Assignment-01

1. How internet works?

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.

When data gets sent over the Internet, it is first broken up into smaller packets, which are then translated into bits. The packets get routed to their destination by various networking devices such as routers and switches. When the packets arrive at their destination, the receiving device reassembles the packets in order and can then use or display the data.

Compare this process to the way the United States' Statue of Liberty was constructed. The Statue of Liberty was first designed and built in France. However, it was too large to fit onto a ship, so it was shipped to the United States in pieces, along with instructions about where each piece belonged. Workers who received the pieces reassembled them into the statue that stands today in New York.

While this took a long time for the Statue of Liberty, sending digital information in smaller pieces is extremely fast over the Internet. For instance, a photo of the Statue of Liberty stored on a web server can travel across the world one packet at a time and load on someone's computer within milliseconds.

Packets are sent across the Internet using a technique called packet switching. Intermediary routers and switches are able to process packets independently from each other, without accounting for their source or destination. This is by design so that no single connection dominates the network. If data was sent between computers all at once with no packet switching, a connection between two computers could occupy multiple cables, routers, and switches for minutes at a time. Essentially, only two people would be able to use the Internet at a time — instead of an almost unlimited number of people, as is the case in reality.

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.

This problem is solved with standardized protocols. In networking, a protocol is a standardized way of doing certain actions and formatting data so that two or more devices are able to communicate with and understand each other.

There are protocols for sending packets between devices on the same network (Ethernet), for sending packets from network to network (IP), for ensuring those packets successfully arrive in order (TCP), and for formatting data for websites and applications (HTTP). In addition to these foundational protocols, there are also protocols for routing, testing, and encryption. And there are alternatives to the protocols listed above for different types of content — for instance, streaming video often uses UDP instead of TCP.

Because all Internet-connected computers and other devices can interpret and understand these protocols, the Internet works no matter who or what connects to it.

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.

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 server available?

Types of servers are:

1. Web Server
2. Database Server
3. Email Server
4. Web Proxy Server
5. DNS Server
6. FTP Server
7. File Server
8. DHCP Server
9. Cloud Server
10. Application Server
11. Print Server
12. NTP Server
13. Radius Server
14. Syslog Server
15. Physical Server

5. What is SEO? Importance of SEO?

SEO, or Search Engine Optimization, is the practice of optimizing a website to improve its visibility and ranking on search engine results pages.

Importance of SEO:

1. Increases Visibility: Helps websites appear in top search results, attracting more visitors.
2. Drives Traffic: Higher rankings lead to more organic traffic.
3. Builds Credibility: Users trust websites that rank higher.
4. Improves User Experience: SEO involves optimizing website structure and content for better user experience.
5. Cost-Effective: Compared to paid advertising, organic search traffic is more sustainable and cost-effective.

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. contribute to the Web.

7. What is Markup Language?
A markup language is a set of rules for describing the structure and presentation of a document.It is used to add meaning to text,such as formatting,links and tables.Markup languages are used to create a variety of documents ,including web pages,ebooks,and technical manuals.
The most common markup language is HTML(Hyper text markup language).HTML is used to create web pages.It uses tags to indicate the structure of the document,such as headings,paragraphs,and lists

8. What is HTML?
*HTML stands for Hyper Text Markup Language

*HTML is the standard markup language for creating Web pages

*HTML describes the structure of a Web page

*HTML consists of a series of elements

*HTML elements tell the browser how to display the content

*HTML 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 rendering engine, is a core software component of a web browser responsible for displaying web content. It interprets HTML, CSS, and JavaScript code, processes the document object model (DOM), and renders the visual representation of web pages.

Key Functions of a Browser Engine:

1. Parsing: Interprets HTML and XML documents.
2. Rendering: Lays out and paints web pages on the screen.
3. Script Execution: Executes JavaScript code.
4. Networking: Handles network requests, such as fetching resources like HTML, CSS, JavaScript, and images.
5. User Interaction: Processes user inputs like clicks, scrolling, and keyboard actions.

Examples of Browser Engines:

1. Blink: Used by Google Chrome and Opera.
2. WebKit: Used by Safari and previously by Google Chrome.
3. Gecko: Used by Mozilla Firefox.
4. EdgeHTML: Previously used by Microsoft Edge (now switched to Blink).

10. What is rendering engine? share the available rendering engine?
A rendering engine is a software program that interprets and converts the HTML, CSS, and JavaScript code of a web page into visuals that are displayed on the screen. It is the core component of a web browser and plays a crucial role in the overall performance and compatibility of the browser. Different browsers use different rendering engines with changes that reflect the browser's performance goal and accessibility.

Available Rendering Engines:

1. Blink:
    - Developed by: Google
    - Used by: Google Chrome, Opera, Microsoft Edge (since it switched from EdgeHTML)
2. WebKit:
    - Developed by: Apple
    - Used by: Safari, older versions of Google Chrome (pre-Blink), and various other browsers on iOS
3. Gecko:
    - Developed by: Mozilla
    - Used by: Mozilla Firefox, Thunderbird
4. EdgeHTML:
    - Developed by: Microsoft
    - Used by: Microsoft Edge (legacy versions before switching to Blink)
5. Trident:
    - Developed by: Microsoft
    - Used by: Internet Explorer (legacy versions)
6. KHTML:
    - Developed by: KDE
    - Used by: Konqueror (though newer versions use WebKit)
7. Presto:
    - Developed by: Opera Software
    - Used by: Older versions of Opera (pre-Blink)

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

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

12. How website works?
A user requests a website by entering the URL or clicking a link. A server processes the request and retrieves the necessary files and data. The server sends the data back to the user's browser.

13. What is Data Structure?

A data structure is a way of organizing and storing data in a computer so that it can be accessed and used efficiently.It refers to the logical or mathematical representation of data, as well as the implementation in a computer program.

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.

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.

Purpose of User Agents:

1. Content Adaptation: Helps servers deliver optimized content based on the user's device and browser.
2. Analytics: Assists in tracking and understanding user demographics and behavior.
3. Compatibility: Ensures that web content is compatible with different browsers and devices.

16. What is Hypertext?

Hypertext is text displayed on a computer display or other electronic devices with references (hyperlinks) to other text that the reader can immediately access.[1] Hypertext documents are interconnected by hyperlinks, which are typically activated by a mouse click, keypress set, or screen touch. Apart from text, the term "hypertext" is also sometimes used to describe tables, images, and other presentational content formats with integrated hyperlinks. Hypertext is one of the key underlying concepts of the World Wide Web,[2] where Web pages are often written in the Hypertext Markup Language (HTML). As implemented on the Web, hypertext enables the easy-to-use publication of information over the Internet.

17. What is HTML Tags?

HTML (HyperText Markup Language) is the standard markup language used to create the structure and layout of web pages. HTML documents consist of a series of elements, and these elements are defined using HTML tags. HTML tags are essential building blocks that define the structure and content of a webpage.

18. What is HTML Attributes?
HTML attributes provide additional information about elements within an HTML document. Every HTML element can have attributes. Attributes are always defined in the start tag. They are specified using a name/value pair format, where the attribute name defines the property, and its value provides specific details, like name=”value”. These attributes impact content display and interaction on web pages.

19. What is HTML Elements?
An HTML Element is a collection of start and end tags with the content inserted between them. HTML elements are building blocks of web pages, representing different types of content such as headings, paragraphs, links, and images.

20. How to convert elements to tree?
Converting elements to a tree structure in web technologies typically involves using the Document Object Model (DOM), which represents the structure of an HTML document as a tree of nodes. Each element in the document is a node in the tree, and the relationships between elements (such as parent-child relationships) define the structure of the tree.

21. What is DOCTYPE?
HTML Doctypes declared at the beginning of HTML documents, inform browsers about the document type and version, ensuring correct rendering. They aren’t HTML tags but provide essential information. The most common doctype is <!DOCTYPE html>, used for HTML5, ensuring modern web standards.

22. What are the ways we can save html file?
1.Text Editor: Write HTML in a text editor (e.g., Notepad, VS Code) and save with a .html extension.
2.IDE: Use a development environment like Visual Studio Code and save the file with a .html extension.
3.Browser Developer Tools: View and copy page source, then save it in a text editor as .html.
4.Online HTML Editors: Write HTML in platforms like CodePen, then export or copy and save as .html.

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.
This allows the computer system to convert text into binary. Examples are ASCII and Unicode.

24. What is meta data? what is the purpose of it?
Metadata is data that provides information about other data. In the context of web development, metadata is often used in HTML to describe various aspects of the web page.

Purpose of Metadata:

1. SEO (Search Engine Optimization): Helps search engines understand the content of the page.
2. Content Description: Provides information about the page's author, description, and keywords.
3. Browser Behavior: Controls how browsers display content or handle files.
4. Social Media: Enhances how content is displayed when shared on social platforms.

25. Explain Web Application Architecture?

Web application architecture defines the interaction between applications,middleware systems and databases to ensure multiple applications can work together. When a user types in a URL and taps “Go,” the browser will find the Internet-facing computer the website lives on and requests that particular page.