Advanced Java Programming [IT404]

Open-ended Project

Submitted to Dr Akansha Singh

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Project Title: E-Commerce website using Servlets and JSP

Tech Stack: Java Servlets, MySQL, JSP, Bootstrap

Theory:

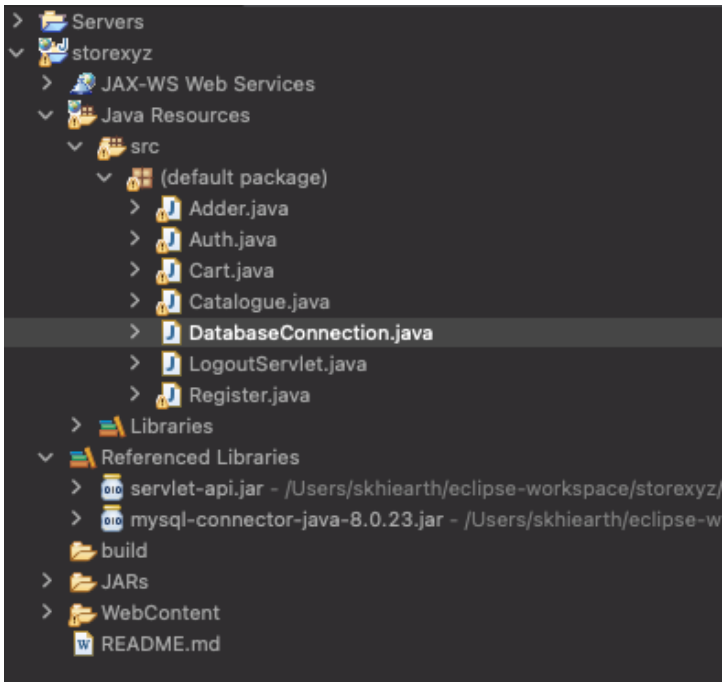
The project, titled *store.xyz*, is a mockup for an E-Commerce application built on Java and MySQL. We have used Eclipse as the IDE for Development.

Our project is on an E-Commerce website using Servlets and JSP. Apart from these, we have used Bootstrap for design and some custom CSS. On the main screen of our application, *store.xyz*, users can see all the products that are available in the catalogue. These are not statically typed, and are fetched from the SQL database using Servlet and rendered using iterative loops in JSP, which is then embedded in the main HTML page.

Source Code: The source code in its entirety has been uploaded on GitHub, which we also used for version control during the development stage. Some key source files are shown here.

GitHub Repository - https://github.com/skhiearth/E-Commerce-Java-Servlets

Project File Structure:



DatabaseConnection.java (https://github.com/skhiearth/E-Commerce-Java-Servlets/blob/main/src/DatabaseConnection.java)

```java
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.SQLException;

public class DatabaseConnection {
   protected static Connection initializeDatabase()
       throws SQLException, ClassNotFoundException {
       String dbURL = "jdbc:mysql://localhost:3306/";
       // Database name to access
       String dbName = "ECommerce";
       String dbUsername = "root";
       String dbPassword = "9810282699";

       Class.forName("com.mysql.jdbc.Driver");
       Connection con = DriverManager.getConnection(dbURL + dbName, dbUsername, dbPassword);
       System.out.println("Connected database successfully...");
       return con;
   }
}
```

Catalogue.java (https://github.com/skhiearth/E-Commerce-Java-Servlets/blob/main/src/Catalogue.java)

```java
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

import java.sql.*;
import java.util.Scanner;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;

import java.util.*;
import javax.servlet.*;

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

  private ServletConfig config;

  //Setting JSP page
  String page="Catalogue.jsp";

  public Catalogue() {
      Statement stmt = null;

      try {
          Connection con = DatabaseConnection.initializeDatabase();
          stmt = con.createStatement();

          String sql = "CREATE TABLE IF NOT EXISTS CATALOGUE" +
                   "(id INTEGER not NULL, " +
                   " image VARCHAR(400) not NULL, " +
                   " name VARCHAR(60) not NULL, " +
                   " price DOUBLE not NULL, " +
                   " description VARCHAR(1000) not NULL, " +
                   " PRIMARY KEY ( id ))";

          stmt.executeUpdate(sql);

          System.out.println("Created table in given database...");
       } catch (Exception e) {
          System.out.println(e);
       }
  }

  public void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
      PrintWriter out = response.getWriter();

      Connection con = null;

      ResultSet rs;

      response.setContentType("text/html");

      List dataList = new ArrayList();

      try {
         Class.forName("com.mysql.jdbc.Driver");

         con = DatabaseConnection.initializeDatabase();

         String sql = "select * from CATALOGUE";
         Statement s = con.createStatement();
         s.executeQuery (sql);
         rs = s.getResultSet();

         while (rs.next ()){
            dataList.add(rs.getString("image"));
            dataList.add(rs.getString("name"));
            dataList.add(rs.getInt("price"));
            dataList.add(rs.getString("description"));
            dataList.add(rs.getInt("id"));
         }

         rs.close ();
         s.close ();
      } catch(Exception e){
         System.out.println("Exception is ;"+e);
      }

      request.setAttribute("data",dataList);
      RequestDispatcher dispatcher = request.getRequestDispatcher(page);
      if (dispatcher != null){
         dispatcher.forward(request, response);
      }

  }
}
```

Auth.java (https://github.com/skhiearth/E-Commerce-Java-Servlets/blob/main/src/Auth.java)

Cart.java (https://github.com/skhiearth/E-Commerce-Java-Servlets/blob/main/src/Cart.java)

```java
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;

import java.sql.*;
import java.util.Scanner;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;


@WebServlet("/Auth")
public class Auth extends HttpServlet {
   private static final long serialVersionUID = 1L;

    public Auth() {
        Statement stmt = null;

        try {
           Connection con = DatabaseConnection.initializeDatabase();
           stmt = con.createStatement();

           String sql = "CREATE TABLE IF NOT EXISTS USERS" +
              "(username VARCHAR(60) not NULL, " +
              " password VARCHAR(60) not NULL, " +
              " name VARCHAR(60) not NULL, " +
              " contact VARCHAR(60) not NULL, " +
              " PRIMARY KEY ( username ))";

           stmt.executeUpdate(sql);
           System.out.println("Created table in given database...");
        } catch (Exception e) {
           System.out.println(e);
        }
    }

    /**
     * @see HttpServlet#doGet(HttpServletRequest request, HttpServletResponse response)
     */
    protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
        // TODO Auto-generated method stub
        response.getWriter().append("Served at: ").append(request.getContextPath());
    }

    /**
     * @see HttpServlet#doPost(HttpServletRequest request, HttpServletResponse response)
     */
    protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
        try {
            String username = request.getParameter("username");
             String password = request.getParameter("pass");

             Boolean login = false;

             System.out.println("Username: " + username);

            Statement stmt = null;

              try {
               Connection con = DatabaseConnection.initializeDatabase();

               stmt = con.createStatement();

               String selector = "SELECT username, password FROM USERS";
                ResultSet rs = stmt.executeQuery(selector);

                if (rs.next() == false) {
                   System.out.println("Incorrect username or password.");
                   PrintWriter out=response.getWriter();
                   String someMessage = "Incorrect username or password.";
                   out.println("<script type='text/javascript'>");
                   out.println("alert(" + "'" + someMessage + "' " + ");</script>");
                   out.println("</head><body></body></html>");
                   response.sendRedirect("signin.html");
                   login = false;
                } else {
                   while(rs.next()){
                      String usr  = rs.getString("username");
                      String pass = rs.getString("password");

                      if(usr.equals(username) && pass.equals(password)){
                         System.out.println("Logged in with user: " + username);
                         System.out.println("Successfully Logged In!");

                         HttpSession session=request.getSession();
                           session.setAttribute("username", username);

                         response.sendRedirect("index.jsp");
                         login = true;
                         break;
                      } else {
                         login = false;
                         PrintWriter out=response.getWriter();
                         out.println("<script type=\"text/javascript\">");
                            out.println("alert('User or password incorrect');");
                            out.println("location='signin.html';");
                            out.println("</script>");
//                          response.sendRedirect("signin.html");
                      }
                   }

                   PrintWriter out=response.getWriter();
                   out.println("<script type=\"text/javascript\">");
                      out.println("alert('User or password incorrect');");
                      out.println("location='signin.html';");
                      out.println("</script>");
//                 response.sendRedirect("signin.html");
                }
            } catch (Exception e) {
               System.out.println(e);
               PrintWriter out=response.getWriter();
               out.println("<script type=\"text/javascript\">");
                  out.println("alert('User or password incorrect');");
                  out.println("location='signin.html';");
                  out.println("</script>");
            }
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
}
```

```java
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;

import java.sql.*;
import java.util.Scanner;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;

import java.util.*;
import javax.servlet.*;

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

  private ServletConfig config;

  //Setting JSP page
  String page="Cart.jsp";

  public void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
     PrintWriter out = response.getWriter();

     Connection con = null;

     ResultSet rs;

     response.setContentType("text/html");

     List dataList = new ArrayList();
     List<Integer> ids = new ArrayList();

     try {
        Class.forName("com.mysql.jdbc.Driver");

        con = DatabaseConnection.initializeDatabase();

        String sql = "select * from CART";
        Statement s = con.createStatement();
        s.executeQuery (sql);
        rs = s.getResultSet();

        HttpSession session=request.getSession(false);

      String name = null;

      if(session!=null){
         name=(String)session.getAttribute("username");
         System.out.println("Username: "+name);
         if(name != null) {
            while (rs.next ()){
               String username = rs.getString("username");

               if(username.equals(name)){
//                dataList.add(rs.getInt("id"));
                  ids.add(rs.getInt("id"));
               }
            }

            System.out.println(ids);
            Set<Integer> uniqueIds = new HashSet<Integer>(ids);
            for (Integer id : uniqueIds) {
                System.out.println(id);

                Statement stmt = null;

               stmt = con.createStatement();
               sql = "SELECT * FROM CATALOGUE";

               rs = stmt.executeQuery(sql);
                 while(rs.next()){
                    //Retrieve by column name
                    int _id  = rs.getInt("id");
                    double price = rs.getDouble("price");
                    String _name = rs.getString("name");

                    if(_id == id) {
                      dataList.add(id);
                      dataList.add(_name);


                      int occurrences = Collections.frequency(ids, id);
                      dataList.add(occurrences);

                      dataList.add(price);
                      int totalPrice = (int)price * occurrences;
                      dataList.add(totalPrice);
                    }
                 }
            }

            System.out.println(dataList);


         } else {
            RequestDispatcher dispatcher = request.getRequestDispatcher("error.jsp");
              if (dispatcher != null){
                 dispatcher.forward(request, response);
              }
         }
      } else {
         PrintWriter outr=response.getWriter();
         outr.println("<script type=\"text/javascript\">");
            outr.println("alert('User or password incorrect');");
            outr.println("location='signin.html';");
            outr.println("</script>");
            request.getRequestDispatcher("index.jsp").include( request, response);
      }


        rs.close ();
        s.close ();
     } catch(Exception e){
        System.out.println("Exception is ;"+e);
        out.println("<script type=\"text/javascript\">");
         out.println("alert('You need to be logged in!');");
         out.println("location='index.jsp';");
         out.println("</script>");
     }

     request.setAttribute("data",dataList);
     RequestDispatcher dispatcher = request.getRequestDispatcher(page);
     if (dispatcher != null){
        dispatcher.forward(request, response);
     }

  }
}
```

LogoutServlet.java (https://github.com/skhiearth/E-Commerce-Java-Servlets/blob/main/src/LogoutServlet.java)

```java
import java.io.IOException;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;

/**
 * Servlet implementation class LogoutServlet
 */
@WebServlet("/LogoutServlet")
public class LogoutServlet extends HttpServlet {
   private static final long serialVersionUID = 1L;

    /**
     * @see HttpServlet#HttpServlet()
     */
    public LogoutServlet() {
        super();
        // TODO Auto-generated constructor stub
    }

   /**
    * @see HttpServlet#doGet(HttpServletRequest request, HttpServletResponse response)
    */
   protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
      // TODO Auto-generated method stub
      request.getRequestDispatcher("index.jsp").include(request, response);

       HttpSession session=request.getSession();
       session.invalidate();
       response.sendRedirect("index.jsp");
   }

   /**
    * @see HttpServlet#doPost(HttpServletRequest request, HttpServletResponse response)
    */
   protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
      // TODO Auto-generated method stub
      doGet(request, response);
   }

}
```

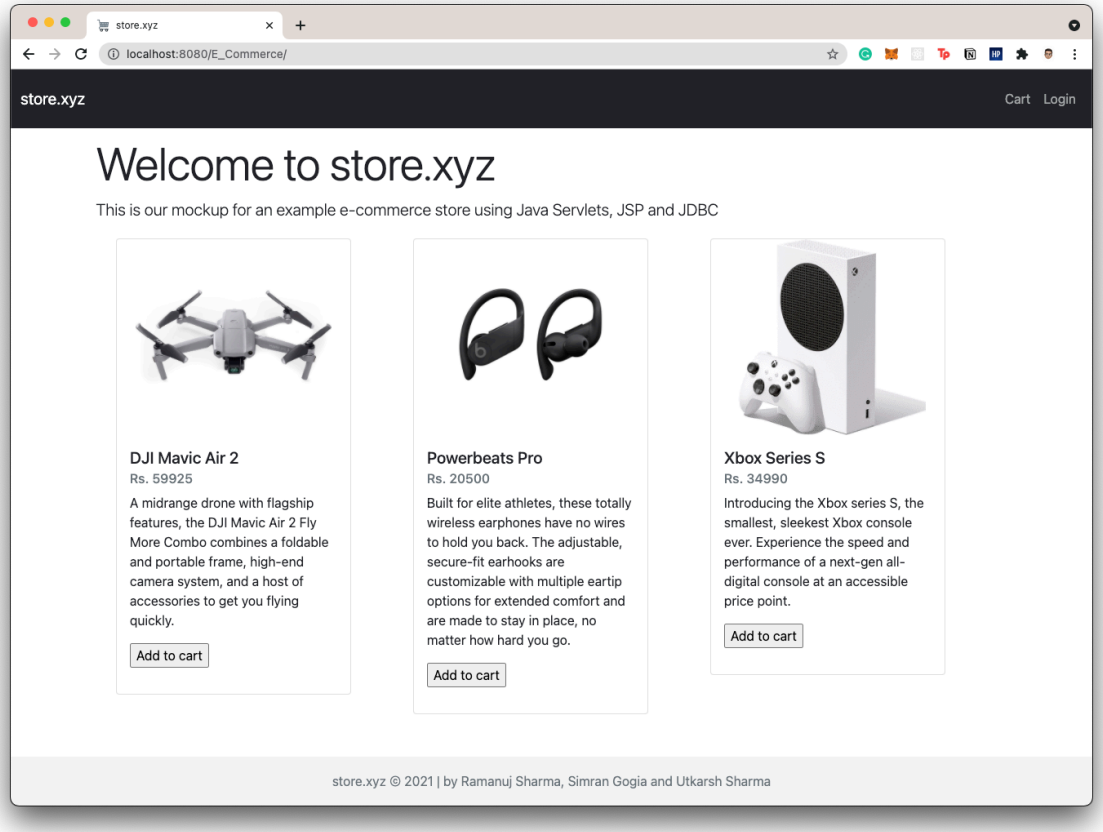
index.jsp (https://github.com/skhiearth/E-Commerce-Java-Servlets/blob/main/WebContent/index.jsp)

```html
<!doctype html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">

    <!-- Bootstrap CSS -->
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.0.0-beta1/dist/css/bootstrap.min.css" rel="stylesheet" integrity="sha384-giJF6kkoqNQ00vy+HMDP7azOuL0xtbfIcaT9wjKHr8RbDVddVHyTfAAsrekwKmP1" crossorigin="anonymous">
   <link rel="icon" type="image/png" href="img/favicon.ico"/>
    <link href="css/sticky-footer-navbar.css" rel="stylesheet">
    <title>store.xyz</title>
  </head>
  <body>

    <header>
      <nav class="navbar navbar-expand-lg navbar-dark bg-dark" style="margin-bottom: 10px;">
        <div class="container-fluid">
          <a class="navbar-brand" href="index.jsp">store.xyz</a>
          <button class="navbar-toggler" type="button" data-bs-toggle="collapse" data-bs-target="#navbarText" aria-controls="navbarText" aria-expanded="false" aria-label="Toggle navigation">
            <span class="navbar-toggler-icon"></span>
          </button>
          <div class="collapse navbar-collapse" id="navbarText">
            <ul class="navbar-nav me-auto mb-2 mb-lg-0">
            </ul>
            <span class="navbar-text">
              <ul class="navbar-nav me-auto mb-2 mb-lg-0">
                <li class="nav-item">
                  <a class="nav-link" href="CartOne.jsp">Cart</a>
                </li>
                <li class="nav-item">
                  <a class="nav-link" href="signin.html">Login</a>
                </li>
              </ul>
            </span>
          </div>
        </div>
      </nav>
    </header>

    <main>
      <div class="jumbotron jumbotron-fluid">
        <div class="container">
          <h1 class="display-4">Welcome to store.xyz</h1>
          <p class="lead">This is our mockup for an example e-commerce store using Java Servlets, JSP and JDBC</p>


          <iframe src="/E_Commerce/Catalogue" width = "100%" height = "450" style="padding-left: 20px; padding-right: 20px;">
            Frames not supported.
          </iframe>

        </div>
      </div>
    </main>

    <footer class="footer text-center">
      <div class="container">
        <span class="text-muted" style="text-align: center;">store.xyz © 2021 | by Ramanuj Sharma, Simran Gogia and Utkarsh Sharma</span>
      </div>
    </footer>

    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.0.0-beta3/dist/js/bootstrap.bundle.min.js" integrity="sha384-JEW9xMcG8R+pH31jmWH6WWP0WintQrMb4s7ZOdauHnUtxwoG2vI5DkLtS3qm9Ekf" crossorigin="anonymous"></script>
  </body>
</html>
```

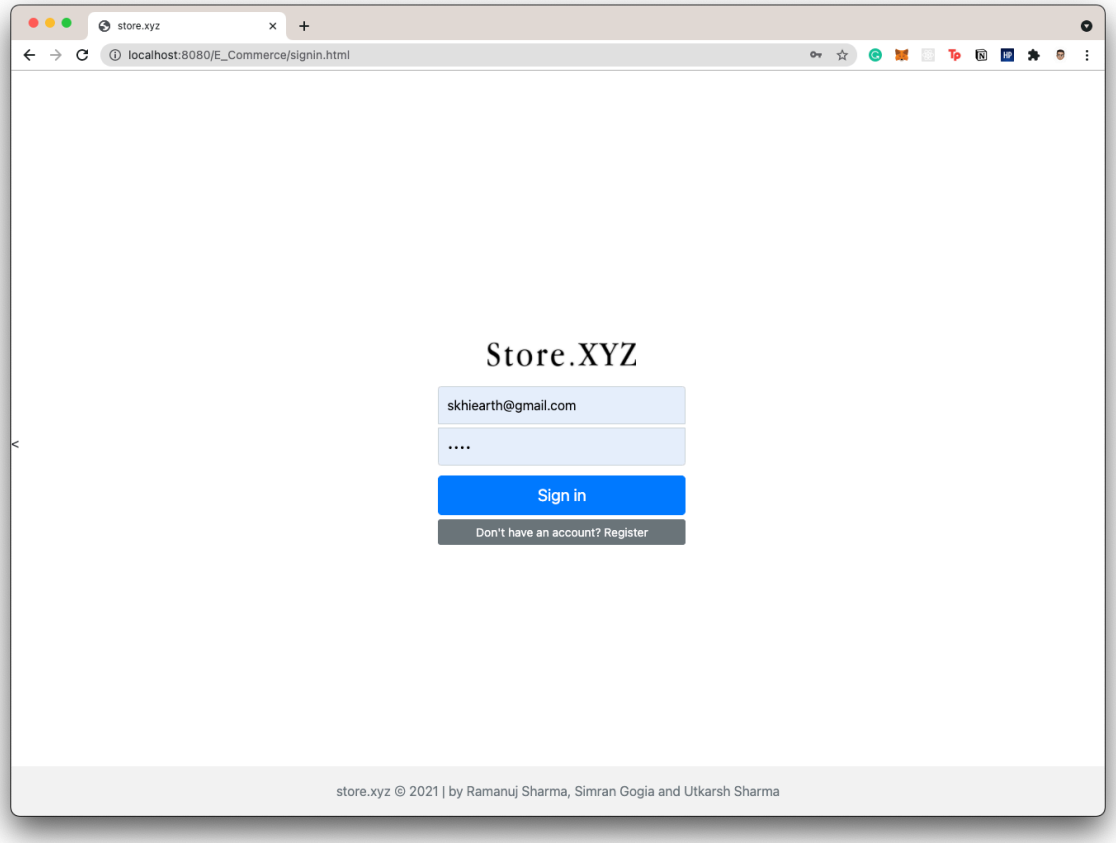
Full Source code on GitHub (https://github.com/skhiearth/E-Commerce-Java-Servlets)

Outputs:

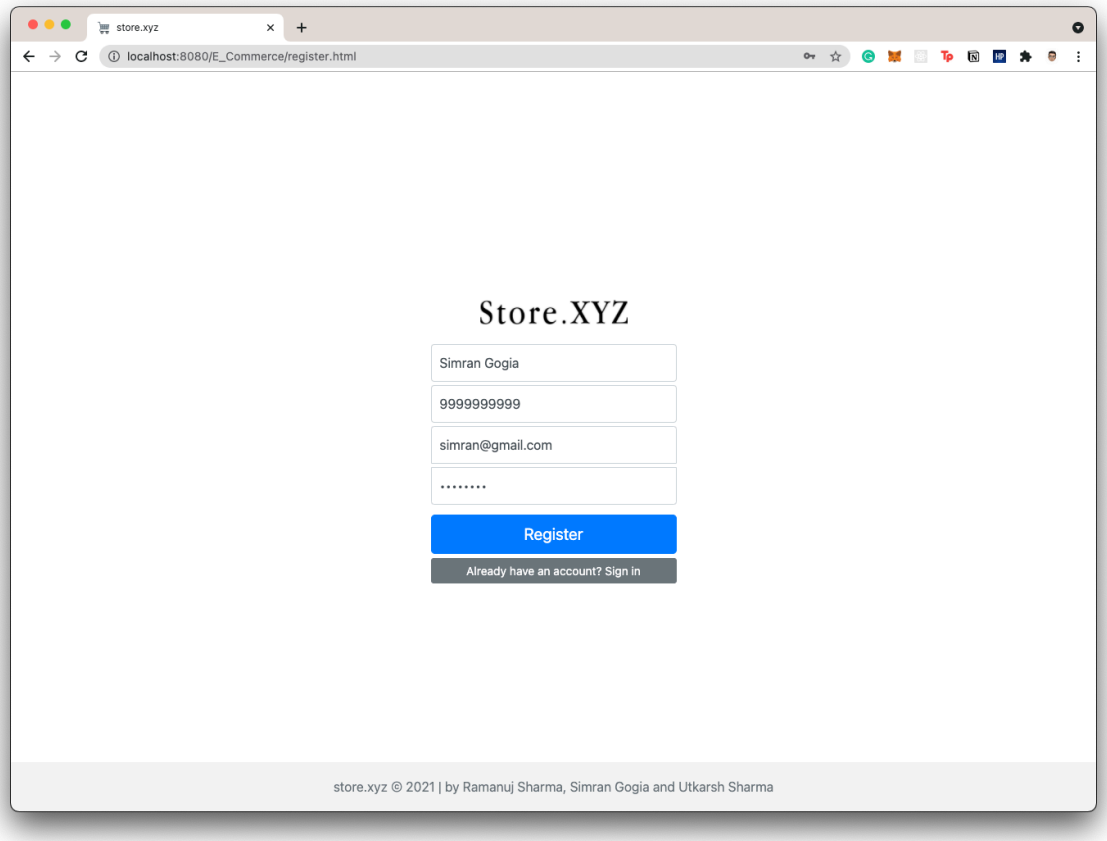
http://localhost:8080/E_Commerce/



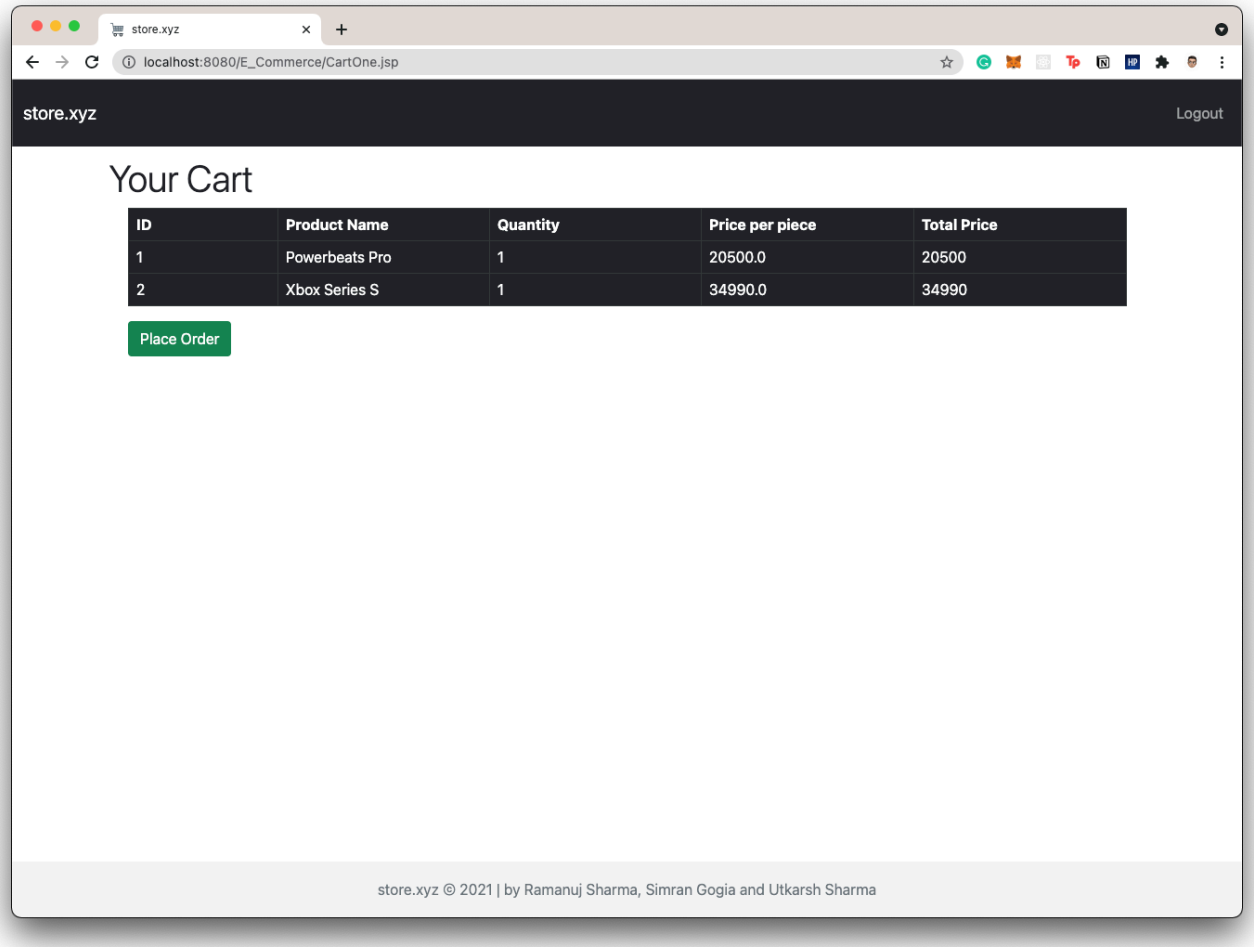
http://localhost:8080/E_Commerce/signin.html



http://localhost:8080/E_Commerce/register.html

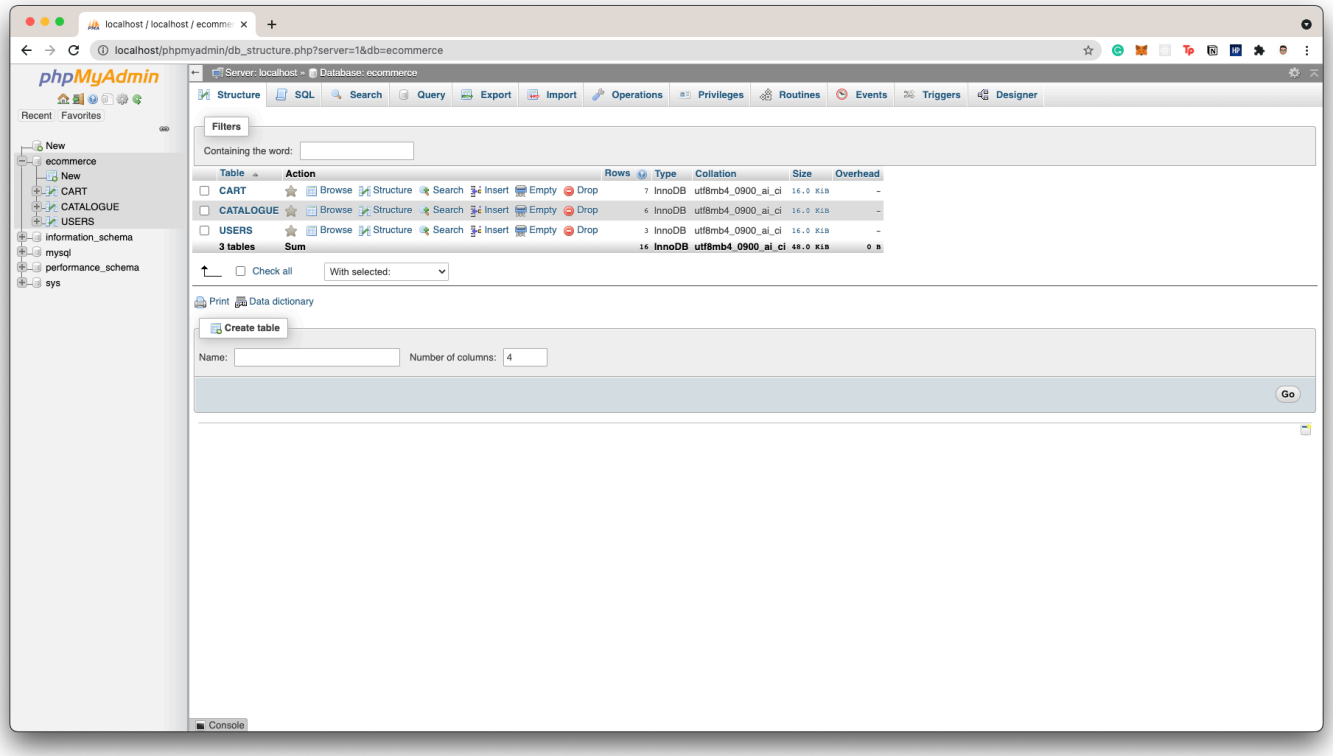


http://localhost:8080/E_Commerce/CartOne.jsp

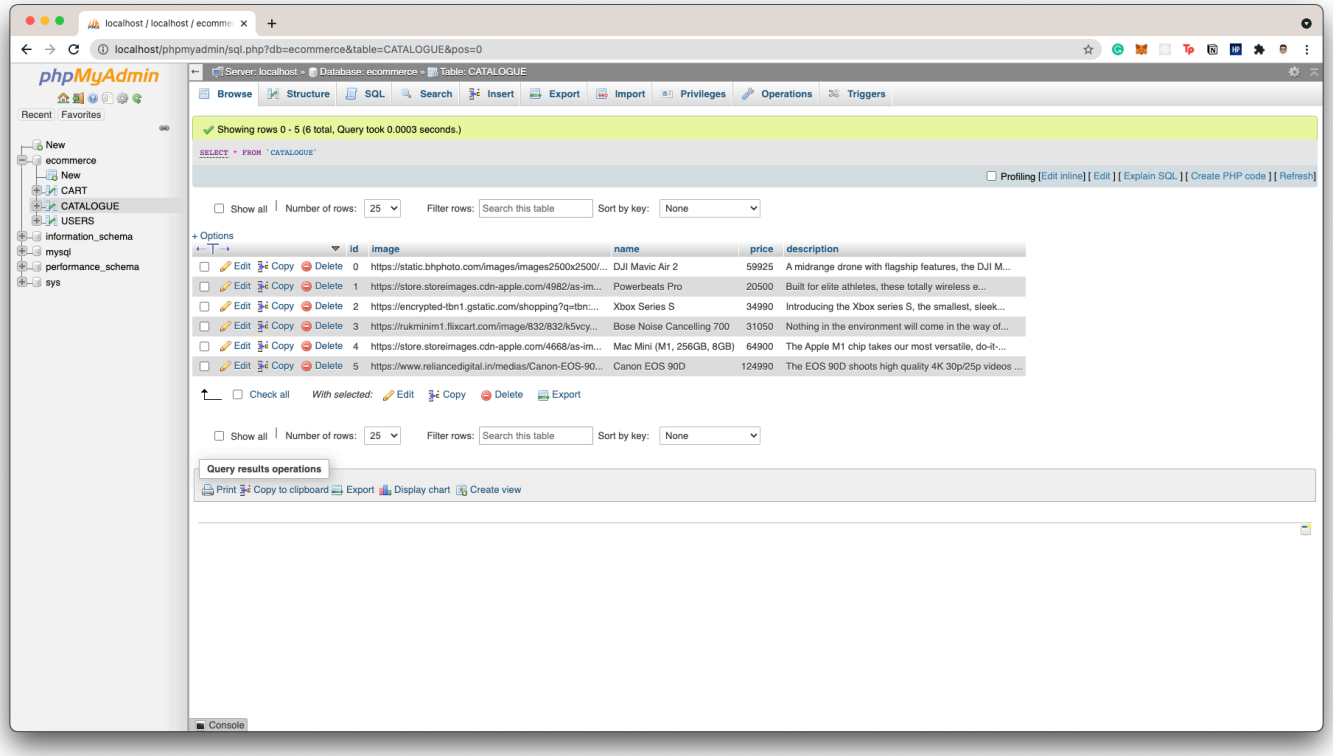


Database Snapshots:

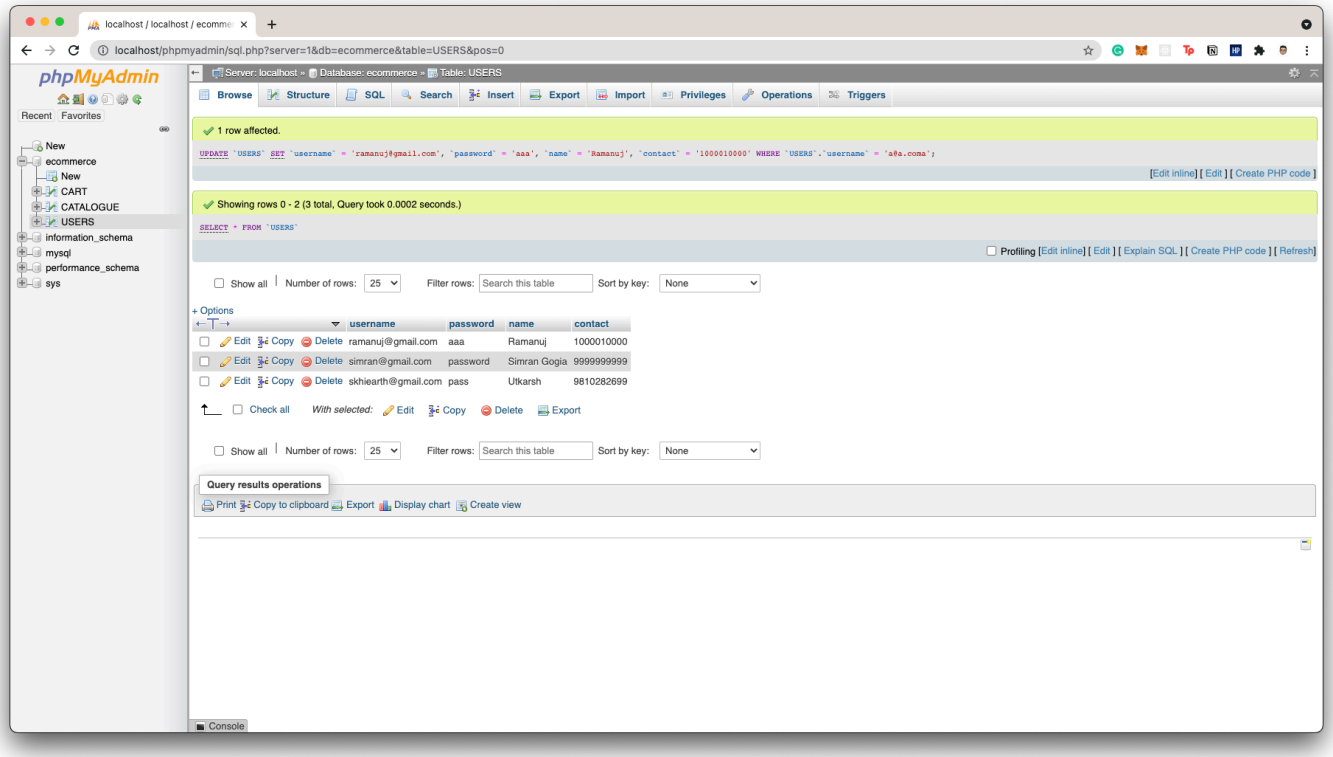
ECOMMERCE Database



CATALOGUE Table



USERS Table



CART Table