Lab Sheet 02

Task 01 - Set Up MySQL Database

```
CREATE DATABASE employee_db;

USE employee_db;

CREATE TABLE employees (
      id INT PRIMARY KEY AUTO_INCREMENT,
      name VARCHAR(100),
      position VARCHAR(100),
      salary DECIMAL(10, 2)
);

INSERT INTO employees (name, position, salary) VALUES ('John Doe', 'Software
Engineer', 75000);
INSERT INTO employees (name, position, salary) VALUES ('Jane Smith', 'HR
Manager', 65000);
INSERT INTO employees (name, position, salary) VALUES ('Steve Brown', 'Team
Lead', 85000);
```

Task 02 - Set Up NetBeans Project

Task 03 - Establish JDBC Connection

DatabaseConnection.java

```
package jdbcexample;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.SQLException;
public class DatabaseConnection {
    private static final String URL =
"jdbc:mysql://localhost:3306/employee_db"; // Database URL
    private static final String USER = "root"; // Your MySQL
username
    private static final String PASSWORD = ""; // Your MySQL
password public static Connection getConnection() throws
SQLException {
    public static Connection getConnection() throws SQLException
{
        try {
            // Load the JDBC driver
            Class.forName("com.mysql.cj.jdbc.Driver");
            // Return the database connection
            return DriverManager.getConnection(URL, USER,
PASSWORD);
        } catch (ClassNotFoundException | SQLException e) {
            System.out.println("Connection failed: " +
e.getMessage());
            throw new SQLException("Failed to establish
connection.");
        }
    }
}
```

Task 04 - Perform CRUD Operations

EmployeeDAO.java

```
package jdbcexample;
import java.sql.*;
import java.util.ArrayList;
import java.util.List;
public class EmployeeDAO {

    // Create an employee
 public static void addEmployee(String name, String position,
double salary) {
    String sql = "INSERT INTO employees (name, position, salary)
VALUES (?, ?, ?)";
    try (Connection conn = DatabaseConnection.getConnection();
    PreparedStatement stmt = conn.prepareStatement(sql)) {
        stmt.setString(1, name);
        stmt.setString(2, position);
        stmt.setDouble(3, salary);
        int rowsAffected = stmt.executeUpdate();
        System.out.println("Employee added successfully. Rows
affected: " + rowsAffected);
    } catch (SQLException e) {
    e.printStackTrace();
    }
 }

 // Read all employees
 public static List<Employee> getAllEmployees() {
    List<Employee> employees = new ArrayList<>();
    String sql = "SELECT * FROM employees";
    try (Connection conn = DatabaseConnection.getConnection();
    Statement stmt = conn.createStatement();
    ResultSet rs = stmt.executeQuery(sql)) {
        while (rs.next()) {
            Employee employee = new Employee(
                rs.getInt("id"),
                rs.getString("name"),
                rs.getString("position"),
                rs.getDouble("salary")
            );
            employees.add(employee);
        }
    } catch (SQLException e) {
        e.printStackTrace();
    }
    return employees;
 }

 // Update an employee's information
 public static void updateEmployee(int id, String name, String
position, double salary) {
    String sql = "UPDATE employees SET name = ?, position = ?,
salary = ? WHERE id = ?";
    try (Connection conn = DatabaseConnection.getConnection();
        PreparedStatement stmt = conn.prepareStatement(sql)) {
        stmt.setString(1, name);
        stmt.setString(2, position);
        stmt.setDouble(3, salary);
        stmt.setInt(4, id);
        int rowsAffected = stmt.executeUpdate();
        System.out.println("Employee updated successfully. Rows
affected: " + rowsAffected);
    } catch (SQLException e) {
        e.printStackTrace();
    }
 }

 // Delete an employee
 public static void deleteEmployee(int id) {
    String sql = "DELETE FROM employees WHERE id = ?";
    try (Connection conn = DatabaseConnection.getConnection();
        PreparedStatement stmt = conn.prepareStatement(sql)) {
        stmt.setInt(1, id);
        int rowsAffected = stmt.executeUpdate();
        System.out.println("Employee deleted successfully. Rows
affected: " + rowsAffected);
    } catch (SQLException e) {
        e.printStackTrace();
    }
 }
}
```

Task 05 - Create Employee.java Class

Employee.java

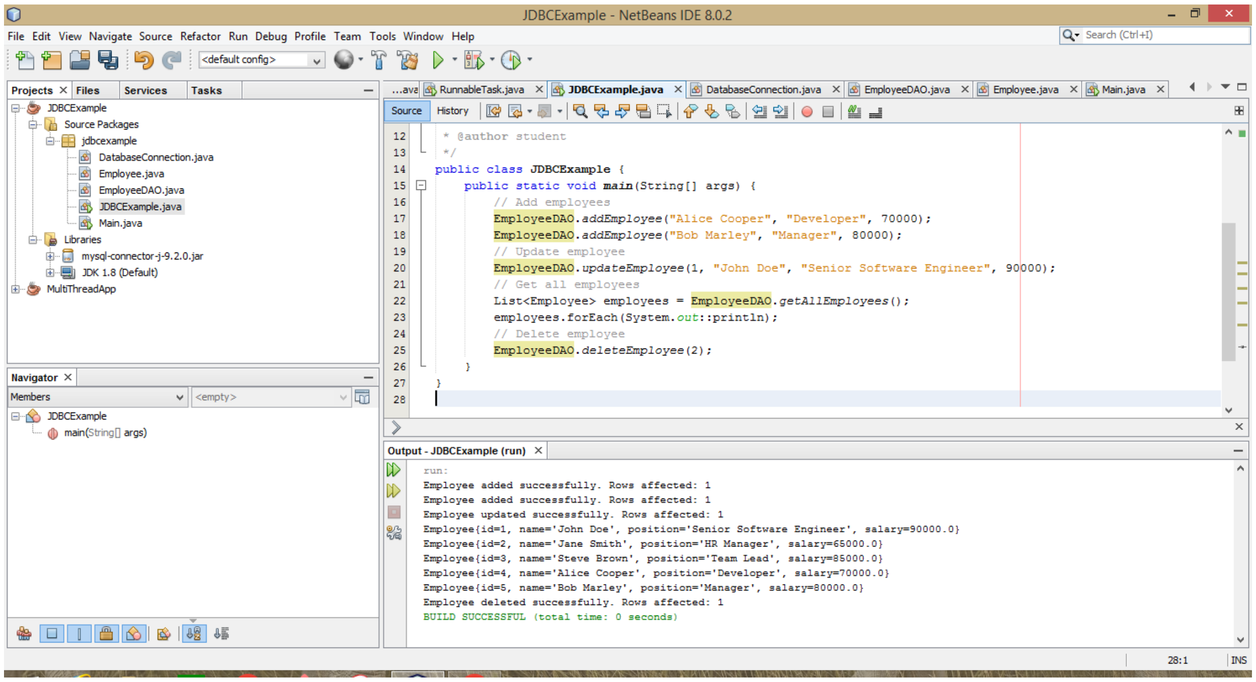
```
package jdbcexample;
public class Employee {
    private int id;
    private String name;
    private String position;
    private double salary;
    public Employee(int id, String name, String position, double
salary) { this.id = id;
    this.name = name;
    this.position = position;
    this.salary = salary;
 }

 // Getters and setters
 public int getId() { return id; }
 public void setId(int id) { this.id = id; }
 public String getName() { return name; }
 public void setName(String name) { this.name = name; }
 public String getPosition() { return position; }
 public void setPosition(String position) { this.position =
position; } public double getSalary() { return salary; }
 public void setSalary(double salary) { this.salary = salary; }
 @Override
 public String toString() {
 return "Employee{id=" + id + ", name='" + name + "',
position='" + position + "', salary=" + salary + '}';
 }
}
```

Task 06 - Test the Application

Main.java

```
package jdbcexample;
import java.util.List;
public class Main {
    public static void main(String[] args) {

        // Add employees
        EmployeeDAO.addEmployee("Alice Cooper", "Developer",
70000);
        EmployeeDAO.addEmployee("Bob Marley", "Manager", 80000);

        // Update employee
        EmployeeDAO.updateEmployee(1, "John Doe", "Senior
Software Engineer", 90000);

        // Get all employees
        List<Employee> employees =
EmployeeDAO.getAllEmployees();
        employees.forEach(System.out::println);

        // Delete employee
        EmployeeDAO.deleteEmployee(2);
    }
}
```

Task 07 - Run the Application

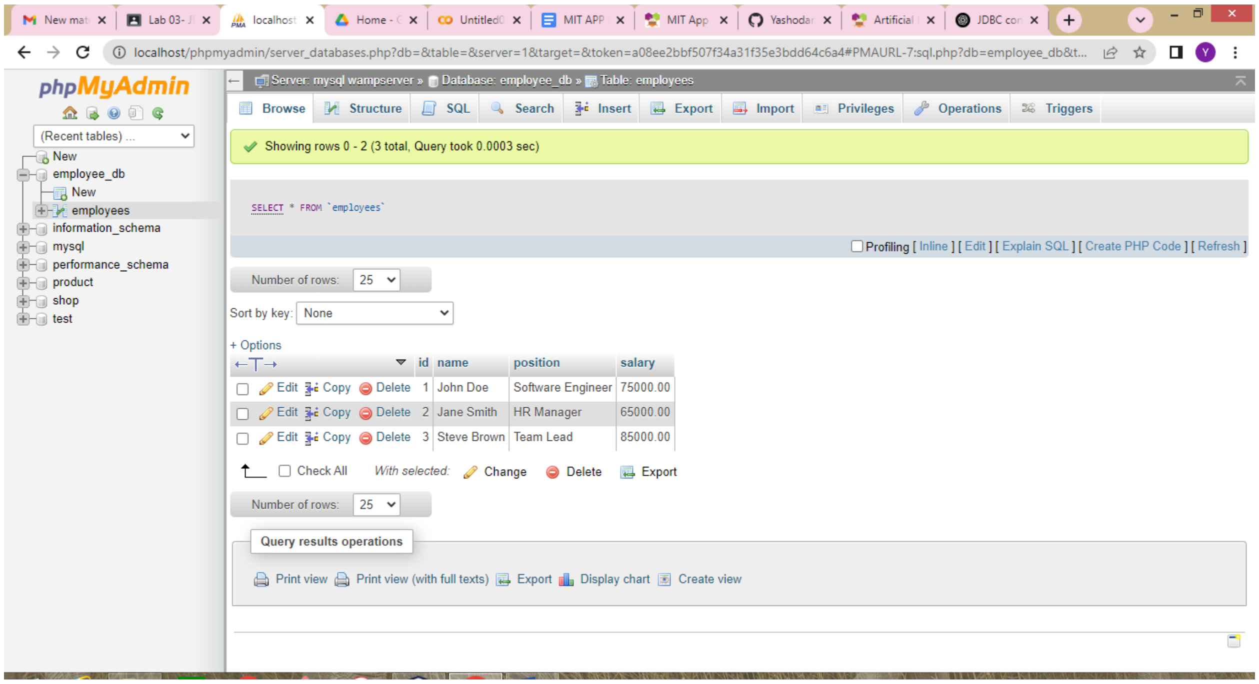


```java
 * @author student
 */
public class JDBCExample {
    public static void main(String[] args) {
        // Add employees
        EmployeeDAO.addEmployee("Alice Cooper", "Developer", 70000);
        EmployeeDAO.addEmployee("Bob Marley", "Manager", 80000);
        // Update employee
        EmployeeDAO.updateEmployee(1, "John Doe", "Senior Software Engineer", 90000);
        // Get all employees
        List<Employee> employees = EmployeeDAO.getAllEmployees();
        employees.forEach(System.out::println);
        // Delete employee
        EmployeeDAO.deleteEmployee(2);
    }
}
```

Output - JDBCExample (run)

```
run:
Employee added successfully. Rows affected: 1
Employee added successfully. Rows affected: 1
Employee updated successfully. Rows affected: 1
Employee{id=1, name='John Doe', position='Senior Software Engineer', salary=90000.0}
Employee{id=2, name='Jane Smith', position='HR Manager', salary=65000.0}
Employee{id=3, name='Steve Brown', position='Team Lead', salary=85000.0}
Employee{id=4, name='Alice Cooper', position='Developer', salary=70000.0}
Employee{id=5, name='Bob Marley', position='Manager', salary=80000.0}
Employee deleted successfully. Rows affected: 1
BUILD SUCCESSFUL (total time: 0 seconds)
```

Before the execution of the code:



localhost/phpmyadmin/server_databases.php?db=&table=&server=1&target=&token=a08ee2bbf507f34a31f35e3bdd64c6a4#PMAURL-7:sql.php?db=employee_db&t...

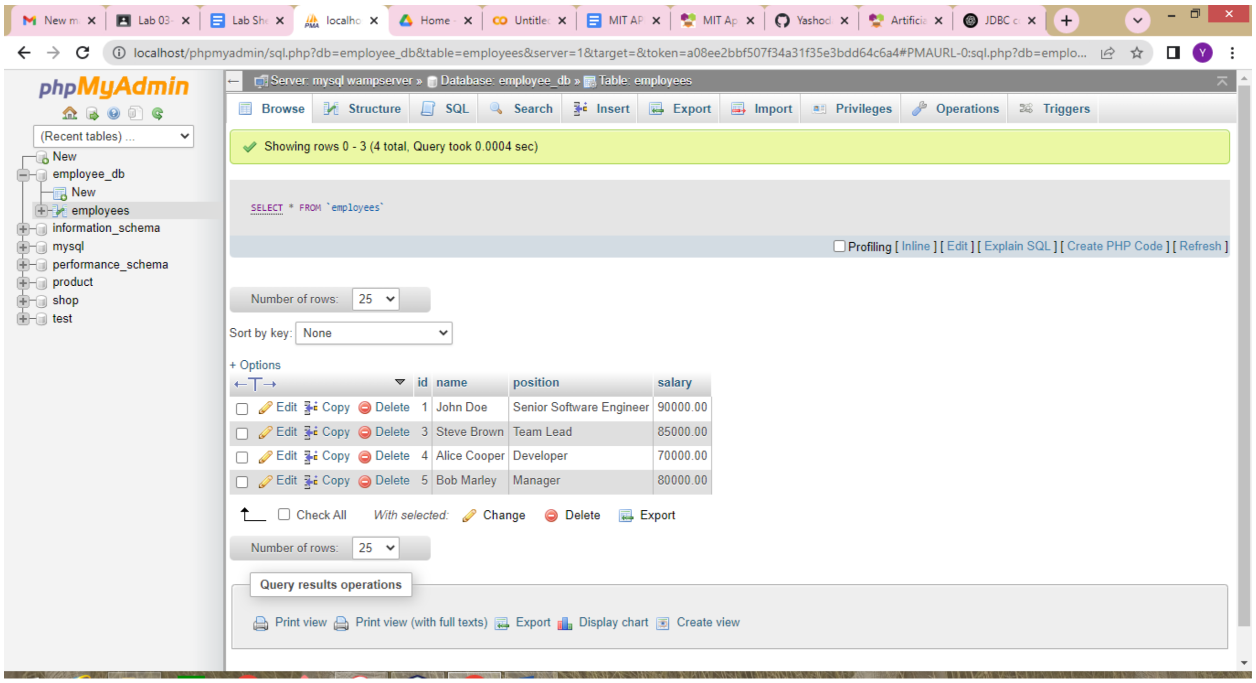
Server: mysql wampserver » Database: employee_db » Table: employees

Showing rows 0 - 2 (3 total, Query took 0.0003 sec)

```sql
SELECT * FROM `employees`
```

id	name	position	salary
1	John Doe	Software Engineer	75000.00
2	Jane Smith	HR Manager	65000.00
3	Steve Brown	Team Lead	85000.00

After the execution of the code:



Server: mysql wampserver » Database: employee_db » Table: employees

Showing rows 0 - 3 (4 total, Query took 0.0004 sec)

```
SELECT * FROM `employees`
```

id	name	position	salary
1	John Doe	Senior Software Engineer	90000.00
3	Steve Brown	Team Lead	85000.00
4	Alice Cooper	Developer	70000.00
5	Bob Marley	Manager	80000.00