Networking

Networking questions are mostly definitions, protocols, ports, and differences.

Network basics

Computer network:

> A group of connected devices that exchange data and share resources.

OSI model

Remember:

```
Please Do Not Throw Sausage Pizza Away
```

Layer	Name	Function
7	Application	user services: HTTP, FTP, DNS
6	Presentation	encryption, compression, format
5	Session	session management
4	Transport	end-to-end delivery, TCP/UDP
3	Network	routing, IP
2	Data Link	MAC, frames, switches
1	Physical	bits, cables, signals

TCP/IP model

Layer	Examples
Application	HTTP, DNS, FTP, SMTP
Transport	TCP, UDP
Internet	IP, ICMP
Link	Ethernet, Wi-Fi

TCP vs UDP

TCP	UDP
Connection-oriented	Connectionless
Reliable	Not guaranteed reliable
Ordered delivery	No ordering guarantee
Slower	Faster
Uses ACK/retransmission	No ACK by default
HTTP/HTTPS, FTP, email	streaming, gaming, DNS

Common ports

Protocol	Port
FTP data	20
FTP control	21
SSH	22
Telnet	23
SMTP	25
DNS	53
HTTP	80
POP3	110
IMAP	143
HTTPS	443

IP address

IP address identifies a device on a network.

IPv4 example:

```
192.168.1.1
```

IPv6 example:

```
2001:0db8::1
```

MAC address

MAC is hardware address of network interface.

Works at Data Link layer.

Router, switch, hub

Device	Layer	Function
Hub	Physical	broadcasts to all ports
Switch	Data Link	forwards using MAC address
Router	Network	forwards using IP address

DNS

DNS converts domain names to IP addresses.

Example:

```
google.com -> IP address
```

DHCP

DHCP automatically assigns IP addresses to devices.

ARP

ARP maps IP address to MAC address.

HTTP vs HTTPS

HTTP is plain text.
HTTPS uses TLS/SSL encryption.

Firewall

Firewall filters network traffic based on rules.

Subnetting basics

Subnet mask separates network part and host part.

Example:

```
192.168.1.10/24
```

`/24` means first 24 bits are network bits.

Common MCQ traps

- DNS uses port 53.
- HTTPS uses port 443.
- Switch uses MAC address.
- Router uses IP address.
- TCP is reliable; UDP is faster but unreliable.
- ARP finds MAC from IP.