

HTML tags are the fundamental building blocks of web development, providing the structure and organization necessary for creating web pages. 1.They include tags for headings, paragraphs, links, images, and more. 2.Commonly used tags like <html>, <head>, and <body> are essential for creating a well-structured web document. 3.These tags provide the framework for building user-friendly and accessible web pages.

The Document Object Model (DOM) is a programming interface (API) that represents a web page as a logical tree of nodes and objects

JavaBean -In any programming language, **reusability** is the main concern. To achieve the same concern, Java introduced the concept of **JavaBean**. It is a software component that has been designed to be reusable in a variety of environments. In this section, we will dive into the topic and understand the horizons of concept in this **What is EJB** - EJB is an acronym for *enterprise java bean*. It is a specification provided by Sun Microsystems to develop secured, robust and scalable distributed applications. **SAX** is a programming interface for processing XML files based on events. The DOM's counterpart, SAX, has a very different way of reading XML code. The Java implementation of SAX is regarded as the de-facto standard. SAX processes documents state-independently, in contrast to DOM which is used for state-dependent processing of XML documents. **JSP (JavaServer Pages) file**, a web server first receives an HTTP request for the JSP page, then the JSP engine compiles the JSP code into a servlet, which is then executed by the servlet container to generate dynamic HTML content that is sent back to the client browser as a response **Introduction and Working of Struts Web Framework** - **Struts** is an open-source web application framework developed by Apache Software Foundation, it is used to create a web application based on servlet and JSP. It depends on the MVC (Model View Controller) framework. **Debugging**-To launch an application into the market, it is very necessary to cross-check it multiple times so as to deliver an error-free product. When we talk about delivering a bug-free product, then our main concern is all about customer satisfaction because if you are application is not up to the mark, then eventually it will demolish the company's reputation in the market.

What is DTD in XML ? -DTD is a document-type definition. DTD contains a set of rules that control the structure and elements of XML files. When any XML file refers DTD file, it validates against those rules. DTD has validated elements and attributes that are defined inside the DTD document. It serves as a formal specification that outlines the elements, attributes, and their relationships within an XML document. They specify what elements can appear, their order, which attributes they can have, and what data types those attributes can contain.

Features of DTD:*-Comprises structure, attributes, and elements of XML file *Validate XML files that help maintain data integrity and consistency. *3.Checks vocabulary of XML for grammatical rules *DTDs have a relatively simple and human-readable syntax *Allows to specify default values for attributes *Support mixed content models **Types of DTD:2 - Internal DTD:** Inside the document

External DTD: Specified in a separate document and linked later.

Difference between Javabeans and Enterprise Javabeans- javabeans - 1-Javabeans is a component technology to create universal Java components. 2. Beaninfo classes, property editors or customizers can be present in Javabeans.3. An external interface called a properties interface is given in JavaBeans, that allows a builder tool to describes the functionality of a bean.4. There is no further category of Java Beans.5. JavaBeans have not any definite support exists for transactions **Enterprise JavaBeans**- 1. Even though EJB is a component technology, it neither reconstructs nor enhances the original JavaBean specification.2. No perception of Beaninfo classes, property editors or customizers is in Enterprise JavaBeans and no additional information is provided except that described in the deployment descriptor.3. A deployment descriptor is given in Enterprise JavaBeans to interpret the functionality to an external builder tool or IDE.4. Enterprise JavaBeans are categorized into two types – session beans and entity beans.5. EJBs may be transactional and transactional support is provided by the EJB servers

What is Java Servlet?- Today, we all are aware of the need to create **dynamic web pages** i.e. the ones that can change the site contents according to the time or can generate the content according to the request received from the client. If you like coding in Java, then you will be happy to know that using Java there also exists a way to generate dynamic web pages and that way is **Java Servlet**. **Properties of Java Servlet** *Servlets work on the server side. *Servlets are capable of handling complex requests obtained from the web server. **difference between the servlet and CGI:**

#Servlet-1-It is thread based i.e. for every new request new thread is created.2. The codes are written in JAVA programming language.3. Since codes are written in Java, it is object oriented and the user will get the benefits of OOPs.4. It is portable.5. It remains in the memory until it is not explicitly destroyed. **#CGI** -1-It is process-based i.e. for every new request new process is created.2-The codes are written any programming language.3. Since codes are written in any language, all the languages are not object-oriented thread-based. So, the user will not get the benefits of OOPs.4. It is not portable.5-It is removed from the memory after the completion of the process-based request

What is a Session?- A session is used to save information on the server momentarily so that it may be utilized across various pages of the website. It is the overall amount of time spent on an activity. The user session begins when the user logs in to a specific network application and ends when the user logs out of the program or shuts down the machine. **JSP Implicit Objects:** 1. **JSP Implicit Objects** 2. **out implicit object** 3. **Example of out implicit object** There are **9 jsp implicit objects**. These objects are *created by the web container* that are available to all the jsp pages. The available implicit objects are out, request, config, session, application etc **Object-** 1-out . 2- request.3-response 4-config 5-application 6-session 7- pageContext 8-page 9- exception Type- 1 JspWriter 2.HttpServletRequest 3.HttpServletResponse 4..ServletConfig 5.ServletContext 6.HttpSession 7.PageContext8.Object 9.Throwable

Features and Advantages of XML- XML is widely used in the era of web development. It is also used to **simplify data storage and data sharing**. **The main features or advantages of XML are given below.** 1) **XML separates data from HTML** -If you need to display dynamic data in your HTML document, it will take a lot of work to edit the HTML each time the data changes. 2) **XML simplifies data sharing** -In the real world, computer systems and databases contain data in incompatible formats. 3) **XML simplifies data transport** One of the most time-consuming challenges for developers is to exchange data between incompatible systems over the Internet. 4) **XML simplifies Platform change** Upgrading to new systems (hardware or software platforms), is always time consuming. Large amounts of data must be converted and incompatible data is often lost. 5) **XML increases data availability** -Different applications can access your data, not only in HTML pages, but also from XML data sources. **Disadvantages of xml schemes-** **Complexity:** XML Schemas can be quite complex and difficult to understand, especially for beginners. The syntax and rules can be overwhelming, making it challenging to create and maintain schemas 2-**Verbosity:** XML Schemas tend to be verbose, requiring a lot of code to define even simple structures. This can make the documents harder to read and manage. 3. **Performance:** Parsing and validating XML documents against a schema can be resource-intensive, leading to performance issues, especially with large documents or complex schemas 4-**Limited Data Types:** While XML Schemas support a wide range of data types, they may not cover all the specific needs of certain applications.5-**Interoperability Issues:** Different systems and applications may interpret XML Schemas differently, leading to interoperability issues.

What is Tomcat?- It is an open-source Java servlet container that implements many Java Enterprise Specs such as the Websites API, Java-Server Pages and last but not least, the Java Servlet. The complete name of Tomcat is "Apache Tomcat" it was developed in an open, participatory environment and released in 1998 for the very first time. It began as the reference implementation for the very first Java-Server Pages and the [Java Servlet](#) API. However, it no longer works as the reference implementation for both of these technologies, but it is considered as the first choice among the users even after that. It is still one of the most widely used java-sever due to several capabilities such as good extensibility, proven core engine, and well-test and durable. Here we used the term "servlet" many times, so what is [java](#) servlet; it is a kind of software that enables the webserver to handle the dynamic(java-based) content using the Http protocols. **Process testing tomcat server-** ***Installation:** First, download and install the latest version of Apache Tomcat on your machine. You can find the installation files on the Apache Tomcat website. ***Configuration:** Configure the server by editing the server.xml file located in the conf directory of your Tomcat installation. This file contains important settings such as port numbers, server name, and other configurations. *** Start the Server:** Start the Tomcat server by running the startup.bat (Windows) or startup.sh (Linux/Mac) script located in the bin directory of your Tomcat installation. ***Access the Server:** Open a web browser and navigate to http://localhost:8080. If the server is running correctly, you should see the Tomcat welcome page.

Differentiate servlet and applet with suitable example- Servlets **1-Definition:** Servlets are server-side Java programs that handle client requests and generate dynamic web content. They run on a web server or application server. **2.Execution:** Servlets are executed on the server side. **3.Use Case:** Servlets are used to create dynamic web applications, such as processing form data, managing sessions, and interacting with databases. **3.Example:** A login form on a website where the user enters their credentials. The form data is sent to a servlet, which processes the login request, validates the user, and generates a response (e.g., redirecting to a dashboard or showing an error message).

Applets-1-Definition: Applets are client-side Java programs that run within a web browser. They are embedded in HTML pages and executed by the Java Virtual Machine (JVM) on the client side. **2-Execution:** Applets are executed on the client side. **3-Use Case:** Applets are used to create interactive web applications, such as games, simulations, and visualizations. **4-Example:** A simple applet that displays a moving ball within a web page.

Describe conditional processing in JSP with suitable example- Conditional processing in JSP (JavaServer Pages) allows you to control the flow of your web application based on certain conditions. This is typically done using JSP tags or scriptlets. Here's a simple example using JSP tags:

Example: Displaying a Message Based on User Role Let's say you want to display a different message based on the user's role (e.g., admin or regular user). You can use the `<c:if>` tag from the JSTL (JavaServer Pages Standard Tag Library) for this purpose.

1-Include the JSTL library in your JSP page:- `<%@ taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c" %>`

2-Set a variable for the user's role:- `<%`

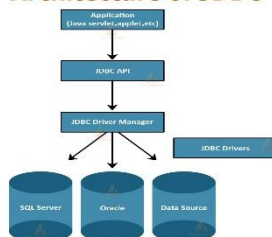
```
String userRole = "admin"; // This could be retrieved from session or dat
request.setAttribute("userRole", userRole);
%>
```

3-Use the <c:if> tag to conditionally display content: **Explanation- 1- Include JSTL Library:** The `<%@ taglib %>` directive includes the JSTL core library, which provides the `<c:if>` tag for conditional processing. **2-Set User Role:** In this example, the user's role is hardcoded as "admin". In a real application, you would retrieve this information from the session or a database. **3-Conditional Display:** The `<c:if>` tag checks the condition specified in the test attribute. If the condition is true, the content inside the tag is displayed. In this case, different messages are displayed based on whether the user is an admin or not.

Design of JDBC:- Java Database Connectivity (JDBC) is an Application Programming Interface (API), from Sun microsystem that is used by the Java application to communicate with the relational databases from different vendors. JDBC and database drivers work in tandem to access spreadsheets and databases. **Design of JDBC** defines the components of JDBC, which is used for connecting to the database. **JDBC has four major components that are used for the interaction with the database.** 1-JDBC API 2-JDBC Test Suite 3-JDBC Driver Manger 4-JDBC ODBC Bridge Driver **1-JDBC API:** JDBC API provides various interfaces and methods to establish easy connection with different databases. **2- JDBC Test suite:** JDBC Test suite facilitates the programmer to test the various operations such as deletion, updation, insertion that are being executed by the JDBC Drivers. **3- JDBC Driver manager:** JDBC Driver manager loads the database-specific driver into an application in order to establish the connection with the database. The JDBC Driver manager is also used to make the database-specific call to the database in order to do the processing of a user request. **4- JDBC-ODBC Bridge Drivers:** JDBC-ODBC Bridge Drivers are used to connect the database drivers to the database. The bridge does the translation of the JDBC method calls into the ODBC method call. It makes the usage of the sun.jdbc.odbc package that encompasses the native library in order to access the ODBC (Open Database Connectivity) characteristics.

Architecture of JDBC **1) Application:** It is the Java [servlet](#) or an applet that communicates with the data source. **2) The JDBC API:** It allows the [Java](#) programs to perform the execution of the [SQL](#) statements and then get the results. *** Drivers** ***DriverManager** ***Statement** ***CallableStatement** ***PreparedStatement** ***ResultSet** ***SQL data** **3)DriverManager:** **DriverManager** plays a crucial role in the architecture of JDBC. It uses database-specific drivers to connect the enterprise applications to various databases. **4) JDBC drivers:** To interact with a data source with the help of the JDBC, one needs a JDBC driver which conveniently interacts with the respective data source. **Different Types of Architecture of JDBC:-** The architecture of the JDBC consists of two and three tiers model in order to access the given database. **Two-tier model:** In this model, the application interacts directly with the source of data. The JDBC driver establishes the interaction between the data source and the application. When a query is sent by the user to the data source, the reply of those sent queries is sent directly to the user. **Three-tier model:** In this model, the queries of the user are being sent to the middle-tier services, from where the commands are sent again to the source of data. The answers to those queries are reverted to the middle tier, and from there, it is again sent to the user. **JDBC Working-** Any Java application that needs to interact with a database needs to be programmed using the JDBC API. The JDBC driver that supports the data sources like Oracle or MySQL needs to be added; then, only the interaction happens with the data source

Architecture of JDBC



Advantages of Cookies:-

- 1-State Management:** Cookies help maintain state information across different pages of a website, allowing for a seamless user experience.
- 2-User Preferences:** They store user preferences, such as language settings or theme choices, making the website more personalized.
- 3-Session Management:** Cookies are used to manage user sessions, enabling features like login persistence and shopping cart functionality.
- 4-Tracking and Analytics:** They help track user behavior and gather analytics data, which can be used to improve website performance and user experience.
- 5-Lightweight:** Cookies are small in size and do not consume significant server resources.

Disadvantages of Cookies

- 1-Security Risks:** Cookies can be intercepted and manipulated by attackers, leading to security vulnerabilities such as session hijacking.
- 2-Privacy Concerns:** They can be used to track user behavior across different websites, raising privacy issues.
- 3-Limited Storage:** Cookies have a size limit (typically 4KB), which restricts the amount of data that can be stored.
- 4-Browser Dependency:** Users can disable cookies in their browsers, which may affect the functionality of websites that rely on them.
- 5-Data Integrity:** Cookies can be easily modified by users, leading to potential data integrity issues.

9Purposes of a Style Class Selector-

- 1-Reusability:** Define a set of styles once and apply them to multiple elements, reducing redundancy and making your CSS more maintainable.
- 2-Consistency:** Ensure that elements with the same class have a uniform appearance, which enhances the overall design and user experience.
- 3-Flexibility:** Easily update the styles of multiple elements by modifying the class definition, without having to change each element individually.
- 4-Organization:** Keep your CSS organized by grouping related styles together in classes, making it easier to manage and understand.