**N+ Assignment**

**Module 5. Network Fundamentals and Building Networks**

* **Beginner Question**

1. **What is network?**

* A network consists of two or more computers that are linked in order to share resources (such as printers and CDs), exchange files, or allow electronic communications. The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams.

1. **List Common Network Components**

* The hardware components are the server, client, peer, transmission medium, and connecting devices. The software components are operating system and protocols.

1. **Add and configure loopback adaptor in network and sharing center**

* Done.
* **Intermediate Question**

1. **Explain application of network**

* A network application is any application running on one host providing communication to another application running on a different host. Network applications allow network operators to easily manage and monitor network traffic as well as analyze data that can be used to improve network systems.

1. **What do you mean by Node?**

* A network node can be defined as the connection point among network devices such as routers, printers, or switches that can receive and send data from one endpoint to the other. Types of network nodes.

1. **Practice of simple file folder sharing**

* Done.
* **Advance Question**

1. **List types of devices**

* Common Types of Network Devices

1. Hubs.
2. Switch.
3. Router.
4. Bridge.
5. Gateway.
6. Modem.
7. Repeater.
8. Access Point.
9. **Explain types of router**

* Below are the different types of Router:

1. Wireless Router.
2. Wired Router.
3. Edge Router.
4. Core Router.
5. Virtual Router.

**Topic: Types of Network**

* **Beginner Question**

1. **What is Difference between a LAN, MAN, WAN?**

* The difference between LAN, MAN, and WAN is that LAN covers a small geographical region, whereas MAN covers a larger area, and WAN covers the largest of all. LAN is limited to schools, hospitals, or buildings, whereas MAN links small towns or cities, and WAN connects a country or a group of countries.

1. **Common Network Components**

* Computer Network Components:

1. Hub
2. Switch
3. Router
4. Modem
5. Cables and Connectors

* **Intermediate Question**

1. **Explain Wide Area Network**

* A wide area network is a telecommunications network that extends over a large geographic area. Wide area networks are often established with leased telecommunication circuits.

1. **Explain Network Backbone**

* The Internet backbone may be defined by the principal data routes between large, strategically interconnected computer networks and core routers of the Internet.

1. **Explain CAN**

* What Does Controller Area Network Mean? A Controller Area Network (CAN) bus is a communication system made for vehicle intercommunication. This bus allows many microcontrollers and different types of devices to communicate with each other in real time and also without a host computer.
* **Advance Question**

1. **Define Physical Network Topologies**

* Physical topology indicates arrangement of different elements of a network. It reflects physical layout of devices and cables to a form a connected network. It is concerned with essentials of network ignoring minute details like transfer of data and device type.

1. **Network Architecture: Peer-to-Peer**

* Peer to peer architecture is a type of computer networking architecture in which there is no division or distinction of abilities amidst the various workstations or nodes of a network. Every section has the exact same responsibilities and can perform the same set of actions.

1. **Point-to-multipoint network**

* In telecommunications, point-to-multipoint communication (P2MP, PTMP or PMP) is communication which is accomplished via a distinct type of one-to-many connection, providing multiple paths from a single location to multiple locations.

**Topic: Network Devices**

* **Beginner Question**

1. **Why we use Network and Devices**

* The primary purpose of network devices is to transmit and receive data quickly and securely. "Network Devices" is a broad term that encompasses a range of communication equipment including hubs, switches, routers, bridges, gateways, load balancers, modems, repeaters, and more.

1. **Explain Switch?**

* A network switch connects devices in a network to each other, enabling them to talk by exchanging data packets. Switches can be hardware devices that manage physical networks or software-based virtual devices. A network switch operates on the data-link layer, or Layer 2, of the Open Systems Interconnection (OSI) model.
* **Intermediate Question**

1. **Define list of cables in use of network**

* The Different 4 Types of Network Cables. Network cables can be divided into four types: coaxial, shielded twisted pair (STP), unshielded twisted pair (UTP), or fiber optic.

1. **Explain Define Access point**

* An access point (AP) is a term used for a network device that bridges wired and wireless networks. Consumer APs are often called a “wireless routers” because they typically also serve as both internet routers and firewalls.

1. **Which types of transmission modes in computer network**

* There are 3 types of transmission modes which are given below: Simplex mode, Half duplex mode, and Full-duplex mode. These are explained below. Simplex mode: In simplex mode, Sender can send the data but the sender can't receive the data.

1. **Practice on Remote Desktop connection**

* Done.

1. **Practice on remote assistance**

* Done.
* **Advance Question**

1. **Explain Repeater and router**

* The repeater and router make a huge difference. Your router can act as a repeater, but your repeater can not operate as a router. The router is being used to connect to the internet, whereas the repeater is used to replicate the router's received signals and the repeater amplifies.

1. **What is multiplexer?**

* What Does Multiplexer Mean? A multiplexer (MUX) is a network device that allows one or more analog or digital input signals to travel together over the same communications transmission link.

1. **Explain MODEM**

* A modem is a network device that both modulates and demodulates analog carrier signals (called sine waves) for encoding and decoding digital information for processing. Modems accomplish both of these tasks simultaneously and, for this reason, the term modem is a combination of “modulate” and “demodulate.”

1. **Monitor "event viewer"**

* Done.

**Topic: Install and configure DHCP, DNS**

* **Beginner Question**

1. **Explain DHCP Dynamic host configuration protocol**

* Dynamic Host Configuration Protocol (DHCP) is a client/server protocol that automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway.

1. **Application of DHCP with one example**

* Each time a device with a dynamic IP address is powered up, it must communicate with the DHCP server to lease another IP address. Wireless devices are examples of clients that are assigned dynamic IP addresses when they connect to a network.
* **Intermediate Question**

1. **Explain Domain naming Services**

* Domain name service (DNS) is the application service that translates the IP address into a more recognized and memorable name. Whenever using the Internet, there are millions of DNS servers that translate any uniform resource locator (URL) typed into the location field of any Web browser into a specific IP address.

1. **Application of DNS with one example**

* DNS, or the Domain Name System, translates human readable domain names (for example, www.amazon.com) to machine readable IP addresses (for example, 192.0.2.44).

**Topic: Network Topologies**

* **Beginner Question**
  1. **What are the 5 network topologies?**
* There are 5 popular types of topology,

1. Bus Topology.
2. Ring Topology.
3. Tree Topology.
4. Star Topology.
5. Mesh Topology.
6. **What is Internet topology?**

* Internet topology is the structure by which hosts, routers or autonomous systems (ASes) are connected to each other. The majority of existing Internet topology research focuses on the AS-level.

1. **What is protocol**

* A network protocol is a set of established rules that specify how to format, send and receive data so that computer network endpoints, including computers, servers, routers and virtual machines, can communicate despite differences in their underlying infrastructures, designs or standards.
* **Intermediate Question**
  1. **What is the most common network topology?**
* Star topology.
  1. **Explain star topology in networking?**
* Star topology is a network topology in which each network component is physically connected to a central node such as a router, hub or switch. In a star topology, the central hub acts like a server and the connecting nodes act like clients.
* **Advance Question**
  1. **Explain Hybrid topology**
* A hybrid topology is a type of network topology that combines two or more network topologies, including ring, bus, and mesh topologies. Its use and selection are influenced by its deployments and specifications, including the required network's performance, the number of computers, and their location.

1. **What is physical and logical topology?**

* Physical Topology means the physical layout of the network. Logical topology means how the network device layout will be shown and how the data will be transferred.

1. **What are the types of logical topology?**

* The two logical topologies are broadcast (also known as bus) and sequential (also known as ring). In a broadcast topology, all devices on the network receive every message transmitted.

**Topic: OSI Model**

* **Beginner Question**
  1. **What is OSI model explain?**
* The Open Systems Interconnection (OSI) model describes seven layers that computer systems use to communicate over a network. It was the first standard model for network communications, adopted by all major computer and telecommunication companies in the early 1980s.
  1. **List of Application layer protocol**
* 1. TELNET

2. FTP

3. TFTP

4. NFS

5. SMTP

6. LPD

7. X window

* 1. **How many types of protocols are there?**
* Generally speaking, there are three types of protocols in networking: communication, such as Ethernet; management, such as SMTP; and security, such as Secure Shell, or SSH.
* **Intermediate Question**
  1. **What is the difference between TCP IP model and OSI model?**
* OSI is a generic, protocol independent standard. It is acting as an interaction gateway between the network and the final-user. TCP/IP model depends on standard protocols about which the computer network has created. It is a connection protocol that assigns the network of hosts over the internet.
  1. **What is TCP IP networking?**
* The Internet protocol suite, commonly known as TCP/IP, is a framework for organizing the set of communication protocols used in the Internet and similar computer networks according to functional criteria.
* **Advance Question**
  1. **What is a wired Internet connection?**
* A wired network uses cables to connect devices, such as laptop or desktop computers, to the Internet or another network. A wired network has some disadvantages when compared to a wireless network. The biggest disadvantage is that your device is tethered to a router.
  1. **What are the disadvantages of wired networks?**
* However, there are disadvantages to using a wired network:

1. they are expensive to install or reconfigure.
2. users can't instantly move a device from one location to another as there may not be a network connection available.
3. **How do I configure network authentication?**

* Configure Network Authentication Settings

1. Access the Embedded Web Server and log in to the Embedded Web Server as a System Administrator.
2. In the Embedded Web Server, click Properties→Login/ Permissions/ Accounting→Login Methods.
3. Set the login method to User Name / Password - Validate on the Network.
4. **Practice of Team viewer, Any Desk, Google Hangout, Skype, zoom.**

* Done.

1. **Download google chrome.**

* Done.

1. **configure "date and time" opting in control panel**

* Done.

**Topic: TCP/IP**

* **Assignment level Basic:**
  1. **What is TCP/IP?**
* The Internet protocol suite, commonly known as TCP/IP, is a framework for organizing the set of communication protocols used in the Internet and similar computer networks according to functional criteria.
  1. **What is the full form of TCP/IP?**
* TCP/IP stands for Transmission Control Protocol/Internet Protocol. TCP/IP is a set of standardized rules that allow computers to communicate on a network such as the internet.
* **Assignment level Intermediate:**
  1. **List out the types of IP**
* There are four different types of IP addresses: public, private, static, and dynamic. While the public and private are indicative of the location of the network—private being used inside a network while the public is used outside of a network—static and dynamic indicate permanency.
  1. **What is protocol?**
* A network protocol is a set of established rules that specify how to format, send and receive data so that computer network endpoints, including computers, servers, routers and virtual machines, can communicate despite differences in their underlying infrastructures, designs or standards.
  1. **DO a practical to set the tcp/ip in network adapter?**
* Done.

**Topic: Cables**

* **Beginner Question**
  1. **Types of cables and connectors?**
  2. **Explain twisted pair cable and shielded twisted pair cable**
* **Intermediate Question**
  1. **Which of these cables connect computers to monitors?**
  2. **How do I connect to a shared printer?**
* **Advance Question**
  1. **Which cable that is commonly used to connect a computer to a printer?**
* Most new printers contain a USB port, making the USB cable the most common way to connect a printer to your PC or Mac.
  1. **What are the different ports and connectors?**
* The parallel port, serial port, and video port all use D-type connectors (DB-25M, DB-9M, and DB-15F, respectively). These are called "D connectors" because of their shape, which permits the cables to be plugged in only one way. The audio jacks are the most confusing connectors on the back panel.
  1. **How do I connect my laptop to my printer without cable?**
* To connect a wireless printer, follow these steps:

1. Select Start > Settings > Bluetooth & devices > Printers & scanners.
2. Next to Add a printer or scanner, select Add device.
3. Wait for it to find nearby printers, then locate the one you want to use, and select Add device.
4. **Application and brief explanation of fiber optic cable and Coaxial cable**

* Coax transmits data through insulated cables with a copper core. This cable can supply both your internet and television connection simultaneously. Fiber optic cables are composed of incredibly thin glass fibers that convert electrical signals into light to carry digital information from one location to another.

1. **Which of following operates at the 5GHz frequency range?**

* 802.11a is an IEEE standard for transmitting data over a wireless network. It uses a 5 GHz frequency band and supports data transfer rates of 54 Mbps or 6.75 megabytes per second. IEEE 802.11a was the first Wi-Fi (Wireless Fidelity) system in the IEEE 802.11 family.

1. **What frequency does 802.11g use?**

* IEEE 802.11 uses various frequencies including, but not limited to, 2.4 GHz, 5 GHz, 6 GHz, and 60 GHz frequency bands.

1. **What standard is compatible with 802.11a?**

* Although the 802.11a and 802.11b specs are incompatible, vendors offer so-called dual-mode APs that support both. A future standard, 802.11g, may offer 802.11a speeds and backward compatibility to 802.11b. The 802.11a standard offers more nonoverlapping channels per AP that clients can use.

**Topic: TCP/IP concepts - IPv6, IPv4**

* **Beginner Question**
  1. **What is the difference between IPv4 & IPv6?**
* IPv4 is composed of 32-bit address length and is the fourth version of the Internet Protocol (IP). IPv6 is composed of 128-bit address length and is the latest updated version of the Internet Protocol (IP).
  1. **Explain TCP/IP**
* TCP/IP stands for Transmission Control Protocol/Internet Protocol and is a suite of communication protocols used to interconnect network devices on the internet. TCP/IP is also used as a communications protocol in a private computer network (an intranet or extranet).
  1. **Explain IPV6 Address with Address structure**
* An IPv6 address is represented as eight groups of four hexadecimal digits, each group representing 16 bits The groups are separated by colons (:). An example of an IPv6 address is: 2001:0db8:85a3:0000:0000:8a2e:0370:7334. The standards provide flexibility in the representation of IPv6 addresses.
  1. **Define IPV6 reserve address**
* IPv6 has reserved a few addresses and address notations for special purposes. See the table below: As shown in the table, the address 0:0:0:0:0:0:0:0/128 does not specify anything and is said to be an unspecified address. After simplifying, all the 0s are compacted to ::/128.
  1. **Explain Difference between public ip and private ip**
* A private IP address, such as a home or office network, is assigned to a device on a local network and is used to identify the device within that network. On the other hand, a public IP address is assigned to a device directly connected to the internet and is used to identify the device on the internet.
  1. **Create straight and cross cables and it's testing**
* Done.
* **Intermediate Question**
  1. **Brief explanation of ip Addresses**
* An Internet Protocol (IP) address is a unique numerical identifier for every device or network that connects to the internet. Typically assigned by an internet service provider (ISP), an IP address is an online device address used for communicating across the internet.
  1. **What is the advantage of IPv6 over IPv4?**
* IPv6 has a much larger address space than IPv4, allowing for more devices, networks, and services to be connected. IPv6 also offers some advantages over IPv4, such as improved security, performance, and scalability.
  1. **Assign multiple IPv4 in single network adapter [lan card]**
* Done.

1. **Assign simple IPv6 between two system and ping it.**

* Done.

1. **Assign and configure simple IPv4 between systems.**

* Done.
* **Advance Question**
  1. **Which is faster IPv4 or IPv6? 2.What does TCP do?**
* Though the IP header size of IPv6 address is 4 times larger than IPv4 address, the IPv6 headers are only 2 times the size of IPv4. This greatly reduces the overhead of packet processing and header bandwidth and that makes it faster.
  1. **Give security in sharing**
* Done.
  1. **Configure "Map network drive"**
* Done.

**Topic: IP routing and Routing protocols**

* **Beginner Question**
  1. **What Is Routing?**
* Routing is the process of selecting a path for traffic in a network or between or across multiple networks. Broadly, routing is performed in many types of networks, including circuit-switched networks, such as the public switched telephone network, and computer networks, such as the Internet.
  1. **How Routing Starts Up?**
* The routing process starts when software on a host device uses a packet's contents, destination, or purpose to select a possible route from a routing table. A routing table is a repository of all the routes to all the destinations in use by a network.
* **Intermediate Question**
  1. **What Is Hybrid Routing Protocol?**
* Hybrid Routing protocol: It basically combines the advantages of both, reactive and pro-active routing protocols. These protocols are adaptive in nature and adapts according to the zone and position of the source and destination mobile nodes.
  1. **What Are the Range of Ad Values?**
* It is an integer value ranging from 0 to 255 where 0 shows that the route is most trusted and 255 means that no traffic will be passed through that route or that route is never installed in the routing table. The smaller the value of AD, the more reliable the routing protocol is.

1. **What Is an Autonomous System?**

* An autonomous system is a collection of connected Internet Protocol routing prefixes under the control of one or more network operators on behalf of a single administrative entity or domain, that presents a common and clearly defined routing policy to the Internet.
* **Advance Question**
  1. **Define Static Routing?**
* Static routing is a form of routing that occurs when a router uses a manually-configured routing entry, rather than information from dynamic routing traffic.
  1. **Explain Dynamic Routing?**
* Dynamic routing, also called adaptive routing, is a process where a router can forward data via a different route for a given destination based on the current conditions of the communication circuits within a system.

**Topic: Switching and VLANS**

* **Beginner Question**
  1. **What is VLAN?**
* A virtual local area network is any broadcast domain that is partitioned and isolated in a computer network at the data link layer. In this context, virtual, refers to a physical object recreated and altered by additional logic, within the local area network.
  1. **Which two benefits of creating VLANs?**
* VLANs provide a number of advantages including ease of administration, confinement of broadcast domains, reduced network traffic, and enforcement of security policies.
  1. **What is Dynamic VLAN?**
* Dynamic VLAN assignment separates and isolates devices into different network segments based on the device or user authorization and their characteristics. The flow of traffic between those VLANs is governed by a firewall or another routing device which can then enforce specific network access rules.
  1. **What is Static VLAN?**
* A static VLAN is a group of ports designated by the switch as belonging to the same broadcast domain. That is, all ports carrying traffic for a particular subnet address would belong to the same VLAN. Using a VLAN, you can group users by logical function instead of physical location.
* **Intermediate Question**
  1. **What is VLAN and INTERVLAN?**
* Inter-VLAN routing refers to the movement of packets across the network between hosts in different network segments. VLANs make it easier for one to segment a network, which in turn improves the performance of the network and makes it more flexible, since they are logical connections.
  1. **What is trunk port?**
* A trunk port is a type of connection on a switch that is used to connect a guest virtual machine that is VLAN aware. Generally, all frames that flow through this port are VLAN tagged. The exception to this is when a trunk port is granted access to the untagged VLAN set (native VLAN ID).
* **Advance Question**
  1. **How to configure Trunk port?**
* A trunk port is a port that can carry traffic of multiple VLANs (Virtual LANs) using a tagging protocol such as 802.1Q or ISL. To configure a trunk port, you need to enable the port for trunking and specify the allowed VLANs for the port. The exact commands may vary depending on the device and the protocol you use. Here are some examples of how to configure a trunk port on different devices:

1. Cisco Catalyst Switch: switchport mode trunk and switchport trunk allowed vlan1
2. Aruba Switch: trunk <port-list> <trunk-id> <trunk-type>2
3. FortiGate: set type aggregate and set member <port-list>3
4. You can also watch some videos that demonstrate how to configure a trunk port using Cisco Packet Tracer, a network simulation tool:
5. Configuring Cisco Trunk Ports - How to configure Trunk Port between Cisco Switch4
6. How to configure Trunk Port configuration on a Switch using Packet Tracer5
7. How to Configure Trunk Port in Cisco Packet Tracer | 802.1Q and Trunking | SYSNETTECH Solutions
   1. **How to delete VLAN information from Switch?**

* Now let us see how to delete the configuration and Vlans from a Cisco switch.

1. Deleting the switch configuration. This is the easy part.
2. Switch#erase startup-config.
3. Switch#reload.
4. Deleting the switch Vlans.
5. Switch#show vlan brief.
6. Switch#show flash
7. Switch#delete vlan.dat.
8. Switch#sh flash.