

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:

```
input
java.lang.ClassNotFoundException: com.mysql.cj.jdbc.Driver
    at java.base/jdk.internal.loader.BuiltinClassLoader.loadClass(BuiltinClassLoader.java:641)
    at java.base/jdk.internal.loader.ClassLoaders$AppClassLoader.loadClass(ClassLoaders.java:188)
    at java.base/java.lang.ClassLoader.loadClass(ClassLoader.java:528)
    at java.base/java.lang.Class.forName0(Native Method)
    at java.base/java.lang.Class.forName(Class.java:462)
    at java.base/java.lang.Class.forName(Class.java:453)
    at MySQLConnection.main(MySQLConnection.java:16)

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

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.█
```