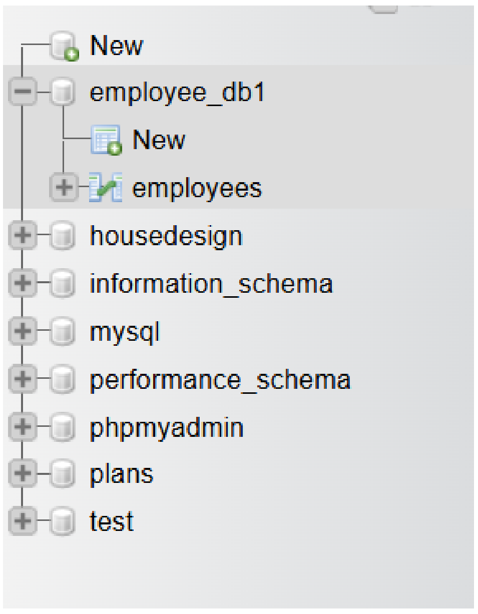
Java JDBC

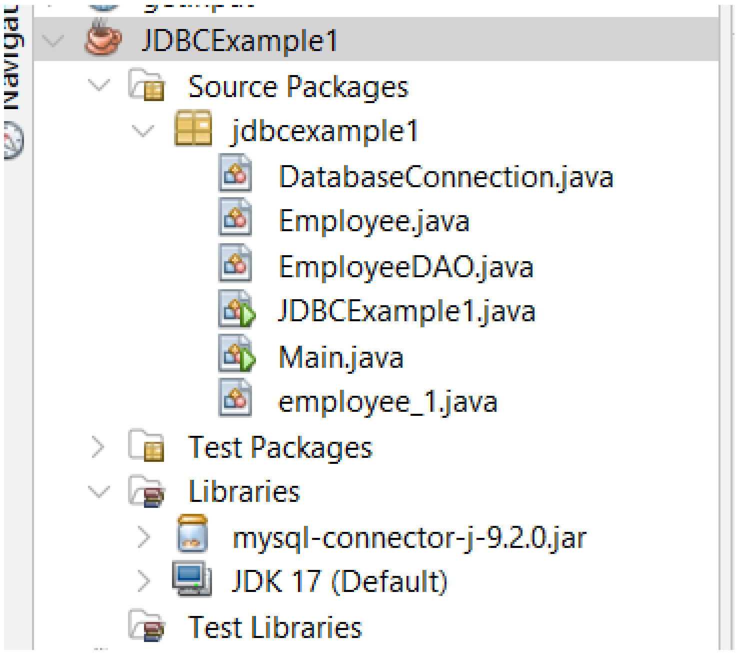
1. Set Up MySQL Database

```
CREATE DATABASE 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);
```



2. Set Up NetBeans Project

1. **Open NetBeans IDE 8.2**.
2. Create a new Java application:
   - Go to **File > New Project**.
   - Select **Java** as the project type, and choose **Java Application**.
   - Name your project **JDBCExample**.
3. Add MySQL JDBC Driver to your project:
   - Right-click on the project in the **Projects** pane.
   - Select **Properties**.
   - In the **Libraries** tab, click **Add JAR/Folder**.
   - Navigate to the location of your **mysql-connector-java-x.x.xx.jar** file and add it.



```
JDBCExample1
  Source Packages
    jdbcexample1
      DatabaseConnection.java
      Employee.java
      EmployeeDAO.java
      JDBCExample1.java
      Main.java
      employee_1.java
  Test Packages
  Libraries
    mysql-connector-j-9.2.0.jar
    JDK 17 (Default)
  Test Libraries
```

3. Establish JDBC Connection

- Create a **DatabaseConnection.java** class to establish a connection to your database.

Code for DatabaseConnection.java:

```
package jdbcexample1;

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 = "password"; // Your MySQL password

   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.");
      }
   }
}
```

4. Perform CRUD Operations

Next, we will create a class called **EmployeeDAO.java** that contains methods for performing CRUD operations.

1. **Create EmployeeDAO.java for CRUD Operations**:

Code for EmployeeDAO.java:

```
package jdbcexample1;
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();
        }
    }
}
```

5. Create Employee.java Class

```
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 + '}';
    }
}
```

6. Test the Application

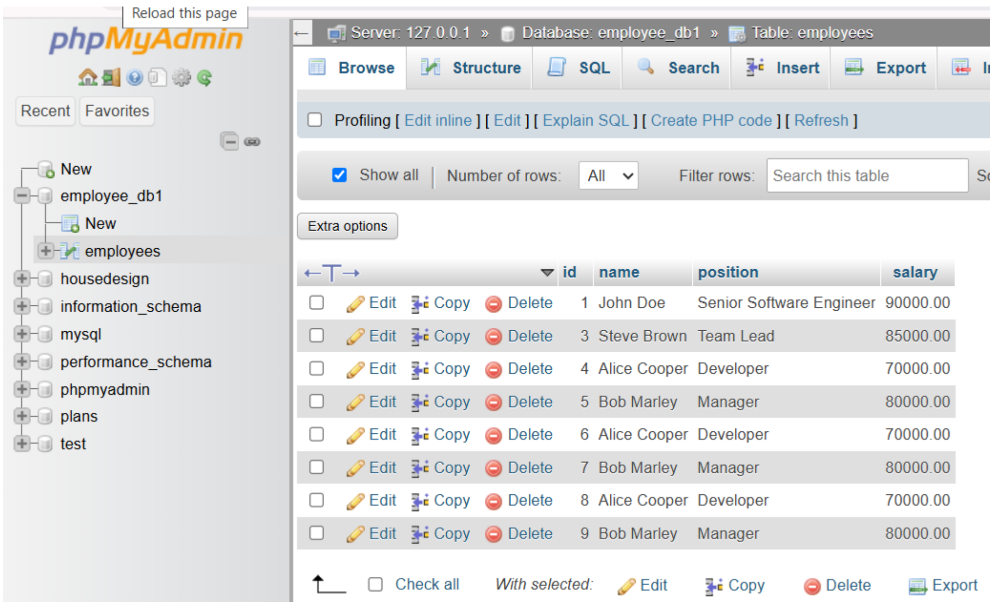
Create a **Main.java** class to test the CRUD operations.

Code for Main.java:

```
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);
    }
}
```

7. Run the Application

- **Run the program** and observe how the database is updated with the CRUD operations.
  - First, the employees will be added to the database.
  - Then, one employee's details will be updated.
  - All employees will be fetched and displayed in the console.
  - Finally, one employee will be deleted.



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
6	Alice Cooper	Developer	70000.00
7	Bob Marley	Manager	80000.00
8	Alice Cooper	Developer	70000.00
9	Bob Marley	Manager	80000.00