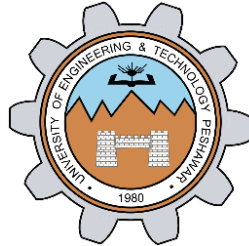


**Exploring Network equipment like Hub, Ethernet Switch, Router, Firewall  
and different cables/media etc.**

**Lab #03**



**Spring 2021**

**CSE303L Data Communication and Networks Lab**

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Class Section: **B**

“On my honor, as student of University of Engineering and Technology, I have neither given  
nor received unauthorized assistance on this academic work.”

Student Signature: \_\_\_\_\_

Submitted to:

**Engr. Faiz Ullah**

Monday, May 31, 2021

**Department of Computer Systems Engineering  
University of Engineering and Technology, Peshawar**

## CSE 303L: Data Communication and Computer Networks

Credit Hours: 1

Demonstration of Concepts	Poor (Does not meet expectation (1))	Fair (Meet Expectation (2-3))	Good (Exceeds Expectation (4-5))	Score
	The student failed to demonstrate a clear understanding of the assignment concepts	The student demonstrated a clear understanding of some of the assignment concepts	The student demonstrated a clear understanding of the assignment concepts	30%
Accuracy	The student mis-configured enough network settings that the lab computer couldn't function properly on the network	The student configured enough network settings that the lab computer partially functioned on the network	The student configured the network settings that the lab computer fully functioned on the network	30%
Following Directions	The student clearly failed to follow the verbal and written instructions to successfully complete the lab	The student failed to follow the some of the verbal and written instructions to successfully complete all requirements of the lab	The student followed the verbal and written instructions to successfully complete requirements of the lab	20%
Time Utilization	The student failed to complete even part of the lab in the allotted amount of time	The student failed to complete the entire lab in the allotted amount of time	The student completed the lab in its entirety in the al	20%

## OBJECTIVES OF THE LAB

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In this lab, we will explore the network equipment and network media.

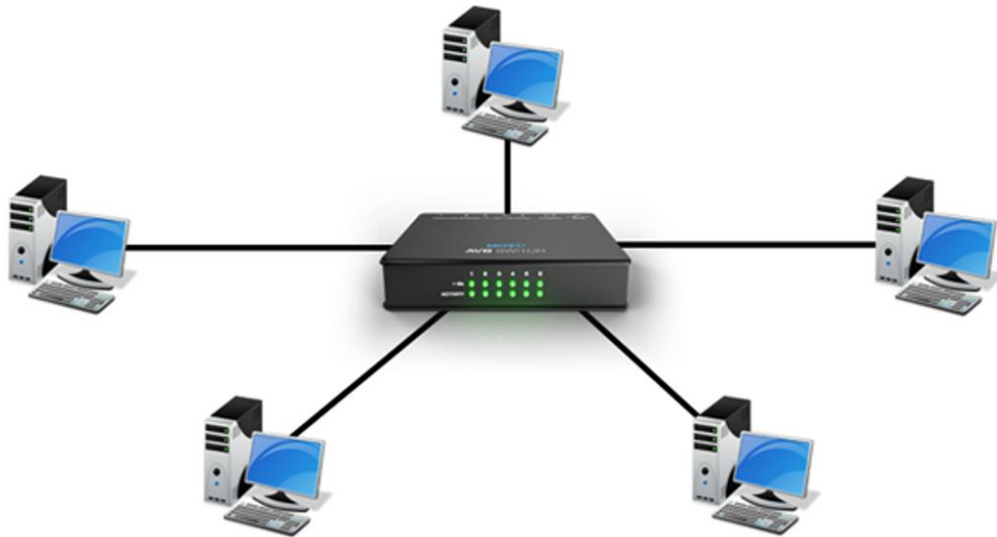
- Explore the end devices and intermediate network devices
  - Explore Category 6 (CAT 6) Straight-Through Ethernet network cable
  - Explore Category 6 (CAT 6) Cross-Over Ethernet network cable
  - Explore Optical Cables
- 

### Task #1:

Paste of the picture of each network device and write brief functionality of each.

#### 1. Hub:

Hubs connect multiple computer networking devices together. A hub also acts as a repeater in that it amplifies signals that deteriorate after traveling long distances over connecting cables. A hub is the simplest in the family of network connecting devices because it connects LAN components with identical protocols.



## 2. Switch:

Switches generally have a more intelligent role than hubs. A switch is a multiport device that improves network efficiency. The switch maintains limited routing information about nodes in the internal network, and it allows connections to systems like hubs or routers. Strands of LANs are usually connected using switches. Generally, switches can read the hardware addresses of incoming packets to transmit them to the appropriate destination.



## 3. Router:

Routers help transmit packets to their destinations by charting a path through the sea of interconnected networking devices using different network topologies. Routers are intelligent devices, and they store information about the networks they're connected to. Most routers can be configured to operate as packet-filtering firewalls and use access control lists (ACLs). Routers, in conjunction with a channel service unit/data service unit (CSU/DSU), are also used to translate from LAN framing to WAN framing. This is needed because LANs and WANs use different network protocols. Such routers are known as border routers. They serve as the outside connection of a LAN to a WAN, and they operate at the border of your network.



#### 4. Bridge:

Bridges are used to connect two or more hosts or network segments together. The basic role of bridges in network architecture is storing and forwarding frames between the different segments that the bridge connects. They use hardware Media Access Control (MAC) addresses for transferring frames. By looking at the MAC address of the devices connected to each segment, bridges can forward the data or block it from crossing. Bridges can also be used to connect two physical LANs into a larger logical LAN.



#### 5. Gateway:

Gateways normally work at the Transport and Session layers of the OSI model. At the Transport layer and above, there are numerous protocols and standards from different vendors; gateways are used to deal with them. Gateways provide translation between networking technologies such as Open System Interconnection (OSI) and Transmission Control Protocol/Internet Protocol (TCP/IP). Because of this, gateways connect two or more autonomous networks, each with its own routing algorithms, protocols, topology, domain name service, and network administration procedures and policies.



## 6. Modem:

Modems (modulators-demodulators) are used to transmit digital signals over analog telephone lines. Thus, digital signals are converted by the modem into analog signals of different frequencies and transmitted to a modem at the receiving location. The receiving modem performs the reverse transformation and provides a digital output to a device connected to a modem, usually a computer. The digital data is usually transferred to or from the modem over a serial line through an industry standard interface, RS-232. Many telephone companies offer DSL services, and many cable operators use modems as end terminals for identification and recognition of home and personal users. Modems work on both the Physical and Data Link layers.



**Task #2:**

What is difference between Hub, Switch and Router?

Template	Hub	Switch	Router
Layer	Physical layer	Data link layer	Network layer
Function	To connect a network of personal computers together, they can be joined through a central hub	Allow connections to multiple devices, manage ports, manage VLAN security settings	Direct data in a network
Data Transmission form	electrical signal or bits	frame & packet	packet
Port	4/12 ports	multi-port, usually between 4 and 48	2/4/5/8 ports
Transmission type	Frame flooding, unicast, multicast or broadcast	First broadcast, then unicast and/or multicast depends on the need	At Initial Level Broadcast then Unicast and multicast
Device type	Non-intelligent device	Intelligent device	Intelligent device
Used in(LAN, MAN, WAN)	LAN	LAN	LAN, MAN, WAN
Transmission mode	Half duplex	Half/Full duplex	Full duplex
Speed	10Mbps	10/100Mbps, 1Gbps	1-100Mbps(wireless); 100Mbps-1Gbps(wired)
Address used for data transmission	MAC address	MAC address	IP address

**Task #3:**

What should I buy for my network? Hub, Switch or Router?

**Answer:**

A router is used to connect two different networks whereas we have only one network, thus there is no need to buy router. Let's talk about switch and hub. In most of the cases, switch perform same as hub. People use these two words interchangeably. Generally, switch and hub are used in the same networks. A hub extends the network by providing more ports. I can choose to buy switch or hub according to my demands. If there is more traffic in the network (more devices connected to the network) then it's a better option to buy switch instead of hub. If there is not that much traffic (for 2 or 3 devices) then it's a better option to buy hub instead of a switch.

**Task #4:**

List networking hardware vendors?

**Answer:**

Following is the list of hardware vendors:

- Cisco
- HPE/Aruba
- Juniper
- Huawei
- Arista
- VMware
- Riverbed
- Netscout
- Extreme Networks
- Dell/EMC