WORKSHEET 8

School: <u>Ba Sangam College</u>   Year / Level: <u>12</u>

Subject: <u>Computer Studies</u>   Name of Student: _____

Strand	1 – Computers and Applications
Sub strand	1.5 Computers and Networks
Content Learning Outcome	Describe different types of communications and networks, network setup and explore the security measures.

Network Architecture
- ❖ Network architecture describes how a network is arranged and how the resources are coordinated and shared.
- ❖ It is divided in two major parts: **topology** and **strategy**.
- ❖ Network topology describes how a network is configured and arranged while strategies define how resources are shared.

There are six different topologies that exist today.

1) Bus network
- ❖ Is where each device is connected to a common cable called a bus or a backbone and all communication travel along this bus
- ❖ The bus network is typically used when only a few microcomputers are to be linked together.
- ❖ This arrangement is common in systems for electronic mail or for sharing data stored on different microcomputers.
  Advantages
  - Less expensive
  - If a computer is down it does not affect the rest of the network
  Disadvantages
  - Inefficient for sharing common resources

2) Ring network
- ❖ Is where each device is connected to two other devices, forming a ring.
- ❖ Both the bus and the ring topology passes the message from device to device till it reaches its correct destination.
- ❖ With micro computes, the ring arrangement is the least frequently used of the four networks.
- ❖ However, it is often used to link mainframes, especially over wide geographical areas. These mainframes tend to operate fairly autonomously.
  Advantages
  - They perform most or all of their own processing and only occasionally share data and programs with other mainframes.
  - Computers can perform processing tasks at their own dispersed locations

- Can also share programs, data, and other resources with each other

  Disadvantage
  - Messages are passed around until they reach the correct destination therefore makes communication slow
  - Computers linked together could easily be infected with virus
  - If ring is broken or node not working then communication is down

3) Star network
- ❖ Is where each device is connected to a central device usually a switch
- ❖ When a node sends a message, it first goes to the switch which then verifies and forwards the message to the correct destination device.
- ❖ The star network is the most widely used network topology in the world.
  Advantage
  - Used to provide a time-sharing system where several users can share resources on a central computer
  - Close control can be kept over the data
  Disadvantages
  - Entire network is dependent on host computer/server and associated hardware and software. If any of these elements fails, the entire network is disabled
  - It is also expensive to install or setup a star network
  - Data communication could be slow at times

4) Tree network
- ❖ Is also known as a hierarchical network where each device is connecting to another device which may be connected to other devices
- ❖ It forms an upside down tree where the root device is usually the most powerful
  Advantages

- Tree network is suitable for centralized organization, allowing various computers to share database, processing power and different output devices
- Easier maintenance and fault findings

Disadvantages

- However, if the root device is not working, the entire network would fail causing loss of information
- It is also expensive to setup a tree network
- Huge cabling is needed

5) Hybrid network
- ❖ Is a mixture of all other topologies
- ❖ Big organizations have lots of smaller networks based on differing topologies which are then interconnected

Advantages

- Hybrid Network is flexible, can be designed according to the requirements of the organization by optimizing the available resources
- Useful in centralized organizations

Disadvantages

- complex design which is one of the biggest drawbacks of hybrid topology

- The hubs used to connect two distinct networks, are very expensive

6) Mesh network
- ❖ There is no particular configuration; rather the devices are connected to each other on the fly especially in the wireless domains.
- ❖ It is best suited for WLANs and PANs.

Advantages

- Is that expansion and modification in topology can be done without disrupting other nodes
- Also if one of the components fails there is always an alternative present for data transmission. So data transfer doesn't get affected.

Disadvantage

- Includes redundancy in many of the network connections
- high cost of this network compared to other network topologies
- difficult to set-up and maintain this type of topology

ACTIVITY

Complete the following table on network types. (20 Marks)

No.	Name of Network Architecture	Description	One Advantage	One disadvantage
1.				
2.	ring network			
3.				
4.				
5.				
6.	tree network			
Marks	2m	6m	6m	6m