ASSIGNMENT

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CSC 828 INTERNET TECHNOLOGY

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Synchronous vs. Asynchronous Communication

Synchronous communication

Synchronous communication refers to any type of communication that happens **in real time**, where all participants are engaged in the interaction **at the same time**. It involves an immediate exchange of information between parties who are simultaneously available.

In synchronous communication, both the sender and the receiver are actively participating in the communication process at the same moment. Because of this real-time interaction, it allows for instant feedback, clarification, and decision-making.

This type of communication is typically used in situations where urgent matters need to be addressed, quick collaboration is needed, or direct interaction is essential for understanding.

Asynchronous communication

Asynchronous communication refers to any communication that does **not happen in real time**. In this mode, there is usually a **time delay** between when a message is sent and when it is received or responded to.

In asynchronous communication, participants do **not need to be present or active at the same time**. This allows individuals to read, process, and respond to messages at their own convenience. It supports flexibility and is useful when people are in different time zones or have conflicting schedules.

So, the differences between this two fundamental ways information are exchanged between parties, especially in computer networks and digital systems are expressed in the table below:

Synchronous Communication	**Asynchronous Communication**
Occurs in real-time; all parties are present and engaged at the same time.	Happens over time; participants do not need to be online or active at the same time.
Example: Phone calls, live chats, Zoom meetings.	Example: Emails, forum posts, recorded messages.
Immediate feedback is possible.	Responses can be delayed.
Requires coordination in time.	More flexible timing for communication.

2. DOM (Document Object Model)

The Document Object Model (DOM) is a programming interface for web documents. It represents the structure of a webpage as a tree of objects, where each element (like headings, paragraphs, images) is a node. The DOM allows programming languages

like JavaScript to access and manipulate the content, structure, and styles of a webpage. For example, JavaScript can change the text inside a paragraph or hide/show elements dynamically. Think of the DOM as a bridge between web content (HTML) and scripts (like JavaScript).

3. Sessions vs. Cookies

Sessions	**Cookies**
Stored on the server-side.	Stored on the client-side (browser).
Data is temporary and usually expires when the browser is closed.	Data can persist for days, weeks, or until manually deleted.
More secure as data is stored on the server.	Less secure; users can view and sometimes modify cookies.
Common use: User login sessions.	Common use: Remembering user preferences, tracking activity.

4. Malware

Malware (short for malicious software) refers to any software intentionally designed to cause damage to a computer system, network, or user data. It can steal, encrypt, delete data, or disrupt computer operations. Malware spreads through infected downloads, email attachments, or malicious websites.

5. Differences Between Viruses, Worms, Trojans, Ransomware, and Spyware

Type	Description
Virus	A program that attaches itself to legitimate files and spreads when those files are executed. Requires user action to activate.
Worm	Self-replicating malware that spreads without user intervention, usually through networks.
Trojan Horse (Trojan)	Disguises itself as a legitimate program, but once installed, performs malicious actions.
Ransomware	Encrypts or locks a user's data and demands payment (ransom) to restore access.
Spyware	Secretly monitors user activity and sends information (like keystrokes or browsing habits) to a third party.