

**COLLEGE OF DENTISTRY  
COMPUTER SCIENCE**

**LECTURE THREE**

**NETWORKS AND VIRUSES**

**BY**

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# RING TOPOLOGY

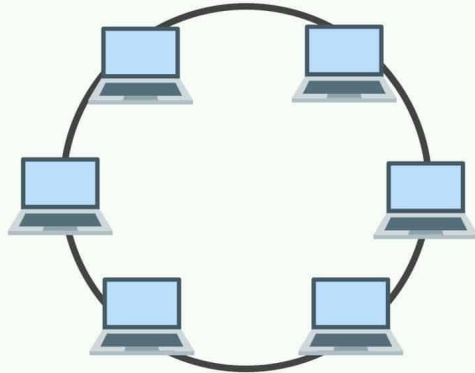
## Ring Topology

**–A ring topology is a network configuration where device connections create a circular data path. Each networked device is connected to two others, like points on a circle. Together, devices in a ring topology are referred to as a ring network.**

**– Ring networks are most commonly wired in a star configuration**

**•In a ring network, packets of data travel from one device to the next until they reach their destination.**

**- Most ring topologies allow packets to travel only in one direction, called a unidirectional ring network. Others permit data to move in either direction, called bidirectional.**

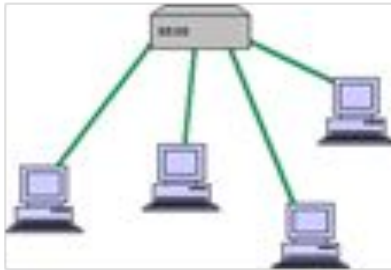


# Ring Topology

Advantages	Disadvantages
Cable faults are easily located, making troubleshooting easier	Expansion to the network can cause network disruption
Ring networks are moderately easy to install	A single break in the cable can disrupt the entire network.

# STAR TOPOLOGY

- **All computers/devices connect to a central device called hub or switch.**
- **Each device requires a single cable**
- **point-to-point connection between the device and hub.**
- **Most widely implemented**
- **Hub is the single point of failure**



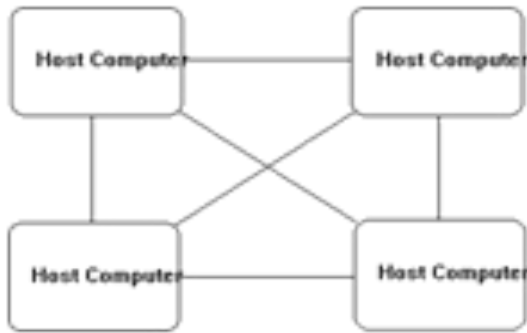
# Star Topology

Advantages	Disadvantages
Easily expanded without disruption to the network	Requires more cable
Cable failure affects only a single user	A central connecting device allows for a single point of failure
Easy to troubleshoot and isolate problems	More difficult to implement

# MESH TOPOLOGY

- Each computer connects to every other.
- High level of redundancy.
- Rarely used.
- Wiring is very complicated
- Cabling cost is high
- Troubleshooting a failed cable is tricky
- A variation hybrid mesh – create point to point connection between specific network devices, often seen in WAN implementation.

# Mesh Topology



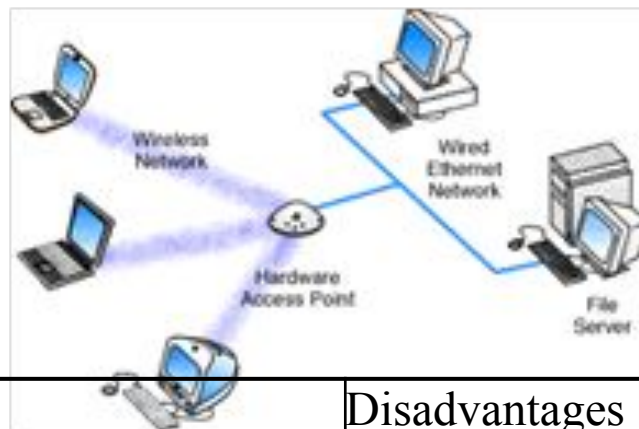
Advantages	Disadvantages
Provides redundant paths between devices	Requires more cable than the other LAN topologies
The network can be expanded without disruption to current uses	Complicated implementation

# **WIRELESS NETWORKING**

- **Do not require physical cabling**
- **Particularly useful for remote access for laptop users**
- **Eliminate cable faults and cable breaks.**
- **Signal interference and security issue.**



# Wireless networking



## Advantages

Allows for wireless remote access

Network can be expanded without disruption to current users

## Disadvantages

Potential security issues associated with wireless transmissions

Limited speed in comparison to other network topologies

# \*COMPUTER VIRUSES

**Viruses:** A virus is a small piece of software that piggybacks on real programs. For example, a virus might attach itself to a program such as a spreadsheet program. Each time the spreadsheet program runs, the virus runs, too, and it has the chance to reproduce (by attaching to other programs) or wreak havoc.

•**E-mail viruses:** An e-mail virus travels as an attachment to e-mail messages, and usually replicates itself by automatically mailing itself to dozens of people in the victim's e-mail address book. Some e-mail viruses don't even require a double-click -- they launch when you view the infected message in the preview pane of your e-mail software [source: Johnson].

•**Trojan horses:** A Trojan horse is simply a computer program. The program claims to do one thing (it may claim to be a game) but instead does damage when you run it (it may erase your hard disk). Trojan horses have no way to replicate automatically.

•**Worms:** A worm is a small piece of software that uses computer networks and security holes to replicate itself. A copy of the worm scans the network for another machine that has a specific security hole. It copies itself to the new machine using the security hole, and then starts replicating from there, as well.

## **WHAT ARE SOME TIPS TO AVOID VIRUSES AND LESSEN \*?THEIR IMPACT**

- **Install anti-virus software from a reputable vendor. Update it and use it regularly.**
- **In addition to scanning for viruses on a regular basis, install an "on access" scanner (included in most anti-virus software packages) and configure it to start each time you start up your computer. This will protect your system by checking for viruses each time you run an executable file.**
- **Use a virus scan before you open any new programs or files that may contain executable code. This includes packaged software that you buy from the store as well as any program you might download from the Internet.**
- **If you are a member of an online community or chat room, be very careful about accepting files or clicking links that you find or that people send you within the community.**
- **Make sure you back up your data (documents, bookmark files, important email messages, etc.) on disc so that in the event of a virus infection, you do not lose valuable work.**