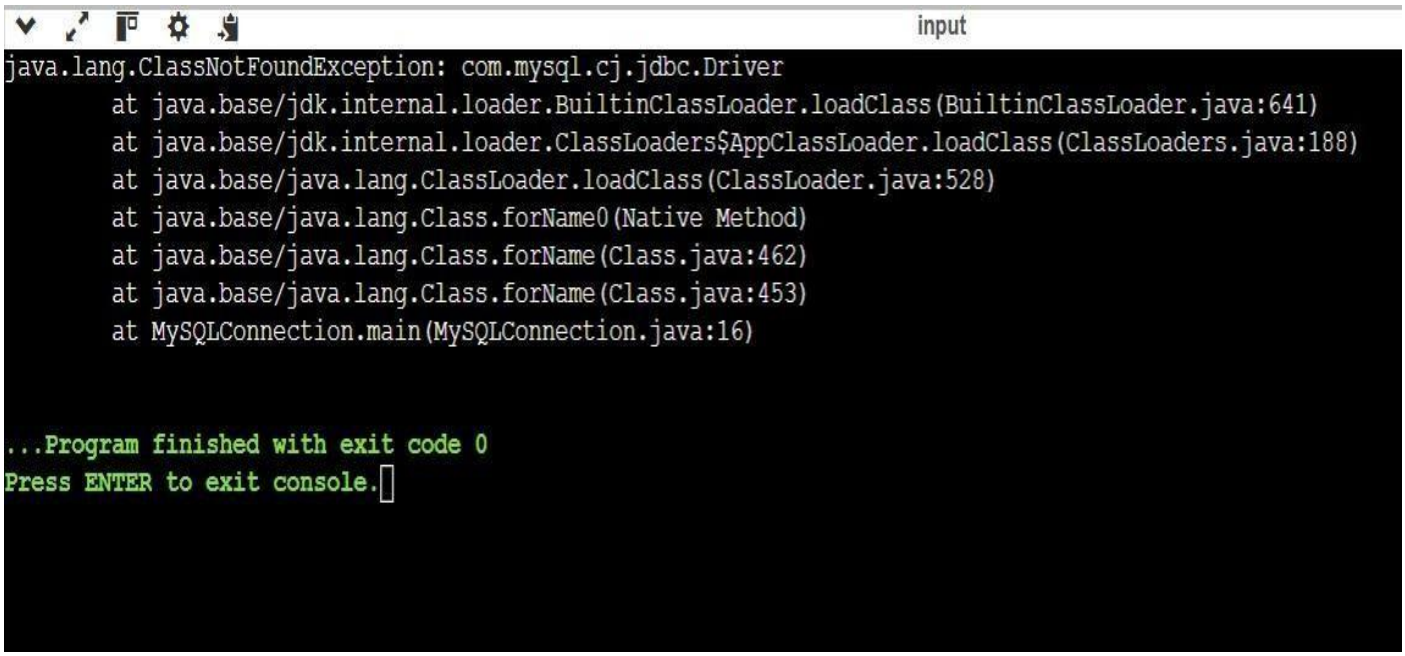
2. Implementation/Code:

```
import java.sql.*; public class
MySQLConnection { public static
void main(String[] args) {
 // Database credentials
 String url = "jdbc:mysql://localhost:3306/your_database"; // Replace with your database name
 String user = "your_username"; // Replace with your username
 String password = "your_password"; // Replace with your password
     // SQL query to fetch employee records
     String query = "SELECT * FROM Employee";
// Establish connection and retrieve data     try {
         // Load MySQL JDBC Driver
         Class.forName("com.mysql.cj.jdbc.Driver");
         // Establish connection
         Connection conn = DriverManager.getConnection(url, user, password);
         Statement stmt = conn.createStatement();
         ResultSet rs = stmt.executeQuery(query);
```

```
            // Display employee records
            System.out.println("EmpID | Name | Salary");
while (rs.next()) {                int id = rs.getInt("EmpID");
String name = rs.getString("Name");                double salary
= rs.getDouble("Salary");                System.out.println(id + "
| " + name + " | " + salary);
            }

            // Close resources
rs.close();
stmt.close();
conn.close();          } catch
(Exception e)
{ e.printStackTrace();
        }
    }
}
```

3. Output:



Problem-2 (Medium)

1. **Aim:**
   Build a program to perform CRUD operations (Create, Read, Update, Delete) on a database table Product with columns: ProductID, ProductName, Price, and Quantity. The program should include: Menu-driven options for each operation. Transaction handling to ensure data integrity.
2. **Implementation/Code:**

```
import java.sql.*;
import java.util.Scanner;

public class ProductCRUD {
   static final String URL = "jdbc:mysql://localhost:3306/your_database";
static final String USER = "your_username";     static final String
PASSWORD = "your_password";

   public static void main(String[] args) { try (Connection conn =
      DriverManager.getConnection(URL, USER, PASSWORD);              Scanner
      scanner = new Scanner(System.in)) {
```

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

            while (true) {
                System.out.println("\nProduct CRUD Menu:");
                System.out.println("1. Add Product");
                System.out.println("2. View Products");
                System.out.println("3. Update Product");
                System.out.println("4. Delete Product");
                System.out.println("5. Exit");
System.out.print("Enter choice: ");                int
choice = scanner.nextInt();
scanner.nextLine();

                switch (choice) {
case 1:
                        addProduct(conn, scanner);
                        break;
case 2:
                        viewProducts(conn);
                        break;
case 3:
                        updateProduct(conn, scanner);
break;                      case 4:
                        deleteProduct(conn, scanner);
                        break;
case 5:
                        System.out.println("Exiting...");
                        return;
default:
                        System.out.println("Invalid choice, try again.");
                }
            }
        } catch (Exception e)
{ e.printStackTrace();
        }
    }

    private static void addProduct(Connection conn, Scanner scanner) throws
SQLException {
```

```
        System.out.print("Enter Product Name: ");
        String name = scanner.nextLine();
System.out.print("Enter Price: ");         double
price = scanner.nextDouble();
System.out.print("Enter Quantity: ");
        int quantity = scanner.nextInt();

        String query = "INSERT INTO Product (ProductName, Price, Quantity) VALUES
(?, ?, ?)";
        try (PreparedStatement pstmt = conn.prepareStatement(query))
{ pstmt.setString(1, name);          pstmt.setDouble(2, price);
pstmt.setInt(3, quantity);             pstmt.executeUpdate();
            System.out.println("Product added successfully.");
        }
    }

    private static void viewProducts(Connection conn) throws SQLException
{ String query = "SELECT * FROM Product";
        try (Statement stmt = conn.createStatement(); ResultSet rs =
stmt.executeQuery(query)) {
            System.out.println("\nProduct List:");
            while (rs.next()) {
                System.out.println(rs.getInt("ProductID") + " | " +
rs.getString("ProductName") + " | " + rs.getDouble("Price") + " | " +
rs.getInt("Quantity"));
            }
        }
    }

    private static void updateProduct(Connection conn, Scanner scanner) throws
SQLException {
        System.out.print("Enter Product ID to update: ");
        int id = scanner.nextInt(); scanner.nextLine();
        System.out.print("Enter new Product Name:
        ");
        String name = scanner.nextLine();
System.out.print("Enter new Price: ");
```

```
double price = scanner.nextDouble();
System.out.print("Enter new Quantity: ");         int
quantity = scanner.nextInt();

        String query = "UPDATE Product SET ProductName=?, Price=?, Quantity=?
WHERE ProductID=?";
        try (PreparedStatement pstmt = conn.prepareStatement(query))
{ pstmt.setString(1, name);          pstmt.setDouble(2, price);
pstmt.setInt(3, quantity);             pstmt.setInt(4, id);
pstmt.executeUpdate();
            System.out.println("Product updated successfully.");
        }
    }

    private static void deleteProduct(Connection conn, Scanner scanner) throws
SQLException {
        System.out.print("Enter Product ID to delete: ");
        int id = scanner.nextInt();

        String query = "DELETE FROM Product WHERE ProductID=?";
try (PreparedStatement pstmt = conn.prepareStatement(query))
{ pstmt.setInt(1, id);          pstmt.executeUpdate();
            System.out.println("Product deleted successfully.");
        }
    }
}
```

3. Output:

```
java.sql.SQLException: No suitable driver found for jdbc:mysql://localhost:3306/your_database
        at java.sql/java.sql.DriverManager.getConnection(DriverManager.java:707)
        at java.sql/java.sql.DriverManager.getConnection(DriverManager.java:230)
        at ProductCRUD.main(ProductCRUD.java:10)


...Program finished with exit code 0
Press ENTER to exit console.
```

Problem-3 (Hard)

1. **Aim:**

   Develop a Java application using JDBC and MVC architecture to manage student data. The application should: Use a Student class as the model with fields like StudentID, Name, Department, and Marks. Include a database table to store student data. Allow the user to perform CRUD operations through a simple menu-driven view. Implement database operations in a separate controller class.

2. **Implementation/Code:**

```
import java.sql.*;
import java.util.Scanner;

public class StudentManagementApp {
    static final String URL = "jdbc:mysql://localhost:3306/StudentDB";
static final String USER = "your_username";     static final String
PASSWORD = "your_password";

    public static void main(String[] args) { try (Connection conn =
        DriverManager.getConnection(URL, USER, PASSWORD);              Scanner
        scanner = new Scanner(System.in))
        { Class.forName("com.mysql.cj.jdbc.Driver");          conn.setAutoCommit(false);

            while (true) {
```

```
            System.out.println("\nStudent Management System:");
            System.out.println("1. Add Student");
            System.out.println("2. View Students");
            System.out.println("3. Update Student");
            System.out.println("4. Delete Student");
            System.out.println("5. Exit");
System.out.print("Enter choice: ");              int
choice = scanner.nextInt();
scanner.nextLine();

            switch (choice) {
case 1:
                addStudent(conn, scanner);
                break;
case 2:
                viewStudents(conn);
                break;
case 3:
                updateStudent(conn, scanner);
break;                  case 4:
                deleteStudent(conn, scanner);
                break;
case 5:
                System.out.println("Exiting...");
                return;
default:
                System.out.println("Invalid choice, try again.");
            }
        }
    } catch (Exception e)
{ e.printStackTrace();
    }
  }

  private static void addStudent(Connection conn, Scanner scanner) throws
SQLException {
    System.out.print("Enter Student ID: ");
    int id = scanner.nextInt();
scanner.nextLine();
```

```
        System.out.print("Enter Name: ");
        String name = scanner.nextLine();
        System.out.print("Enter Department: ");
        String dept = scanner.nextLine();
System.out.print("Enter Marks: ");         double
marks = scanner.nextDouble();

        String query = "INSERT INTO Student (StudentID, Name, Department, Marks)
VALUES (?, ?, ?, ?)";
        try (PreparedStatement pstmt = conn.prepareStatement(query))
{ pstmt.setInt(1, id);          pstmt.setString(2, name);
pstmt.setString(3, dept);             pstmt.setDouble(4, marks);
pstmt.executeUpdate();              conn.commit();
            System.out.println("Student added successfully.");
        } catch (SQLException e)
            { conn.rollback();
throw e;
        }
    }

    private static void viewStudents(Connection conn) throws SQLException
{ String query = "SELECT * FROM Student";
        try (Statement stmt = conn.createStatement(); ResultSet rs =
stmt.executeQuery(query)) {
            System.out.println("\nStudent List:");
            while (rs.next()) {
                System.out.println(rs.getInt("StudentID") + " | " + rs.getString("Name") + " | "
+ rs.getString("Department") + " | " + rs.getDouble("Marks"));
            }
        }
    }

    private static void updateStudent(Connection conn, Scanner scanner) throws
SQLException {
        System.out.print("Enter Student ID to update: ");
        int id = scanner.nextInt();
scanner.nextLine();
```

```
        System.out.print("Enter new Name: ");
        String name = scanner.nextLine();
        System.out.print("Enter new Department: ");
        String dept = scanner.nextLine();
System.out.print("Enter new Marks: ");
        double marks = scanner.nextDouble();

        String query = "UPDATE Student SET Name=?, Department=?, Marks=? WHERE
StudentID=?";
        try (PreparedStatement pstmt = conn.prepareStatement(query))
{ pstmt.setString(1, name);          pstmt.setString(2, dept);
pstmt.setDouble(3, marks);             pstmt.setInt(4, id);
pstmt.executeUpdate();             conn.commit();
            System.out.println("Student updated successfully.");
        } catch (SQLException e)
            { conn.rollback();
throw e;
        }
    }

    private static void deleteStudent(Connection conn, Scanner scanner) throws
SQLException {
        System.out.print("Enter Student ID to delete: ");
int id = scanner.nextInt();

        String query = "DELETE FROM Student WHERE StudentID=?";
        try (PreparedStatement pstmt = conn.prepareStatement(query)) {
pstmt.setInt(1, id);            pstmt.executeUpdate();
conn.commit();
            System.out.println("Student deleted successfully.");
        } catch (SQLException e)
            { conn.rollback();
            throw e;
        }
    }
}
```

3. Output:

```
java.sql.SQLException: No suitable driver found for jdbc:mysql://localhost:3306/StudentDB
        at java.sql/java.sql.DriverManager.getConnection(DriverManager.java:707)
        at java.sql/java.sql.DriverManager.getConnection(DriverManager.java:230)
        at StudentManagementApp.main(StudentManagementApp.java:10)


...Program finished with exit code 0
Press ENTER to exit console.
```