# Week 2 Assignment

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## Date : 03/08/2024 - 03/08/2024

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**1) Among A and B, select which one is the software layer and which one is the hardware layer in the Open Systems Interconnection Model.**

- A is the **software layer** (Application layer, Presentation layer, Session layer).
- B is the **hardware layer** (Network layer, Data Link layer, Physical layer).

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**2) HTTPS uses which protocol for security?**

- HTTPS uses **TLS (Transport Layer Security)** protocol for security.

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**3) Apart from LAN, VAN and MAN, what do you understand by VPN?**

- VPN (Virtual Private Network) allows users to securely connect to another network over the internet. It provides privacy and security by encrypting the data and masking the user's IP address.

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**4) Digital Signatures, as the name sounds, are the new alternative to signing a document digitally. What other authenticity have you used over the network in regular life?**

- Other authenticity methods I have used over the network include biometric authentication (e.g., fingerprint or facial recognition), two-factor authentication (2FA), and security tokens.

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**5) After the authentication is successful, _____ (Authorization/Communication) can be used to determine what resources the user is allowed to access and the operations that can be performed.**

- After the authentication is successful, **authorization** can be used to determine what resources the user is allowed to access and the operations that can be performed.

**6) Consider the above Packet firewall rule. Now Network IP: 192.168.21.0, Trying to connect to your machine and want to send data. Is the Action allowed, as per above table firewall rule? (Allow/Deny)**

- The action is Deny as per the above table firewall rule.

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**7) Application Layer Firewall, software Firewall, and Hardware Firewall allow only destined and avoid malicious data. If these firewalls are not installed, your application may receive _____ data (malicious/all secured) data.**

- If these firewalls are not installed, your application may receive **malicious** data.

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**8) When a bigger network is divided into smaller networks, in order to maintain security and to maintain smaller networks easier using the routing table, we go for _____ (Subnetting/Firewall).**

- When a bigger network is divided into smaller networks, we go for **subnetting**.

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**9) Move A and B to the corresponding IP assignment.**

- **Static IP Address:**
  - It is provided by ISP (Internet Service Provider).
  - This IP address does not change at any time, which means if an IP address is provided then it can't be changed or modified and is easily traceable.
- **Dynamic IP Address:**
  - It is provided by DHCP (Dynamic Host Configuration Protocol).
  - These addresses change at any time and are not easily traced.

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**10) List any two differences between MAC address, IP address, and Network Address.**

- **MAC Address:**
  - Unique identifier assigned to network interfaces for communications on the physical network segment.
  - Operates at the Data Link Layer (Layer 2) of the OSI model.
- **IP Address:**
  - Numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication.
  - Operates at the Network Layer (Layer 3) of the OSI model.
- **Network Address:**

- Identifies a network segment and is used in routing to determine the path data should take to reach its destination.
- Includes both the IP address and the subnet mask.

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**11) Match numbers with letters according to 7 layers roles:**

- **1. Application Layer:**
  - **G.** Message format, Human-Machine interfaces, HTTP, FTP, Data
- **2. Presentation Layer:**
  - **C.** Coding into 1s and 0s, encryption, compression, JPG, HTTPS, SSL, TSL, ASCII, Data
- **3. Session Layer:**
  - **D.** Authentication, Permission, connection between two hosts, NetBIOS, PPTP, RPC, API, Data
- **4. Transport Layer:**
  - **E.** End-to-End Error Control, TCP, UDP, Segment
- **5. Network Layer:**
  - **F.** Routing, switching, IPV4, IPV6, IPSec, Packet
- **6. Data Link Layer:**
  - **B.** MAC Address, Flow control, Frames, switches, ARP
- **7. Physical Layer:**
  - **A.** Bit Stream, physical medium, Cable, Connectors

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**12) DNS is a host name to IP address translation service. Use ping amazon.com and share IP addresses.**

- **Domain:** amazon
- **IP address:**

  Pinging amazon.com [52.94.236.248] with 32 bytes of data:

  Reply from 52.94.236.248: bytes=32 time=247ms TTL=242

  Reply from 52.94.236.248: bytes=32 time=251ms TTL=242

  Reply from 52.94.236.248: bytes=32 time=245ms TTL=242

  Reply from 52.94.236.248: bytes=32 time=247ms TTL=242

  Ping statistics for 52.94.236.248:

  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 245ms, Maximum = 251ms, Average = 247ms

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**13) Consider below network address and subnetID. From the routing table, which Interface should be chosen for Network ID 172.16.0.0: (A/B)**

- **Routing Table:**
  - Network Address: 172.16.0.0
  - Subnet ID: 172.16.0.0/16
  - Network ID Subnet Mask Interface
  - 200.1.2.0 255.255.255.192 A
  - 172.16.0.0 255.255.255.193 B
- The Interface that should be chosen for Network ID 172.16.0.0 is **B**.