**ASSIGNMENT01**

## 1. How the Internet Works?

The Internet connects millions of computers worldwide through a network of servers and routers.

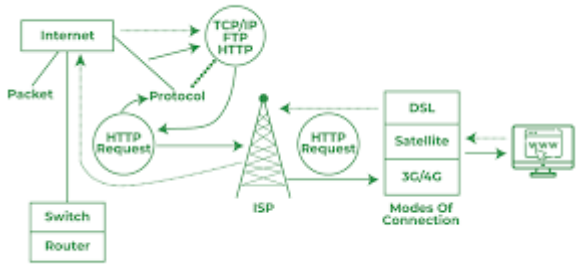
### Key Components:

- Client: Your device (computer, smartphone).
- Server: A computer that provides data or services.
- Router: Directs data between networks.
- ISP (Internet Service Provider)**: Provides internet access.

### Process:

1. Client Request: You enter a URL.
2. DNS Lookup: Translates domain name into IP address.
3. Data Transfer: Data is sent in packets across networks.
4. Server Response: Server sends requested data back to the client.

How the Internet

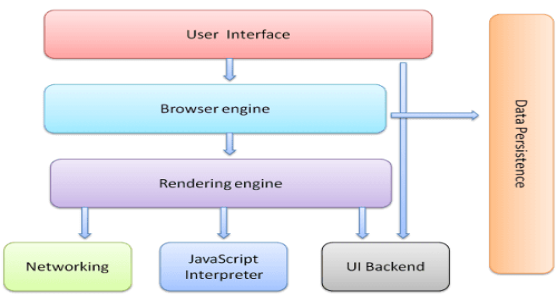



## 2. How Browser Works?

A browser retrieves, interprets, and displays web content.

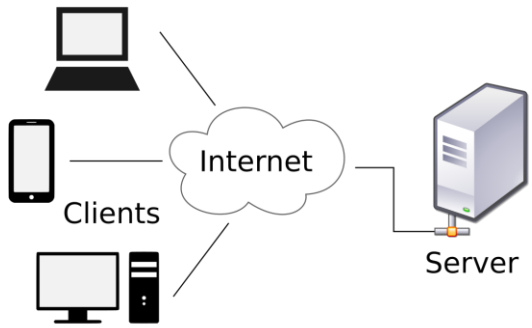
### Key Steps:

1. URL Input: Enter a URL in the browser.
2. DNS Resolution: Translates domain to IP address.
3. HTTP Request: Browser sends request to the server.
4. Server Response: Receives HTML, CSS, JS files.
5. Rendering: Parses HTML, CSS and executes JavaScript to display the page.



**3. What is a Server?**

A server is a computer or system that provides resources, data, services, or programs to other computers (clients) over a network.




**4. Types of Servers?**

1. Web Server: Hosts websites (e.g., Apache, Nginx).
2. Database Server: Manages databases (e.g., MySQL, PostgreSQL).
3. File Server: Stores and manages files.
4. Mail Server: Handles email communication.
5. Application Server: Runs applications for users (e.g., Java Application Server).

**5. What is SEO? Importance of SEO?**

SEO (Search Engine Optimization)** is the practice of enhancing a website to increase its visibility on search engines.

**Importance:**
- Increased Traffic: Higher ranking in search results drives more visitors.
- Better User Experience: Improves site usability.
- Credibility: High-ranking sites are perceived as trustworthy.

**6. What is Accessibility?**

Accessibility ensures that websites are usable by everyone, including those with disabilities.

**Key Aspects:**
- Screen Readers: For visually impaired users.
- Keyboard Navigation: For users unable to use a mouse.
- Text Alternatives: Descriptions for images and media.

**7. What is Markup Language?**
A markup language uses tags to define elements within a document, used to format and display text and data.

**Examples:**
- HTML: For web pages.
- XML: For data storage and transfer.

**8. What is HTML?**

HTML (HyperText Markup Language)** is the standard language for creating web pages.

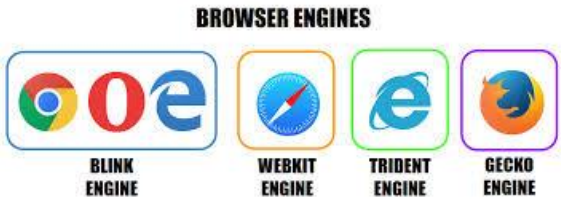
**Example:**
```html
<!DOCTYPE html>
<html>
<head>
  <title>Page Title</title>
</head>
<body>
  <h1>Hello, World!</h1>
</body>
</html>
```

**9. What is a Browser Engine?**

A browser engine is a core part of a web browser that translates HTML, CSS, and JavaScript into a visual representation on the screen.

**Examples:**
- Blink: Used in Chrome.
- WebKit: Used in Safari.

[Browser Engine]




**10. What is a Rendering Engine? Available Rendering Engines**

A rendering engine interprets HTML and CSS to display web content.

**Available Engines:**
- Blink: Used in Chrome.
- WebKit: Used in Safari.
- Gecko: Used in Firefox.
- Trident: Used in older Internet Explorer.

[Rendering Engine]

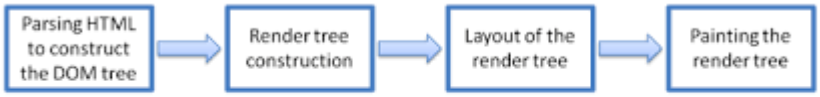



*Figure : Rendering engine basic flow*

### 11. What is a JavaScript Engine? Available JS Engines and Purpose

A JavaScript engine executes JavaScript code in the browser.

**Available Engines:**
- V8: Used in Chrome.
- SpiderMonkey: Used in Firefox.
- avaScriptCore: Used in Safari.

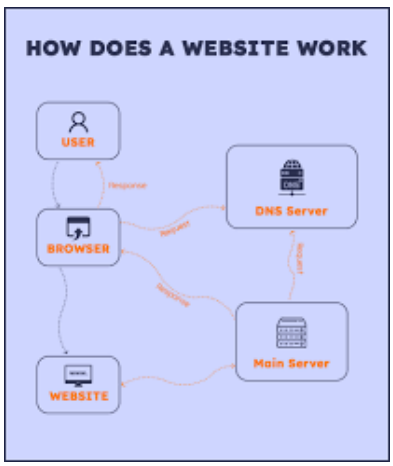
**Purpose:**
- Execution: Runs JavaScript code.
- Optimization: Enhances performance by optimizing code execution.

### 12. How a Website Works?

A website consists of multiple web pages served by a web server and accessed via a browser.

**Process:**
1. Request: Browser sends a request to the server.
2. Response: Server sends HTML, CSS, JS files.
3. Rendering: Browser renders the files and displays the content.

[How Website Works]




### 13. What is Data Structure?

A data structure is a way of organizing and storing data to enable efficient access and modification.

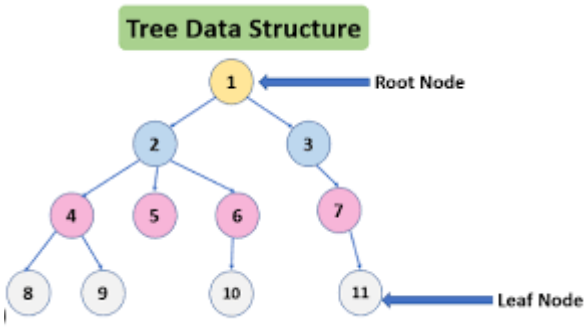
**Types:**
- Array: A collection of elements.
- Linked List: A series of connected nodes.
- Stack: Last In, First Out (LIFO) collection.
- Queue: First In, First Out (FIFO) collection.

**14. Explain Tree Data Structure?**

A tree is a hierarchical data structure consisting of nodes, with a single root node and child nodes forming a hierarchy.

**Components:**
- Root: The top node.
- Child: Nodes connected to another node.
- Leaf: Nodes with no children.

Tree Data Structure




**15. What is a User Agent? List and Purpose**

A user agent is software (usually a browser) that acts on behalf of a user, identifying itself to web servers.

**Examples:**
- Mozilla/5.0 (Firefox)
- Chrome/91.0 (Chrome)
- Safari/605.1.15(Safari)

**Purpose:**
- Identify the Browser: Helps servers deliver appropriate content.
- Compatibility: Ensures site works correctly on different browsers.

**16. What is Hypertext?**

Hypertext is text displayed on a computer or other electronic device with references (hyperlinks) to other text that the reader can immediately access.

### 17. What are HTML Tags?

HTML tags are used to create HTML elements, defined by angle brackets (`< >`).

**Example:**

```html
<h1>Title</h1>
<p>Paragraph</p>
```

[HTML Tags]

| Tag | Description |
|---|---|
| <html> ... </html> | Declares the Web page to be written in HTML |
| <head> ... </head> | Delimits the page's head |
| <title> ... </title> | Defines the title (not displayed on the page) |
| <body> ... </body> | Delimits the page's body |
| <h *n*> ... </h*n*> | Delimits a level *n* heading |
|  ...  | Set ... in boldface |
|  ...  | Set ... in italics |
|  ...  | Center ... on the page horizontally |
| <ul> ... </ul> | Brackets an unordered (bulleted) list |
| <ol> ... </ol> | Brackets a numbered list |
| <li> ... </li> | Brackets an item in an ordered or numbered list |
| <br> | Forces a line break here |
| <p> | Starts a paragraph |
| <hr> | Inserts a horizontal rule |
| <img src="..."> | Displays an image here |
| <a href="..."> ... </a> | Defines a hyperlink |

### 18. What are HTML Attributes?

HTML attributes provide additional information about HTML elements, usually found in the opening tag.

**Example:**

```html
<a href="https://www.example.com">Link</a>
```

**HTML Attributes**

## HTML Attributes

| Attribute | Description |
|---|---|
| alt | Specifies an alternative text for an image |
| disabled | Specifies that an input element should be disabled |
| href | Specifies the URL (web address) for a link |
| id | Specifies a unique id for an element |
| src | Specifies the URL (web address) for an image |
| style | Specifies an inline CSS style for an element |
| title | Specifies extra information about an element (displayed as a tool tip) |
| value | Specifies the value (text content) for an input element. |

**19. What are HTML Elements?**

HTML elements are the building blocks of HTML pages, defined by a start tag, content, and an end tag.

**Example:**

```html
<p>This is a paragraph.</p>
```

**20. How to Convert Elements to a Tree**

HTML elements are represented as a DOM (Document Object Model) tree.

**Example:**

```html
<html>
  <body>
    <div>
      <p>Text</p>
    </div>
  </body>
</html>
```

**DOM Tree:**

```
```

**- html**
**  - body**
**    - div**
**      - p**
**        - "Text"**
```

**21. What is DOCTYPE?**

`<!DOCTYPE html>` declares the document type and version of HTML being used, helping the browser render the page correctly.

**22. Ways to Save an HTML File?**

1. File Extension: Save as `.html` or `.htm`.
2. Text Editor: Use a plain text editor (e.g., Notepad).
3. Web Editor: Use a web editor (e.g., Dreamweaver).

**23. What is Charset? Why Use It?**

`charset` (character set) defines the character encoding for the HTML document.

**Importance:**
- Correct Display: Ensures characters are rendered correctly.
- UTF-8: Commonly used encoding that

supports many characters.

**Example:**
```**html**
**<meta charset="UTF-8">**
```
**24. What is Metadata? Purpose of Metadata?**

Metadata provides information about the HTML document, such as its author, description, and keywords, typically used for SEO and accessibility.

**Example:**
```**html**
**<meta name="description" content="A description of the page">**
```
**25. Explain Web Application Architecture?**

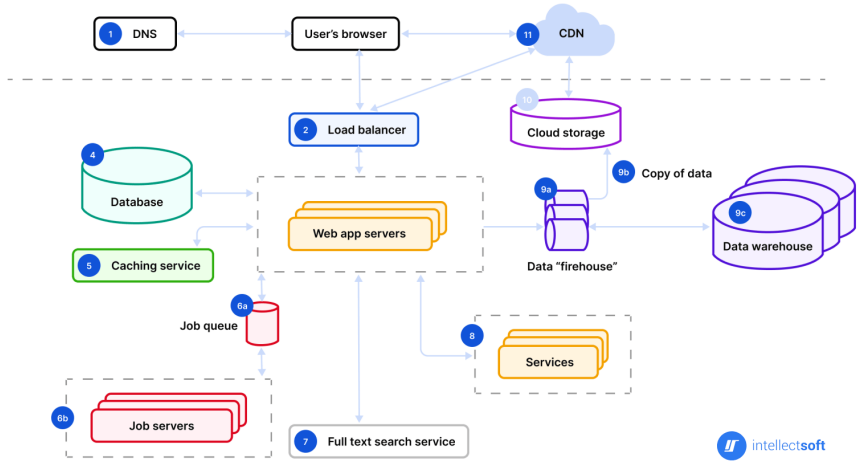
Web application architecture defines the interactions between applications, middleware systems, and databases.

**Components:**
- Client-Side: User interface in the browser.
```

- Server-Side: Backend logic and database interaction.
- Database: Stores and retrieves data.

**Example:**

[Web Application Architecture]

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