# Computer Networks

SAN PEDRO HIGH SCHOOL

Anchor In Success

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Computer Applications 1
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# COMPUTER NETWORKS

**OBJECTIVES**

At the end of this chapter you should be able to:

• Define and describe a LAN and WAN.

• Understand the hardware required.

• Know the 3 LAN topologies.

• Know the 3 types of network security.

# NETWORKS

- What is a **Network**?

- What is a **LAN**? What hardware do you need to make one?

- What is a **WAN**? What hardware do you need to make one?

- What are the **advantages** and **disadvantages** of a network?

- Draw a **star**, **ring** and **bus** network – give advantages and disadvantages of each.
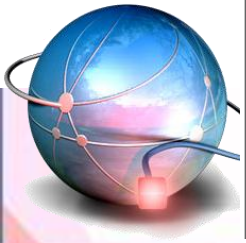
# NETWORKS

A **network** is two or more computers connected together so they can communicate which each other.

COMPUTER 1

COMPUTER 2

There are 2 main types of network...

# NETWORKS

**LAN stands for:**

**L**OCAL
**A**REA
**N**ETWORK

LANs are networks that are found where computers within a **building** need to communicate.
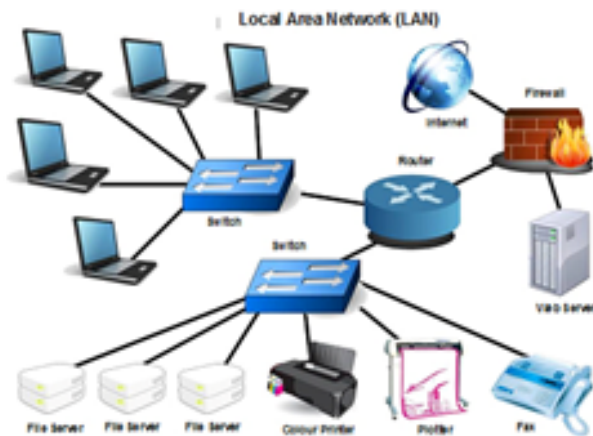
They are Small and Local!

# NETWORKS

## What hardware do you need for a LAN network?



Local Area Network (LAN)

- **File Server** : Runs software, stores files.

- **Terminals** : Workstations that give network access.

- **Print Server** : Queues up all print jobs from users in network.

- **Cables (wire/optic)** : Sends data.

- **Switches/Routers**: transfers data between devices

# NETWORKS

**WAN stands for:**

**W**AN

**W**IDE

**A**REA

**N**ETWORK

WANs are networks that are found where computers in **different areas** or **countries** need to communicate.

They are long range and not local!

# DATA COMMUNICATIONS & NETWORK

◉ **Network - Advantages**

1) Allows computers to share devices, such as printers, scanners, peripheral devices.
2) Users can share resources such as documents, internet.
3) Once network is setup, it is easy to add users
4) It is cheaper to purchase software for group rather than individual.
5) An **administrator** can control resource of network users such as internet access.
6) A network has a central server (file server).
   It allows data storage and security of data.

# DATA COMMUNICATIONS & NETWORK

◉ **Network – Disadvantages**

1. It is time consuming and expensive to set up a network.
2. Viruses spread easily in a network
3. If many people have access to a file server, data can be corrupted.
4. If central server fails, many users will not be able to work until server is repaired because they will not be able to access the data needed.
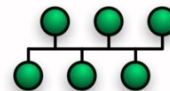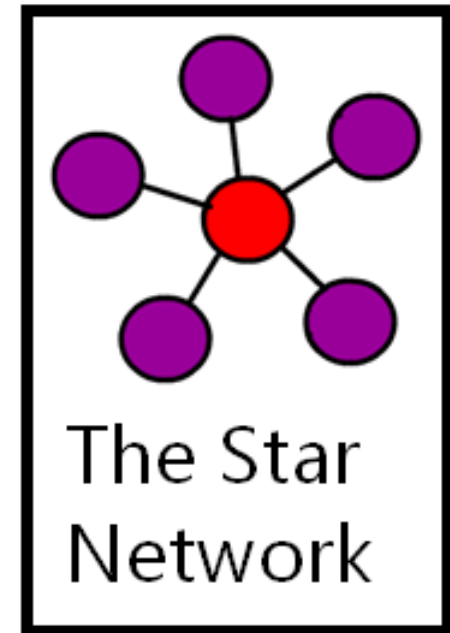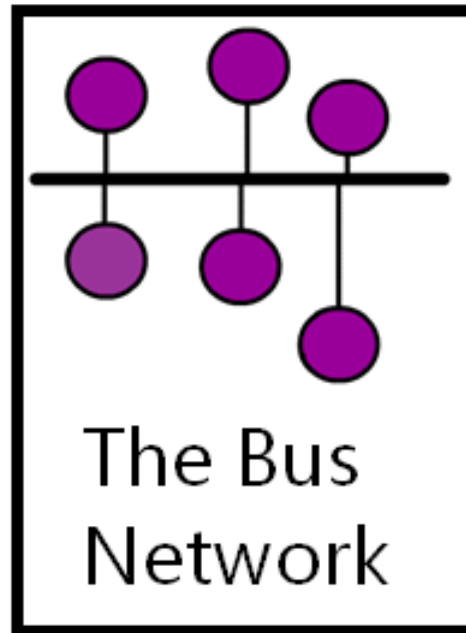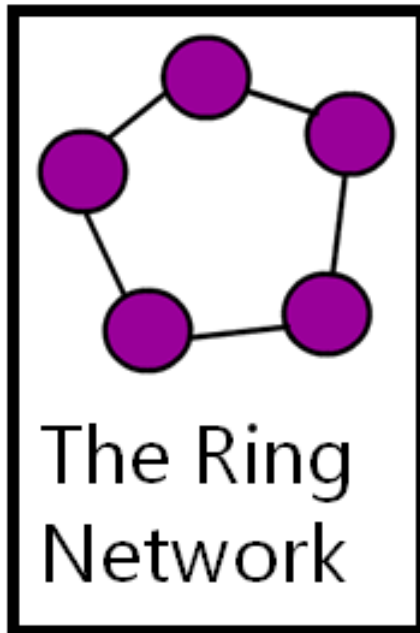
Virus, Malware, Spyware:
https://youtu.be/n8mbzU0X2nQ

# NETWORKS

There are 3 main types of network topologies:


The Ring Network


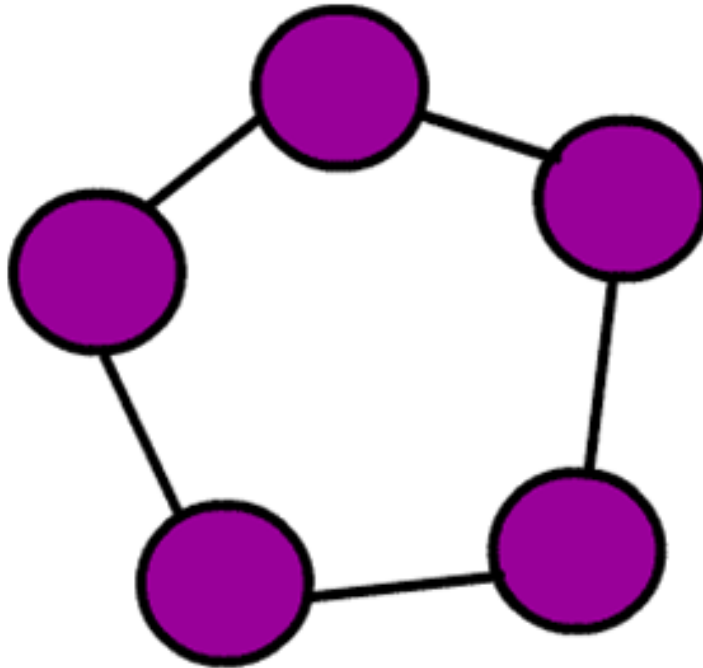The Bus Network


The Star Network
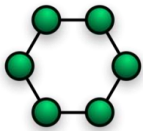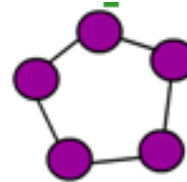
# NETWORKS

## The Ring Network:



Computers are connected together to form a ring shape so that none of them is more important than any of the others.

# NETWORKS

## The Ring Network:

### Advantages:

- They are cheap to expand.

- The data flows around the network in one direction so it is fast.

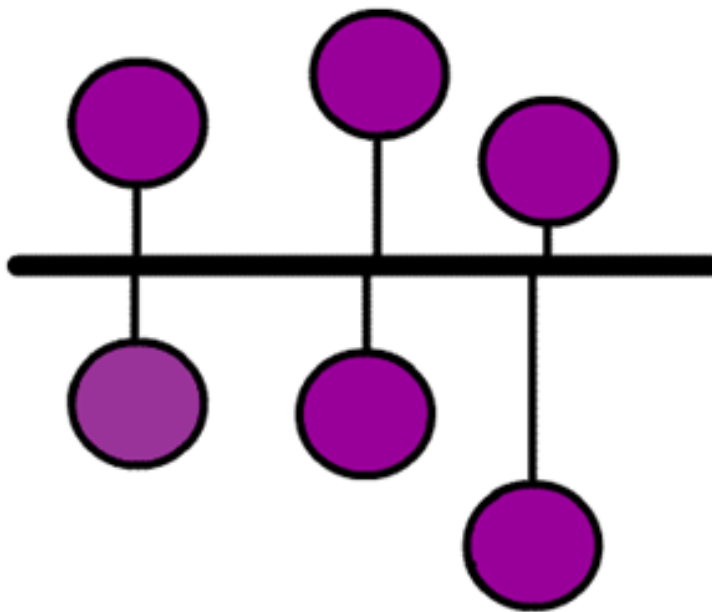- There is no reliance on a central computer.

### Disadvantages:

- If there are a lot of users on the network, it could slow down as all the data is sent along a single line.

- If one computer in the ring stops working, the whole network stops.
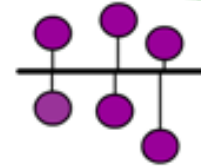
# NETWORKS

The Bus (or line) Network:

Computers are connected like bus stops on a main road. None of them is more important than any of the others.

# NETWORKS

## The Bus (Line) Network:

**Advantages:**

- It is cheap as it uses the least amount of cable.

- More computers can be added without disruption.
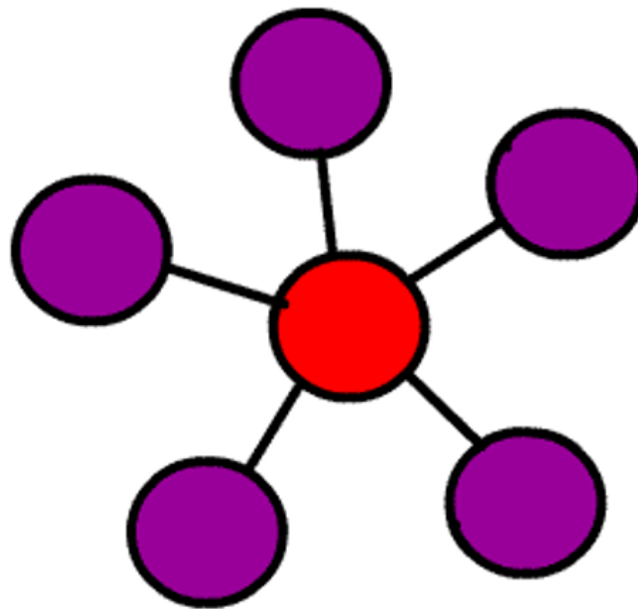
**Disadvantages:**

- With a lot of users, the network will be slow as data has to travel through the same central cable.

- Failure of the central cable will stop the network from working.
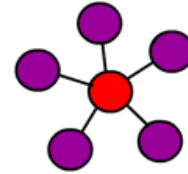
# NETWORKS

## The Star Network:



Computers are connected like a star to a central computer such as a mainframe. This is also called the "host" computer.

# NETWORKS

## The Star Network:

| Advantages: | Disadvantages: |
|---|---|
| •If a cable fails, it will only affect one workstation. | •It is more expensive as it uses the most cabling. |
| •More computers can be added without disruption. | •Failure of the central computer will stop the network from working. |

# DATA COMMUNICATIONS & NETWORK

⊙ **Cabled LAN can have 3 types of cables:**

1. **Twisted Pair** is a cheap cabling used to connect computers and peripherals. It is made from insulated copper wires twisted around each other.

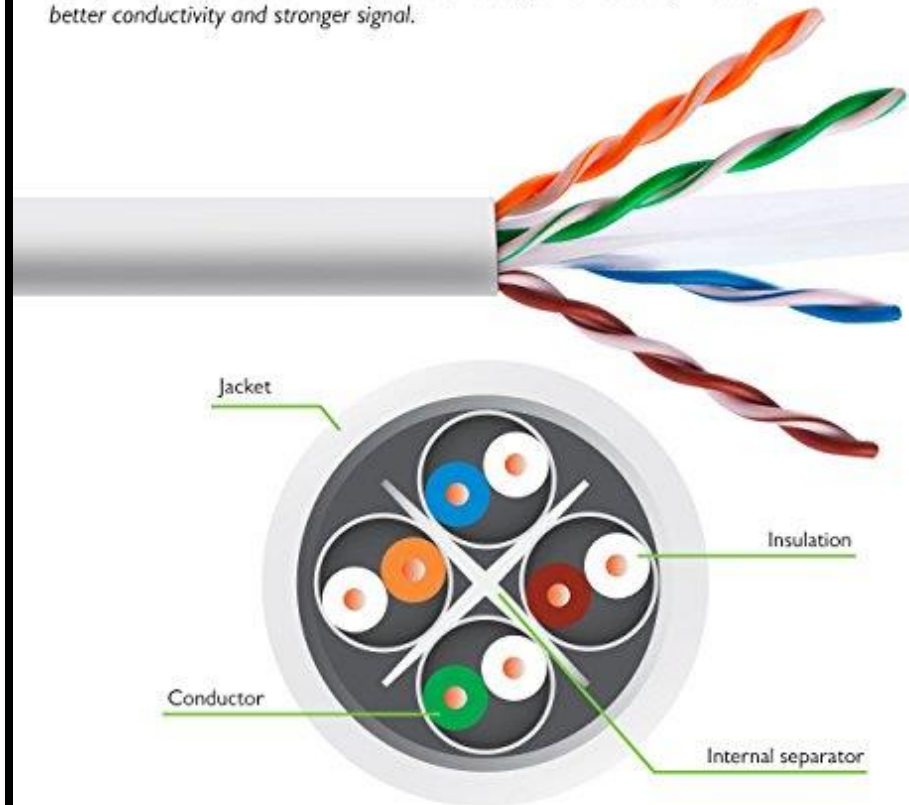CAT 5  –    100 Mbps
CAT 6/7 – 1000Mbps

# DATA COMMUNICATIONS & NETWORK



It's what's inside that counts

Top quality 24 AWG 550Mhz Cat 6 with bare copper conductors, made for better conductivity and stronger signal.
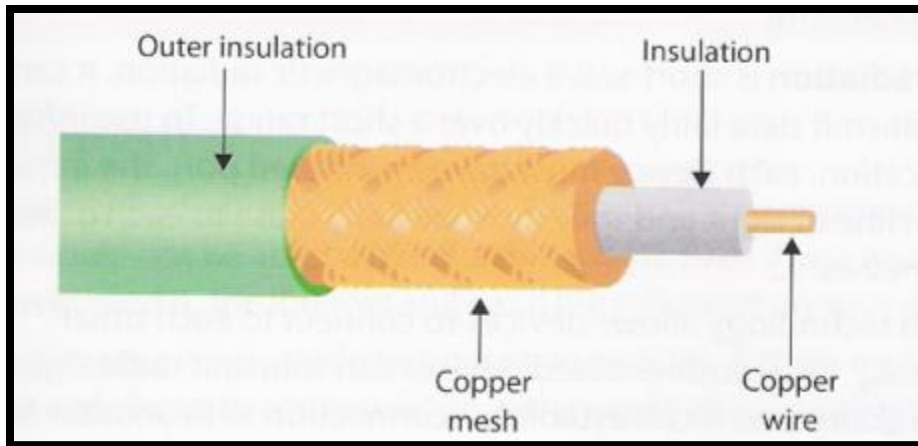
⦿ **Cabled LAN can have 3 types of cables:**

2. **Coaxial Cable** is more expensive than twisted pair. It is a copper wire covered in a very thick layer of insulation and is used to transmit voice, video and data.
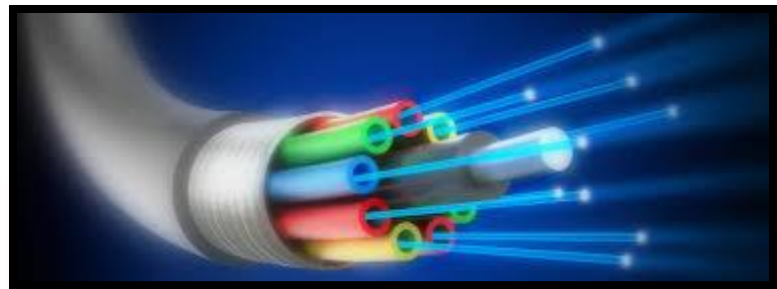


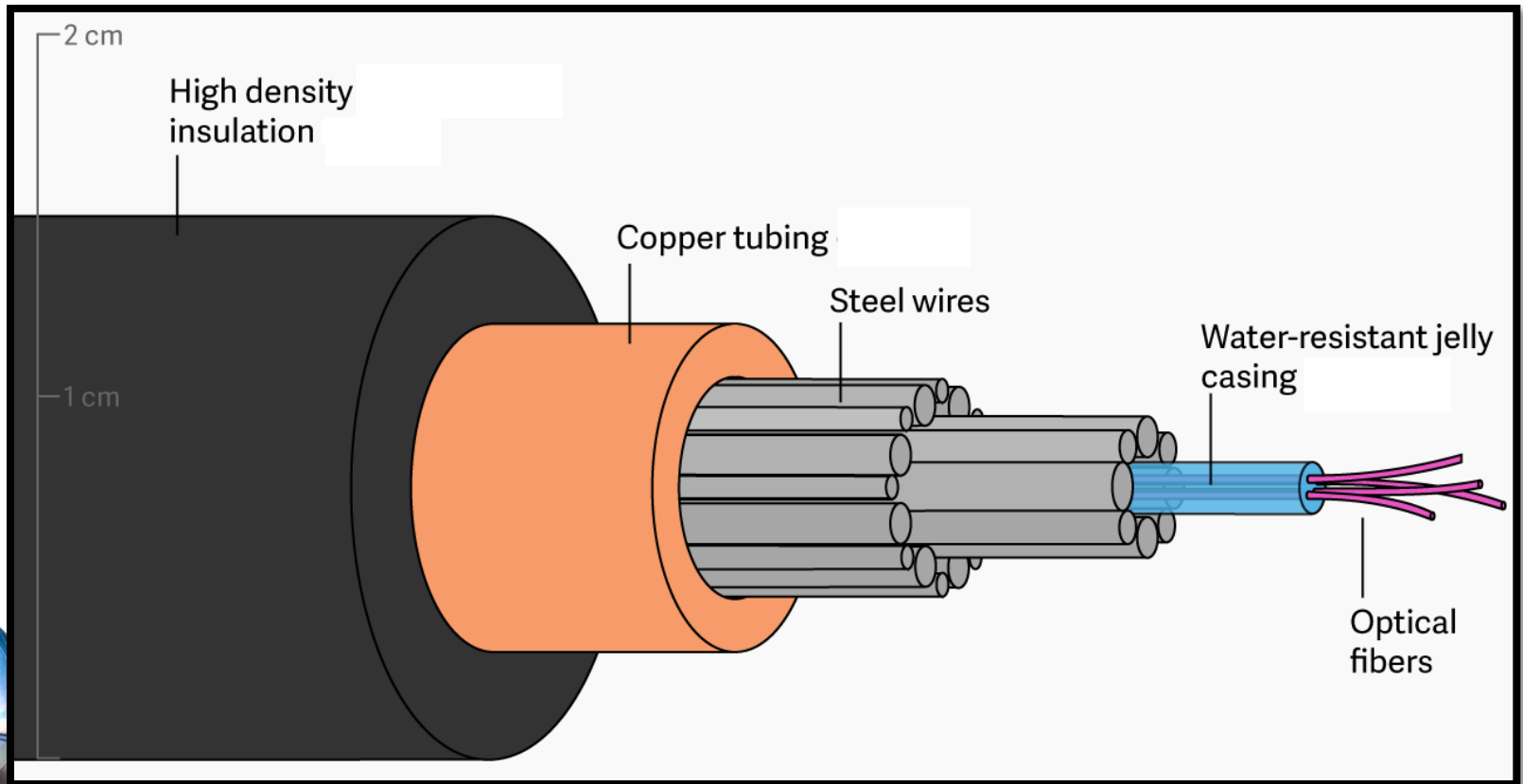Outer insulation — Insulation — Copper mesh — Copper wire

⦿ **Cabled LAN can have 3 types of cables:**

3. **Fibre-Optic Cable** is the most robust, efficient and expensive cable. Best used for large WANs and MANs. Data is transmitted as light pulses along clear glass fibers instead of electrical signals along copper wires.

- High density insulation
- Copper tubing
- Steel wires
- Water-resistant jelly casing
- Optical fibers
- 2 cm
- 1 cm

# DATA COMMUNICATIONS & NETWORK

- **WLAN:** Wireless LAN differs from wired LAN in that PC uses radio link to connect to the network instead of cable.

- Wireless connections made possible by **NIC (network interface cards)** on PCs and access points.

- Access point is a device attached to a LAN and contains a radio receiver, encryption and communications software .

# DATA COMMUNICATIONS & NETWORK

Because networks are almost vital to an organisation's daily activities, they must be kept safe and secure...

There are 3 main types of network security...

Physical, Access and Data.

Physical security means that the hardware of the network is protected from theft and kept safe.

# DATA COMMUNICATIONS & NETWORK

**Access security** means that there is a limit to the amount of access a user has to the information held on the network.

# DATA COMMUNICATIONS & NETWORK

## Data security

means that there are measures taken to prevent the loss of data held on the system.