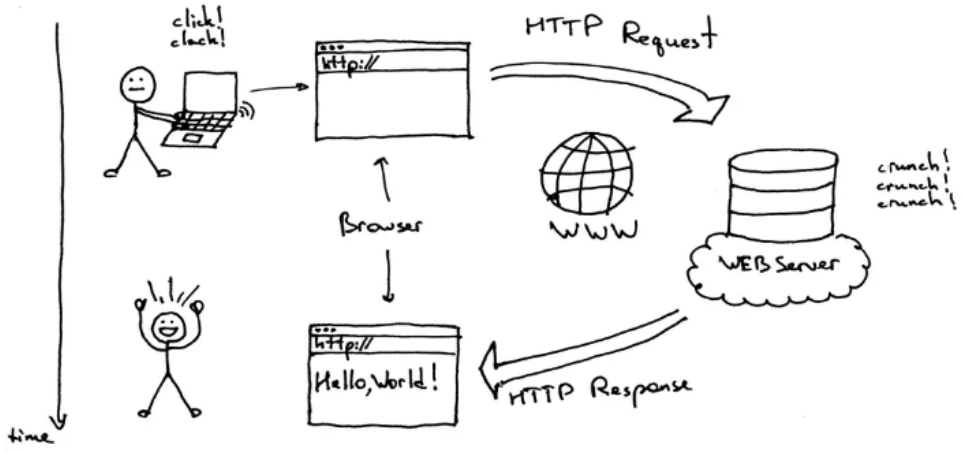
Assignment 1

1.How internet works?

The Internet works by connecting networks together through a series of routers and switches. A router forwards packets of data between different networks while a switch links devices within a single network. This enables computers to communicate with each other and access content stored on remote servers.

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.

3. What is server?

A Server is a program or a device that provides functionality for called clients which are other programs or devices. This architecture is called the client-server model.

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 servers available?

- **Application Server** : Users on the network can run and use web apps (software that runs inside a web browser) on application servers without having to install a copy of them on their personal machines. These servers don't have to be connected to the Internet. Web-enabled PCs serve as their clients.
- **Catalog Server :** The calalog servers keep a table of contents or index of the information that is spread out over a wide distributed network. Computers, users, files exchanged via file servers, and web apps can all be part of a distributed network. Directory servers or name servers are a couple of examples of catalog servers. Any computer programme that has to search the network is one of their clients. An email client seeking an email address, a user looking for a file, or a domain member trying to log in are a few examples.
- **Communications Server** : The communication servers keep up the environment required for a communication endpoint to locate and then connect with other endpoints. Depending on the network's openness and security settings, these servers may or may not have a directory containing communication endpoints or a presence detection service. Their customers are points of communication.
- **Computing Server** : Over a network, computing servers share a sizable amount of computational resources, such as CPU and random-access memory. These kinds of servers can be used by any computer programme that requires more CPU and RAM than a single computer is likely able to provide. To implement the client-server concept, which is essential, the client has to be a networked computer.
- **Database Server** : Any type of database can be maintained and shared using database servers via a network. A structured collection of data with predetermined properties that may be shown in a table is referred to as a database. Spreadsheets, asset management software, accounting software, and just about any other computer programme that consumes well-organised information, particularly in huge amounts, are clients of these servers.
- **Fax Server** : By sharing one or more fax machines across a network, fax servers do away with the inconvenience of physical access. These servers' clients might be either fax senders or recipients.
- **File Server** : The file servers share over network files and folders, along with storage space for files and folders, or both. Even though local programmes might be clients, networked machines are the intended recipients.
- **Mail Server :** Similar to how a post office facilitates communication via snail mail, mail servers enable communication via email. Both email senders and recipients are clients of these servers.
- **Print Server** : The inconvenience of physical access is removed by the print servers' network sharing of one or more printers. Computers in need of printing are their customers.
- **Proxy Server :** By receiving incoming traffic from a client and transferring it to the server, the proxy server serves as an intermediate between a client and another server. The use of a proxy server can be justified for a number of reasons, such as content filtering and control, traffic performance enhancement, preventing unwanted network access or simple traffic routing over a big and complicated network. Any networked computer can be one of the clients.
- **Web Server** : Websites are hosted on web servers. The World Wide Web is only feasible because of web servers. There are one or more web servers for each website. Computers equipped with web browsers serve as the clients.

5. What is SEO ? Importance of SEO ?

SEO stands for Search Engine Optimization. It is a process designed to optimize a website for search engines. It helps websites achieve a higher ranking in search engine results when people search for keywords related to their products and services. So, it is a practice of increasing the quantity and quality of traffic to a website through organic search engine results. See the following image to understand the basic activities involved in the SEO.

Importance of SEO:

- Visibility and Rankings : When searching for a service or product online, users are more likely to choose one of the top five suggestions that the search engine shows them. After all, while Google may return thousands upon thousands of search results for any given term, the vast majority of searchers never make it past the first page, and more than 25% of people click the first search result they see. SEO helps you rank higher in search results and garner more visibility online, making potential customers more likely to click over to your site and convert.
- Web Traffic : To put it simply—if potential customers can't find your website, you miss out on sales opportunities. SEO increases your organic search engine traffic, in turn increasing the number of visitors your website sees each day. This directly correlates to an increase in sales—because the more relevant people see your site, the more chances you have to sell to them.
- Trustworthy : The better optimized your site is, the higher you'll appear on search engines like Google and Bing. While ranking higher on Google is appealing to all brands because of increased visibility, a secondary benefit is the trust you gain with potential customers. Users tend to defer to the recommendations that a search engine generates, so having a higher position for the keywords a user is searching for will solidify your product or service as trustworthy in the user's mind.
- User Experience : A well-optimized website clearly communicates what product or service is being offered, shows how to obtain it, and answers any questions surrounding it. User experience is a major ranking factor for Google. This means that by catering the site to appeal to search engines like Google and Bing, you're also catering it to the user's experience. This means both search engines and users are able to easily get the information they need. On the other hand, if a user struggles to navigate your site, chances are that search engines will as well.
- Growth : There's no doubt about it—SEO carries a lot of importance for the growth of your brand. As we mentioned above, the higher you rank on a search engine for a variety of high-volume keywords, the more organic (aka non-paid) web traffic your site will receive. It's as simple as that.

6.What is accessibility?

Accessibility ensures that all people—regardless of ability—can interact with the information or services you provide.

7.What is markup language?

Markup is a computer language made up of tags, which determine how a document should be structured, stored, and interpreted.

A markup language is a text-encoding system which specifies the structure and formatting of a document and potentially the relationship between its parts.Markup can control the display of a document or enrich its content to facilitate automated processing.

8.What is HTML?

HTML stands for Hyper Text Markup Language. It is the standard markup language for creating Web pages. It describes the structure of a Web page.It consists of a series of elements.It elements tell the browser how to display the content. It elements label pieces of content such as "this is a heading", "this is a paragraph", "this is a link", etc.

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?

Rendering engine is responsible for rendering a specific web page requested by the user on their screen. It interprets HTML and XML documents along with images that are styled or formatted using CSS, and a final layout is generated, which is displayed on the user interface.

The available rendering engine:

- Google Chrome and Opera v.15+: Blink
- Internet Explorer: Trident
- Mozilla Firefox: Gecko
- Chrome for iOS and Safari: WebKit

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.

The available JS engine

Browser	**Name of Javascript Engine**
Google Chrome	V8
Edge (Internet Explorer)	Chakra
Mozilla Firefox	Spider Monkey
Safari	Javascript Core Webkit

Purpose of JavaScript Engine:

- Execution: The main purpose of a JavaScript engine is to execute JavaScript code written by developers. It takes the code, parses it, optimizes it (if possible), and then executes it line by line.
- Performance: Modern JavaScript engines are highly optimized for performance. They use various techniques like just-in-time (JIT) compilation and optimizations based on profiling to ensure that JavaScript code runs as fast as possible.
- Compatibility: JavaScript engines ensure compatibility with the ECMAScript standard, which defines the language syntax, semantics, and behavior. They implement the standard to ensure that JavaScript code behaves consistently across different platforms and browsers.

12.How website works?

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

Simply put, 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 Hyper Text 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.

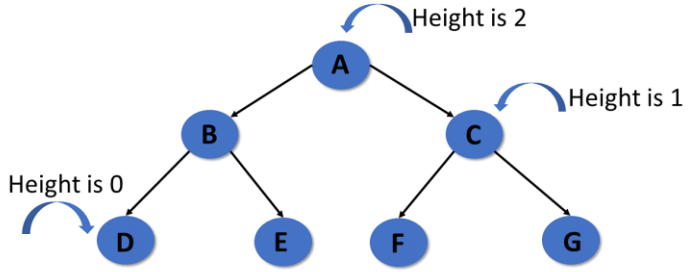
Fortunately, you don't need to know how to write computer code or have in-depth knowledge of these technologies to make a website. In fact, you can turn your website idea into a fully functional site in a matter of minutes using a website builder.

13. What is Data Structure?

Data Structure is a method of managing and arranging data in such a way that we can conduct operations on these data in an efficient way. Data Structures is about providing or contributing data elements for better organization and storage.

14. Explain Tree Data Structure?

Tree data structure is a specialized data structure to store data in hierarchical manner. It is used to organize and store data in the computer to be used more effectively. It consists of a central node, structural nodes, and sub-nodes, which are connected via edges.



15. What is user agent? Share the list and its purpose?

The User-Agent (UA) string is contained in the HTTP headers and is intended to identify devices requesting online content. The User-Agent tells the server what the visiting device is (among many other things) and this information can be used to determine what content to return.

Enabling users to access and interact with online content and services in a convenient and secure manner.

Purpose of user agent:

- Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36
- Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:124.0) Gecko/20100101 Firefox/124.0
- Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 Edg/123.0.2420.81
- Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 OPR/109.0.0.0
- Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36
- Mozilla/5.0 (Macintosh; Intel Mac OS X 14.4; rv:124.0) Gecko/20100101 Firefox/124.0
- Mozilla/5.0 (Macintosh; Intel Mac OS X 14_4_1) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/17.4.1 Safari/605.1.15
- Mozilla/5.0 (Macintosh; Intel Mac OS X 14_4_1) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36 OPR/109.0.0.0
- Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36
- Mozilla/5.0 (X11; Linux i686; rv:124.0) Gecko/20100101 Firefox/124.0

16. What is Hypertest?

HyperTest is a cutting-edge testing tool that has gained prominence in the field of software testing. HyperTest is an API test automation platform that helps teams generate and run integration tests for their microservices without ever writing a single line of code.

17. What is HTML Tags?

HTML tags are used to define the structure and content of an HTML document. They enclose content and determine the type of element represented. For example, <p> tags indicate a paragraph element, tags define a division or container, and <a> tags create hyperlinks.

<!DOCTYPE html>

```
<html>
  <head>
    <!-- Metadata is contained in this element-->
  </head>
</html>
```

18. What is HTML Attributes?

HTML attributes provide additional information or properties to HTML elements. They modify the behavior or appearance of elements and are specified within the opening tag of an element. Attributes can define characteristics such as the source of an image (src), the URL of a hyperlink (href), the style of an element (style), or the alternative text for an image (alt).

<element attribute_name= "attribute_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.

<h1>My First Heading</h1>

20. How do convert elements to tree?

A tree view represents a hierarchical view of information, where each item can have a number of subitems.

Step 1) Add HTML

Step 2) Add CSS

Step 3) Add JavaScript

21. What is DOCTYPE?

All HTML documents must start with a <!DOCTYPE> declaration.The declaration is not an HTML tag. It is an "information" to the browser about what document type to expect.

In HTML 5, the declaration is simple:

<!DOCTYPE html>

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

In Chrome:

- Navigate to the web page, right-click on the page and select Save as...
- 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
- Click the Save button.

In FireFox:

- Navigate to the web page and select File, Save Page As... or right-click and select Save Page As...
- Select or create a new folder to save the file, images, and associated items from the web page.
- Enter a file name and select Web Page, complete (*.htm;*.html) for the Save as type:
- Click Save

In Internet Explorer:

- Navigate to the web page and File, Save as...
- Enter a file name and select Web Page, complete (*.htm;*.html) for the Save as type:
- Click Save

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

Character set utf-8 is character encoding capable of encoding all characters on the web. It replaced ASCII as the default character encoding. Because it is the default all modern browsers will use utf-8 without being explicitly told to do so. It remains in meta data as a common good practice.

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

Metadata is defined as the information that describes and explains data. It provides context with details such as the source, type, owner, and relationships to other data sets. So, it can help you understand the relevance of a particular data set and guide you on how to use it.

25. Explain Web Application Architecture?

Web application architecture is a mechanism that gives us a clarification that how the connection is established between the client and the server. It determines how the components in an application communicate with each other. It doesn’t matter what is the size and the complexity level of the application is, they all follow the same principle only the details may differ.

Web Application Architecture Components

Web application architecture works on various components. These components can be divided into two areas.

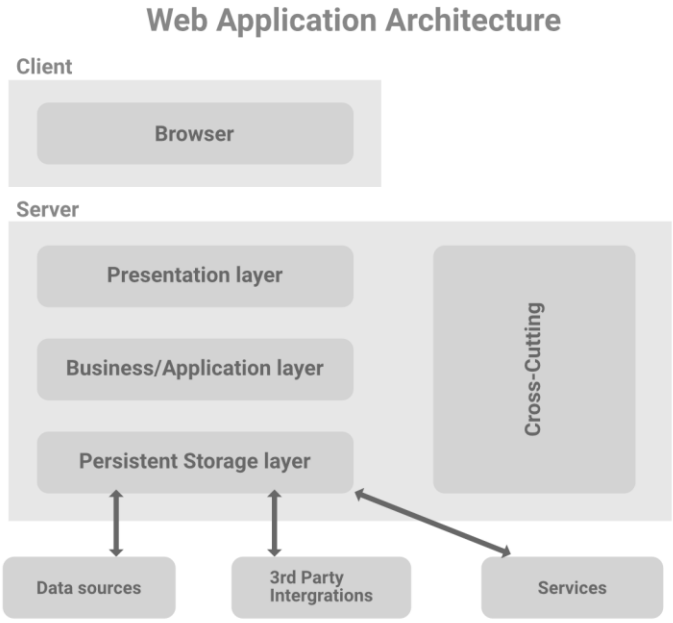
1. User Interface App Components: As the name suggests this category is much more related to the user interface/experience. In this category, the role of the web page is related to the display, dashboards, logs, notifications, statistics, configuration settings, etc and it has nothing to do with the functionality or working of the web application.

2. Structural Components: This category is mainly concerned with the functionality of the web application with which a user interacts, the control, and the database storage. As the name suggests it is much more about the structural part of the web application. This structural part comprises…

- The web browser or client
- The web application server
- The database server

Web Application Three Tier Architecture Layers:

Web application architectural patterns are separated into many different layers or tiers which is called Multi- or Three-Tier Architecture. You can easily replace and upgrade each layer independently.



Presentation Layer: This layer is accessible to the client via a browser and it includes user interface components and UI process components. As we have already discussed that these UI components are built with HTML, CSS, and JavaScript (and its frameworks or library) where each of them plays a different role in building the user interface.

Business Layer: It is also referred to as a Business Logic or Domain Logic or Application Layer. It accepts the user's request from the browser, processes it, and regulates the routes through which the data will be accessed. The whole workflow is encoded in this layer. You can take the example of booking a hotel on a website. A traveler will go through a sequence of events to book the hotel room and the whole workflow will be taken care of by the business logic.

Persistence Layer: It is also referred to as a storage or data access layer. This layer collects all the data calls and provides access to the persistent storage of an application. A server and a database management system software exist in data storage infrastructure which is used to communicate with

the database itself, applications, and user interfaces to retrieve data and parse it. You can store the data in hardware servers or in the cloud.