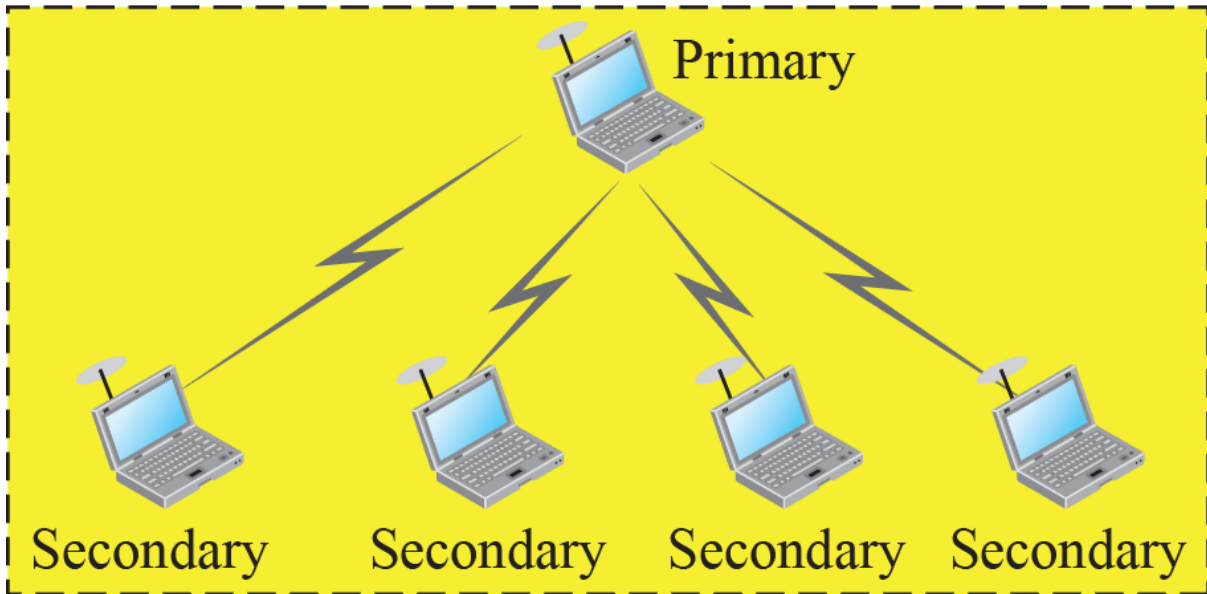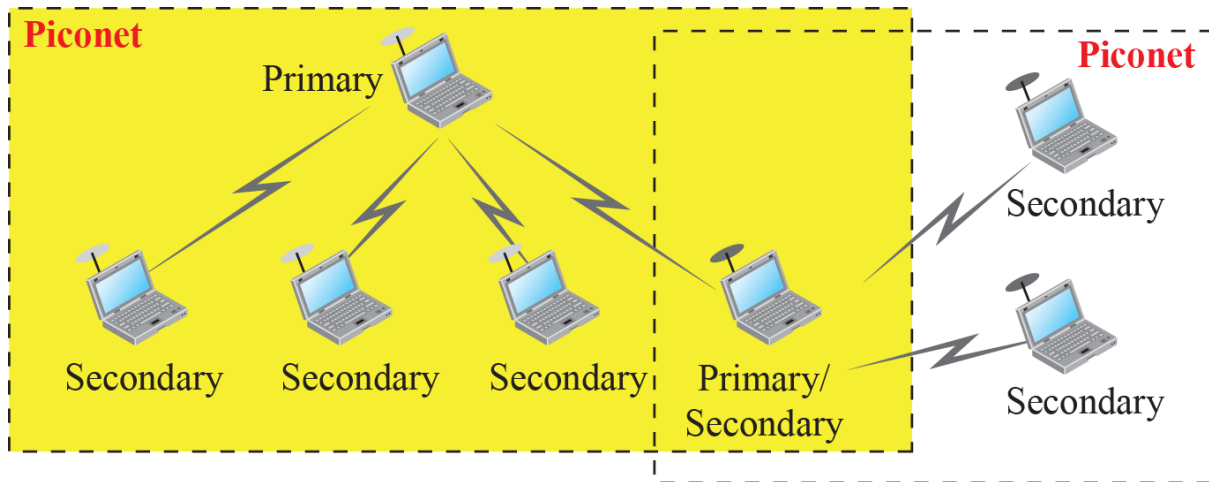# IAT-3 scheme and solution.

1. Explain Bluetooth architecture and also explain layers with a neat diagram.
   Bluetooth defines two types of networks: piconet and scatternet.
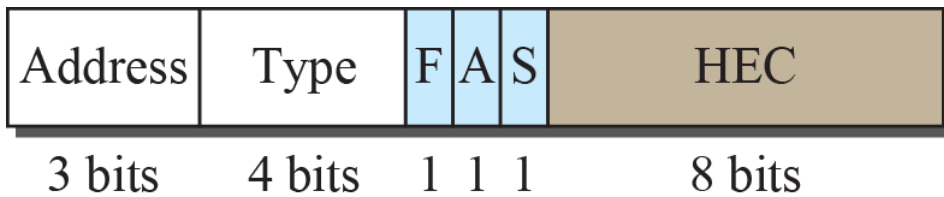
Piconet

Scatter net

Frame format

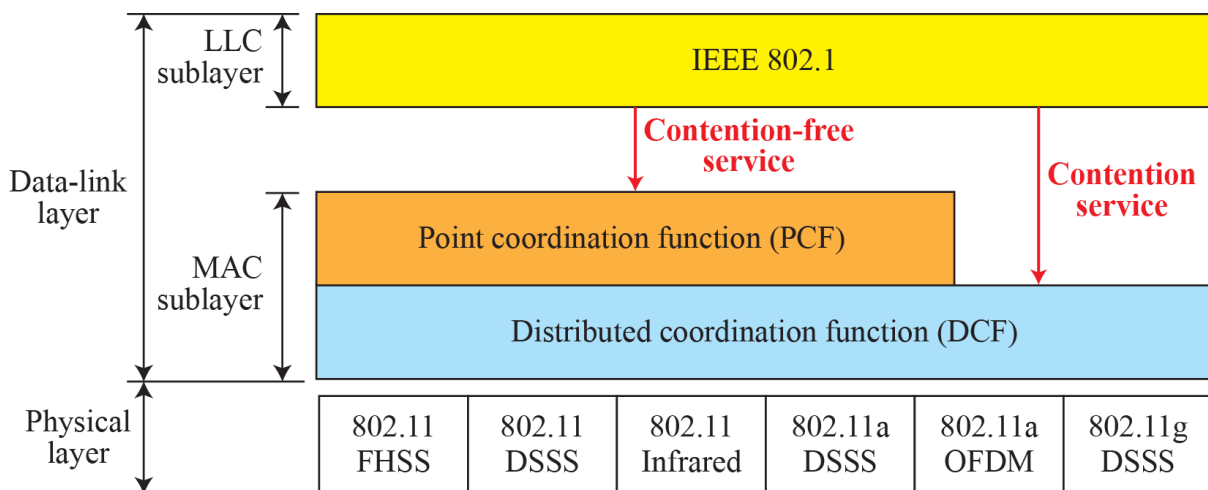| Address	Type	F	A	S	HEC
3 bits	4 bits	1	1	1	8 bits

This 18-bit part is repeated 3 times.

N = 240 for 1-slot frame

N = 1490 for 3-slot frame

N = 2740 for 5-slot frame

Bluetooth uses several layers that do not exactly match those of the Internet model we have defined in this book. Figure 15.19 shows these layers.

*1.* Explain IEEE 802.11 architecture and also frame format.

IEEE 802.11 defines two MAC sublayers: the distributed coordination function (DCF) and point coordination function (PCF). Figure 15.6 shows the relationship between the two MAC sublayers, the LLC sublayer, and the physical layer. We discuss the physical layer implementations later in the chapter and will now concentrate on the MAC sublayer.

3. Explain User datagram Protocol(UDP) with neat diagram.

The User Datagram Protocol (UDP) is a connectionless, unreliable transport protocol.

If UDP is so powerless, why would a process want to use it?

With the disadvantages come some advantages. UDP is a very simple protocol using a minimum of overhead

a. UDP user datagram
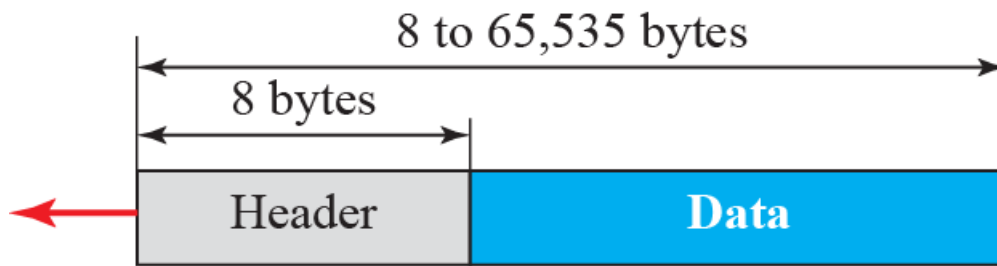
0	16	31
Source port number	Destination port number	
Total length	Checksum	
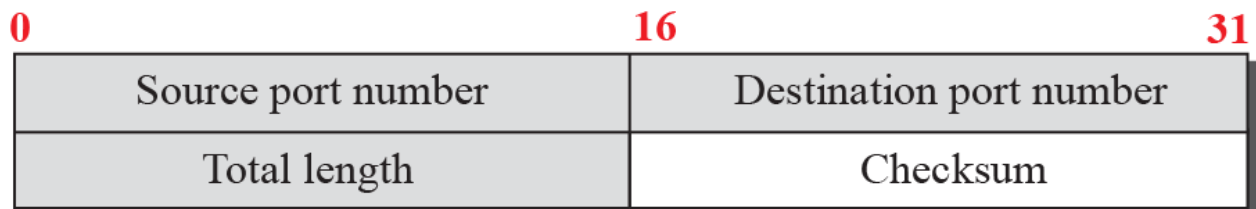
b. Header format

*general services are provided by UDP.*

1. ***Process to process communication using socket address***

2. ***Connectionless services***

3. ***No Flow control so no window mechanism***

4. ***No error control***

Although UDP meets almost none of the criteria we mentioned earlier for a reliable transport-layer protocol, UDP is preferable for some applications. The reason is that some services may have some side effects that are either unacceptable or not preferable. An application designer sometimes needs to compromise to get the optimum. For example, in our daily life, we all know that a one-day delivery of a package by a carrier is more expensive than a three-day delivery. Although high speed and low cost are both desirable features in delivery of a parcel, they are in conflict with each other.

4)Explain iBGP protocol with neat network diagram.

The Border Gateway Protocol version 4 (BGP4) is the only interdomain routing protocol used in the Internet today. BGP4 is based on the path-vector algorithm we described before, but it is tailored to provide information about the reachability of networks in the Internet.


Legend

- - - Point-to-point WAN

LAN
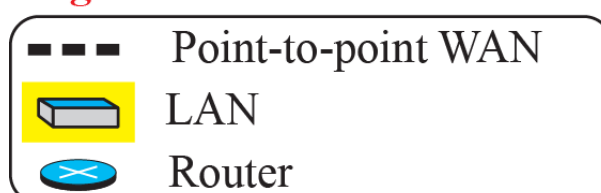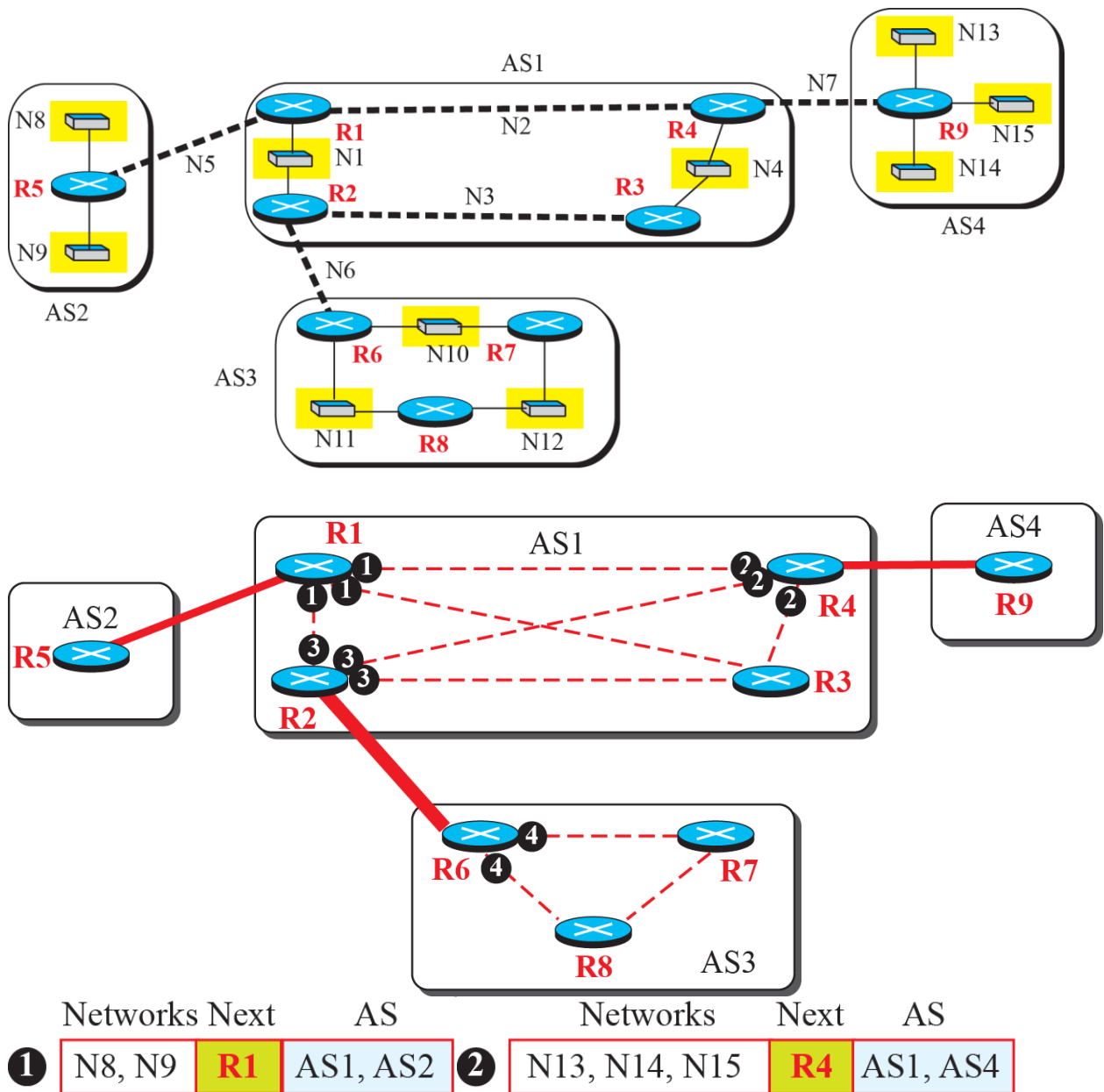
Router

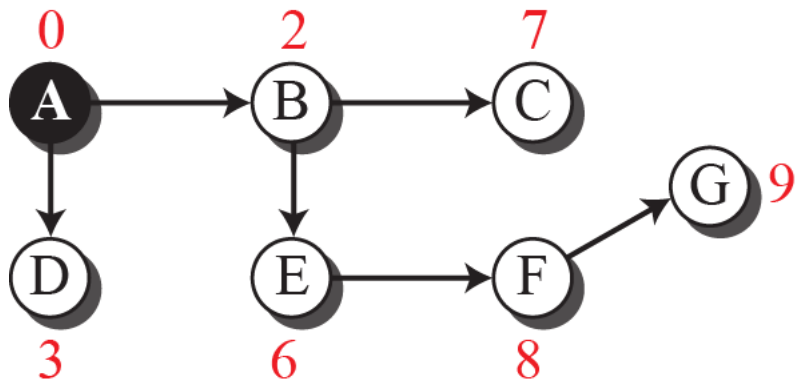5) Explain distance protocol with neat diagram.vector.

The distance-vector (DV) routing uses the goal we discussed in the introduction, to find the best route. In distance-vector routing, the first thing each node creates is its own least-cost tree with the rudimentary information it has about its immediate neighbors. The incomplete trees are exchanged between immediate neighbors to make the trees more and more complete and to represent the whole internet. We can say that in distance-vector routing, a router continuously tells all of its neighbors what it knows about the whole internet (although the knowledge can be incomplete).
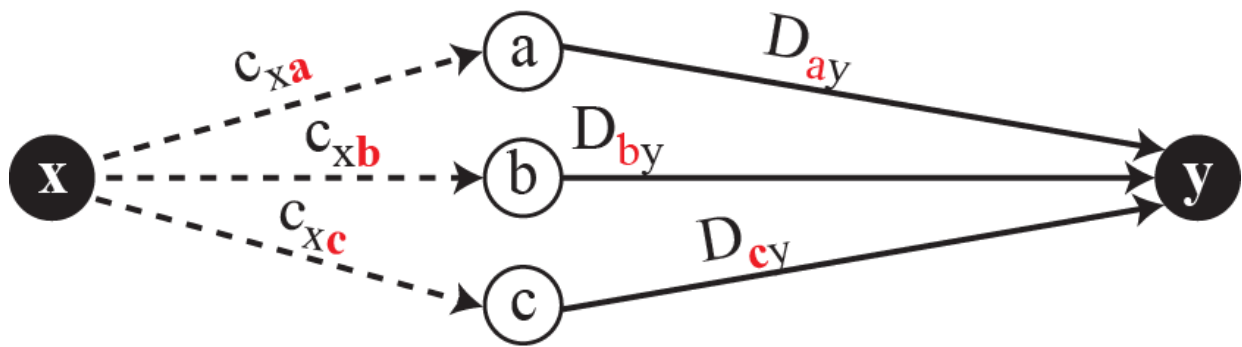
a. General case with three intermediate nodes
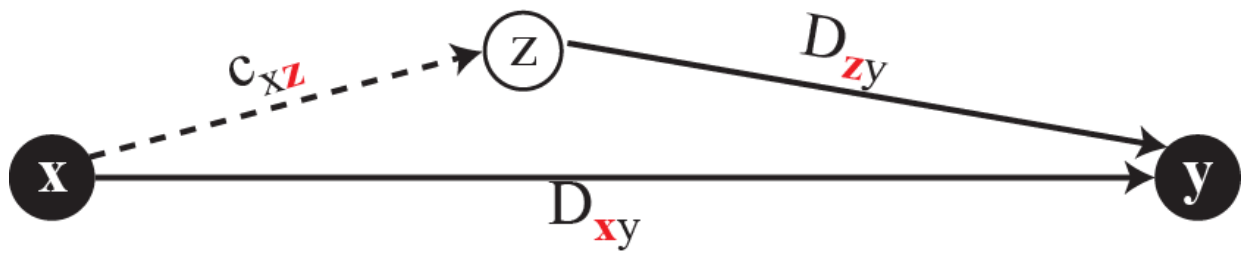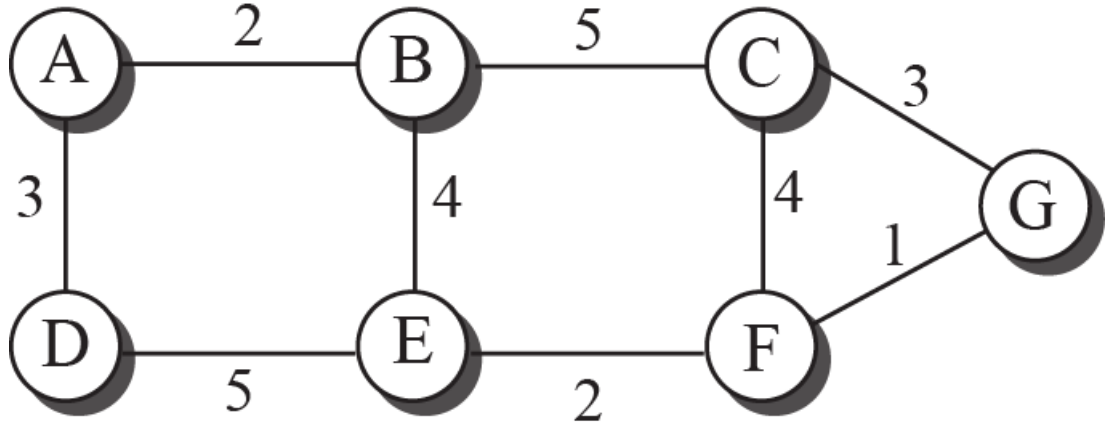
b. Updating a path with a new route

a. Tree for node A

b. Distance vector for node A

	1	2	3	4	5	6	7
A	0	2	∞	∞	3	∞	∞
B	2	0	5	∞	∞	4	∞
C	∞	5	0	3	∞	∞	4
D	3	∞	∞	∞	0	5	∞
E	∞	4	∞	∞	5	0	2
F	∞	∞	4	1	∞	2	0
G	∞	∞	3	0	∞	∞	1

New B

A	2
B	0
C	5
D	5
E	4
F	∞
G	∞

Old B

A	2
B	0
C	5
D	∞
E	4
F	∞
G	∞

A

A	0
B	2
C	∞
D	3
E	∞
F	∞
G	∞

$$B[\ ] = \min (B[\ ], 2 + A[\ ])$$

a. First event: B receives a copy of A's vector.

New B

A	2
B	0
C	5
D	5
E	4
F	6
G	∞

Old B

A	2
B	0
C	5
D	5
E	4
F	∞
G	∞

E

A	∞
B	4
C	∞
D	5
E	0
F	2
G	∞

$$B[\ ] = \min (B[\ ], 4 + E[\ ])$$

b. Second event: B receives a copy of E's vector.

6)Explain Routing Information Protocol(RIP) in detail   .

The Routing Information Protocol (RIP) is one of the most widely used intradomain routing protocols based on the distance-vector routing algorithm we described earlier. RIP was started as part of the Xerox Network System (XNS), but it was the Berkeley Software Distribution (BSD) version of UNIX that helped make the use of RIP widespread.
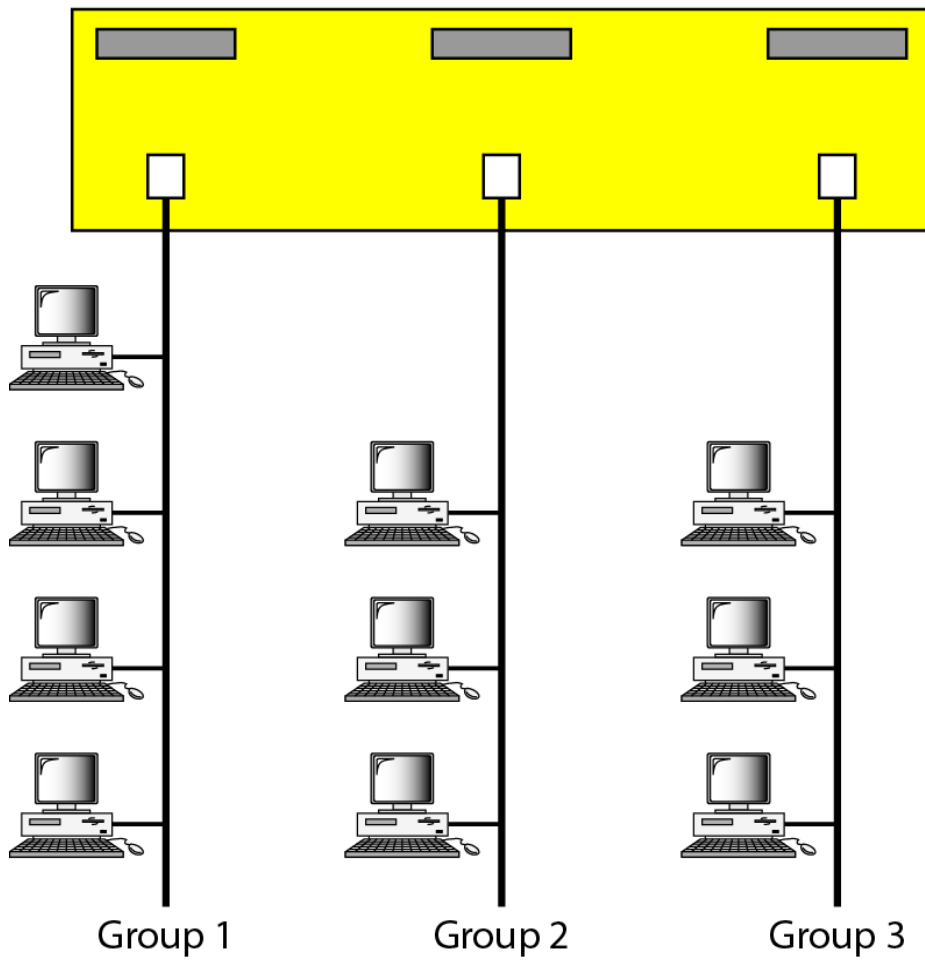
N1 Source

N2

N3

N4 Destination

R1   R2   R3

3 hops (N2, N3, N4)

2 hops (N3, N4)   1 hop (N4)
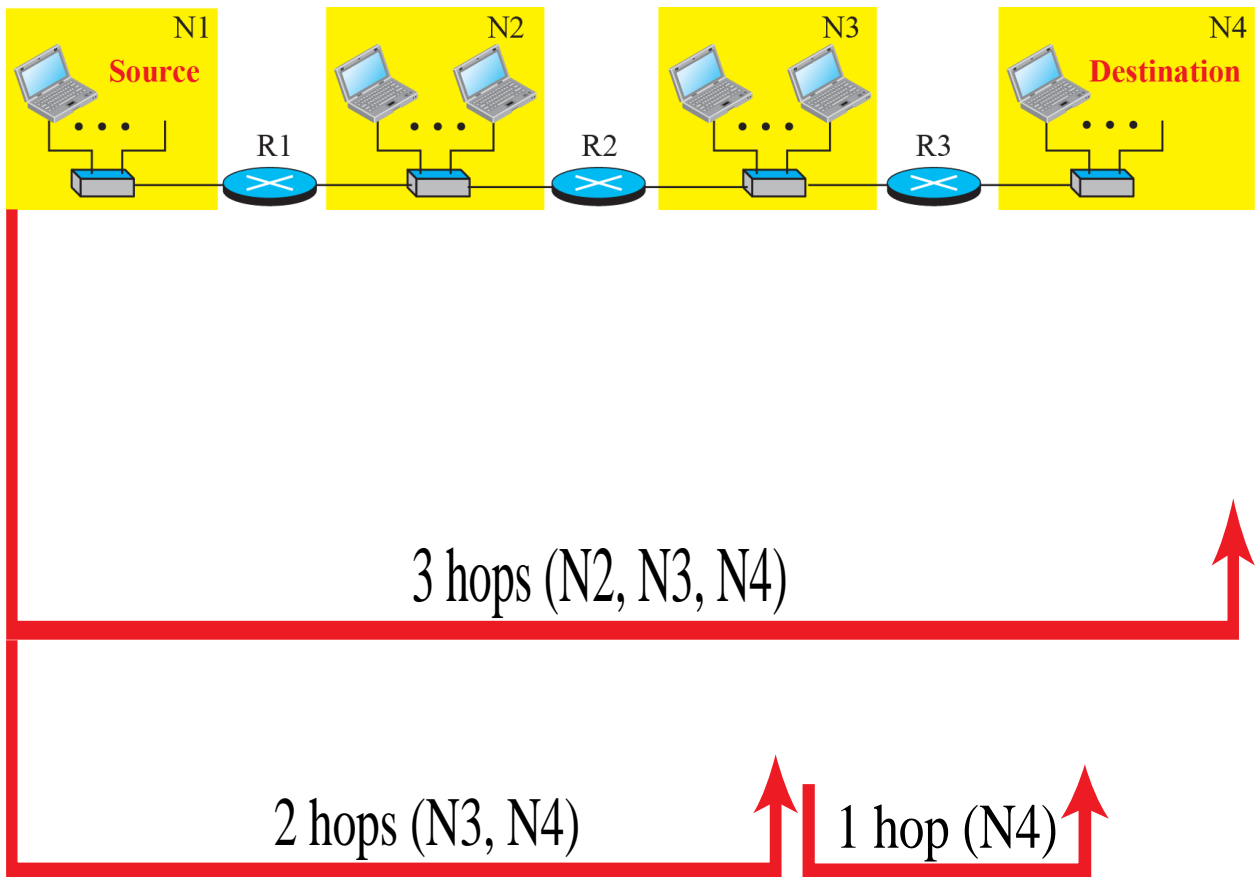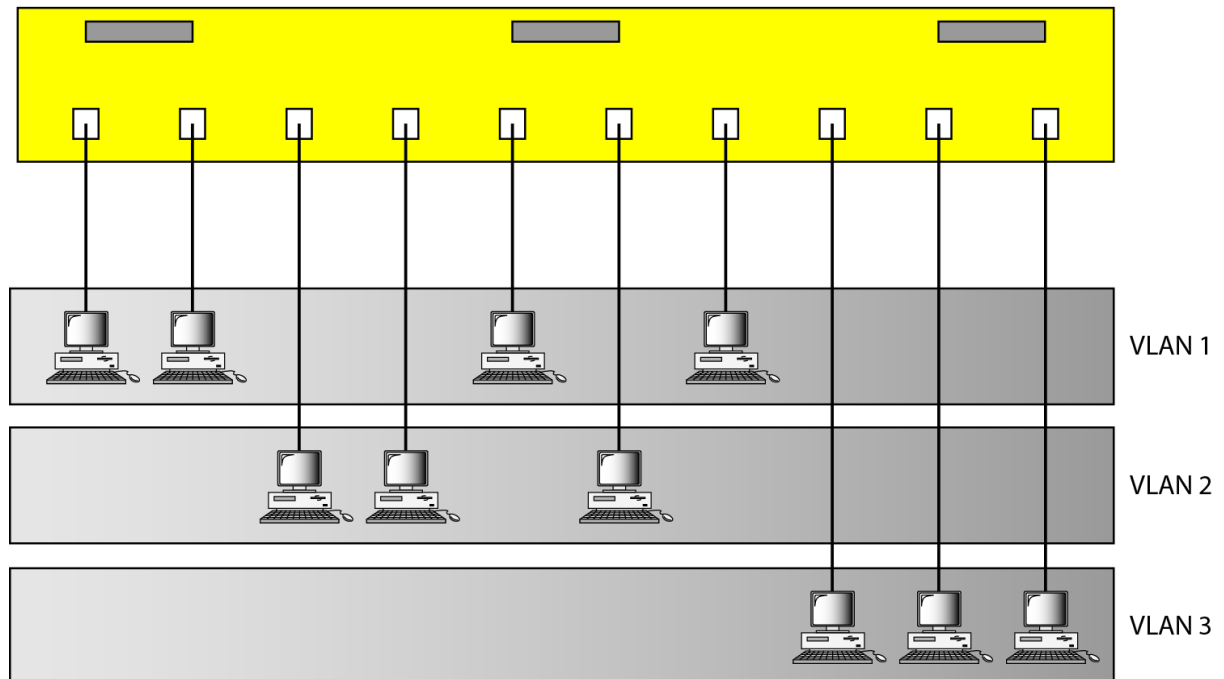
7)(a) Explain VLAN with neat diagrams.

(b) Explain membership characteristics of VLAN in detail.

We can roughly define a virtual local area network (VLAN) as a local area network configured by software, not by physical wiring.

Switch

Group 1   Group 2   Group 3

Switch with VLAN software

VLAN 1

VLAN 2

VLAN 3

Membership
Configuration

Communication between Switches

IEEE Standard

Advantages

8) Explain selective repeat protocol with window size and flow diagram.

The Go-Back-N protocol simplifies the process at the receiver. The receiver keeps track of only one variable, and there is no need to buffer out-of-order packets; they are simply discarded.

However, this protocol is inefficient if the underlying network protocol loses a lot of packets. Each time a single packet is lost or corrupted, the sender resends all outstanding packets, even though some of these packets may have been received safe and sound but out of order.

Ack.no. is the seq. no. of the error free packet received.
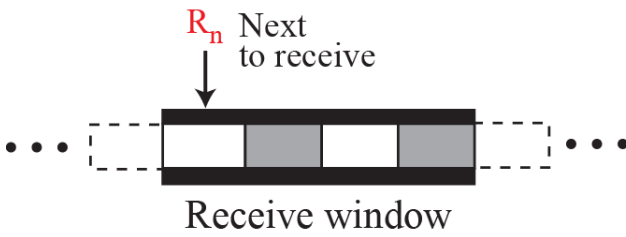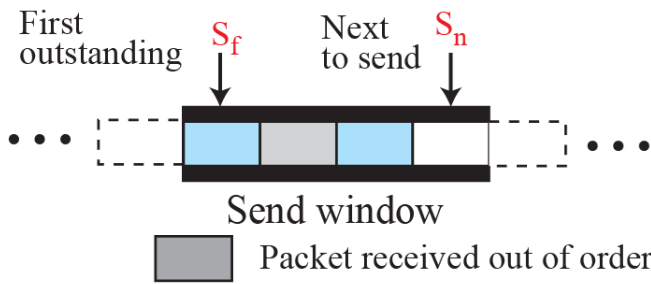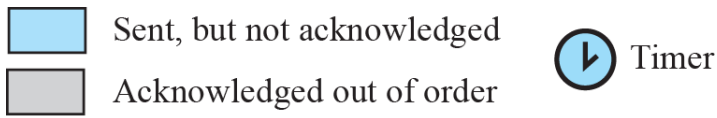
Size of the sender and receiver window is one-half of 2^m
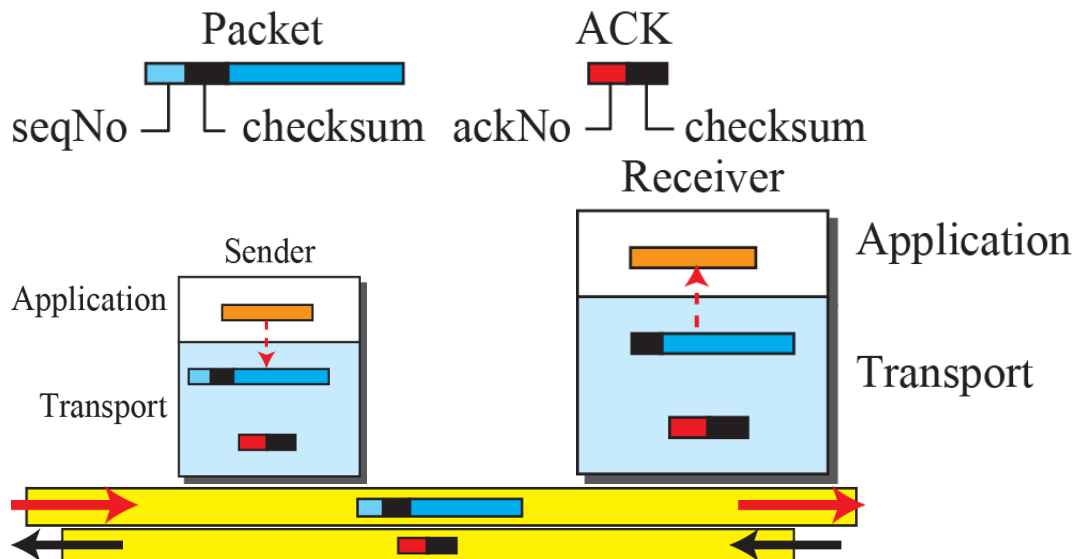
Figure 23.32: *Send window for Selective-Repeat protocol*