

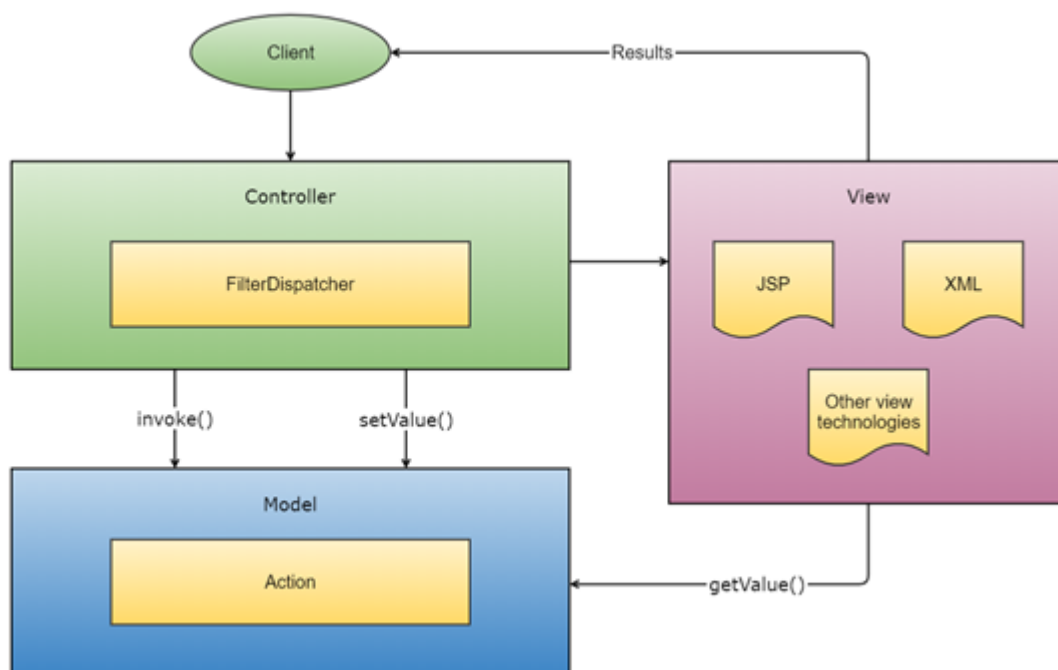
What is struts framework?

Apache Struts is a modern Java framework that uses the MVC (Model View Controller) architecture for building enterprise-ready web applications.

Struts help developers to create flexible, maintainable, and secure web applications in Java. It is based on the MVC architecture, where each component takes care of different aspects of the application.

Working of Struts:

Whenever there is an incoming request to the application, the request is processed by Controller. In the case of Struts, it is an ActionServlet (FilterDispatcher in Struts 2.x). The View component is responsible for presenting information to the user or to accept the input form from them. The business logic of the application is in the Model component.



Explain two types of URL referencing techniques with suitable examples in HTML.

Absolute URL: Absolute URLs specify the complete address of a resource, including the protocol, domain name, path, and filename. They are independent of the current page's location and provide a direct link to the specified resource.

Example: `Visit Google`

Relative URL: Relative URLs specify the path to a resource relative to the current page's location. They are shorter and more flexible than absolute URLs, but they rely on the current page's location to determine the full address of the resource.

Example: `About Us`

When to use Absolute URLs:

- When linking to a resource on a different domain
- When sharing URLs with others to ensure they always point to the correct location

When to use Relative URLs:

- When linking to resources within the same domain
- When reducing the length of URLs and improving code readability

What do you mean by web hosting and Publishing? Explain with the help of an example.

| Web Hosting | Web Publishing |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| It is a process of using server to host website. | It is a process of publishing original content on Internet. |
| It's process includes proving space in server to store web pages, make it available for viewing online, etc. | It's process includes uploading files, updating web pages, posting blogs, posting content to web pages, etc. |
| It allows for advanced level of customization. | It allows customization from beginner to advanced levels depending on platform. |
| It provides space in internet for website. | It makes website available to view on your domain. |
| It does not come with premade website. | It provides ready-made themes to develop website. |
| Its main aim is to provide storage space for website or application on server on internet so that it can be accessed by other computers connected to internet. | Its main aim is to communicate ideas and concepts between people. |

Example

- Web hosting: You sign up for a hosting plan with GoDaddy. This plan gives you 10GB of disk space and 100GB of bandwidth.
- Web publishing: You create an account on Wix.com, choose a template, customize your template, add content, select a domain name and publish your website.

What are the advantages of client side scripting using Java Script?

Advantages of client side scripting:

1. The scripting language for clients is very simple
2. It's light and easy to use
3. The servers are less burdened
4. Data validation on the client side can be achieved
5. The execution of client-side scripts is faster
6. The client-side software helps complete complicated tasks in a few steps
7. It takes less time to run script code.
8. Faster response from browser

What do you mean by DTD's using XML?

DTD stands for **Document Type Definition**. It defines the legal building blocks of an XML document. It is used to define document structure with a list of legal elements and attributes. It's main purpose is to define the structure of an XML document. It contains a list of legal elements and define the structure with the help of them. An application can use a DTD to verify that XML data is valid. If the DTD is declared inside the XML file, it must be wrapped inside the `<!DOCTYPE>` definition.

What are HTTP cookies?

A **cookie** is a small piece of information that is persisted between the multiple client requests. There are 2 types of cookies in servlets:

1. Non-persistent cookie: It is **valid for single session** only. It is removed each time when user closes the browser.
2. Persistent cookie: It is **valid for multiple session** . It is not removed each time when user closes the browser. It is removed only if user logout or signout.

Advantages of cookies:

1. Simplest technique of maintaining the state.
2. Cookies are maintained at client side.

Disadvantages of cookies:

1. It will not work if cookie is disabled from the browser.
2. Only textual information can be set in Cookie object.

Write a HTTP Servlet program to create a cookie.

```
import javax.servlet.http.*;  
import java.io.IOException;
```

```

public class CookieServlet extends HttpServlet {
    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse
response)
        throws javax.servlet.ServletException, java.io.IOException {
        // Create a cookie named "username" with the value "johndoe"
        Cookie cookie = new Cookie("username", "johndoe");

        // Add the cookie to the response
        response.addCookie(cookie);
    }
}

```

What are the building blocks of XML documents? Explain.

Building Blocks of XML documents are:

- Elements
- Attributes
- Entities
- PCDATA
- CDATA

Elements: Elements are the **main building blocks** of both XML and HTML documents.

Examples of HTML elements are "body" and "table". Examples of XML elements could be "note" and "message". Examples:

<body>some text</body>

<message>some text</message>

Attributes: Attributes provide **extra information about elements**. Attributes are always placed inside the opening tag of an element.

The name of the element is "img". The name of the attribute is "src".

Entities: They have a special meaning in XML. They are expanded when a document is parsed by an XML parser. The following entities are predefined in XML:

| Entity | Character |
|--------|-----------|
| %lt; | < |
| %gt; | > |
| %amp; | & |
| %quot; | " |
| %apos; | ' |

PCDATA: PCDATA means parsed character data. **PCDATA is text that WILL be parsed by a parser. The text will be examined by the parser for entities and markup.**

CDATA: CDATA means character data. **CDATA is text that will NOT be parsed by a parser.**

What is DOM and explain its working? How is it beneficial to use in a web browser, give some examples?

The Document Object Model (DOM) is a programming API for HTML and XML documents. It defines the logical structure of documents and the way a document is accessed and manipulated.

Working of DOM:

When a web browser loads an HTML page, it creates a corresponding DOM tree in memory. This tree represents the hierarchical structure of the HTML document, with each node in the tree corresponding to an element in the HTML document. The DOM provides a set of methods and properties that allow programming languages to access and manipulate the DOM tree.

Benefits of DOM:

- **Dynamic Web Pages:** It allows you to create dynamic web pages.
- **Interactivity:** It allows you to create interactive web pages that respond to user input.
- **Content Updates:** It allows updating the content without refreshing the entire page.
- **Cross-Browser Compatibility:** Different browsers may render HTML and CSS in different ways. The DOM provides a standardized way to interact with page elements.
- **Single-Page Applications:** It allows efficient rendering and updating of content within a single HTML page without reloading the full page.

Examples:

- **Dynamic Web Pages:** A shopping cart application where items are dynamically added or removed, and the cart total is updated accordingly without reloading the entire page.
- **Interactivity:** A drag-and-drop file uploader that allows users to drag and drop files to upload them, providing an interactive way to upload files.
- **Content Updates:** A news feed that displays the latest news articles and updates the content without reloading the entire page.
- **Cross-Browser Compatibility:** A responsive layout that adapts to different screen sizes.
- **Single-Page Applications:** An email application that allows users to compose, send, and receive emails within a single page.

Explain how is HTML different from XML and DHTML?

| HTML | XML | DHTML |
|-------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| HyperText Markup Language | eXtensible Markup Language | Dynamic HyperText Markup Language |
| Used for structuring and presenting web pages | Used for organizing and exchanging data | Used for making web pages interactive and dynamic |
| Textual representation of web page elements | Hierarchical data representation using tags and attributes | No specific data representation |
| Validation rules enforced by browsers | Validation rules defined by user-defined schemas | Validation rules can be implemented using JavaScript |
| Limited error handling | Robust error handling mechanisms | Error handling implemented through JavaScript |
| Widely supported by all major browsers | Widely supported by all major browsers | Requires JavaScript support in browsers |
| Creating web pages with headings, paragraphs, images, links, etc. | Defining data structures like XML documents, RSS feeds, and sitemaps | Implementing user interactions like drag-and-drop, animations, and real-time updates |

Write the syntax of the tag used to find the version of XML in a given program.

```
<?xml version="1.0" encoding="UTF-8"?>
```

Describe the complete lifecycle of a servlet.

1) Servlet class is loaded: The classloader is responsible to load the servlet class. The servlet class is loaded when the first request for the servlet is received by the web container.

2) Servlet instance is created: The web container creates the instance of a servlet after loading the servlet class. The servlet instance is created only once in the servlet life cycle.

3) init method is invoked: The web container calls the init method only once after creating the servlet instance. The init method is used to initialize the servlet. Syntax:

```
public void init(ServletConfig config) throws ServletException
```

4) service method is invoked: The web container calls the service method each time when request for the servlet is received. If servlet is not initialized, it follows the first three steps as described above then calls the service method. If servlet is initialized, it calls the service method. Syntax:

public void service(ServletRequest request, ServletResponse response)
throws ServletException, IOException

5) destroy method is invoked: The web container calls the destroy method before removing the servlet instance from the service. It gives the servlet an opportunity to clean up any resource for example memory, thread etc. Syntax:

public void destroy()

What is the difference between servlet and applet?

| Applets | Servlets |
|--------------------------------------------------------------------|------------------------------------------------------------------|
| Java application delivered to users in the form of bytecode. | Java class used to extend the capabilities of a server. |
| Applets are executed on client side. | Servlets are executed on server side. |
| Life cycle of Applets init(), stop(), paint(), start(), destroy(). | Lifecycle of servlets are:- init(), service(), and destroy(). |
| Applets use user interface classes like AWT and Swing. | No User interface required. |
| Applets are more prone to risk as it is on the client machine. | Servlets are under the server security. |
| Applets utilize more network bandwidth | Servlets require less bandwidth |
| Applets are two types 1.) Untrusted Applets 2.) trusted Applets | Servlet are two types 1.) Generic Servlet 2.) HTTP Servlet |
| Applets is a part of JSE(JAVA Standard Edition) Modules. | Servlet is a part of JEE(Java Enterprise Edition) Modules. |

Write at least four features of Javax.sql using examples.

- **DataSource Interface:** A DataSource simplifies connection management. Instead of using DriverManager, you can use it to establish a connection using a URL and credentials. Example:

```
DataSource dataSource = (DataSource)
NamingContext.lookup("java:comp/env/jdbc/MyDataSource");
Connection connection = dataSource.getConnection();
statement.close();
connection.close();
```

- **Connection Pooling:** Connection pooling reuses database connections to improve performance and scalability. When an application requests a connection, it is retrieved from the pool instead of creating a new one. Example:

```
Connection connection = dataSource.getConnection();
connection.close();
```

- **Distributed Transactions:** Distributed transactions span multiple database servers. This is important for applications that need to access data from multiple databases. Example:

```
Connection connection1 = dataSource1.getConnection();
Connection connection2 = dataSource2.getConnection();
try {
    connection1.setAutoCommit(false);
    connection1.commit();
} catch (SQLException e) {
    connection1.rollback();
} finally {
    connection1.close();
    connection2.close();
}
```

- **RowSets:** RowSets provide a scrollable, updatable, and disconnected view of a database result set. This makes them convenient for processing large result sets or accessing data offline. Example:

```
RowSet rowSet = CachedRowSet.create(connection, "SELECT * FROM customers");
while (rowSet.next()) {
    System.out.println(rowSet.getString("name"));
}
rowSet.close();
connection.close();
```


Write short on any three of the following:

a) SMTP

SMTP (Simple Mail Transfer Protocol) is used by the clients to send emails to the servers or for the email communications between servers.

There are 2 types of SMTP servers: Relays and Receivers. Relays accept emails from users and route them to recipients, while Receivers deliver them to the mailbox after accepting the email from the Relay servers.

Working of SMTP

1. The SMTP client will connect to the SMTP server.
2. The email is transferred using that connection.
3. The client and the server terminate the connection.

b) Positioning elements of CSS

The position property in CSS tells about the method of positioning for an element

There are five different types of position properties available in CSS:

| Position Property | Description |
|-------------------|-------------------------------------------------------------------------------------------------------------------------|
| fixed | Positions the element relative to the viewport, even when the page is scrolled. |
| static | The default position property. Elements with position: static are positioned in the normal flow of the page. |
| relative | Positions the element relative to its original position. |
| absolute | Positions the element relative to its nearest non-static ancestor. |
| sticky | Positions the element relative to its normal position until it reaches the top of the viewport, where it becomes fixed. |

c) Structure of HTML program

An HTML Document is mainly divided into two parts:

- **HEAD:** This contains the information about the HTML document. For Example, the Title of the page, version of HTML, Meta Data, etc.
- **BODY:** This contains everything you want to display on the Web Page.

Example:

```
<!DOCTYPE html>
<html>

<head>
  <title>Page Title</title>
</head>

<body>
  <h2>Heading Content</h2>
  <p>Paragraph Content</p>
</body>

</html>
```

d) Properties of Java Beans

1. **getProperty()**

For example, if the property name is firstName, the method name would be getFirstName() to read that property. This method is called the accessor.

2. **setProperty()**

For example, if the property name is firstName, the method name would be setFirstName() to write that property. This method is called the mutator.