WEB TECHNOLOGY

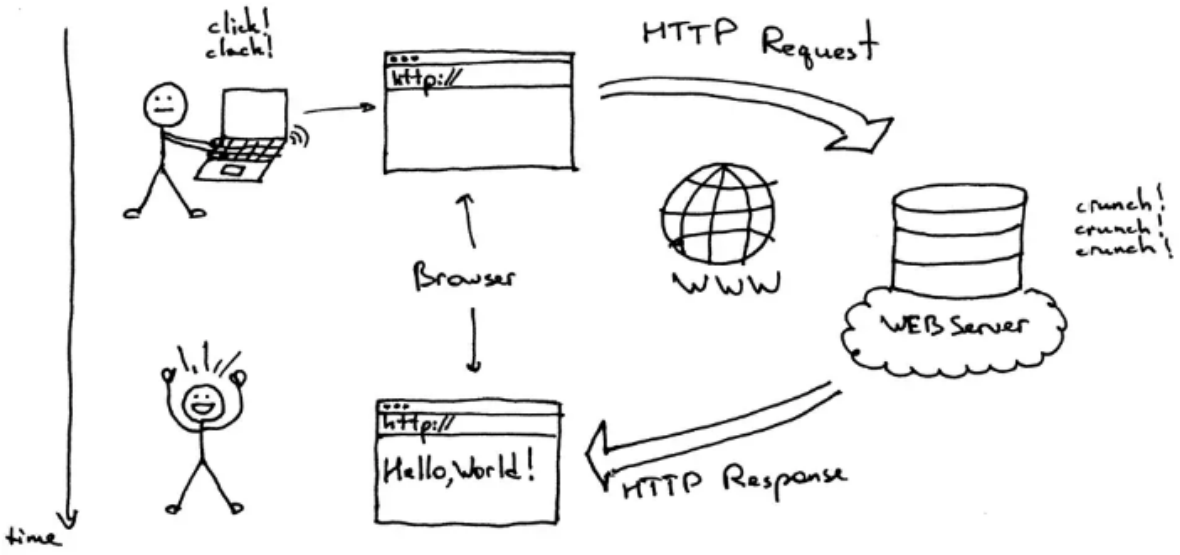
1.How internet works?

Before we cover what the Internet is, we must define what a "network" is. A network is a group of connected computers that are able to send data to each other. A computer network is much like a social circle, which is a group of people who all know each other, regularly exchange information, and coordinate activities together.

Computers connect to each other and to the Internet via wires, cables, radio waves, and other types of networking infrastructure. All data sent over the Internet is translated into pulses of light or electricity, also called "bits," and then interpreted by the receiving computer. The wires, cables, and radio waves conduct these bits at the speed of light. The more bits that can pass over these wires and cables at once, the faster the Internet works.

2. How browser works?

Browsers are responsible for retrieving and displaying web content to users. When a user enters a URL or clicks on a link, the browser initiates a complex series of actions to retrieve the web content from a server and display it on the user's device.



The process begins with Domain Name System (DNS) resolution, where the browser translates the domain name into an IP address to locate the server where the web page is stored.

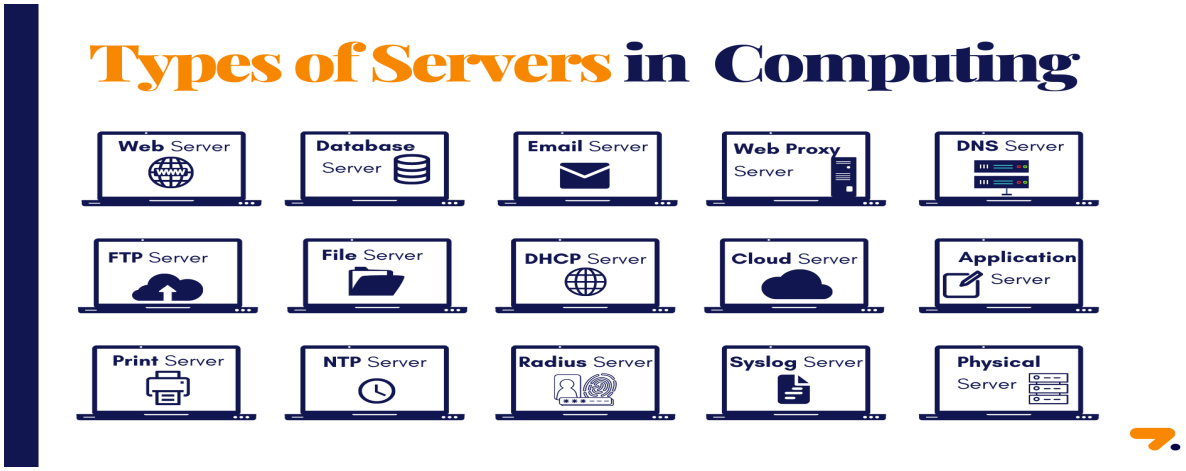
- The browser then sends an HTTP request to the server, specifying the path and parameters of the requested resource.

- Once the server receives the request, it sends an HTTP response to the browser containing the requested resource in HTML, CSS, and JavaScript code.
- The browser's rendering engine interprets and renders the code to display the web page on the user's device.
- The CSS stylesheets are applied to format the web page's content, including fonts, colors, and layout.
- The browser may also execute JavaScript code on the web page to add interactivity and dynamic behavior.
  As new content is loaded or changes are made to the web page, the browser updates the display accordingly.

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. There are many types of servers, including web servers, mail servers, and virtual 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. A server that provides hosting, also called "hosting", over the internet protocol is called a web server. The renting of space required to publish Web pages on the Internet is referred to as "hosting". Hosting means putting pages, images, or documents meant for a website on a computer that internet users use to access them. Apache, Microsoft's Internet Information Server (IIS), and Nginx are the most popular web servers on the Internet.

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. A database server is a computer that runs database software and is dedicated to providing database services. A database server is made up of hardware and software that is used to run a database.

Email Server

A mail server, also known as an email server, is a computer system that sends and receives emails. When you send an email, it passes through several servers before arriving at its destination. While this process is quick and efficient, there is a significant amount of complexity involved in sending and receiving emails.

5) What is SEO? Importance of SEO?

SEO (Search Engine Optimization) is the process of optimizing a website to improve its visibility and ranking in search engine results pages (SERPs). The goal of SEO is to increase organic (non-paid) traffic to a website by making it more attractive to search engines like Google, Bing, and Yahoo. SEO encompasses a variety of strategies, techniques, and best practices aimed at improving a site's relevance and authority for targeted keywords and phrases.

Importance of SEO

1. **Increased Organic Traffic:** Higher visibility in search engine results leads to increased organic traffic. This is crucial because organic traffic is typically more targeted and relevant, leading to higher engagement and conversion rates.
2. **Cost-Effectiveness:** Unlike paid advertising, SEO does not require a continuous financial investment. Once optimized, a well-ranked page can continue to attract traffic without ongoing costs.
3. **Credibility and Trust:** Websites that rank high in search results are often perceived as more credible and trustworthy by users. SEO helps build brand authority and trustworthiness.
4. **Better User Experience**: Many SEO practices, such as improving site speed, mobile optimization, and high-quality content, enhance the overall user experience, leading to increased user satisfaction and retention.
5. **Long-Term Strategy**: SEO is a long-term strategy that builds over time. Once a site establishes strong rankings, maintaining and improving those positions becomes easier, providing sustained benefits.

6. What is Accessibility?

Accessibility can be viewed as the "ability to access" and benefit from some system or entity. The concept focuses on enabling access for people with disabilities, or enabling access through the use of assistive technology; however, research and development in accessibility brings benefits to everyone.

7.What is Markup Language?

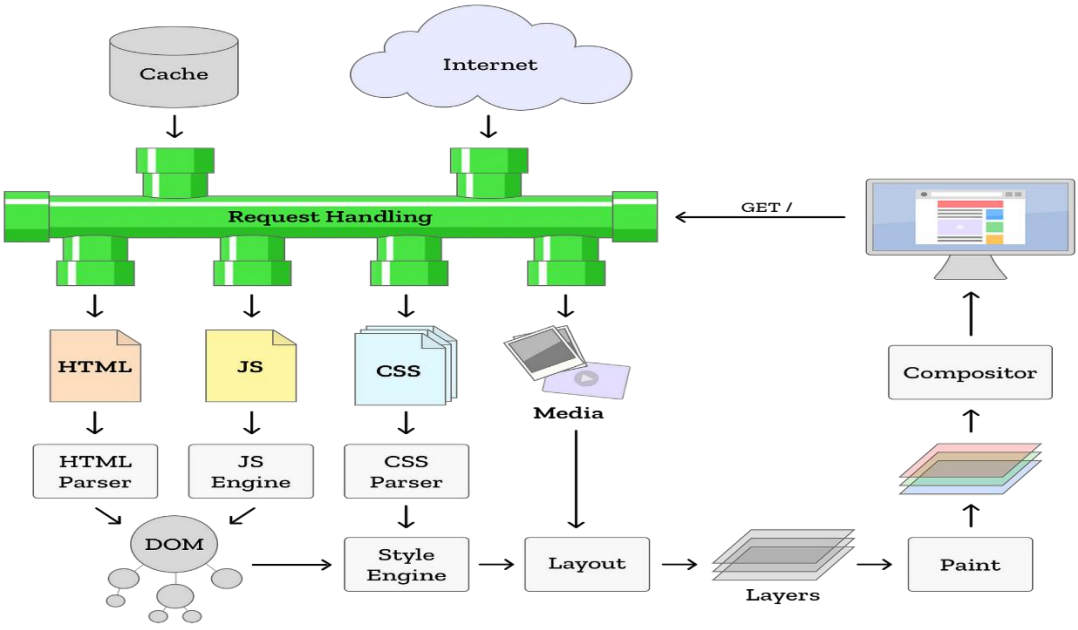
A markup language is a system of annotating a document to describe its structure and presentation. It uses tags or codes to define elements such as headings, paragraphs, lists, images, links, and more.

8. What is HTML?

HyperText Markup Language (**HTML**) is the standard markup language for documents designed to be displayed in a web browser. It defines the content and structure of web content. It is often assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript.

9. What is browser engine?

A **browser engine** (also known as a **layout engine** or **rendering engine**) is a core software component of every major web browser. The primary job of a browser engine is to transform HTML documents and other resources of a web page into an interactive visual representation on a user's device.



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

A rendering engine, also known as a layout engine, is a software component that takes marked-up content (such as HTML, XML, images, etc.) and displays it on the screen. The rendering engine interprets the content and its formatting information (from CSS, for example) and then paints the content correctly in the browser window or application.

Function of a Rendering Engine

1. **Parsing Content**: The rendering engine parses HTML and CSS, converting them into a DOM (Document Object Model) tree and a render tree.
2. **Layout**: It calculates the geometric layout of the elements, determining their position and size on the screen.
3. **Painting**: It paints the pixels on the screen based on the calculated layout.
4. **Reflow and Repaint**: When changes occur (like window resizing or content updates), the rendering engine may need to recalculate the layout (reflow) and repaint the screen.

Available Rendering Engines

Several rendering engines are used in web browsers and other applications. Some of the most well-known rendering engines include:

1. **Blink**:
    - **Used by**: Google Chrome, Microsoft Edge (since version 79), Opera (since version 15), and other Chromium-based browsers.
    - **Developed by**: Google, as a fork of the WebKit engine.
    - **Features**: High performance, extensive support for web standards, and ongoing development and optimization.
2. **WebKit**:
    - **Used by**: Apple Safari, older versions of Opera (before version 15), and various other applications.
    - **Developed by**: Apple, initially a fork of the KHTML engine from the KDE project.
    - **Features**: Excellent rendering accuracy, particularly for macOS and iOS devices, with a strong emphasis on web standards compliance.
3. **Servo**:

- **Used by**: Experimental and future projects by Mozilla.
- **Developed by**: Mozilla Research.
- **Features**: Written in Rust for improved safety and performance, designed to leverage modern hardware features like parallelism.

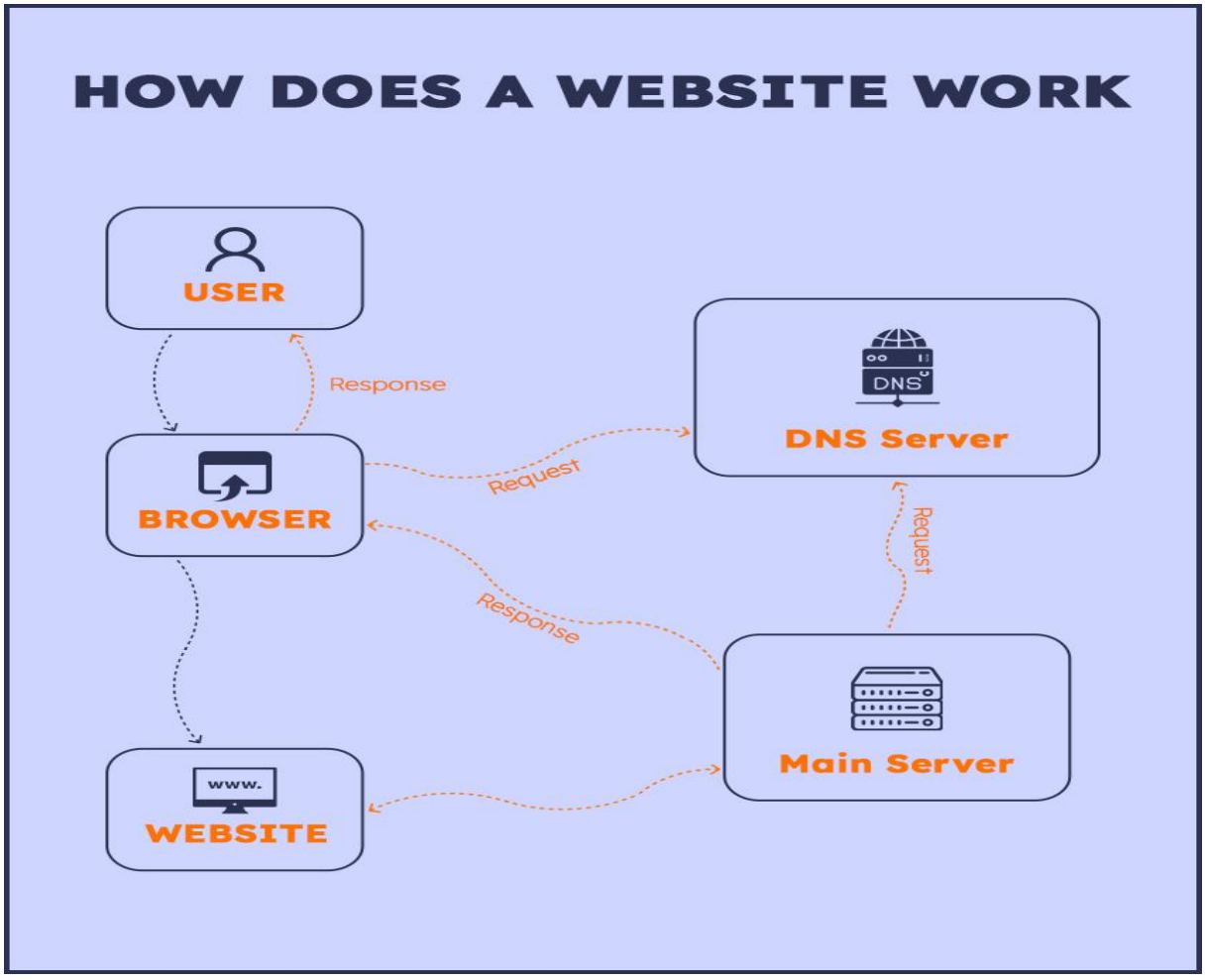
11. What is JavaScript Engine? share the available JS engine? Purpose of JS Engine?

A **JavaScript engine** is a software component that executes JavaScript code. The first JavaScript engines were mere interpreters, but all relevant modern engines use just-in-time compilation for improved performance.[1]

JavaScript engines are typically developed by web browser vendors, and every major browser has one.

12. How website works?

A website is a place on the internet where you can keep information for others to see. This can be information about yourself, your business, or even topics of your interest. Based on the website category, people can also use them to shop, chat, study, and get entertained.



13) what is data structure?

Data structures are the fundamental building blocks of computer programming. They define how data is organized, stored, and manipulated within a program. Understanding data structures is very important for developing efficient and effective algorithms. In this tutorial, we will explore the most commonly used data structures, including arrays, linked lists, stacks, queues, trees, and graphs.

A data structure is a storage that is used to store and organize data. It is a way of arranging data on a computer so that it can be accessed and updated efficiently.

A data structure is not only used for organizing the data. It is also used for processing, retrieving, and storing data. There are different basic and advanced types of data structures that are used in almost every program or software system that has been developed. So we must have good knowledge about data structures.

14) Explain Tree Data Structure?

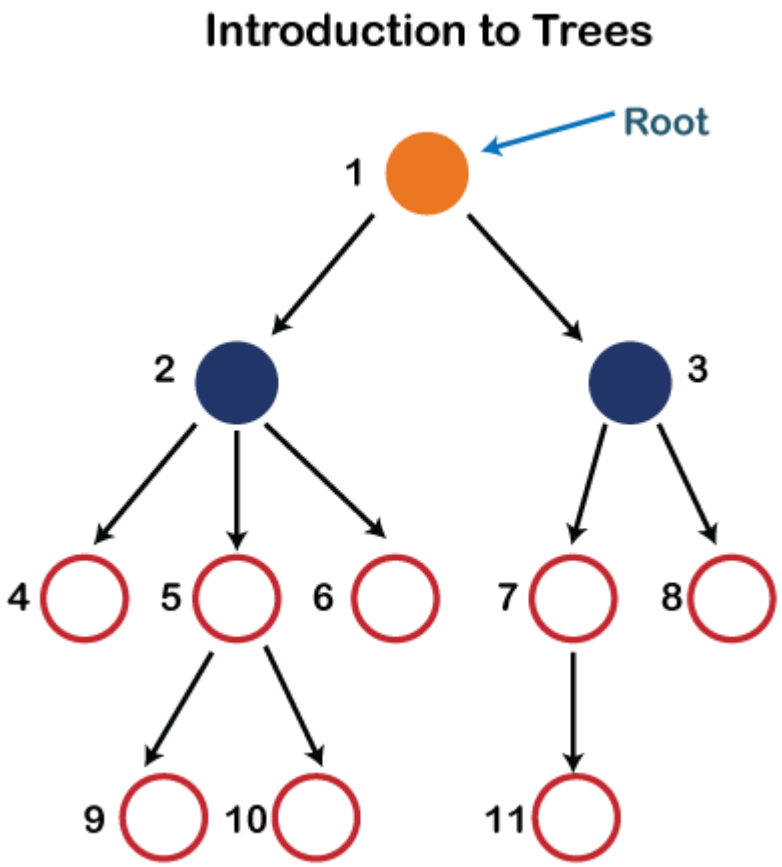
A tree data structure is defined as a collection of objects or entities known as nodes that are linked together to represent or simulate hierarchy.

A tree data structure is a non-linear data structure because it does not store in a sequential manner. It is a hierarchical structure as elements in a Tree are arranged in multiple levels.

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.

Let's consider the tree structure, which is shown below:



In the above structure, each node is labeled with some number. Each arrow shown in the above figure is known as a link between the two nodes.

Root: The root node is the topmost node in the tree hierarchy. In other words, the root node is the one that doesn't have any parent. In the above structure, node numbered 1 is the root node of the tree. If a node is directly linked to some other node, it would be called a parent-child relationship.

Child node: If the node is a descendant of any node, then the node is known as a child node.

Parent: If the node contains any sub-node, then that node is said to be the parent of that sub-node.

Sibling: The nodes that have the same parent are known as siblings.

Leaf Node:- The node of the tree, which doesn't have any child node, is called a leaf node. A leaf node is the bottom-most node of the tree. There can be any number of leaf nodes present in a general tree. Leaf nodes can also be called external nodes.

Internal nodes: A node has atleast one child node known as an internal

Ancestor node:- An ancestor of a node is any predecessor node on a path from the root to that node. The root node doesn't have any ancestors. In the tree shown in the above image, nodes 1, 2, and 5 are the ancestors of node 10.

Descendant: The immediate successor of the given node is known as a descendant of a node. In the above figure, 10 is the descendant of node 5.

15) What is user agent? share the list and its purpose?

The HTTP headers User-Agent is a request header that allows a characteristic string that allows network protocol peers to identify the Operating System and Browser of the web-server. Your browser sends the user agent to every website you connect to. There is no conventional way of writing a user agent string as different browsers use different formats and many web browsers load a lot of information.
When your browser is connected to a website, a User-Agent field is included in the HTTP header. The data of the header field varies from browser to browser. This information is used to serve different websites to different web browsers and different operating systems.

Directives

There are three directives in HTTP headers user-agent.

product: This holds the product identity.

product-version: This holds the product version of the used product.

comment: This holds the sub-product information of the used product.

16) What is Hypertest?

HyperTest is a no-code test automation tool that regresses all your APIs by auto-generating integration tests using your network traffic, also giving a way to reproduce these failures inside actual user-journeys.

17) What is HTML Tags?

HTML tags are the keywords on a web page that define how your web browser must format and display your web page.

Almost all tags contain two parts, an opening, and a closing tag.

18) What is HTML Attributes?

All HTML elements can have attributes.

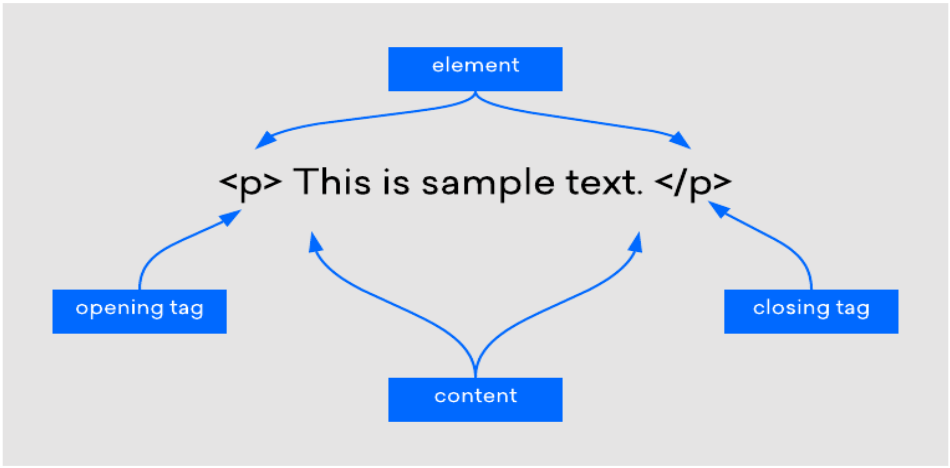
Attributes provide additional information about elements.

Attributes are always specified in the start tag.

Attributes usually come in name/value pairs like: name="value".

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.



20) How do convert elements to tree?

We can use the knowledge that the array is sorted . We can divide the array into two equal parts and assign the mid-value as a root node. The elements in the array to the left of the mid-value would the left subtree and the elements in the array to the right of the mid-value would the right subtree .

21) What is DOCTYPE?

The HTML document type declaration, also known as DOCTYPE , is the first line of code required in every HTML or XHTML document. The DOCTYPE declaration is an instruction to the web browser about what version of HTML the page is written in. This ensures that the web page is parsed the same way by different web browsers.

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

Select or create a new folder to save the file, images, and associated items from the web page.

Enter a file name and select Webpage, Complete (*. htm;*html) for the Save as type.

23) What is charset? why we need to use this?

The charset attribute specifies the character encoding for the HTML document.

The HTML5 specification encourages web developers to use the UTF-8 character set, which covers almost all of the characters and symbols in the world!

24) What is meta data? what is the purpose of it?

Metadata is essentially data about data. It provides information that describes various aspects of other data, such as its content, structure, format, location, ownership, and usage. The purpose of metadata is to facilitate the understanding, management, and use of the underlying data.

 Identification and Discovery: Metadata helps in identifying and locating specific data resources. It includes information such as titles, descriptions, unique identifiers, and keywords that make it easier to find and access data.

 Description and Understanding: Metadata provides essential details about the content, context, quality, and structure of data. It describes what the data is, how it was collected or created, its format, and its relationships to other data.

 Management and Administration: Metadata facilitates the efficient management and administration of data resources. It includes information about ownership, rights management, access permissions, and usage policies, which are crucial for data governance and stewardship.

25. Explain Web Application Architecture?

The web application architecture is a structural design that explains the interconnection between various components such as applications, databases, and middleware systems and their interaction with each other. It helps establish a communication channel between the server and the client.

The web application architecture encompasses the arrangement of various components, modules and technologies that work together to deliver the functionality of a web application. It determines how these components interact, how data flows within the application, and how the application handles user's requests and responses.