UNIVERSITI MALAYSIA TERENGGANU

CSM3023 -PEMBANGUNAN APLIKASI BERASASKAN WEB

BANCHELOR OF COMPUTER SCIENCE (MOBILE COMPUTING) WITH HONORS

LAB 8 -Creating MVC Database Web Application in JSP and Servlets – for Create, Read, Update, Delete

SEMESTER 2 2023/2024

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S66467

TASK 1:

EmployeeDAO.java

```
package com.DAO;



import java.sql.*;

import java.sql.SQLException;

import java.util.*;

import com.Model.Employee;



public class EmployeeDAO {



    Connection connection = null;

    private String jdbcURL = "jdbc:mysql://localhost:3306/company";

    private String jdbcUsername = "root";

    private String jdbcPassword = "admin";



    private static final String INSERT_EMPLOYEES_SQL = "INSERT INTO employees(name, email, position) VALUES (?, ?, ?);";

    private static final String SELECT_EMPLOYEE_BY_ID = "select id,name,email,position from employees where id=?";

    private static final String SELECT_ALL_EMPLOYEES = "select * from employees";

    private static final String DELETE_EMPLOYEES_SQL = "delete from employees where id = ?;";

    private static final String UPDATE_EMPLOYEES_SQL = "update employees set name = ?,email= ?, position= ? where id = ?;";
```

```
  public EmployeeDAO(){}


    protected Connection getConnection(){
      Connection connection = null;
      try{
        Class.forName("com.mysql.cj.jdbc.Driver");
        connection = DriverManager.getConnection(jdbcURL, jdbcUsername,
jdbcPassword);
        System.out.println("Database connected!");
      }catch(SQLException e){
        e.printStackTrace();
      }catch(ClassNotFoundException e){
        e.printStackTrace();
      }
      return connection;
    }


  public void insertEmployee(Employee employee) throws SQLException{
    System.out.println(INSERT_EMPLOYEES_SQL);
    try(Connection connection = getConnection(); PreparedStatement
preparedStatement =
        connection.prepareStatement(INSERT_EMPLOYEES_SQL)){
```

```
        preparedStatement.setString(1, employee.getName());
        preparedStatement.setString(2, employee.getEmail());
        preparedStatement.setString(3, employee.getPosition());
        System.out.println(preparedStatement);
        preparedStatement.executeUpdate();
      }catch(SQLException e){
        printSQLException(e);
          }
    }

    public Employee selectEmployee(int id){
      Employee employee = null;
      // Step 1: Establishing a Connection
      try(Connection connection = getConnection();
        // Step 2: Create a statement using connection
        PreparedStatement preparedStatement =
connection.prepareStatement(SELECT_EMPLOYEE_BY_ID);){
        preparedStatement.setInt(1, id);
        System.out.println(preparedStatement);
        ResultSet rs = preparedStatement.executeQuery();

        while(rs.next()){
          String name = rs.getString("name");
          String email = rs.getString("email");

          String position = rs.getString("position");

          employee = new Employee(id, name, email,position);

        }

      }catch (SQLException e){

          printSQLException(e);

          }

      return employee;

    }


    public List < Employee > selectAllEmployees(){

      List < Employee > employees = new ArrayList < > ();

      try (Connection connection = getConnection();


         PreparedStatement preparedStatement =
connection.prepareStatement(SELECT_ALL_EMPLOYEES);){

         System.out.println(preparedStatement);

         ResultSet rs = preparedStatement.executeQuery();


         while(rs.next()){

           int id = rs.getInt("id");

           String name = rs.getString("name");

           String email = rs.getString("email");
           String position = rs.getString("position");
           employees.add(new Employee(id, name, email, position));
         }
      }catch(SQLException e){
        printSQLException(e);
      }
      return employees;
    }

    public boolean deleteEmployee(int id) throws SQLException{
      boolean rowDeleted;
      try(Connection connection = getConnection(); PreparedStatement statement =
          connection.prepareStatement(DELETE_EMPLOYEES_SQL);){
        statement.setInt(1, id);
        rowDeleted = statement.executeUpdate() > 0;
      }
      return rowDeleted;
    }

    public boolean updateEmployee(Employee employee) throws SQLException{
      boolean rowUpdated;
      try(Connection connection = getConnection(); PreparedStatement statement =
          connection.prepareStatement(UPDATE_EMPLOYEES_SQL);){
        statement.setString(1, employee.getName());
        statement.setString(2, employee.getEmail());
        statement.setString(3, employee.getPosition());
        statement.setInt(4, employee.getId());

        rowUpdated = statement.executeUpdate() > 0;
      }
      return rowUpdated;
    }

    private void printSQLException(SQLException ex){
      for(Throwable e: ex){
        if(e instanceof SQLException){
          e.printStackTrace(System.err);
          System.err.println("SQLState: " + ((SQLException) e).getSQLState());
          System.err.println("Error Code: " + ((SQLException) e).getErrorCode());
          System.err.println("Message: " + e.getMessage());
          Throwable t = ex.getCause();
          while(t != null){
            System.out.println("Cause: " + t);
            t = t.getCause();
```

```
                }
            }
        }
    }
}
```

Employee.java

```
/*
 * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
 * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template
 */
package com.Model;


/**
 *
 * @NUR EZREENA
 */
public class Employee {

    protected int id;
    protected String name;
    protected String email;
protected String position;


public Employee() {}


public Employee(String name, String email, String position) {
   super();
   this.name = name;
   this.email = email;
   this.position = position;
}


public Employee(int id, String name, String email, String position) {
   this.id = id;
   this.name = name;
   this.email = email;
   this.position = position;
}


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 getEmail() {

   return email;

}



public void setEmail(String email) {

   this.email = email;

}



public String getPosition() {

   return position;
   }

   public void setPosition(String position) {
      this.position = position;
   }
}
```

EmployeeServlet.java

```
package com.WEB;

import jakarta.servlet.RequestDispatcher;
import java.io.IOException;
import java.io.PrintWriter;
import jakarta.servlet.ServletException;
import jakarta.servlet.annotation.WebServlet;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;
import java.sql.SQLException;
import java.util.List;

import com.DAO.EmployeeDAO;
import com.Model.Employee;;
```

```
/**
 *
 * @NUR EZREENA
 */
@WebServlet("/")
public class EmployeeServlet extends HttpServlet {

    /**
     * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
     * methods.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    private EmployeeDAO employeeDAO;

    @Override
    public void init(){
        employeeDAO = new EmployeeDAO();
```

```
  }



  // <editor-fold defaultstate="collapsed" desc="HttpServlet methods. Click on the +
sign on the left to edit the code.">

  /**

   * Handles the HTTP <code>GET</code> method.

   *

   * @param request servlet request

   * @param response servlet response

   * @throws ServletException if a servlet-specific error occurs

   * @throws IOException if an I/O error occurs

   */

  @Override

  protected void doGet(HttpServletRequest request, HttpServletResponse response)

      throws ServletException, IOException {

    String action = request.getServletPath();



    try{

      switch(action){

        case "/new":

          showNewForm(request, response);

          break;

        case "/insert":
          insertEmployee(request, response);
          break;
        case "/delete":
          deleteEmployee(request, response);
          break;
        case "/edit":
          showEditForm(request, response);
          break;
        case "/update":
          updateEmployee(request, response);
          break;
        default:
          listEmployee(request, response);
          break;
      }
    }catch(SQLException ex){
      throw new ServletException(ex);
    }
  }


  private void listEmployee(HttpServletRequest request, HttpServletResponse
response)
      throws SQLException, IOException, ServletException{
```

```
    List < Employee > listEmployee = employeeDAO.selectAllEmployees();

    request.setAttribute("listEmployee", listEmployee);

    RequestDispatcher dispatcher =
request.getRequestDispatcher("EmployeeList.jsp");

    dispatcher.forward(request, response);

  }



  private void showNewForm(HttpServletRequest request, HttpServletResponse
response)

      throws ServletException, IOException{

    RequestDispatcher dispatcher =
request.getRequestDispatcher("EmployeeForm.jsp");

    dispatcher.forward(request, response);

  }



  private void showEditForm(HttpServletRequest request, HttpServletResponse
response)

      throws SQLException, ServletException, IOException{

    int id = Integer.parseInt(request.getParameter("id"));

    Employee existingEmployee = employeeDAO.selectEmployee(id);

    RequestDispatcher dispatcher =
request.getRequestDispatcher("EmployeeForm.jsp");

    request.setAttribute("employee", existingEmployee);

    dispatcher.forward(request, response);

  }
```

```
   private void insertEmployee(HttpServletRequest request, HttpServletResponse
response)

         throws SQLException, IOException{

      String name = request.getParameter("name");

      String email = request.getParameter("email");

      String position = request.getParameter("position");

      Employee newEmployee = new Employee(name, email, position);

      employeeDAO.insertEmployee(newEmployee);

      response.sendRedirect("list");

   }



   private void updateEmployee(HttpServletRequest request, HttpServletResponse
response)

         throws SQLException, IOException{

      int id = Integer.parseInt(request.getParameter("id"));

      String name = request.getParameter("name");

      String email = request.getParameter("email");

      String position = request.getParameter("position");



      Employee employee = new Employee(id, name, email, position);

      employeeDAO.updateEmployee(employee);

      response.sendRedirect("list");
```

```
  }



  private void deleteEmployee(HttpServletRequest request, HttpServletResponse response)
        throws SQLException, IOException{
    int id = Integer.parseInt(request.getParameter("id"));
    employeeDAO.deleteEmployee(id);
    response.sendRedirect("list");
  }




  /**
   * Handles the HTTP <code>POST</code> method.
   *
   * @param request servlet request
   * @param response servlet response
   * @throws ServletException if a servlet-specific error occurs
   * @throws IOException if an I/O error occurs
   */
  @Override
  protected void doPost(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
```

```
        doGet(request, response);

    }



    /**

     * Returns a short description of the servlet.

     *

     * @return a String containing servlet description

     */

    @Override

    public String getServletInfo() {

        return "Short description";

    }// </editor-fold>



}
```

employeeForm.jsp

```
<%--

    Document   : employeeForm

    Created on : 15 Jun 2024, 10:10:55 pm

    Author     : Nur Ezreena

--%>



<%@page contentType="text/html" pageEncoding="UTF-8"%>
```

```
<%@taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c"%>

<!DOCTYPE html>

<html>

  <head>

    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">

    <title>Employee Management Application</title>

    <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"

       integrity="sha384-ggOyR0iXCbMQv3Xipma34MD+dH/1fQ784/j6cY/iJTQUOhcWr7x9JvoRxT2MZw1T" crossorigin="anonymous">



    <script>

      function updatePosition() {

        var selectedPosition = document.getElementById("position").value;

        document.getElementById("displayPosition").value = selectedPosition;

      }

    </script>

  </head>

  <body>

    <header>

      <nav class="navbar navbar-expand-md navbar-dark" style="background-color: tomato">

        <div>
```

```
          <a href="" class="navbar-brand"> Employee Management App </a>

        </div>



        <ul class="navbar-nav">

          <li><a href="<%=request.getContextPath()%>/list" class="nav-link">Employees</a></li>

        </ul>

      </nav>

    </header>

    <br>

    <div class="container col-md-5">

      <div class="card">

        <div class="card-body">

          <c:if test="${employee != null}">

            <form action="update" method="post">

          </c:if>

          <c:if test="${employee == null}">

            <form action="insert" method="post">

          </c:if>



          <h2>

           <c:if test="${employee != null}">

              Edit Employee
```

```
                </c:if>

                <c:if test="${employee == null}">

                    Add New Employee

                </c:if>

            </h2>


            <c:if test="${employee != null}">

                <input type="hidden" name="id" value="<c:out value='${employee.id}' />" />

            </c:if>


            <fieldset class="form-group">

                <label>Employee Name</label><input type="text" value="<c:out value='${employee.name}' />"

                                    class="form-control" name="name" required="required">

            </fieldset>


            <fieldset class="form-group">

                <label>Employee Email</label><input type="text" value="<c:out value='${employee.email}' />"

                                    class="form-control" name="email">

            </fieldset>


            <fieldset class="form-group">
            <label>Employee Position</label>
            <input type="text" id="displayPosition" value="<c:out value='${employee.position}' />" class="form-control" readonly>
            <input list="positionList" id="position" class="form-control" name="position" onchange="updatePosition()" >
            <datalist id="positionList">
              <option value="Manager">
              <option value="Head of Dept">
              <option value="Supervisor">
              <option value="Director">
            </datalist>
          </fieldset>

          <button type="submit" class="btn btn-success">Save</button>
          </form>
        </div>
      </div>
    </div>
  </body>
</html>
```

employeeList.jsp

```
<%--

   Document   : employeeForm

   Created on : 15 Jun 2024, 10:10:55 pm

   Author     : Nur Ezreena

--%>



<%@page contentType="text/html" pageEncoding="UTF-8"%>

<%@taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c" %>

<!DOCTYPE html>

<html>

   <head>

      <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">

      <title>Employee Management System</title>

      <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"

           integrity="sha384-ggOyR0iXCbMQv3Xipma34MD+dH/1fQ784/j6cY/iJTQUOhcWr7x9JvoRxT2MZw1T" crossorigin="anonymous">

   </head>

   <body>



      <header>

         <nav class="navbar navbar-expand-md navbar-dark" style="background-color: tomato">
```

```
        <div>

          <a href="" class="navbar-brand"> Employee Management App </a>

        </div>



        <ul class="navbar-nav">

          <li><a href="<%=request.getContextPath()%>/list" class="nav-link">Employees</a></li>

        </ul>

      </nav>

    </header>

    <br>



    <div class="row">

      <div class="container">

        <h3 class="container">List of Employees</h3>

        <hr>

        <div class="container text-left">

          <a href="<%=request.getContextPath()%>/new" class="btn btn-success">Add New Employee</a>

        </div>

        <br>

        <table class="table table-bordered">

          <thead>
      <tr>
        <th>ID</th>
        <th>Name</th>
        <th>Email</th>
        <th>Position</th>
        <th>Actions</th>
      </tr>
    </thead>
    <tbody>
      <c:forEach var="employee" items="${listEmployee}">
        <tr>
          <td>
            <c:out value="${employee.id}" />
          </td>
          <td>
            <c:out value="${employee.name}" />
          </td>
          <td>
            <c:out value="${employee.email}" />
          </td>
          <td>
            <c:out value="${employee.position}" />
```

```
                </td>
                <td><a href="edit?id=<c:out value='${employee.id}' />">Edit</a>
&nbsp;&nbsp;&nbsp;&nbsp;
                  <a href="delete?id=<c:out value='${employee.id}' />">Delete</a>
                </td>
              </tr>
            </c:forEach>
          </tbody>
        </table>
      </div>
    </div>
  </body>
</html>
```

Index.jsp

```
<%--
  Document   : index
  Created on : 15 Jun 2024, 10:11:36 pm
  Author     : NUr Ezreena
--%>


<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
```

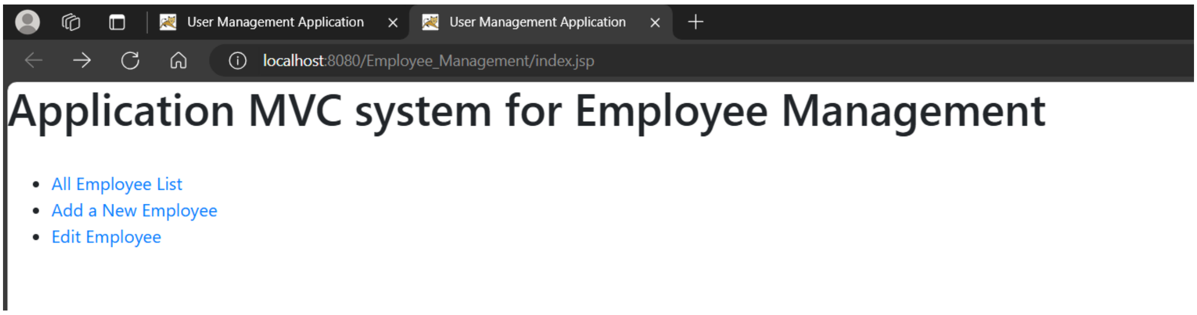
```
  <head>

    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">

    <title>User Management Application</title>

    <link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"

       integrity="sha384-
ggOyR0iXCbMQv3Xipma34MD+dH/1fQ784/j6cY/iJTQUOhcWr7x9JvoRxT2MZw1T"
crossorigin="anonymous">

  </head>

  <body>

    <h1>Application MVC system for Employee Management</h1><br>



    <ul>

      <li><a href="http://localhost:8080/Employee_Management/list">All Employee
List</a></li>

      <li><a href="http://localhost:8080/Employee_Management/new">Add a New
Employee</a></li>

      <li><a href="http://localhost:8080/Employee_Management/list">Edit
Employee</a></li>

    </ul>

  </body>

</html>
```

Error.jsp

```
<%--

  Document   : error
```

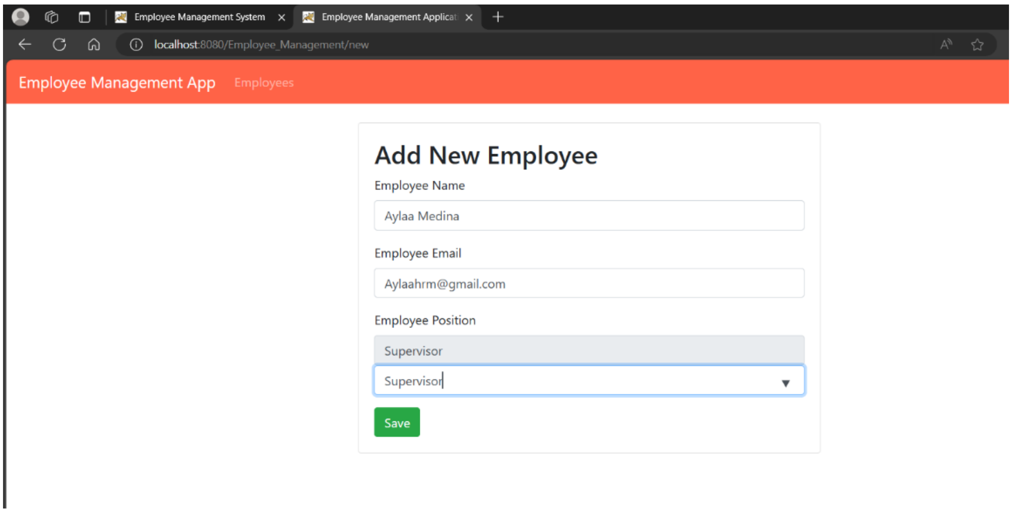
```
   Created on : 15 Jun 2024, 10:11:21 pm
   Author     : User
--%>


<%@page contentType="text/html" pageEncoding="UTF-8" isErrorPage="true" %>
<!DOCTYPE html>
<html>
   <head>
      <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
      <title>Error page</title>
   </head>
   <body>
      <center>
         <h1>Error</h1>
         <h2><%=exception.getMessage() %><br/></h2>
      </center>
   </body>
</html>
```

OUTPUT:


User Management Application
User Management Application
localhost:8080/Employee_Management/index.jsp

Application MVC system for Employee Management

- All Employee List
- Add a New Employee
- Edit Employee


Employee Management System
Employee Management Applicat
localhost:8080/Employee_Management/new
Employee Management App
Employees

Add New Employee

Employee Name

Aylaa Medina

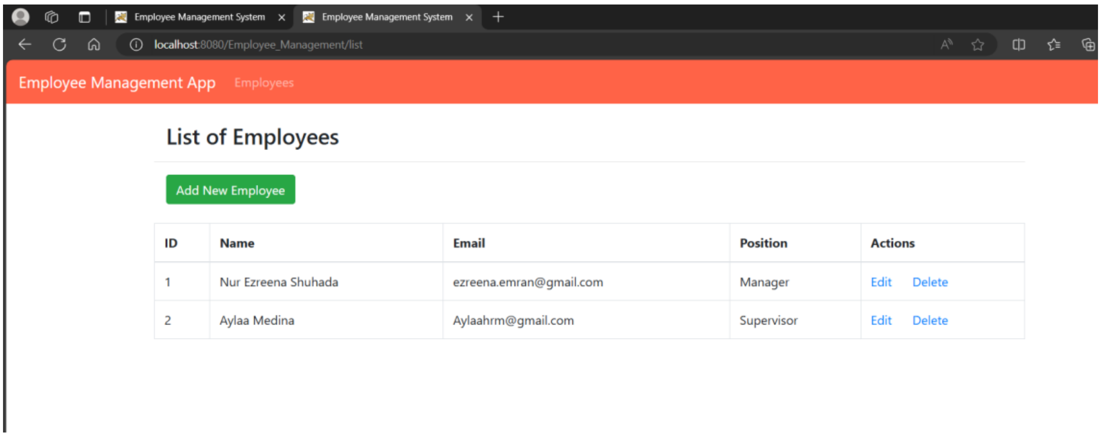
Employee Email

Aylaahrm@gmail.com

Employee Position

Supervisor

Supervisor


Employee Management System
Employee Management System
localhost:8080/Employee_Management/list
Employee Management App
Employees
Add New Employee

List of Employees

ID	Name	Email	Position	Actions
1	Nur Ezreena Shuhada	ezreena.emran@gmail.com	Manager	Edit Delete
2	Aylaa Medina	Aylaahrm@gmail.com	Supervisor	Edit Delete

EXERCISE

CarDAO.java

```
/*

 * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license

 * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template

 */

package com.DAO;



import java.sql.*;

import java.sql.SQLException;

import java.util.*;



import com.Model.Car;



/**

 *

 * @author NUR EZREENA

 */

public class CarDAO {



    Connection connection = null;

    private String jdbcURL = "jdbc:mysql://localhost:3306/carshop";
```

```
  private String jdbcUsername = "root";
  private String jdbcPassword = "admin";


  private static final String INSERT_CARS_SQL = "INSERT INTO carpricelist(brand, model, cylinder, price) VALUES (?, ?, ?, ?);";
  private static final String SELECT_CAR_BY_ID = "select car_id, brand, model, cylinder, price from carpricelist where car_id=?";
  private static final String SELECT_ALL_CARS = "select * from carpricelist";
  private static final String DELETE_CARS_SQL = "delete from carpricelist where car_id = ?;";
  private static final String UPDATE_CARS_SQL = "update carpricelist set brand = ?,model= ?, cylinder= ?, price= ? where car_id = ?;";


  public CarDAO(){}


    protected Connection getConnection(){
      Connection connection = null;
      try{
        Class.forName("com.mysql.cj.jdbc.Driver");
        connection = DriverManager.getConnection(jdbcURL, jdbcUsername, jdbcPassword);
        System.out.println("Database connected!");
      }catch(SQLException e){
        e.printStackTrace();
      }catch(ClassNotFoundException e){
        e.printStackTrace();

      }

      return connection;

    }



  public void insertCar(Car car) throws SQLException{

    System.out.println(INSERT_CARS_SQL);

    try(Connection connection = getConnection(); PreparedStatement
preparedStatement =

        connection.prepareStatement(INSERT_CARS_SQL)){

      preparedStatement.setString(1, car.getBrand());

      preparedStatement.setString(2, car.getModel());

      preparedStatement.setInt(3, car.getCylinder());

      preparedStatement.setDouble(4, car.getPrice());

      System.out.println(preparedStatement);

      preparedStatement.executeUpdate();

    }catch(SQLException e){

      printSQLException(e);

        }

  }



  public Car selectCar(int id){

    Car car = null;
```

```
}
```

```
    // Step 1: Establishing a Connection
    try(Connection connection = getConnection();
      // Step 2: Create a statement using connection
      PreparedStatement preparedStatement =
connection.prepareStatement(SELECT_CAR_BY_ID);){
      preparedStatement.setInt(1, id);
      System.out.println(preparedStatement);
      ResultSet rs = preparedStatement.executeQuery();


      while(rs.next()){
        String brand = rs.getString("brand");
        String model = rs.getString("model");
        int cylinder = rs.getInt("cylinder");
        double price = rs.getDouble("price");
        car = new Car(id, brand, model, cylinder, price);
      }
    }catch (SQLException e){
        printSQLException(e);
        }
    return car;
  }


  public List < Car > selectAllCars(){
  }
```

```
    List <Car> cars = new ArrayList <>();

    try (Connection connection = getConnection();



       PreparedStatement preparedStatement =
connection.prepareStatement(SELECT_ALL_CARS);){

       System.out.println(preparedStatement);

       ResultSet rs = preparedStatement.executeQuery();



       while(rs.next()){

         int id = rs.getInt("car_id");

         String brand = rs.getString("brand");

         String model = rs.getString("model");

         int cylinder = rs.getInt("cylinder");

         double price = rs.getDouble("price");

         cars.add(new Car(id, brand, model, cylinder, price));

       }

    }catch(SQLException e){

      printSQLException(e);

    }

    return cars;

  }



  public boolean deleteCar(int id) throws SQLException{
```

```
  boolean rowDeleted;
  try(Connection connection = getConnection(); PreparedStatement statement =
      connection.prepareStatement(DELETE_CARS_SQL);){
    statement.setInt(1, id);
    rowDeleted = statement.executeUpdate() > 0;
  }
  return rowDeleted;
}

public boolean updateCar(Car car) throws SQLException{
  boolean rowUpdated;
  try(Connection connection = getConnection(); PreparedStatement statement =
      connection.prepareStatement(UPDATE_CARS_SQL);){
    statement.setString(1, car.getBrand());
    statement.setString(2, car.getModel());
    statement.setInt(3, car.getCylinder());
    statement.setDouble(4, car.getPrice());
    statement.setInt(5, car.getCar_id());

    rowUpdated = statement.executeUpdate() > 0;
  }
  return rowUpdated;
```

```
    }


    private void printSQLException(SQLException ex){
        for(Throwable e: ex){
            if(e instanceof SQLException){
                e.printStackTrace(System.err);
                System.err.println("SQLState: " + ((SQLException) e).getSQLState());
                System.err.println("Error Code: " + ((SQLException) e).getErrorCode());
                System.err.println("Message: " + e.getMessage());
                Throwable t = ex.getCause();
                while(t != null){
                    System.out.println("Cause: " + t);
                    t = t.getCause();
                }
            }
        }
    }
}
```

Car.java

```
/*
 * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
 * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template
 */
package com.Model;


/**
 *
 * @author NUR EZREENA
 */
public class Car {


   protected int car_id;
   protected String brand;
   protected String model;
   protected int cylinder;
   protected double price;


   public Car(){}


   public Car(String brand, String model, int cylinder, double price) {
      super();
      this.brand = brand;
      this.model = model;
```

```
    this.cylinder = cylinder;
    this.price = price;
}

public Car(int car_id, String brand, String model, int cylinder, double price) {
    this.car_id = car_id;
    this.brand = brand;
    this.model = model;
    this.cylinder = cylinder;
    this.price = price;
}



public int getCar_id() {
    return car_id;
}

public void setCar_id(int car_id) {
    this.car_id = car_id;
}
```

```
public String getBrand() {
   return brand;
}

public void setBrand(String brand) {
   this.brand = brand;
}

public String getModel() {
   return model;
}

public void setModel(String model) {
   this.model = model;
}

public int getCylinder() {
   return cylinder;
}

public void setCylinder(int cylinder) {
   this.cylinder = cylinder;
```

```
    }


    public double getPrice() {
        return price;
    }


    public void setPrice(double price) {
        this.price = price;
    }
}
```

CarServlet.java

```
/*
 * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
 * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template
 */
package com.Controller;


import jakarta.servlet.RequestDispatcher;
import java.io.IOException;
import java.io.PrintWriter;
import jakarta.servlet.ServletException;
import jakarta.servlet.annotation.WebServlet;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;
import java.sql.SQLException;
import java.util.List;

import com.DAO.CarDAO;
import com.Model.Car;

/**
 *
 * @author NUR EZREENA
 */

@WebServlet("/")
public class CarServlet extends HttpServlet {

    /**
     * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
     * methods.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    private CarDAO carDAO;


    @Override
    public void init(){
        carDAO = new CarDAO();
    }


    // <editor-fold defaultstate="collapsed" desc="HttpServlet methods. Click on the + sign on the left to edit the code.">
    /**
     * Handles the HTTP <code>GET</code> method.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    @Override
```

```
protected void doGet(HttpServletRequest request, HttpServletResponse response)
    throws ServletException, IOException {
  String action = request.getServletPath();


  try{
    switch(action){
      case "/new":
        showNewForm(request, response);
        break;
      case "/insert":
        insertCar(request, response);
        break;
      case "/delete":
        deleteCar(request, response);
        break;
      case "/edit":
        showEditForm(request, response);
        break;
      case "/update":
        updateCar(request, response);
        break;
      default:
```

```
     listCar(request, response);

     break;

   }

  }catch(SQLException ex){

   throw new ServletException(ex);

  }

 }



 private void listCar(HttpServletRequest request, HttpServletResponse response)

   throws SQLException, IOException, ServletException{

  List < Car > listCar = carDAO.selectAllCars();

  request.setAttribute("listCar", listCar);

  RequestDispatcher dispatcher = request.getRequestDispatcher("CarList.jsp");

  dispatcher.forward(request, response);

 }



 private void showNewForm(HttpServletRequest request, HttpServletResponse
response)

   throws ServletException, IOException{

  RequestDispatcher dispatcher = request.getRequestDispatcher("CarForm.jsp");

  dispatcher.forward(request, response);

 }
```

```
  private void showEditForm(HttpServletRequest request, HttpServletResponse
response)
        throws SQLException, ServletException, IOException{
    int id = Integer.parseInt(request.getParameter("car_id"));
    Car existingCar = carDAO.selectCar(id);
    RequestDispatcher dispatcher = request.getRequestDispatcher("CarForm.jsp");
    request.setAttribute("car", existingCar);
    dispatcher.forward(request, response);
  }

  private void insertCar(HttpServletRequest request, HttpServletResponse response)
        throws SQLException, IOException{
    String brand = request.getParameter("brand");
    String model = request.getParameter("model");
    int cylinder = Integer.parseInt(request.getParameter("cylinder"));
    double price = Double.parseDouble(request.getParameter("price"));
    Car car = new Car(brand, model, cylinder, price);
    carDAO.insertCar(car);
    response.sendRedirect("listcar");
  }

  private void updateCar(HttpServletRequest request, HttpServletResponse
response)
```

```
        throws SQLException, IOException{
    int id = Integer.parseInt(request.getParameter("car_id"));
    String brand = request.getParameter("brand");
    String model = request.getParameter("model");
    int cylinder = Integer.parseInt(request.getParameter("cylinder"));
    double price = Double.parseDouble(request.getParameter("price"));
    Car car = new Car(brand, model, cylinder, price);
    carDAO.updateCar(car);
    response.sendRedirect("listcar");
  }

  private void deleteCar(HttpServletRequest request, HttpServletResponse
response)
        throws SQLException, IOException{
    int id = Integer.parseInt(request.getParameter("car_id"));
    carDAO.deleteCar(id);
    response.sendRedirect("listcar");
  }


  /**
   * Handles the HTTP <code>POST</code> method.
   *
```

```
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    @Override
    protected void doPost(HttpServletRequest request, HttpServletResponse
response)
            throws ServletException, IOException {
        doGet(request, response);
    }

    /**
     * Returns a short description of the servlet.
     *
     * @return a String containing servlet description
     */
    @Override
    public String getServletInfo() {
        return "Short description";
    }// </editor-fold>

}
```

CarForm.jsp

```
<%--
   Document   : CarForm
   Created on : 16 Jun 2024, 11:41:56 pm
   Author     : Nur Ezreena
--%>


<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c"%>
<!DOCTYPE html>
<html>
   <head>
      <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
      <title>Car Shop Management Application</title>
      <link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"
           integrity="sha384-
ggOyR0iXCbMQv3Xipma34MD+dH/1fQ784/j6cY/iJTQUOhcWr7x9JvoRxT2MZw1T"
crossorigin="anonymous">


      <script>
         function updateBrand() {
            var selectedBrand = document.getElementById("brand").value;
            document.getElementById("displayBrand").value = selectedBrand;
      }
    </script>
  </head>
  <body>
    <header>
      <nav class="navbar navbar-expand-md navbar-dark" style="background-color: tomato">
        <div>
          <a href="" class="navbar-brand"> Car Management Application </a>
        </div>

        <ul class="navbar-nav">
          <li><a href="<%=request.getContextPath()%>/listcar" class="nav-link">Cars</a></li>
        </ul>
      </nav>
    </header>
    <br>
    <div class="container col-md-5">
      <div class="card">
        <div class="card-body">
          <c:if test="${car != null}">
            <form action="update" method="post">
            </c:if>
            <c:if test="${car == null}">
              <form action="insert" method="post">
            </c:if>

            <h2>
             <c:if test="${car != null}">
                Edit Car
              </c:if>
              <c:if test="${car == null}">
                Add New Car
              </c:if>
            </h2>

            <c:if test="${car != null}">
              <input type="hidden" name="car_id" value="<c:out value='${car.car_id}' />" />
            </c:if>

            <fieldset class="form-group">
              <label>Car Brand</label>
              <input type="text" id="displayBrand" value="<c:out value='${car.brand}' />" class="form-control" readonly>
            <input list="carList" id="brand" class="form-control" name="brand"
onchange="updateBrand()" >

            <datalist id="carList">

              <option value="Proton">

              <option value="Perodua">

              <option value="Toyota">

              <option value="Honda">

              <option value="Nissan">

              <option value="Ford">

              <option value="Hyundai">

              <option value="Kia">

            </datalist>

          </fieldset>



          <fieldset class="form-group">

            <label>Car Model</label><input type="text" value="<c:out
value='${car.model}' />"

                              class="form-control" name="model"
required="required">

          </fieldset>



          <fieldset class="form-group">

            <label>Engine Cylinder</label><input type="text" value="<c:out
value='${car.cylinder}' />"
```

```
                              class="form-control" name="cylinder">
          </fieldset>

          <fieldset class="form-group">
            <label>Car Price</label><input type="text" value="<c:out value='${car.price}' />"
                              class="form-control" name="price">
          </fieldset>

          <button type="submit" class="btn btn-success">Save</button>
          </form>
        </div>
      </div>
    </div>
  </body>
</html>
```

CarList.jsp

```
<%--
  Document   : CarList
  Created on : 16 Jun 2024, 11:43:24 pm
  Author     : NUr Ezreena
--%>
```

```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c" %>
<!DOCTYPE html>
<html>
  <head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
    <title>Car Shop Management Application</title>
    <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"
          integrity="sha384-ggOyR0iXCbMQv3Xipma34MD+dH/1fQ784/j6cY/iJTQUOhcWr7x9JvoRxT2MZw1T" crossorigin="anonymous">
  </head>
  <body>


    <header>
      <nav class="navbar navbar-expand-md navbar-dark" style="background-color: tomato">
        <div>
          <a href="" class="navbar-brand"> Car Shop Management App </a>
        </div>


        <ul class="navbar-nav">
          <li><a href="<%=request.getContextPath()%>/listcar" class="nav-link">Cars</a></li>
        </ul>

      </nav>

    </header>

    <br>



    <div class="row">

      <div class="container">

        <h3 class="container">List of Cars</h3>

        <hr>

        <div class="container text-left">

          <a href="<%=request.getContextPath()%>/new" class="btn btn-success">Add New Car</a>

        </div>

        <br>

        <table class="table table-bordered">

          <thead>

            <tr>

              <th>ID</th>

              <th>Brand</th>

              <th>Model</th>

              <th>Engine Cylinder</th>

              <th>Price</th>

              <th>Actions</th>
        </tr>
      </thead>
      <tbody>
        <c:forEach var="car" items="${listCar}">
          <tr>
            <td>
              <c:out value="${car.car_id}" />
            </td>
            <td>
              <c:out value="${car.brand}" />
            </td>
            <td>
              <c:out value="${car.model}" />
            </td>
            <td>
              <c:out value="${car.cylinder}" />
            </td>
            <td>
              <c:out value="${car.price}" />
            </td>
            <td><a href="edit?car_id=<c:out value='${car.car_id}' />">Edit</a>
&nbsp;&nbsp;&nbsp;&nbsp;
              <a href="delete?car_id=<c:out value='${car.car_id}' />">Delete</a>
```

```
                </td>
              </tr>
            </c:forEach>
          </tbody>
        </table>
      </div>
    </div>
  </body>
</html>
```

Error.jsp

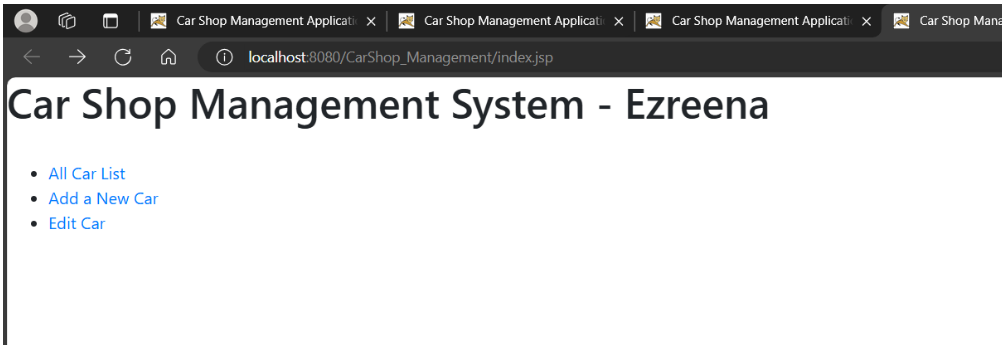
```
<%--
  Document   : error
  Created on : 16 Jun 2024, 11:44:16 pm
  Author     : Nur Ezreena
--%>

<%@page contentType="text/html" pageEncoding="UTF-8" isErrorPage="true" %>
<!DOCTYPE html>
<html>
  <head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
    <title>Error page</title>
  </head>
  <body>
    <center>
      <h1>Error</h1>
      <h2><%=exception.getMessage() %><br/></h2>
    </center>
  </body>
</html>
```

Index.jsp

```
<%--
  Document   : index
  Created on : 16 Jun 2024, 11:44:44 pm
  Author     : Nur Ezreena
--%>


<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
  <head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
    <title>Car Shop Management Application</title>
    <link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"
```

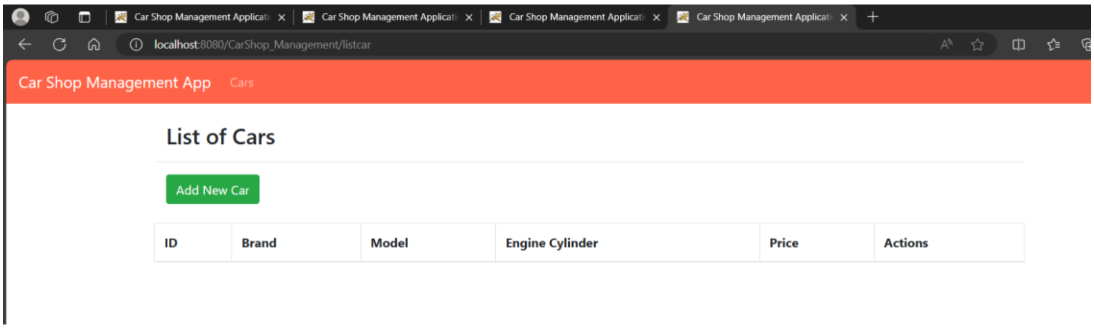
```
        integrity="sha384-ggOyR0iXCbMQv3Xipma34MD+dH/1fQ784/j6cY/iJTQUOhcWr7x9JvoRxT2MZw1T" crossorigin="anonymous">

  </head>

  <body>

    <h1>Car Shop Management System - Ezreena</h1><br>



    <ul>

      <li><a href="http://localhost:8080/CarShop_Management/listcar">All Car List</a></li>

      <li><a href="http://localhost:8080/CarShop_Management/new">Add a New Car</a></li>

      <li><a href="http://localhost:8080/CarShop_Management/listcar">Edit Car</a></li>

    </ul>

  </body>

</html>
```

OUTPUT:


Car Shop Management Applicati
Car Shop Management Applicati
Car Shop Management Applicati
Car Shop Mana
localhost:8080/CarShop_Management/index.jsp

Car Shop Management System - Ezreena

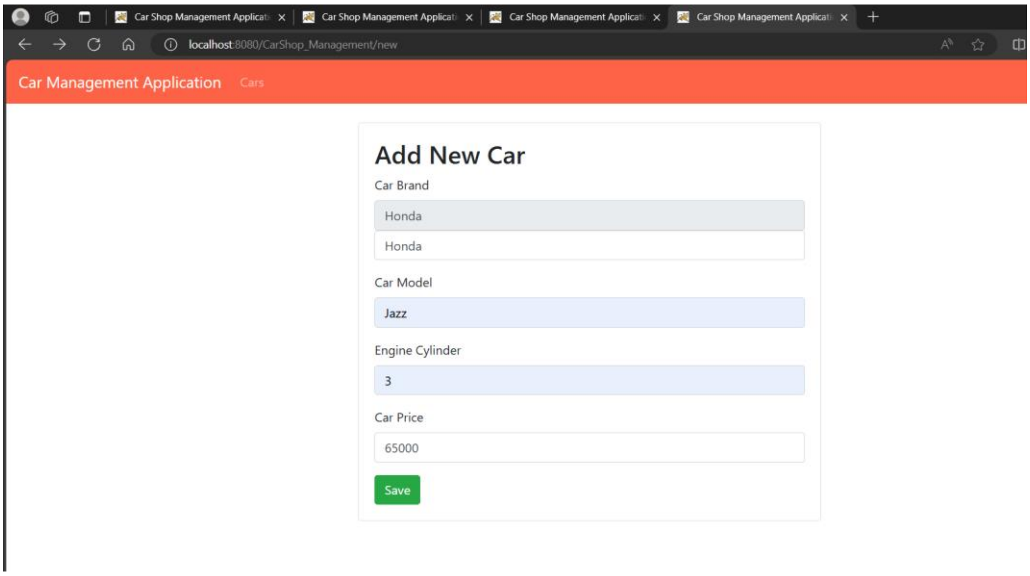
- All Car List
- Add a New Car
- Edit Car


Car Shop Management Applicati
Car Shop Management Applicati
Car Shop Management Applicati
Car Shop Management Applicati
localhost:8080/CarShop_Management/listcar
Car Shop Management App
Cars

List of Cars

Add New Car

ID	Brand	Model	Engine Cylinder	Price	Actions


Car Shop Management Applicati
Car Shop Management Applicati
Car Shop Management Applicati
Car Shop Management Applicati
localhost:8080/CarShop_Management/new
Car Management Application
Cars

Add New Car

Car Brand

Honda

Honda

Car Model

Jazz

Engine Cylinder

3

Car Price

65000

Save