1. **What is the IP address?**
   * An IP address is a unique address that identifies a device on the internet or a local network. IP stands for "Internet Protocol,"
2. **What is the use of a proxy server in networking?**
   * A proxy server acts as an intermediary between client devices and other servers. It can be used for content filtering, caching, load balancing, security, bandwidth control.
3. **What is the network?**
   * A network is a collection of interconnected devices (such as computers, servers, routers) that can communicate and share resources. Networks can be classified based on size (LAN, WAN, MAN) or topology (bus, star, ring).
4. **How are Network types classified?**
   * Network types are classified based on their geographical scope:
     + Local Area Network (LAN)
     + Wide Area Network (WAN)
     + Metropolitan Area Network (MAN).
5. **Tell me something about VPN (Virtual Private Network)**
   * A Virtual Private Network (VPN) is a secure network connection that enables users to access resources over the internet as if they were connected to a private network. VPNs provide privacy and security by encrypting data.
6. **What are the advantages of using a VPN?**
   * VPNs offer secure remote access, data encryption, anonymity, bypassing geographical restrictions, and enhanced security for communication over public networks.
7. **What are the different types of VPN?**
   * Common types of VPNs include Site-to-Site VPNs, Remote Access VPNs, and Extranet-based VPNs.
8. **What are nodes and links?**
   * Nodes are devices or data points on a network, and links are the connections between them. Nodes can be computers, routers, switches, or any device that participates in data communication.
9. **What is the network topology?**
   * Network topology refers to the arrangement of nodes and links in a network.
     + Bus Topology
     + Star Topology
     + Ring Topology
     + Mesh Topology
     + Hybrid Topology
10. **What is an IPv4 address? What are the different classes of IPv4?**
    * An IPv4 address is a 32-bit numerical label assigned to each device on a network. The classes of IPv4 addresses are A, B, C, D, and E, each with a different range and purpose.

* **C**lass A:
  + Range: 1.0.0.0 to 127.0.0.0
  + Subnet Mask: 255.0.0.0
* Class B:
  + Range: 128.0.0.0 to 191.255.0.0
  + Subnet Mask: 255.255.0.0
* Class C:
  + Range: 192.0.0.0 to 223.255.255.0
  + Subnet Mask: 255.255.255.0
* Class D (Multicast):
  + Range: 224.0.0.0 to 239.255.255.255
  + Subnet Mask: N/A (Not used for traditional unicast addressing)
* Class E (Reserved):
  + Range: 240.0.0.0 to 255.255.255.255
  + Subnet Mask: N/A (Not used for traditional unicast addressing)

1. **What are Private IP address?**
   * Private IP addresses (e.g., 192.168.x.x) are reserved for use within private networks, while special IP addresses like loopback (127.0.0.1) and broadcast (255.255.255.255) serve specific purposes.
   * The three main ranges of private IP addresses defined by RFC 1918 are:

Class A:  
Range: 10.0.0.0 to 10.255.255.255  
Subnet Mask: 255.0.0.0

Class B:  
Range: 172.16.0.0 to 172.31.255.255  
Subnet Mask: 255.240.0.0

Class C:  
Range: 192.168.0.0 to 192.168.255.255  
Subnet Mask: 255.255.0.0

1. **What is** **CIDR ?**

* CIDR, which stands for Classless Inter-Domain Routing, is a method to specify IP addresses and their routing on the internet. CIDR was introduced to overcome the limitations of the traditional IP addressing system, which was based on classes (Class A, B, and C).

1. **What are the** **HTTP and** **HTTPS protocol?**
   * HTTP (Hypertext Transfer Protocol) is used for transmitting data over the web. HTTPS (Hypertext Transfer Protocol Secure) is a secure version of HTTP that uses encryption for added security.
2. **What is the SMTP protocol?**
   * SMTP (Simple Mail Transfer Protocol) is a protocol used for sending email messages between servers.
3. **What is the DNS?**
   * DNS (Domain Name System) is a system that translates domain names into IP addresses, allowing users to access resources on the internet using human-readable names.
4. **What is the use of a router and how is it different from a gateway?**
   * A router connects different networks and forwards data between them. A gateway is a device that connects two different networks using different protocols.
5. **What is the ICMP protocol?**
   * ICMP (Internet Control Message Protocol) is used for error reporting and diagnostics in IP networks.
6. **What do you mean by the DHCP Protocol?**
   * DHCP (Dynamic Host Configuration Protocol) automatically assigns IP addresses and other network configuration information to devices in a network.
7. **What is the ARP protocol?**
   * ARP (Address Resolution Protocol) is used to map an IP address to a MAC address within a local network.
8. **What is the FTP protocol?**
   * FTP (File Transfer Protocol) is used for transferring files between computers on a network.
9. **What is the MAC address and how is it related to NIC?**
   * A MAC (Media Access Control) address is a unique identifier assigned to a network interface card (NIC) for communication on a network.
10. **Differentiate the MAC address with the IP address**
    * A MAC address is a hardware address for network communication, while an IP address is a logical address for identifying devices in a network.
11. **Q: What is a VLAN and how does it work?**A VLAN (Virtual Local Area Network) is a logical grouping of devices within a physical network, created to segment and isolate network traffic. VLANs operate at the Data Link layer and use tagging (IEEE 802.1Q) to identify and manage traffic for different VLANs on the same physical network infrastructure.
12. **What is a subnet? And its purpose**
    * The purpose of subnetting is to create a fast, efficient, computer network by dividing a large network into smaller, interconnected subnetworks. This offers several benefits, including:
    * Efficient IP Address Allocation: Increased Security: Improved Network Performance: Better Organization and Control:

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Total Ip address are 256 in one octet.

192.168.1.0 = Network address  
192.168.1.1 - 192.168.1.245 = Host address  
192.168.1.255 = Broadcast address

2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0

128 64 32 16 8 4 2 1

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|  |  |  |  |
| --- | --- | --- | --- |
| **CIDR** | **Decimal** | **# addresses** | **# hosts** |
| /0 | 0.0.0.0 | 4294967296 | 4294967294 |
| /1 | 128.0.0.0 | 2147483648 | 2147483646 |
| /2 | 192.0.0.0 | 1073741824 | 1073741822 |
| /3 | 224.0.0.0 | 536870912 | 536870910 |
| /4 | 240.0.0.0 | 268435456 | 268435454 |
| /5 | 248.0.0.0 | 134217728 | 134217726 |
| /6 | 252.0.0.0 | 67108864 | 67108862 |
| /7 | 254.0.0.0 | 33554432 | 33554430 |
| /8 | 255.0.0.0 | 16777216 | 16777214 |
| /9 | 255.128.0.0 | 8388608 | 8388606 |
| /10 | 255.192.0.0 | 4194304 | 4194302 |
| /11 | 255.224.0.0 | 2097152 | 2097150 |
| /12 | 255.240.0.0 | 1048576 | 1048574 |
| /13 | 255.248.0.0 | 524288 | 524286 |
| /14 | 255.252.0.0 | 262144 | 262142 |
| /15 | 255.254.0.0 | 131072 | 131070 |
| /16 | 255.255.0.0 | 65536 | 65534 |
| /17 | 255.255.128.0 | 32768 | 32766 |
| /18 | 255.255.192.0 | 16384 | 16382 |
| /19 | 255.255.224.0 | 8192 | 8190 |
| /20 | 255.255.240.0 | 4096 | 4094 |
| /21 | 255.255.248.0 | 2048 | 2046 |
| /22 | 255.255.252.0 | 1024 | 1022 |
| /23 | 255.255.254.0 | 512 | 510 |
| /24 | 255.255.255.0 | 256 | 254 |
| /25 | 255.255.255.128 | 128 | 126 |
| /26 | 255.255.255.192 | 64 | 62 |
| /27 | 255.255.255.224 | 32 | 30 |
| /28 | 255.255.255.240 | 16 | 14 |
| /29 | 255.255.255.248 | 8 | 6 |
| /30 | 255.255.255.252 | 4 | 2 |
| /31 | 255.255.255.254 | 2 | 0 |
| /32 | 255.255.255.255 | 1 | - |