N+ Assignment

Module 5. Network Fundamentals and Building Networks

- Beginner Question

1. What is network?

ANS: A network is collection of computer, servers, mainframes, network devices and other devices connected to one another for the purpose of sharing data and resources.

2. List Common Network Components

- ANS:computers
- Routers
- Switches
- Hubs
- Cables
- Wireless access points

3. Add and configure loopback adaptor in network and sharing center

ANS: In the Network and sharing center you can add and configure a loopback adapter by going to" change adapter setting " and then choosing "add a new hardware devices".

- Intermediate Question

1. Explain application of network

ANS: Networks facilitate communication, resource sharing and collaboration. They are used for task such as files sharing, internet access, and printing and collaborative software usage.

2. What do you mean by Node?

ANS: A Node refers to any device or junction point in a network where data can be sending, receives or passed through. This includes computers, servers and devices

3. Practice of simple file folder sharing

ANS: TO share a file or folder creates a shared folder on your devices. Right click the folder select "properties" and go the "sharing" tab choose "share" and select user and group. Adjust permission and click "share" other can access it via the shared path

- Advance Question

1. List types of devices

- Router
- Switch

- Hub
- Modem
- Access point
- Bridge
- Gateway
- Firewall
- Load Balancer
- Repeater
- Proxy server
- Network interface card
- Ethernet adapter
- Network switcher
- Cables/DSL Modem

2. Explain types of router
   - ANS: home router
   - Enterprise router
   - Edge router
   - core router
   - branch router
   - virtual router
   - wireless router
   - modem router combo
   - Mpls router
   - Gigabit router
   - Carrier grade router

Topic: Types of Network

- Beginner Question

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

ANS:

NAME	LAN	WAN	MAN
Scope	Limited to small geographic area, such as a single building office or	Spans a large geographic area, often connecting multiple lans	Falls between lan and wan covering a larges geographic area than a single

	campus	across cities countries or continents	lan but not as extensive as a wan. Typically covers a city or a large camps
Distance	Typically covers a short distance usually within a few kilometers	Covers long distances, potentially spanning hundreds or thousands of kilometers	Encompasses a medium sized distance typically within a large of few tens of kilometers
example	Home network, office network,	The internet, a network connecting Brach offices of a multinational company	A network connecting multiple building within a city ,linking different campuses of a university

2. Common Network Components
   - ANS: Router
   - Switch
   - Hub
   - Modem
   - Access point
   - Bridge
   - Gateway
   - Firewall
   - Load Balancer
   - Repeater
   - Proxy server
   - Network interface card
   - Ethernet adapter
   - Network switcher
   - Cables/DSL Modem
   - Server
   - DNS Server
   - DHCP Server

Network Switcher

- Intermediate Question

1. Explain Wide Area Network

ANS: Spans a large geographic area, often connecting multiple lans across cities countries or continents.WAN connect multiple local area network and Metropolitan area network to facilitate the exchange of data over long distances

2. Explain Network Backbone

ANS:A network backbone is the main transtructure connect and facilitates data transfer between different network or segments within an organization using high capacity communication link

3. Explain CAN

ANS: Controller Area Network is a communication protocol widely used in automotive and industrial application, facilitating reliable data exchange between electronic control units through a two wire bus system

- Advance Question

1. Define Physical Network Topologies

ANS: The arrangement of physical connections or devices within a network

2. Network Architecture: Peer-to-Peer

ANS: Machines can be both server and client less reliable and more difficult to secure easy and cheap to set up but difficult to manage and expand

3. Point-to-multipoint network

ANS: One too many link

Remote nodes communicate via a central node rather than establish direct link

Topic: Network Devices

- Beginner Question

1. Why we use Network and Devices

ANS: we use network for communication and resource sharing, while device enable us to access, process and interact with information through these network.

2. Explain Switch?

ANS: A switch is network devices that operate at the data link layer of the os model. It connect devices within a local area network and uses Mac addresses to forward data only to the specific devices it is intended for, improving network efficiency compared to traditional hubs. Switches are crucial for creating efficient and secure local network s by intelligently managing data traffic.

- Intermediate Question

1. Define list of cables in use of network

- ANS:Ethernet cable
- Coaxial cable
- Fiber optical cable
- USB cable
- HDML cable
- Power line Ethernet Adapter
- Console cable
- Patch cable

2. Explain Define Access point

ANS: Access point is commonly used to extend the coverage of a wireless network or to create a wireless network where none exists.

3. Which types of transmission modes in computer network?

- ANS:Simplex Mode
- Half-Duplex Mode
- Full –Duplex Mode

3. Practice on Remote Desktop connection

I. ANS:enable remote Desktop on the remote computer
II. Note the computer name: find the ip address
III. Configure remote desktop on the connecting computer
IV. Enter remote computer details
V. Initiate connection
VI. Verify connection
VII. Interaction and file transfer

4. Practice on remote assistance

Done

- Advance Question

1. Explain Repeater and router

ANS: **Repeater**: A devices that extend the range of a wireless network by amplifying and retransmitting signals, enhancing coverage

Router: A devices that connect different networks, managing data flow between a local network and the internet, often including feature like NAT, firewalls and wireless access points

2. What is multiplexer?

ANS: A multiplexer is a device that combines multiple input signals into a single output allowing efficient sharing of a communication channel or transmission medium.

3. Explain MODEM

ANS: A modem is devices that convert digital signals from a computer into analog signals for transmission over communication channels like telephone line and vice versa, enabling digital data exchange over analog network

4. Monitor "event viewer"

ANS**: Event Viewer: A** windows tool that logs system event and errors providing a centralized view for troubleshooting and monitoring system health

Topic: Install and configure DHCP, DNS

- Beginner Question

1. Explain DHCP Dynamic host configuration protocol

ANS: DHCP is a network protocol that automatically assigns ip addresses and configuration and details to devices, streaming the process of connecting to and operating within a network

2. Application of DHCP with one example

ANS: DHCP is commonly used in network to dynamically assign ip address Example: In a corporate network DHCP ensure that computer and devices connecting to the network recover ip address automatically simplifying network and reducing the likelihood of conflict

- Intermediate Question

1. Explain Domain naming Services

ANS: Domain Name Service is a system that translates human –readable domain name (like ex.com) into ip address, allowing computer to locate and connect each other on the internet

2. Application of DNS with one example

ANS: One application of DNS is facilitating website acess.for example, when you type a domain like “www.google .com” in your browser, DNS translate it to an ip address, ending you device to connect to Google’s sever and retrieve the WebPages

Topic: Network Topologies

- Beginner Question

1. What are the 5 network topologies?

I. **Bus Topologies**: All devices share a single communication line
II. **Star Topologies**: Devices connect to a central hub or switch
III. **Ring Topologies**: devices are connect in a circular fashion
IV. **Mesh Topologies**: every devices is connected to every other device
V. **Hybrid Topologies**: combination of two or more different topologies

2. What is Internet topology?

ANS: The Internet topology is often described as a complex and decentralized mesh, where vast network of interconnected router and server enable global communication

3. What is protocol?

ANS:A protocol is a set of rules that govern how to data is transmitted and received in a communication system, ensuring standardized and efficient exchange between devices or entities.

- Intermediate Question

1. What is the most common network topology?

ANS: STAR Topology

2. Explain star topology in networking?

ANS: Endpoint nodes connected via central forwarding node (like hub, switch, and router)
Requires more cable but simple or reconfigure
Cable faults are isolated to each hub port and easier to troubleshoot
Central node can be a single point of failure

- Advance Question

1. Explain Hybrid topology

❖ ANS: Different physical and logical topologies
- Physical Star
- Logical Bus

❖ Combine physical topologies
  - Tree/star –bus
  - Join multiple star networks via a bus backbone

2. What is physical and logical topology?

ANS: **physical topology**: refers to the actual layout of devices and cables in a network

Logical topology: how to data is transmitted between devices in network

3. What are the types of logical topology?

- ANS:BUS
- Ring
- Star
- mesh

Topic: OSI Model

- Beginner Question

1. What is OSI model explains? s

ANS: The Open system interconnection model is a conceptual framework that standardizes the function of a telecommunication or computing system into seven abstraction layer from physical transmission to application, facilitating interoperability between different systems.

2. List of Application layer protocol
   - ANS:HTTP(Hyper transfer protocol)
   - HTTPS(Hyper transfer protocol secure)
   - FTP (file transfer protocol)
   - SMTP (simple mail transfer protocol)
   - POP3(Post office protocol version 3)
   - IMAP (internet Message access protocol)
   - SNMP (simple network management protocol)
   - DNS(Domain name system)
   - SSH(Secure shell)
   - DHCP(Dynamic host configuration protocol)
   - SIP(session imitation protocol)
   - RTP(real time transport protocol)
   - XMPP (Extensible messaging and presence protocol)
   - LDAP (lightweight directory access protocol)

3. How many types of protocols are there?
   - ANS: Communication protocols
   - Internet protocols
   - Application layer protocols

- Intermediate Question

1. What is the difference between TCP IP model and OSI model?

ANS:

Open System Interconnection	Transmission Control protocol
SEVEN LAYER • Application • Presentation • Session • Transport • Data link • physical	FOUR LAYER • Application • Transport • Internet • link
More commonly used and I s the foundation for the internet	While informative is not as widely adopted in real world implementations.

2. What is TCP IP networking?

ANS: Transmission Control protocol is a suite of communication protocol that from the backbone of the internet. it provided a set of rule for how devices on a network can communication, facilitating data transmission and enabling the function of the internet

- Advance Question

1. What is a wired Internet connection?

ANS: A wired Internet connection refers to the use of physical cables to connect devices to a network or the internet. This typically involves using cables to establish a direct, point to point connection between the devices and the network source.

I. Ethernet
II. Fiber optic

2. What are the disadvantages of wired networks?

- Limited mobility
- Installation complexity
- Maintenance issues
- Cost
- Aesthetic concerns
- Vulnerability to physical damage

How do I configure network authentication?

ANS: Set up a security protocol like wpa2/wpa3 for or use protocol like EAP for wired network. Choose strong passwords, implement user authentication and configure your network devices accordingly

3. Practice of Team viewer, Any Desk, Google Hangout, Skype, zooms
:-Done

4. Download Google chrome
:-done

4. Configure "date and time" opting in control panel
:-Done

Topic: TCP/IP

- Assignment level Basic:

1. What is TCP/IP?

ANS: Transmission Control protocol /internet protocol is a suite of communication protocol that govern how data is transmitted and receives over network including the internet, it provides a standardizes framework for reliable

and orderly data exchanged between computer, ensuring effecting communication in a network environment

2. What is the full form of TCP/IP?

ANS: Transmission Control protocol /internet protocol

- Assignment level Intermediate:

1. List out the types of IP

ANS: IPV4/IPV6

2. What is protocol?

ANS: A protocol is a set of rules that govern how to data is transmitted and received in a communication system, ensuring standardized and efficient exchange between devices or entities

2. DO a practical to set the TCP/IP in network adapter?

:-Done

Topic: Cables

- Beginner Question

1. Types of cables and connectors?

- ANS: :Ethernet cable
  - RJ45 connector
- Coaxial cable
  - F-TYPE connector
- Fiber optical cable
  - LC,SC,ST connector
- USB cable
  - TYPE-A, TYPE-B, USB-C connector
- HDML cable
  - HDMI connector
- Power cable
  - AC POER cord
- Display Cables
  - VGA,DVL,Displayport,HDMI
- Audio cables
  - 3.5mm jack,RCA connector

2. Explain twisted pair cable and shielded twisted pair cable

ANS**: twisted pair cable**:

- **Description**: consists of pairs of insulated copper wires twisted together
- **Purpose**: Reduces electromagnetic interference and crosstalk, enhancing signal quality.

- **Common types**:Cat5e , Cat6 , Cat6a

Shielded twisted pair cable:

- **Description:** similar to twisted pair but with additional metallic shielding.
- **Purpose**: provided extra protection against electromagnetic interference.
- **Common types:** foil shielded or braided shielded cables

- Intermediate Question

1. Which of these cables connect computers to monitors?

- VGA Cable
- Dvl Cable
- HDMI Cable
- Display Cable
- USB-C Cable

2. How do I connect to a shared printer?
    - Ensure printer sharing
    - Find the printer
    - Add a printer
    - Network printer
    - Connect to shared printer

- Advance Question

1. Which cable that is commonly used to connect a computer to a printer?

ANS: USB CABLE

2. What are the different ports and connectors?

USB:

- **Connector:** TYPE –A ,TYPE –B ,Micro USB, USB-C

HDMI:

- **Connector :**HDMI TYPE-A, HDMI TYPE-B

Ethernet:

- **Connector : RJ45**

Display port:

- **Connector: Display port**

Audio jack:

- **Connector :**3.5mm,6.35mm

VGA:

- **Connector :** VGA

DVI:

- **Connector :**DVI-I, DVI-D DVI-A

SD card:

- **Connector** : SD,MICROSD

3. How do I connect my laptop to my printer without cable?
   - Ensure wireless printer
   - Connect printer to Wi-Fi
   - Enable Wi-Fi on laptop
   - Add wireless printer on laptop
   - Select printer
   - Install drivers if needed
   - Printer a test page
4. Application and brief explanation of fiber optic cable and Coaxial cable

ANS:

	fiber optic cable	**Coaxial cable**
construction	Thin strands of glass or plastic transmit data using pulses of light	Copper conductor surrounded by insulating layer, metallic shield and insulating layer
Advantages	High data transfer rates, immune to electromagnetic inference, suitable for long distances	Good for transmitting cable television and internet signal, moderate data rates
Common use	High speed internet connection, telecommunication and networking	Used for cable TV connection ,broadband internet and some network application

5. Which of following operates at the 5GHz frequency range?
   - Wi-Fi Router and access points
   - Laptop and Smartphone
   - Wireless printer and camera

Streaming Devices

6. What frequency does 802.11g use?

ANS:2.4 GHZ microwave band.

7. What standard is compatible with 802.11a?

ANS:802.11 Standard

Topic: TCP/IP concepts - IPv6, IPv4

- Beginner Question

1. What is the difference between IPv4 & IPv6?

ANS: IPV4 uses 32 bit addresses, limiting it to around 4.3 billion unique address IPV6 uses 128 bit address providing an almost limitless number of unique addresses, crucial for the growing number of devices connected to the internet

3. Explain TCP/IP

ANS: Transmission Control protocol /internet protocol is a suite of communication protocol that govern how data is transmitted and receives over network including the internet, it provides a standardizes framework for reliable and orderly data exchanged between computer, ensuring effecting communication in a network environment

3. Explain IPV6 Address with Address structure

ANS: IPV6 Address are 128 bit long, written in hexadecimal format separated by colons

Example: 2001:0db8:0000:0000:0370:8a2e:7334

This stricter includes eight group of four hexadecimal digital, providing a vastly larger address space compared to IPV4. Double colons can be used to represent consecutive group of zeros, simplifying the notation

4. Define IPV6 reserve address

Ans: IPV6 reserve address are specific block of IPV6 address set aside for special purposes ,such as documentation loopback and multicast

- **Unspecified Address :**0:0:0:0:0:0:0:0, used to indicate the absence of an address
- **Loopback Address :**0:0:0:0:0:0:0:1 equivalent to IPV4's 127.0.0.1 used for testing network software on an individual device.
- **Link-local Address: Beginning** with FE80: :/10, these address are used for communication within a local network segment.
- **Multicast Address :**IPV6 reserves specific multicast address ranges for various purposes

5. Explain Difference between public ip and private ip

ANS:

Private Ip	Public Ip
Used with LAN or Network	Used on public network
Not recognized over internet	Recognized over internet
Assigned by LAN administrator	Assigned by server provide\LANA
Unique only in LAN	Unique globally
Free of charge	Cost associated with using public IP
Rang: Class A: 10.0.0.0 to 10.255.255.255 Class B: 172.16.0.0 to 172. 31.255.255 Class C: 192.168.0.0 to 192.168.255.55	Range: Class A:1.0.0.0 to 9.255.255.255 11.0.0.0-126.255.255.255 Class B: 128.0.0.0 to 172.15.255.255 172.32.0.0 to 191.255.255.255 Class C:192.0.0.0 to 192.167.255.255 192.169.0.0 -233.255.255.255

6. Create straight and cross cables and it's testing

ANS: **Straight trough cable**:

- Cut a Cat5e or Cat6 cable to the desired length.
- Strip insulations on both ends.
- Arrange and insert wired according to T568B OR T568A.
- Crimp RJ45 connectors on both ends.

  Crossover cables:
  - Cut a Cat5e or Cat6 cable to the desired length.
  - Strip insulations on both ends.
  - Use T568A on one end OR T568B on the other
  - Crimp RJ45 connectors on both ends.

    Testing:

  - Use a cable tester
  - Connect one end of the cable to each side of the tester
  - Ensure the tester indicates a successful connection, confirming correct wire order

- Intermediate Question

1. Brief explanation of ip Addresses

ANS: An IP address (internet protocol address) is a numerical label assigned to each device connected to a computer network that used the internet protocol for communication. It server two main functions: identifying the host and network interface and providing the location of the host in the network. IP addresses can be IPV4 (192.168.1.1) or IPV6 (2001:0db3:85a3: :8a2e:0370:7334)and they enable devices to communicate and exchange data across the internet

2. What is the advantage of IPv6 over IPv4?

- ❖ Larger address space
- ❖ Better header format
- ❖ New options
- ❖ Allowance for extension
- ❖ Support for resource allocation
- ❖ Support for more security
- ❖ Support for mobility

3. Assign multiple IPv4 in single network adapter [LAN card]
    - Go to control panel and network sharing center
    - Click on " change adapter setting"
    - Right click on your network adapter, select properties.
    - Choose "internet protocol version 4" and click properties.
    - Click advanced then add under the IP address section .enter the addition IP addresses'
4. Assign simple IPv6 between two systems and ping it.

ANS: Assigning a static IP between two systems involves configuring the IP addresses manually.
System A: 192.168.1.1
Subnet mask: 255.255.255.0
System B: 192.168.1.2
Subnet mask: 255.255.255.0
Open cmd and use the "ping" command

5. Assign and configure simple IPv4 between systems

ANS: **System A**: 192.168.1.10
Subnet mask: 255.255.255.0
System B: 192.168.1.20
Subnet mask: 255.255.255.0
Open cmd and use the "ping" command

- Advance Question

1. 1. Which is faster IPv4 or IPv6?

ANS: IPV6

2. What does TCP do?

ANS: TCP ensures reliable and ordered communication between on a network by handling error checking, flow control and retransmission of data

3. Give security in sharing

ANS: security in sharing involves safeguarding information to prevent unauthorized access or misuse. This can be achieved through encryption, access controls, authentication, and regular security audits to identify and address vulnerabilities

4. Configure "Map network drive"
    - Click on this pc in the navigation pane.
    - Click on the computer tab in the top menu.
    - Select “map network drive” from the menu
    - Choose a drive letter for the network drive
    - In the folder filed renter the network path or browse to the network location you want to map
    - Check the box for “reconnect at sing-in” if you want the drive to be mapped every time you sign in.
    - Click finish

Topic: IP routing and routing protocols• Beginner Question

1. What Is Routing?

ANS: routing is the process of determining the optimal path for data to travel from a source to a destination in a network.

2. How Routing Starts Up?

ANS: The device then uses routing algorithms to determine the best path for the data to reach its destination, based on factors like network topology and cost

• Intermediate Question

1. What Is Hybrid Routing Protocol?

ANS: Hybrid Routing Protocol combines characteristics of both distance vector and link- state routing protocols to optimize efficiency and adaptability in network communication

2. What Are the Range of Ad Values?

ANS:

3. What Is an Autonomous System?

ANS: An Autonomous System is a collection of ip network and routers managed by a single organization, identifiled by a unique number and it present a unified a routing policy to the internet

• Advance Question

1. Define Static Routing?

ANS: static routing is a manual configuration of routes in a network where network administrators define specific path for data to travel between devices

2. Explain Dynamic Routing?

ANS: Dynamic Routing is an automated network routing process where routers use protocols to exchange information and adapt to changes in network topology. Dynamically selecting the best path for data transmission

Topic: Switching and VLANS

- Beginner Question

1. What is VLAN?

ANS: VLAN is a network segmentation technique that enables the creating of logically isolated broadcast domain within a physical network management, security and efficiency

2. Which two benefits of creating VLAN?

- ❖ Improved network management
- ❖ Enhanced security

3. What is Dynamic VLAN?

ANS: Dynamic VLAN is a network configuration where devices are automatically assigned to VLAN based on specific criteria such as user authentication, MAC address or other dynamic factor providing flexibility and efficient network manage

4. What is Static VLAN?

ANS: Static VLAN is a network configuration where devices are manually assigned to VLAN providing a fixed and predetermined segmentation of the network for efficient management and security

- Intermediate Question

1. What is VLAN and INTERVLAN?

ANS: VLAN is a logical segmentation of a network while INTERVLAN refer to communication between VLAN often facilitated by routing devices or layer 33 switches

2. What is trunk port?

ANS: A trunk port is a network port configured to carry traffic for multiple VLAN, facilitating the communication between switches and allowing the transfer of VLAN information between them.

- Advance Question

1. How to configure Trunk port?

- ❖ Access switch configuration mode
- ❖ Choose the desired port
- ❖ Enter the command to set the port bas a trunk such bas switch port mode trunk
- ❖ Optionally specify allowed VLAN with switch port trunk allowed vlan command
- ❖ Save the configuration

2. How to delete VLAN information from Switch?

- Access switch configuration mode
- Navigate to the vlan configuration
- Use the no command followed by the vlan number like “no vlan <VLAN-ID>” to delete the VLAN
- Save the configuration changes