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شيكات ععلي

وزارة التعليم العالي والبحث العلمي

الجامعة المستنصرية

ا. مهند علي

مع تحيات ...

مكتب البيت الهندسي للطباعة والاستنساخ

مجاور الباب الرئيسي للجامعة المستنصرية

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طباعة - استنساخ - سحب ليزري ملون - صور سريعة للمعاملات - كس هويات - سبايرونل - قرطاسية - انترنت

shzhamid@yahoo.com
07901782126

salamsuuny@yahoo.com
07901314371

NETWORKS

A network is a set of devices (often referred to as *nodes*) connected by communication links.

A node can be a computer, printer, or any other device capable of sending and/or receiving data generated by other nodes on the network.

Network's Components

Cables

Client

Servers

Workstations

Routers

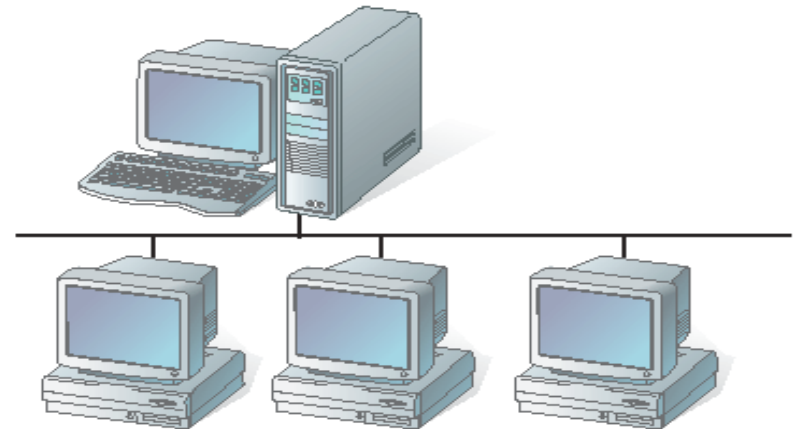
Hubs, Switches



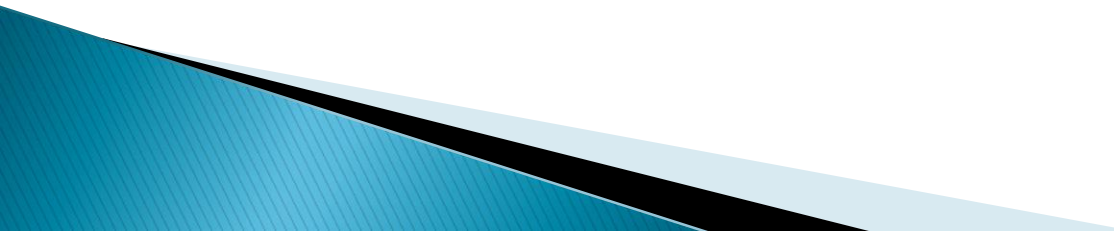
Hub



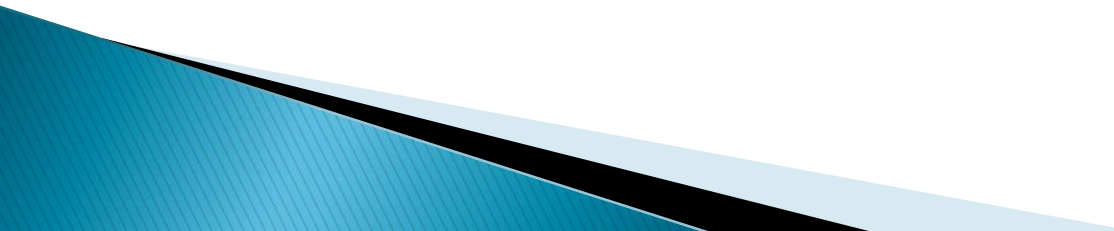
Connections



A network Client

- A network client or client is a device on a computer network that requests services or resources from a server.
 - Clients can be printers, workstations, servers, or any other device connected to the computers on a network.
 - The most common network clients are workstations.
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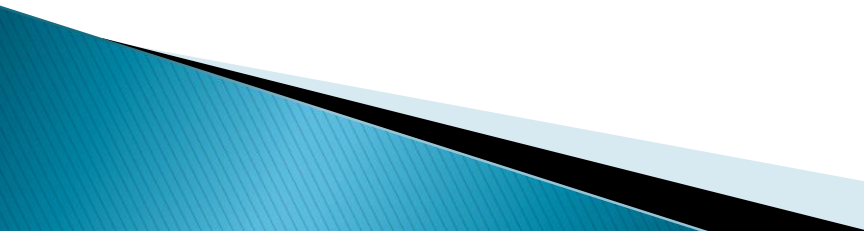
Workstation

- A workstation is a computer that operates independently of the network.
 - It manages its own files and processing.
 - Workstations connect to the network for the purpose of security and centralized management of networked resources.
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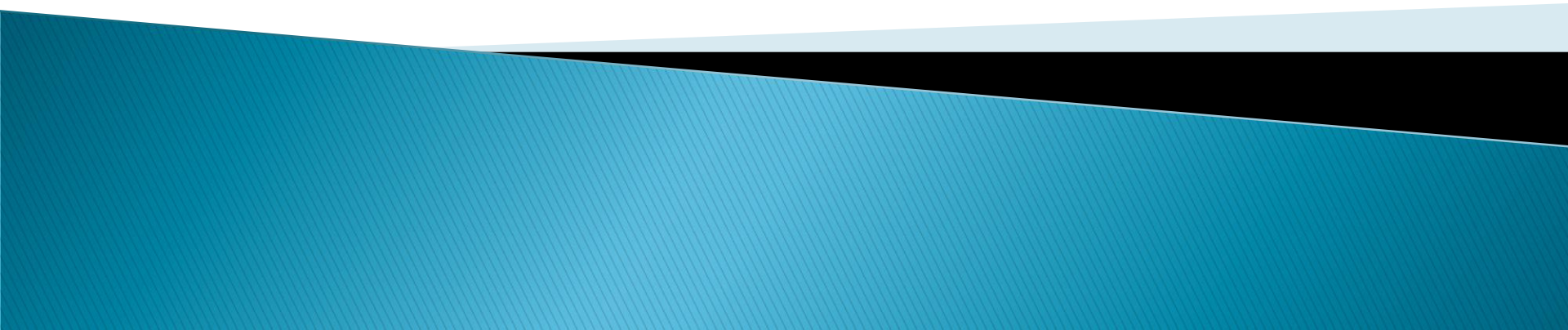
Interface of Work Stations



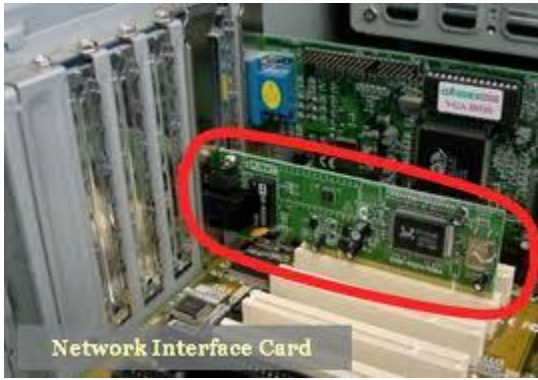
Communication Medium

- A communication medium is the physical path between the networked resources.
 - The medium used is either a coaxial cable or a twisted-pair wire.
 - Fiber-optic cabling and wireless medium have gained widespread acceptance as a network communication medium.
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Network Interface Card (NIC)

- A NIC, also known as the network board, is used to connect the networked components to the physical cable.
 - The NIC provides a physical connection to the device and also creates and sends signals from one networked device to another.
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Network Interface Card



Network Classification

Network classification by size or scale:

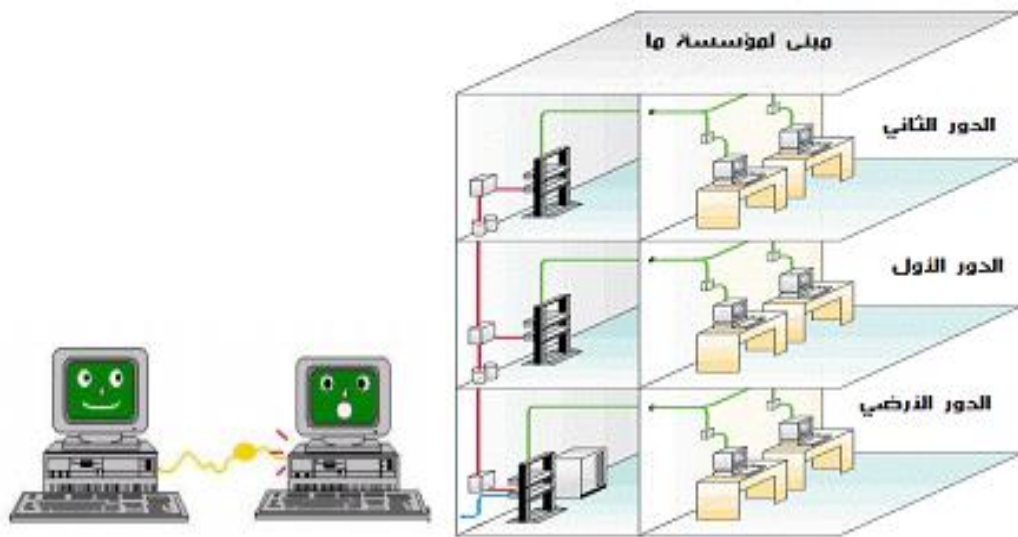
LAN

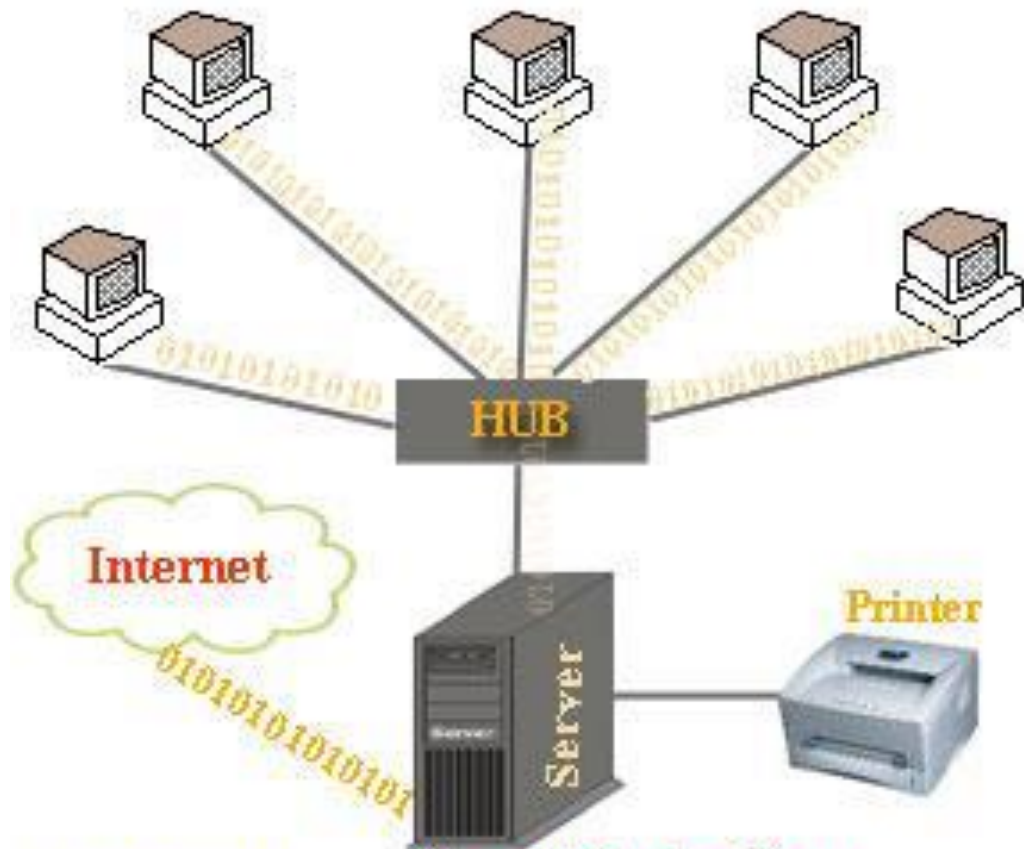
WAN

MAN

Local Area Network (LAN)

- ❑ Contains printers, servers and computers
- ❑ Systems are close to each other
- ❑ Contained in one office or building
- ❑ Organizations often have several LANS

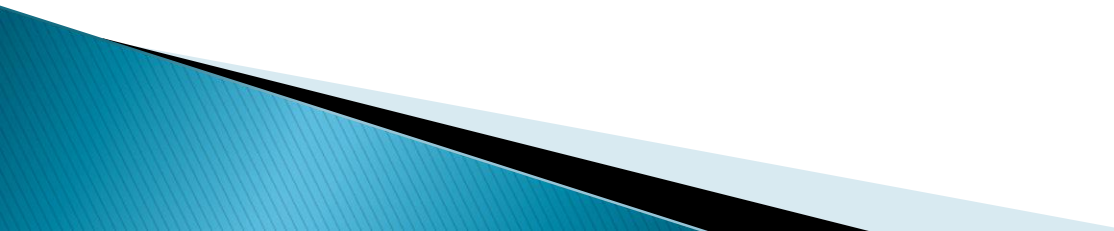




**Network
Structure**

- Internet Sharing Server
- Mail Server
- Sharing Resource
- File Security server

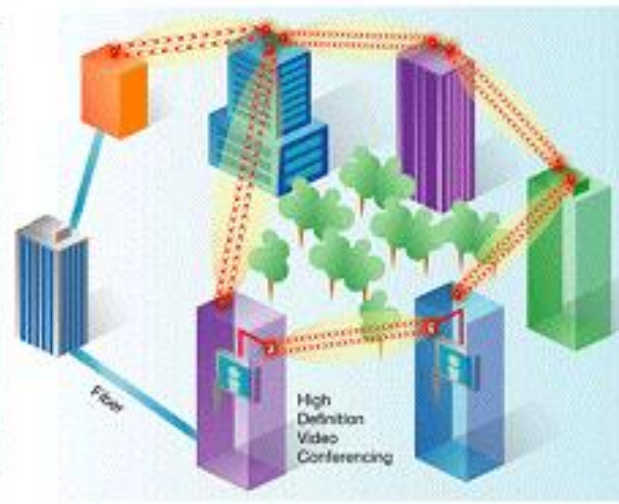
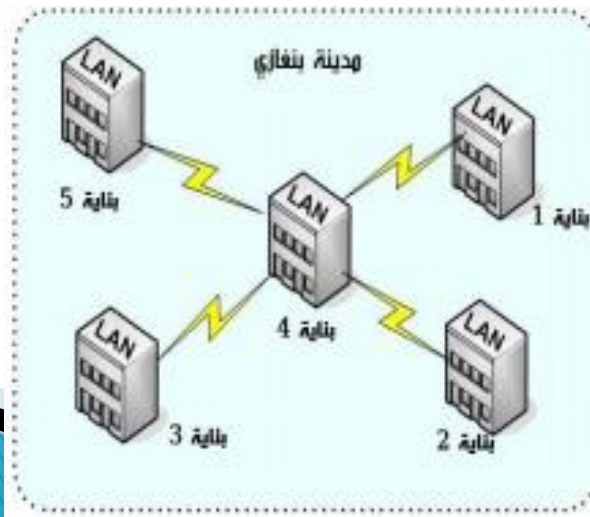
Metropolitan Area Network (MAN)

- ❑ Is collection of LANs with the same geographical area, for instance a city.
 - ❑ Is a network of computers located at different sites within a large physical area, such as a city.
 - ❑ MAN often acts as a high speed network(although not as fast as LAN) to allow sharing of regional resources.
 - ❑ MAN can defined as a group of computers and network devices connected together within a large physical area.
 - ❑ Companies that have several branches within the kuala lumpur city such as banks, might find a MAN useful to them.
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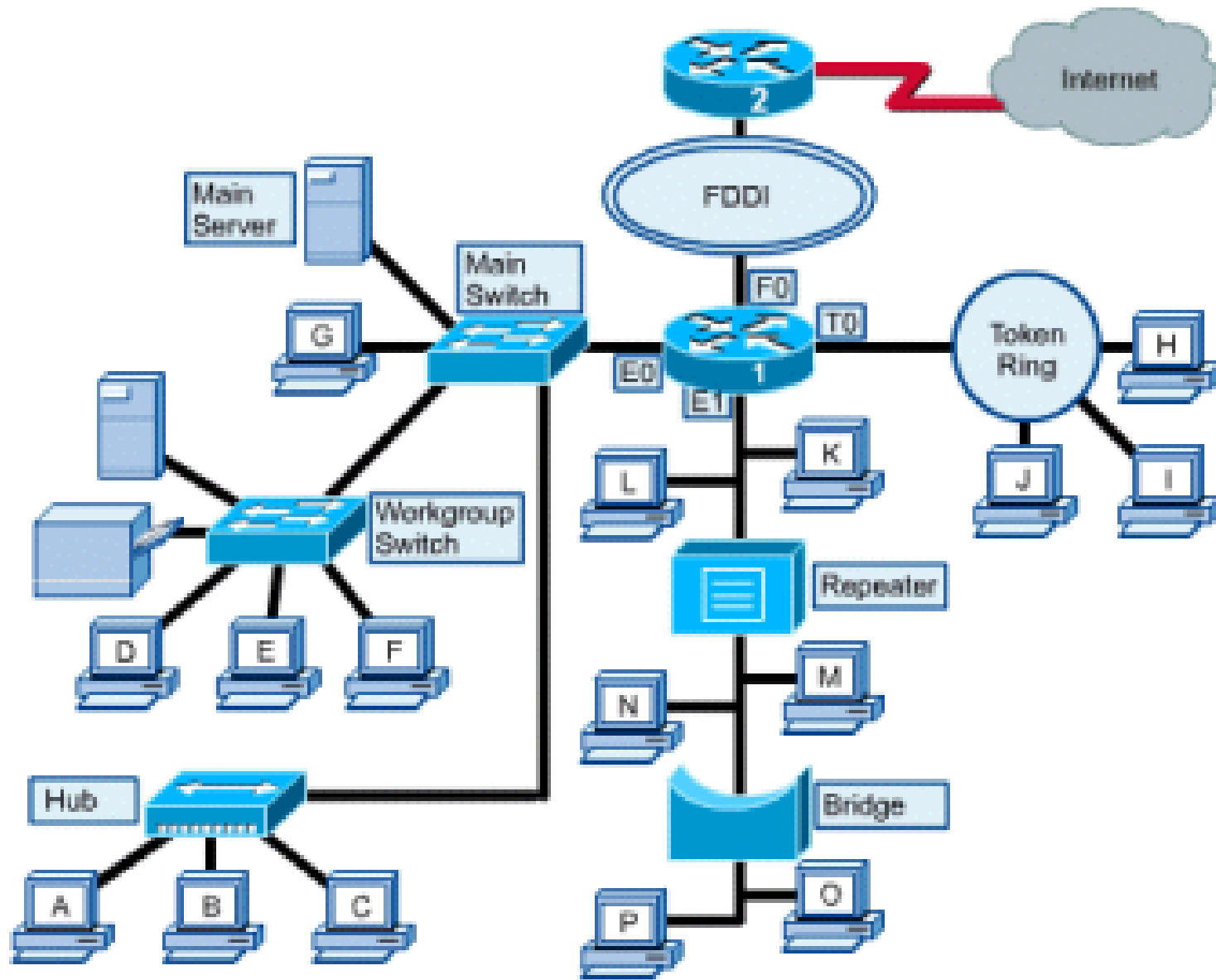
Wide Area Networks (WAN)

- ❑ Two or more LANs connected
- ❑ Over a large geographic area
- ❑ Typically use public or leased lines
- ❑ Phone lines
- ❑ Satellite
- ❑ The Internet is a WAN its about 10-100 km



Topology of Network

- ❑ The network topology defines the layout of the network.
 - ❑ It shows how devices on the network are interconnected.
 - ❑ Devices on the network are termed nodes.
 - ❑ A network has both a physical and a logical topology.
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Bus Topology

Commonly referred to as a linear bus, all the devices on a bus topology are connected by one single cable, which proceeds from one computer to the next (The bus is the data link in a bus network. The bus can only transmit data in one direction, and if any network segment is severed, all network transmission ceases)


This topology is rarely used and would only be suitable for a home office or small business with only a few hosts.

Identifying Network Topologies

Advantages of a bus topology

- The thinnet cabling it uses is quite inexpensive.
- It uses less cable compared to other physical topologies like star or extended star
- It works well for small networks
- It does not need a central device, such as a hub, switch, or router

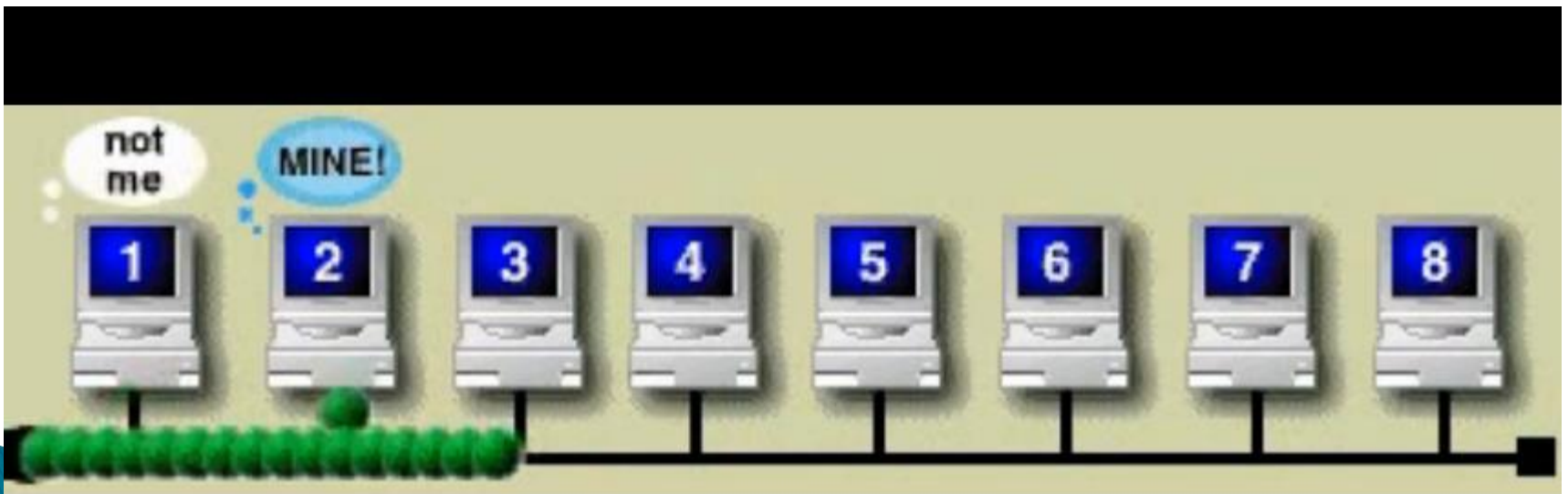
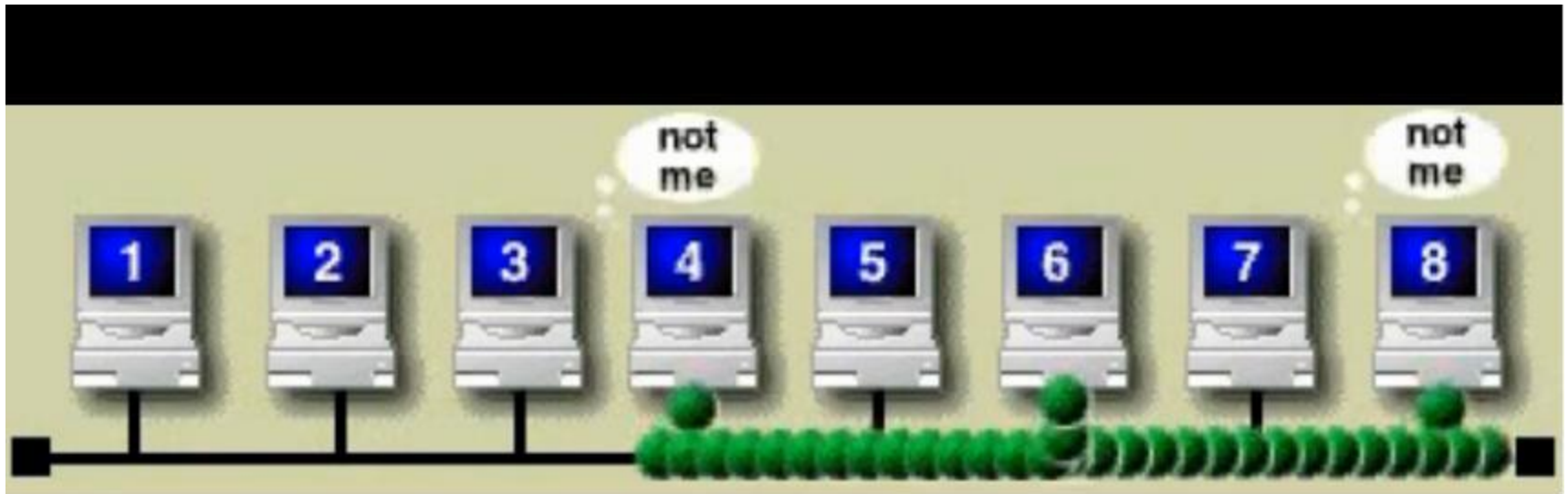
Disadvantages of a bus topology:

- It results in slower access to the network and less bandwidth due to the sharing of the same cable by all devices
 - It is challenging to identify and isolate problems
 - A break at any point in the bus cable can disable the entire bus network
 - It needs terminators
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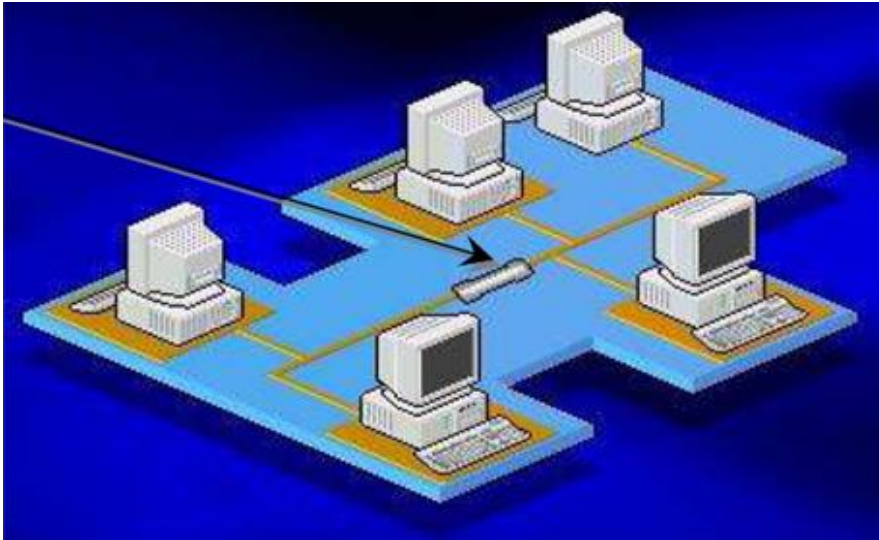
Collisions and Terminator

Bus topology avoiding data collisions using terminator

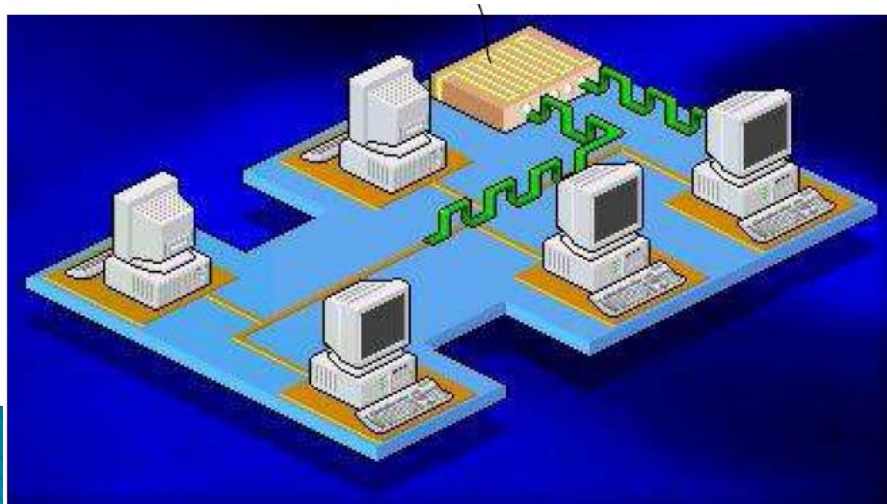




How to Extend The Network Bus



Barrel Connector

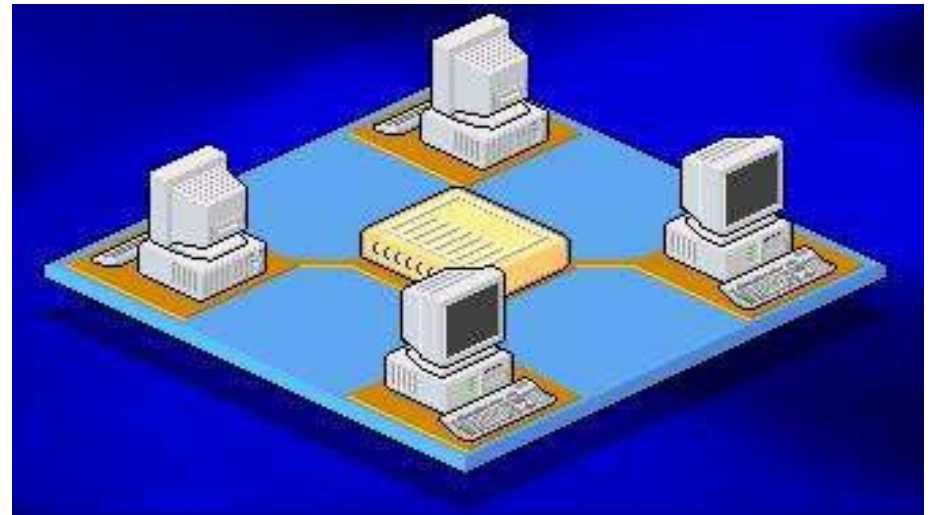


Repeater

Network star

- ❑ The most commonly used architecture in Ethernet LANs and resembles spokes in a bicycle wheel.
- ❑ A star topology generally costs more to implement than the bus topology because more cable is used and a central device is needed, such as a hub, switch, or router.

(resembles:like)



Identifying Network Topologies

Advantages of a Star Topology:

- ❖ It is upgradeable, flexible, and reliable
- ❖ It is easy to design and install
- ❖ This topology makes diagnosing problems relatively easy since the problem is localized to one computer or device
- ❖ This topology allows for more throughput than any other topology

Disadvantages of a Star Topology:

- ❖ It requires a lot of cable to connect computers since a cable is required between each device and the central location.
 - ❖ It is more expensive to build because of the additional cost of cables and devices like hubs and switches that are needed to run between the central device and each computer
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