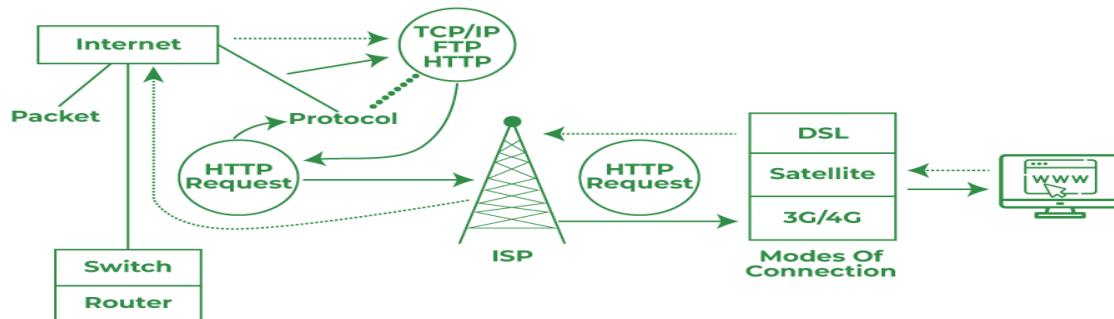


ASSIGNMENT 1

1. How internet works?

The Internet is a vast, sprawling collection of networks that connect to each other. In fact, the word "Internet" could be said to come from this concept: interconnected networks.

There are two main concepts that are fundamental to the way the Internet functions: packets and protocols.

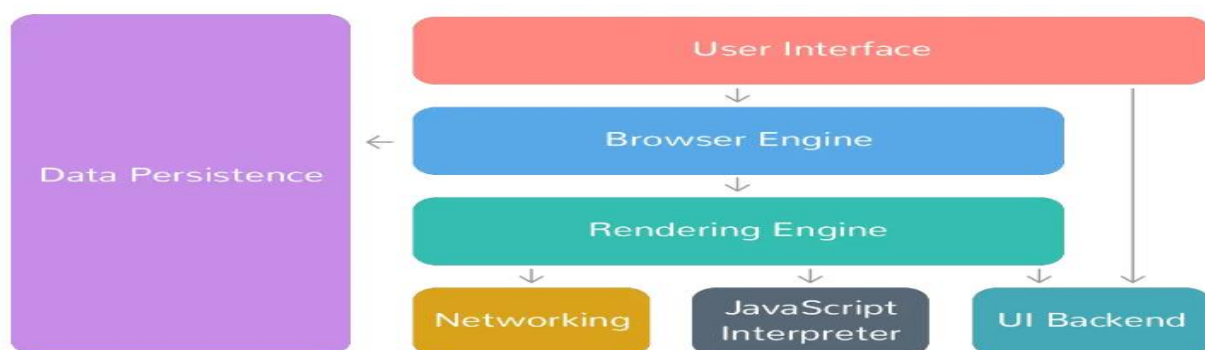


Packets: In networking, a packet is a small segment of a larger message. Each packet contains both data and information about that data. The information about the packet's contents is known as the "header," and it goes at the front of the packet so that the receiving machine knows what to do with the packet. To understand the purpose of a packet header, think of how some consumer products come with assembly instructions.

Protocols: Connecting two computers, both of which may use different hardware and run different software, is one of the main challenges that the creators of the Internet had to solve. It requires the use of communications techniques that are understandable by all connected computers, just as two people who grew up in different parts of the world may need to speak a common language to understand each other.

2. How browser works?

The browser is a rendering engine. Its job is to download a web page and render it in a way that's understandable by a human being.



A web browser takes you anywhere on the internet. It retrieves information from other parts of the web and displays it on your desktop or mobile device. The information is transferred using the Hypertext Transfer Protocol, which defines how text, images and video are transmitted on the web. This information needs to be shared and displayed in a consistent format so that people using any browser, anywhere in the world can see the information.

3. What is Server?

A server is a computer or system that provides resources, data, services, or programs to other computers, known as clients, over a network. In theory, whenever computers share resources with client machines they are considered servers.



The computer system that accepts requests for online files and transmits those files to the client is referred to as a “server” in the context of the Internet.

A single overall computation is distributed across multiple processes or devices. Servers can provide various functionalities called services. These services include sharing data or resources among multiple clients or performing computations for a client. Multiple clients can be served by a single server, and a single client can use multiple servers.

4. What are the types of server available?

Web Server: The server that is in charge of publishing a website on the internet is known as a web server.

Database Server: A database server manages a database and provides database services to clients. The server manages data access and retrieval as well as the completion of client requests.

Email Server: A mail server, also known as an email server, is a computer system that sends and receives emails.

Web Proxy Server: A proxy server is a web server that serves as a conduit between a client program, such as a browser, and the actual server.

DNS Server: The Domain Name System (DNS) is the Internet's telephone directory. DNS is responsible for finding the correct IP address for websites when users enter their domain names, such as 'google.com' or 'nytimes.com,' into web browsers.

FTP Server: FTP is a network protocol that is used to transfer files between a client and a server on a computer network.

File Server: A file server is a central server in a computer network that serves file systems or portions of file systems to clients connected to the network.

DHCP Server: A DHCP Server is a network server that gives and assigns IP addresses, default gateways, and other network information to client devices on an automatic basis.

5. What is SEO? Importance of SEO?

SEO means Search Engine Optimization and is the process used to optimize a website's technical configuration, content relevance and link popularity so its pages can become easily findable, more relevant and popular towards user search queries, and as a consequence, search engines rank them better.



Importance of SEO:

Better user experience: Optimizing your site's structure, content, and navigation for SEO makes it more accessible.

Increased organic traffic: SEO helps improve visibility on SERPs, leading to more traffic to website as users are more likely to click.

Increased Visibility: SEO helps in increasing a website's visibility in search engine results pages, making it more likely to be seen by potential customers.

Credibility and trustworthiness: Builds trust and credibility sites that rank high on SERPs are considered to be of the highest quality and most trustworthy.

SEO is quantifiable: SEO results are quantifiable i.e., one can measure organic rankings, traffic, and conversions. This means one can gauge the performance.

6. What is Accessibility?

Web accessibility means that websites, tools, and technologies are designed and developed so that people with disabilities can use them. More specifically, people can: perceive, understand, navigate, and interact with the Web.

A browser engine (also known as a layout engine or rendering engine) is a core software component of every major web browser that is responsible for transforming HTML documents and other resources of a web page into an interactive visual representation on a user's device. Common browser engines include Blink, Trident, Gecko, and WebKit.

All Chromium-based browsers use Blink, as do applications built with CEF, Electron, or any other framework that embeds Chromium. Microsoft has two proprietary engines, Trident and EdgeHTML.

10. What is rendering engine? Share the available rendering engine?

It's responsible for displaying the requested web resources by parsing the contents. By default it can parse html, xml, and images. It uses different plugins and/or extensions to display other type of data such as flash, PDF, etc.

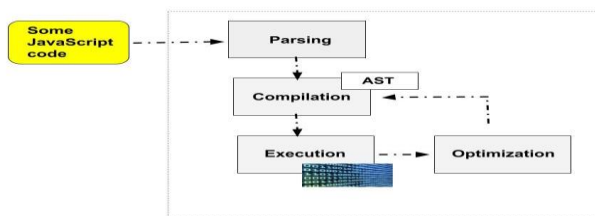


There are different rendering engines such as Gecko, WebKit, and Trident. Most widely used rendering engine is WebKit or its variant version. Gecko and WebKit are open source rendering engines while Trident is not. Firefox uses Gecko, Safari uses WebKit, Internet Explorer uses Trident, Chrome and Opera uses Blink, which is a variant of WebKit.

Different rendering engines use different algorithms and also have their different approaches to parse a particular request.

11. What is JavaScript Engine? Share the available JS engine? Purpose of JS engine?

JavaScript is a scripting language and is not directly understood by computer but the browsers have inbuilt JavaScript engine which help them to understand and interpret JavaScript codes. These engines help to convert our JavaScript program into computer-understandable language. A JavaScript engine is a computer program that executes JavaScript code and converts it into computer understandable language.



JavaScript Engines:

V8: V8 is a JavaScript engine developed by the Chromium Project for Google Chrome and Chromium web browsers. It is a JavaScript engine that can run standalone, or be embedded into any C++ application. Using its own parser, it generates an abstract syntax tree.

Chakra: Chakra is a JScript engine developed by Microsoft. It is proprietary software. It is used in the Internet Explorer web browser. A distinctive feature of the engine is that it JIT compiles scripts on a separate CPU core, parallel to the web browser.

Spider Monkey: SpiderMonkey is the first JavaScript engine, written by Brendan Eich at Netscape Communications, later released as open-source and currently maintained by the Mozilla Foundation. It is still used in the Firefox web browser.

WebKit: WebKit is developed by Apple and used in its Safari web browser, as well as all iOS web browsers. It is used by the BlackBerry Browser, PlayStation consoles beginning from the PS3, the Tizen mobile operating systems, and a browser included with the Amazon Kindle e-book reader.

Purpose of JS engine:

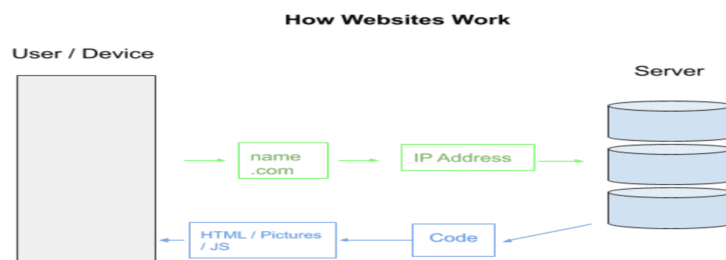
- The engine is responsible for executing the code.
- Every major browser has a JavaScript engine that executes JavaScript code.

12. How website works?

A website is one of the most crucial tools businesses or individuals can use to nurture their digital presence. Whether you're a small firm, a large corporation, or a freelancer, making a website is a highly effective way to make yourself more visible on the World Wide Web.

All websites are identified by a unique address, which tells browsers where they are located.

When you enter a web address into your browser, it goes to that specified location and retrieves the web page. The process of retrieving this information is carried out by a web service using technologies such as Hypertext Transfer Protocol (HTTP) and File Transfer Protocol (FTP), which essentially define how information and files are transmitted over the web.



The browser then displays the retrieved web page on your screen using technologies such as HyperText Markup Language (HTML) and Cascading Style Sheet (CSS). They structure and present the web page's information to the visitor by telling the browser exactly where to put what on the screen.

13. What is Data Structure?

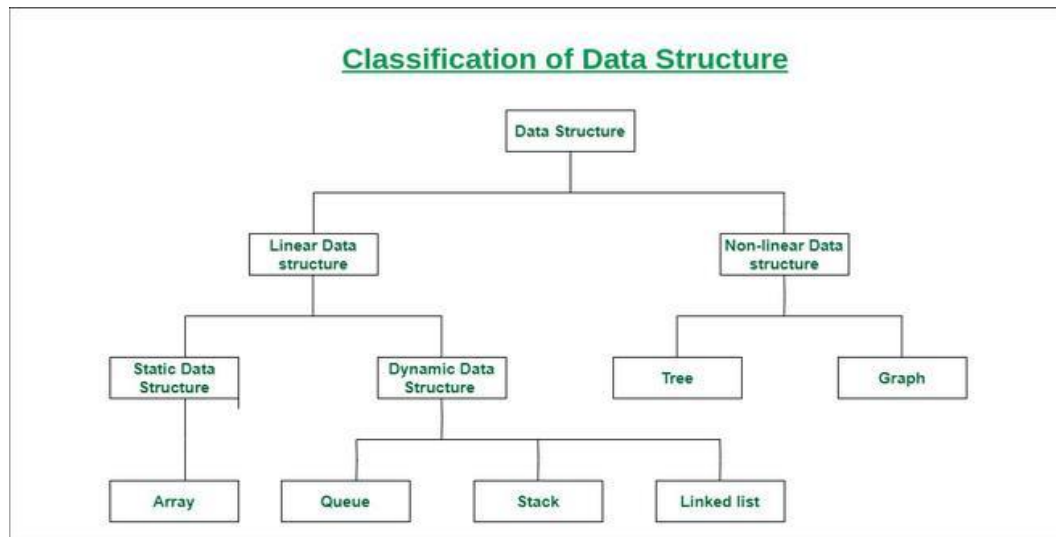
A data structure is a particular way of organizing data in a computer so that it can be used effectively. The idea is to reduce the space and time complexities of different tasks.

The structure of the data and the synthesis of the algorithm are relative to each other. Data presentation must be easy to understand so the developer, as well as the user, can make an efficient implementation of the operation.

Data structures provide an easy way of organising, retrieving, managing, and storing data.

Needs for the data:

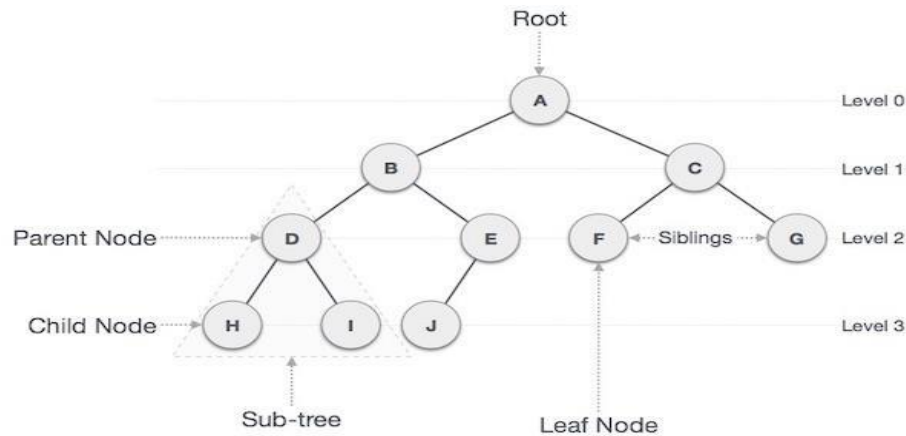
- Data structure modification is easy.
- It requires less time.
- Save storage memory space.
- Data representation is easy.
- Easy access to the large database



Data structure has many different uses in our daily life. There are many different data structures that are used to solve different mathematical and logical problems.

14. Explain Tree Data Structure?

A tree data structure is defined as a collection of objects or entities known as nodes that are linked together to represent or simulate hierarchy. A tree data structure is a non-linear data structure because it does not store in a sequential manner.



In the Tree data structure, the topmost node is known as a root node. Each node contains some data, and data can be of any type. In the above tree structure, the node contains the name of the employee, so the type of data would be a string.

Each node contains some data and the link or reference of other nodes that can be called children.

15. What is user agent? Share the list and it's pupose?

A user agent is a relatively short bit of text that (attempts to) describe the Software/Browser (the "Agent") that is making the request to a website. Web browsers include the user agent string in the requests they make to websites. The User Agent often includes descriptions of the Operating System and Device Type that the Browser/Agent is running on.

Some of the user agents are:

- Microsoft Edge on Windows
- Google Chrome on Mac OS X
- Google Chrome on Windows
- Mozilla Firefox on Windows
- Safari on iPhone (iOS) and iPad (iPadOS)
- Chrome on Android.

Purpose of User Agent: a user agent is a software agent responsible for retrieving and facilitating end-user interaction with Web content.

16. What is Hypertest?

Hypertext is a method of structuring and linking digital documents, allowing users to quickly and easily navigate between related pieces of information.

It acts as a backbone of WWW (World Wide Web) and allows users to jump from one piece of information to another related piece of information. The jump can be within the same document or to a completely different document that user wants to know about.

Hypertexts expand and create ethical issues related to access, the implications of linking choices, and more by both enhancing and subverting traditional assumptions about the linear reading of a text (i.e., word after word, sentence after sentence, page after page).

17. What is HTML Tags?

HTML tags are like keywords which defines that how web browser will format and display the content. With the help of tags, a web browser can distinguish between an HTML content and a simple content. HTML tags contain three main parts: opening tag, content and closing tag. But some HTML tags are unclosed tags.

- All HTML tags must enclosed within < > these brackets.
- Every tag in HTML perform different tasks.
- If you have used an open tag <tag>, then you must use a close tag </tag> (except some tags)

Syntax: <tag>content</tag>

Example:

<p> Paragraph Tag </p>

<h2> Heading Tag </h2>

 Bold Tag

<i> *Italic Tag* </i>

<u> Underline Tag </u>

18. What is HTML Attributes?

- HTML attributes are special words which provide additional information about the elements or attributes are the modifier of the HTML element.
- Each element or tag can have attributes, which defines the behaviour of that element.

- Attributes should always be applied with start tag.
- The Attribute should always be applied with its name and value pair.
- The Attributes name and values are case sensitive, and it is recommended by W3C that it should be written in Lowercase only.

Syntax: `<element attribute_name="value">content</element>`

Example:

`<h1> This is Style attribute</h1>`

`<p style="height: 50px; color: blue">It will add style property in element</p>`

`<p style="color: red">It will change the color of content</p>`

19. What is HTML elements?

An HTML element is a component of an HTML document that tells a web browser how to structure and interpret a part of the HTML document. HTML elements can contain formatting instructions, semantic meaning, and content.

Example:

`<h1>My First Heading</h1>`

`<p>My first paragraph.</p>`

HTML elements are created with tags. An HTML tag consists of text between angle brackets (<>).

20. How to convert elements to tree?

1. Define a Node Structure: Create a data structure to represent each node in the tree. Each node should contain the element itself and references (pointers) to its child nodes.

2. Build the Tree: Starting from the root node, traverse through the elements and construct the tree by assigning child nodes accordingly.

3. Link Nodes: Ensure each node is properly linked to its parent and children based on the hierarchical relationship defined by the elements.

4. Handle Edge Cases: Consider scenarios like empty elements, duplicate elements, or specific tree structures (e.g., binary tree, n-ary tree) depending on your requirements.

5. Validate and Test: Validate the tree structure to ensure it conforms to your expectations and test with different inputs to verify correctness.

21. What is DOCTYPE?

The HTML document type *declaration* or doctype is an instruction used by web browsers to fetch what version of HTML the website is written in.

It helps browsers in understanding how the document should be interpreted thus eases the rendering process. It is neither an element nor a tag. The doctype should be placed on the *top* of the document. It must not contain any content and does not need a closing tag.

Syntax: <!DOCTYPE html>

Example:

```
<!DOCTYPE html>
<html>
<head>
<title>Page Title</title>
</head>
<body>
<h2>Welcome To GFG</h2>
<p>Default code has been loaded into the Editor.</p>
</body>
</html>
```

22. What are the ways we can save html file?

Text Editor: Use any text editor (e.g., Notepad, Sublime Text, Visual Studio Code) to create and save HTML files with a .html extension.

Integrated Development Environment (IDE): IDEs like Visual Studio, IntelliJ IDEA, or Eclipse provide robust features for creating and saving HTML files along with project management capabilities.

Content Management Systems (CMS): Platforms like WordPress or Joomla allow you to create and save HTML files through their administration interfaces.

Online HTML Editors: Websites such as CodePen, JSFiddle, or JS Bin provide online editors where you can write and save HTML files directly.

Browser Developer Tools: You can copy the HTML code from a web page using the "Inspect" tool in browsers and save it as an HTML file on the computer.

23. What are charset? Why we need to use this?

A character set refers to the composite number of different characters that are being used and supported by a computer software and hardware. It consists of codes, bit pattern or natural numbers used in defining some particular character.

A character set may also be referred to as character map, charset or character code. A character set is the key component behind displaying, manipulating and editing text, numbers and symbols on a computer.

Usage:

When used by the <script> element, the charset attribute specifies the character encoding used in an external script file.

24. What is meta data? What is the purpose of it?

Metadata is data about the data or documentation about the information which is required by the users. In data warehousing, metadata is one of the essential aspects.

Metadata is Like a Nerve Center. Various processes during the building and administering of the data warehouse generate parts of the data warehouse metadata.

Another uses parts of metadata generated by one process. In the data warehouse, metadata assumes a key position and enables communication among various methods. It acts as a nerve centre in the data warehouse.

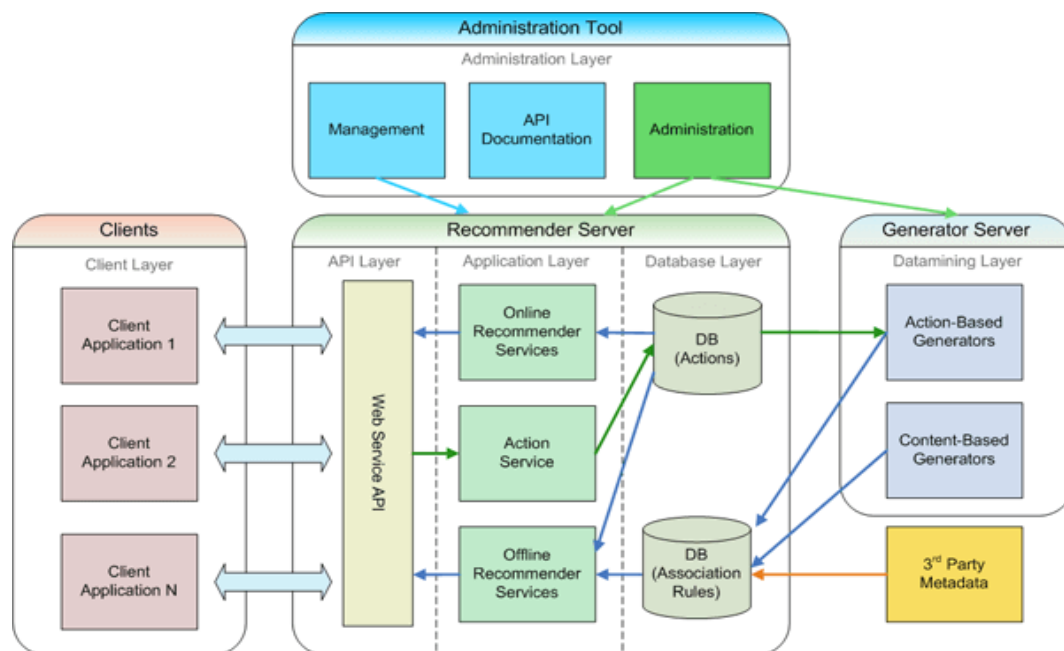
Purpose:

Metadata summarizes basic information about data, making finding and working with particular instances of data easier.

Essentially it helps explain its provenance – its origin, nature and lineage.

25. Explain Web Application Architecture?

Web application architecture defines the interactions between applications, middleware systems and databases to ensure multiple applications can work together.



A **web application architecture** is a model of interaction between web application components. The specific kind of architecture for web applications strictly depends on the way application logic will be allocated among client and server sides.

Components of Web Application Architecture:

The applications differ in complexity and functionality, and the number of layers and components changes accordingly. It may happen that an app is so simple that it works as a monolith, storing all the web application design architecture in one place.

The two major groups for web application architecture are user interface and structural web components. In their turn, structural web components include client-side components and server-side components.