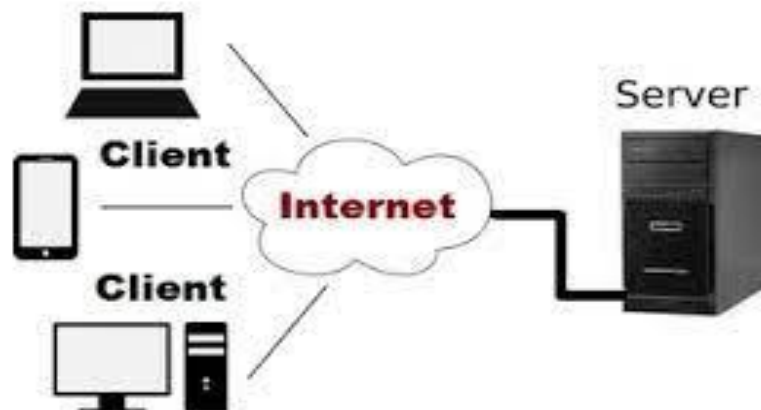


Web Application

A web application is a computer program that utilizes web browsers and web technology to perform tasks over the Internet. Web applications use a combination of server-side scripts (PHP and ASP) to handle the storage and retrieval of the information, and client-side scripts (HTML, CSS and Java Script) to present information to users. This allows users to interact with the company using online forms, content management systems, shopping carts and more. In addition, the applications allow employees to create documents, share information, collaborate on projects, and work on common documents regardless of location or device.

Client-Server Model

A client-server network is the medium through which clients access resources and services from a central computer, via either a local area network (LAN) or a wide-area network (WAN), such as the Internet. A unique server called a daemon may be employed for the sole purpose of awaiting client requests, at which point the network connection is initiated until the client request has been fulfilled.



Server-side programming

Server-side programming refers to a program that runs on the server and focuses on the generation of dynamic content. Server-side programming is used for querying and interacting with the database, accessing files on a server, interacting with other servers, processing user input, and structuring web applications. Popular programming languages for server-side programming include C++, Java and ASP, JSP, PHP, Python, and Ruby on Rails.

Web Server

A web server is server software application. That is an interpreter for server side languages or scripts like PHP, ASP, Java Servlet and others. The primary function of a web server is to store, process and deliver web pages to clients. The communication between client and server takes place using the Hypertext Transfer Protocol (HTTP). Pages delivered are most frequently HTML documents, which may include images, style sheets and scripts in addition to the text content. The process is an example of the client/server model. All

computers that host Web sites must have Web server programs. Leading Web servers include Apache (the most widely-installed Web server), Microsoft's Internet Information Server (IIS) and nginx (pronounced engine X) from NGNIX. Other Web servers include Novell's NetWare server, Google Web Server (GWS) and IBM's family of Domino servers.

File servers, database servers, mail servers, and web servers use different kinds of server software. Each of these applications can access files stored on a physical server and use them for different purposes. The job of a web server is to serve websites on the internet. To achieve that goal, it acts as an intermediary between the server and client machines

Apache Tomcat web server

Essentially it's an open-source Java servlet and Java Server Page container that lets developers implement an array of enterprise Java applications. Tomcat also runs a HTTP web server environment in which Java code can run.

The original release of Java in 1995, Sun Microsystems architect James Duncan Davidson developed an open-source servlet reference implementation for the first Java Servlet API. Java servlets are small Java programs that define how responses and requests are handled by the server. A developer would write their servlet or JSP and let Tomcat conduct all of the routing and backend work.

Introduction to JSP

Java Server Pages (JSP) is a Java standard technology that enables you to write dynamic, data-driven pages for your Java web applications. JSP is built on top of the Java Servlet specification. The two technologies typically work together, especially in older Java web applications. From a coding perspective, the most obvious difference between them is that with servlets you write Java code and then embed client-side markup (like HTML) into that code, whereas with JSP you start with the client-side script or markup, then embed JSP tags to connect your page to the Java backend.

JSP is an advanced version of Servlet Technology. JSP is first converted into servlet by JSP container before processing the client's request. JSP has access to entire API of JAVA

JSP is a collection of technologies that helps software developers create dynamically generated web pages based on HTML, XML, SOAP, or other document types. Released in 1999 by Sun Microsystems, JSP is similar to PHP and ASP, but uses the Java programming language.

Difference b/w JSP and HTML

The main difference between JSP and HTML is that JSP is a technology to create dynamic web applications while HTML is a standard markup language to create the structure of web pages.

JSP stands for Java Server Pages. These files have the extension **.jsp**. The main advantage of JSP is that the programmer can insert Java code inside HTML. There are JSP tags to insert Java code. The embedded JSP tags will be used to call server-side code and data.

Features of JSP

1. **Coding in JSP is easy:** - As it is just adding JAVA code to HTML/XML.
2. **Reduction in the length of Code:** - In JSP we use action tags, custom tags etc.
3. **Connection to Database is easier** :-It is easier to connect website to database and allows to read or write data easily to the database.
4. **Make Interactive websites:** - In this we can create dynamic web pages which helps user to interact in real time environment.
5. **Portable, Powerful, flexible and easy to maintain:** - as these are browser and server independent.
6. **No Redeployment and No Re-Compilation:** - It is dynamic, secure and platform independent so no need to re-compilation.
7. **Extension to Servlet:** - as it has all features of servlets, implicit objects and custom tags

The programmer can write the `<%` tag to start the Java code and write `%>` tag at the end of the Java code. Moreover, there are different JSP tags to accomplish various tasks. There are tags to share data between requests and pages, pass control between pages and to get data from databases, etc.

JSP syntax

<p>Declaration Tag :-It is used to declare variables.</p> <p>Syntax:- <code><%! Dec var %></code></p> <p>Example:- <code><%! int var=10; %></code></p>	<p>Java Scriplets :- It allows us to add any number of JAVA code, variables and expressions.</p> <p>Syntax:- <code><% java code %></code></p>
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Process of Execution

Steps for Execution of JSP are following: -

1. Create html page from where request will be sent to server Example test.html.
2. To handle to request of user next is to create **.jsp** file Example newtest.jsp
3. Create project folder Name structure.
4. Create XML file example mytest.xml.
5. Create WAR file.
6. Start Tomcat
7. Run Application

Example-1

Write a server Side (JSP) Program to display Result of Student with Roll, Name, and Math's, English and Urdu Marks and calculate obtain Marks and Percentage and apply condition for Grade.

```

<%@page import = "java.sql.*,util.*" %>
<html>
<head>
  <title> This First JSP Program </title>
<style>
h1{
    text-align:center;
    color:#00F;
    text-decoration:underline;
}
h2{ color:#090;
}

</style>
</head>
<body>
<h1> Student Result Information </h1>
<%
    int Roll,Math,English,Urdu,Obt;
    float Per;
    String Name,Grade;

    Roll= 101;
    Name = "Imran Ahmed";
    Math =67;
    English=58;
    Urdu =83;

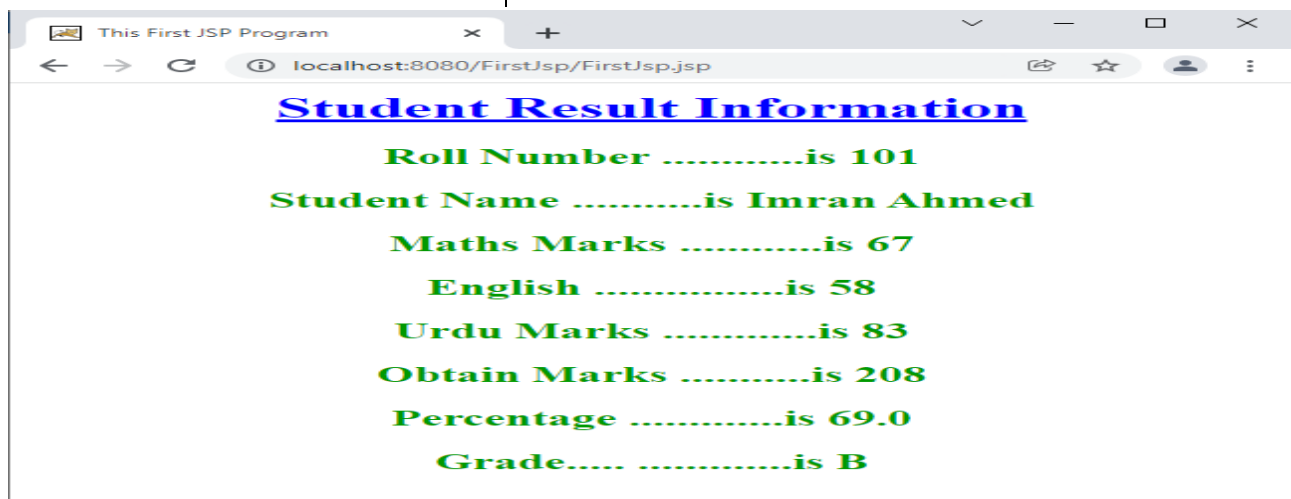
    Obt = Math + English + Urdu;
    Per = Obt * 100 /300;

    if (Per >=80)
        Grade="A+1";
    else if(Per >=70)
        Grade="A";
    else if(Per >=60)
        Grade="B";
    else if(Per >=50)
        Grade="C";
    else if(Per >=40)
        Grade="D";
    else
        Grade="Fail";

    out.print("<center>");
    out.println("<h2> Roll Number .....is "+Roll+"</h2>");
    out.println("<h2> Student Name .....is "+Name+"</h2>");
    out.println("<h2> Maths Marks .....is "+Math+"</h2>");
    out.println("<h2> English .....is "+English+"</h2>");
    out.println("<h2> Urdu Marks .....is "+Urdu+"</h2>");
    out.println("<h2> Obtain Marks .....is "+Obt+"</h2>");
    out.println("<h2> Percentage .....is "+Per+"</h2>");
    out.println("<h2> Grade..... .....is "+Grade+"</h2>");
    out.print("</center>");

    %>
</body>
</html>

```



Exercise

Theory Question

- 1) What is web application with example?
- 2) What difference between server side and client-side programming.
- 3) What is web server and write some list of web server name.
- 4) Define purpose of Apache Tom Cat Web server.

Practical Question

- 1) Write a JSP program to assign Employee code, Name, Designation and Basic Salary data content and calculate Conveyance Allowance 10%, Medical Allowance 20%, House Rent 30%, and calculate Gross Amount, and calculate Income Tax 5% then calculate Net Salary. After find calculation display pay slip information as following.

Employee Code: 101

Employee Name: Muhammad Ali

Employee Designation: Programmer

Employee Basic Salary: Rs. 1000

Conveyance Allowance: Rs. 100

Medical Allowances: Rs. 200

Hose Rent: Rs. 300

Gross Amount: Rs. 1600

Income Tax: Rs. 50

Net Salary: Rs. 1550

Objective and MCQ

- 1) Server Side Programming Language is .
 - a) Java Script
 - b) HTML
 - c) CSS
 - d) JSP or PHP
- 2) Client Side Programming Language is.
 - a) PHP
 - b) ASP
 - c) JSP
 - d) Java Script

- 3) The programmer can write the ____ tag to start the Java code and write ____ tag at the end of the Java code.
- < >
 - <? ?>
 - <% %>
 - <% !>
- 4) The Source code of Java server Page file extension should be ____.
- .php
 - .htm
 - .java
 - .jsp
- 5) JSP is an advanced version of _____.
- Servlet Technology
 - Java Language
 - Active Server Page (ASP)
 - HTML Technology.