Chapter 4
Section 2

Networks
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Networks

- The term *local area network (LAN)* is used to describe a communications network designed to link computers and their peripherals within the same building or site.
- Networks can take three basic forms:

1. *Star* form (Figure 4.26(a))
2. *Bus* or *single highway* type of network (Figure 4.26(b))
3. *Ring* network (Figure 4.26(c)),

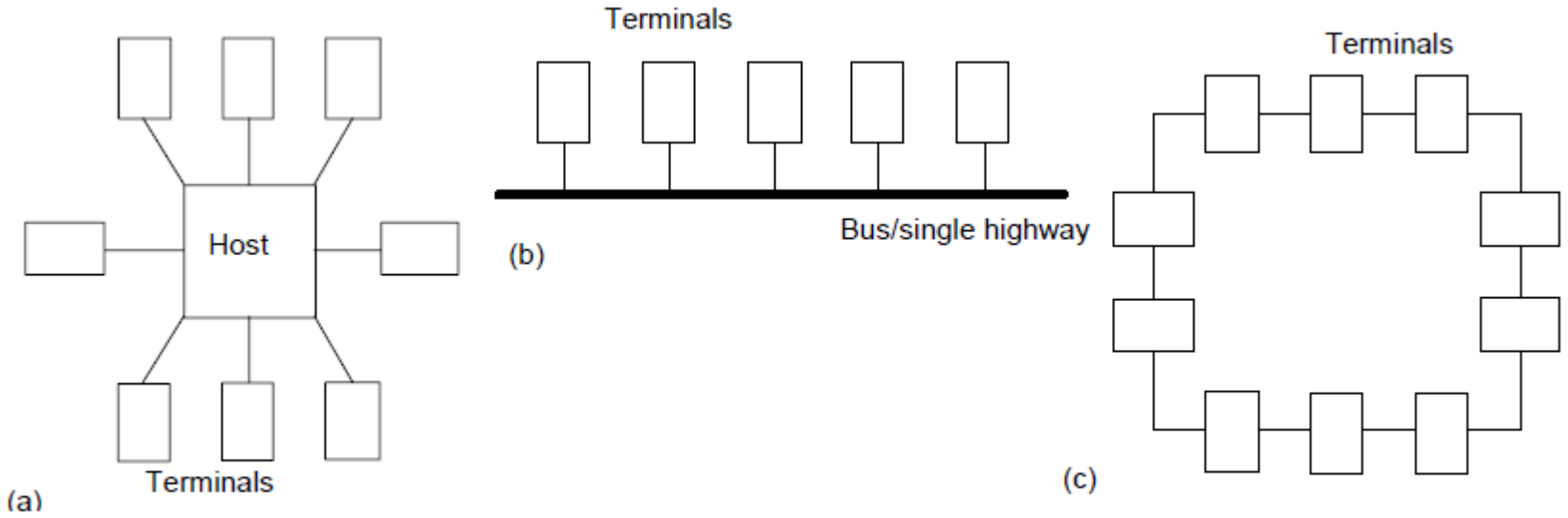


Figure 4.26 *Networks: (a) star, (b) bus/single highway, (c) ring*

Networks

The commonly used methods that are employed to avoid two stations talking at once are:

1. Token passing:

special bit pattern called a token is circulated round the network. When a station wishes to transmit into the network it waits until it receives the token, then transmits the data with the token attached. Another station wishing to transmit cannot do so until the token has been freed by removal from the data by a receiver.

2. Slot passing :

Empty slots are circulated into which stations can deposit data for transmission.

3. *Carrier sense multiple access* (CSMA):

If no message is being transmitted, a station can take control of the network and transmit its message.

4. *Carrier sense multiple access with collision detection* (CSMA/CD): both stations cease transmitting and wait a random time before attempting to again transmit.

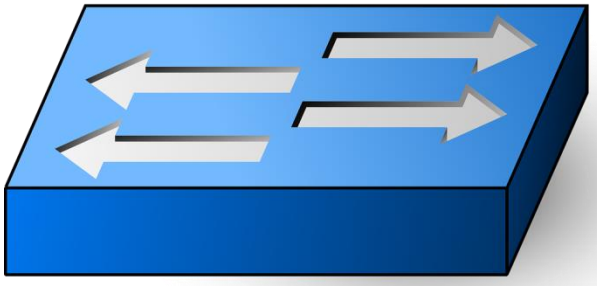
Network devices

- **Hub**

Hubs connect multiple computer networking devices together. Hubs do not perform packet filtering or addressing functions; they just send data packets to all connected devices.

Note : Outside the book.

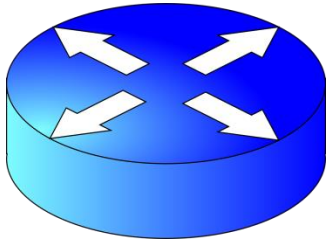
Network devices



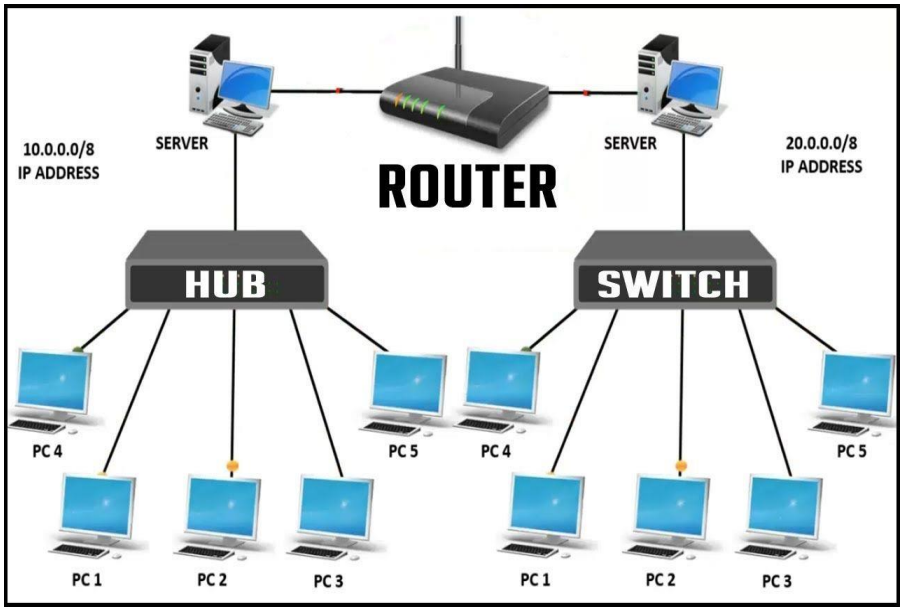
- **Switch**

- Switches generally have a more intelligent role than hubs. A switch is a multiport device that improves network efficiency.
- Generally, switches can read the hardware addresses of incoming packets to transmit them to the appropriate destination.
- Using switches improves network efficiency over hubs or routers because of the virtual circuit capability.

Network devices **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.

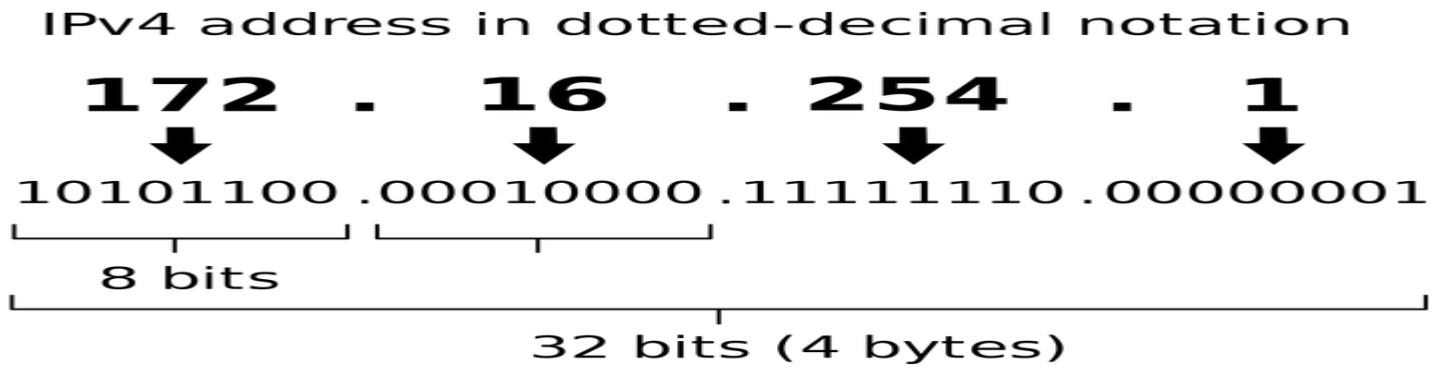


Another Network devices

- **Bridge**
- **Gateway**
- **Modem**
- **Repeater**
- **Access Point**

IP address

- An IP address is a unique address that identifies a device on the internet or a local network.
- IP stands for "Internet Protocol," which is the set of rules governing the format of data sent via the internet or local network.
- An IP address is a string of numbers separated by periods. IP addresses are expressed as a set of four numbers — an example address might be 192.158.1.38. Each number in the set can range from 0 to 255. So, the full IP addressing range goes from 0.0.0.0 to 255.255.255.255.



IP classes

Class A

- In a Class A network, the first eight bits, or the first dotted decimal, is the network part of the address, with the remaining part of the address being the host part of the address.
- There are 128 possible Class A networks. 0.0.0.0 to 127.0.0.0
- However, any address that begins with 127. is considered a loopback address.
- Example for a Class A IP address:
- 2.134.213.2

IP classes

Class B

- In a Class B network, the first 16 bits are the network part of the address. All Class B networks have their first bit set to 1 and the second bit set to 0.
- In dotted decimal notation, that makes 128.0.0.0 to 191.255.0.0 as Class B networks.
- There are 16,384 possible Class B networks.
- Example for a Class B IP address:
- 135.58.24.17

IP classes

Class C

- In a Class C network, the first two bits are set to 1, and the third bit is set to 0. That makes the first 24 bits of the address the network address and the remainder as the host address. Class C network addresses range from 192.0.0.0 to 223.255.255.0. There are over 2 million possible Class C networks.
- Example for a Class C IP address:
- 192.168.178.1

IP classes

Special addresses

Certain IPv4 addresses are set aside for specific uses:

127.0.0.0	Loopback address (the host's own interface)
224.0.0.0	IP Multicast
255.255.255.255	Broadcast (sent to all interfaces on network)

SubnetMask, Default Gateway

- Examples