

Week 2 Assignment

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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.

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.

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**.

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.

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:** (This would require a live ping operation to provide the current IP address.)
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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**.