**ASSIGNMENT-4**

**Roll No: 31164**

**Title:** JSP, Servlet, MySQL

**Problem Definition:** Add dynamic web application features to previously selected application using Servlet, JSP and backend (MySQL / MongoDB).

**Objective:** To apply database connectivity and back-end features to the existing application with the help of Servlet, JSP and an appropriate database.

**Outcome:** One will be able to create a fully functional web app with dynamic features and record storage with a database.

**Theory:**

* Servlet is used to create dynamic web pages using Java.
* It is a server-side extension in Java and is available in the form of the Servlet interface.
* There are three ways of creating a web app using Servlet:
  1. Implementing the Servlet interface.
  2. Extending the GenericServlet class.
  3. Extending the HttpServlet class.
* To implement server-side programming using Java, it is important that the servlet-api.jar available with tomcat be made an environment path variable in Windows.
* The Servlet life cycle consists of three methods:
  1. Init(): The init method is called only once when the servlet is created. It initializes the servlet. The syntax is as follows:
     + public void init(ServletConfig config) throws ServletException
  2. Service(): It is called multiple times if multiple threads execute it. Syntax for service is:
     + public void service(ServletRequest request, ServletResponse response) throws ServletException, IOException
  3. Destroy(): It is called to remove the servlet instance. It is called only once irrespective of the threads. Syntax for destroy is:
     + public void destroy()
* JSP refers to Java Server Pages. It is also a server-side technology.
* Unlike Servlet, which is coded in Java, JSP is the use of Java code in an HTML web page.
* It is an extended version of Servlet.
* JSP can be used to communicate with Servlet to render objects in the front-end at runtime.
  1. Declaration syntax: <%! datatype var\_name %>
  2. We can any kind of Java code in JSP using Java Scriptlets:
     + <% java code %>
  3. Expressions: <%= expression %>
  4. Comments: <% -- JSP Comments %>
* In Servlet, we can set variables as attributes by:
  1. Request.setAttribute(key, value)
* In JSP, we can retrieve the attribute by:
  1. Datatype var\_name = (Datatype) request.getAttribute(key)
* To establish connectivity with a database:
  1. Write JDBC code in Servlet
  2. Fetch results from the database
  3. Pass data to JSP using requests
  4. Render data in front-end by retrieving values for the attributes.

**Test Cases:**

|  |  |  |
| --- | --- | --- |
| **Input** | **Expected Output** | **Result** |
| Update zipcode to 411061 | Page shows zipcode as 41161 and value is updated in MySQL | Success |
| Schedule new exam titled English-UT1 | New examination shown in examinations page | Success |
| Add new question in English-UT1 | Question reflected in English-UT1 | Success |

**Conclusion:** Thus, we were able to create a dynamic web app using Servlet, JSP and MySQL.