Connecting LANs

CONNECTING DEVICES

In this section, we divide connecting devices into five different categories based on the layer in which they operate in a network.

Topics discussed in this section:

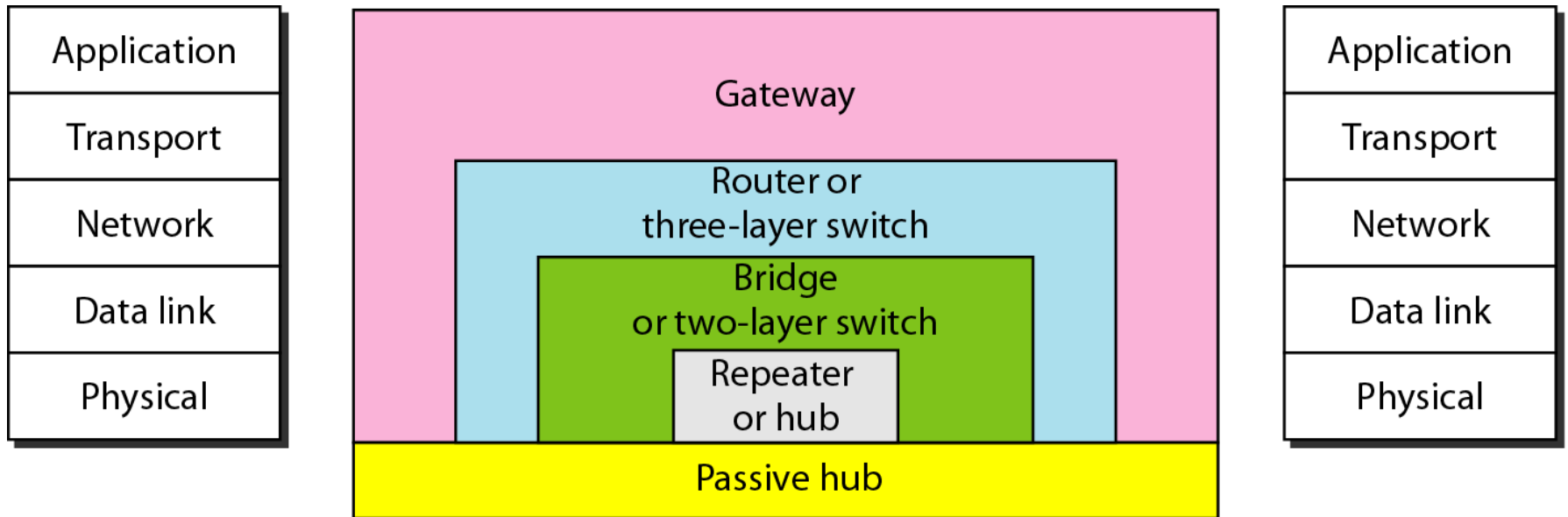Passive Hubs
Active Hubs
Bridges
Two-Layer Switches
Routers
Three-Layer Switches
Gateways

Five categories of connecting devices

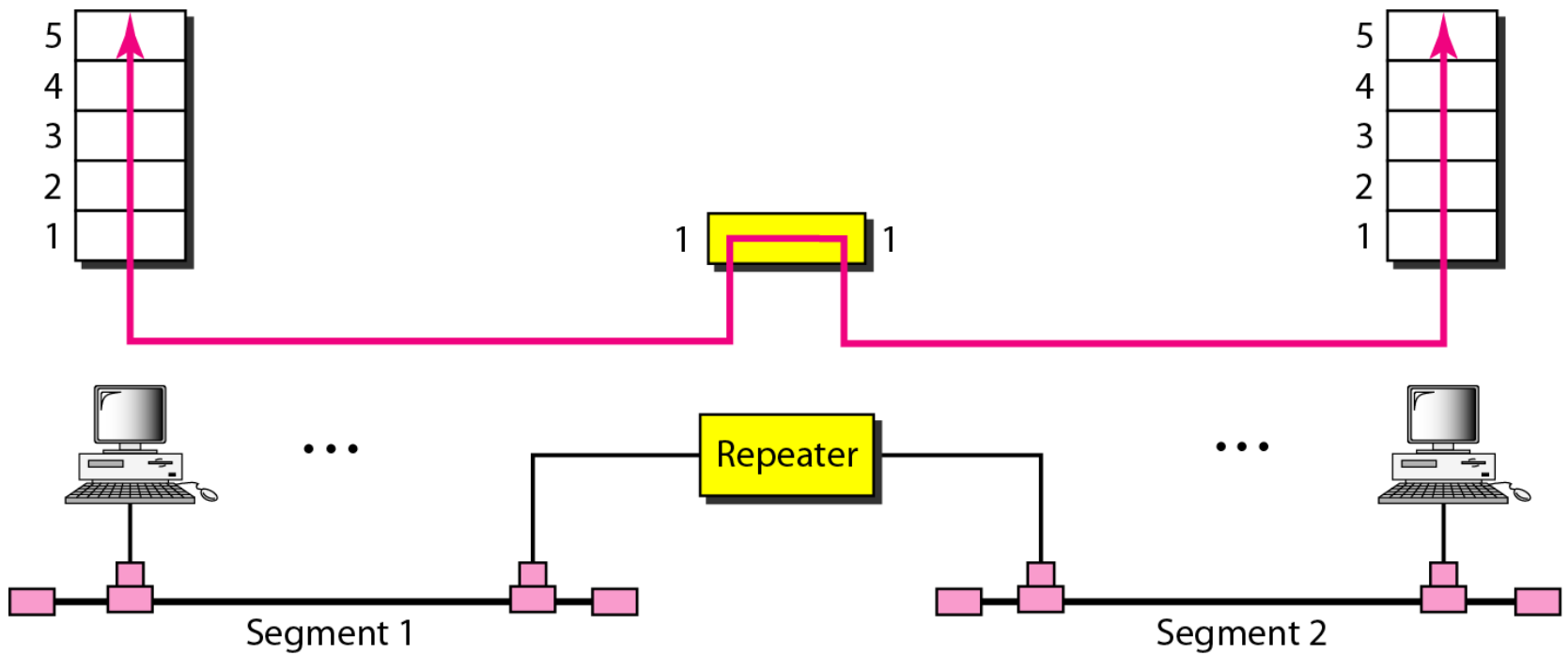| Application |
|---|
| Transport |
| Network |
| Data link |
| Physical |

Gateway

Router or three-layer switch

Bridge or two-layer switch

Repeater or hub

Passive hub

Application
Transport
Network
Data link
Physical

A repeater connecting two segments of a LAN

Note

A repeater connects segments of a LAN.

Note

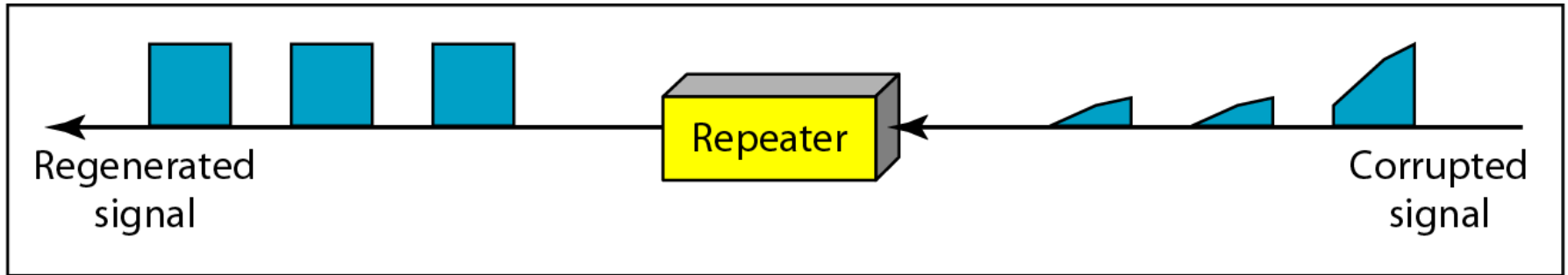A repeater forwards every frame;
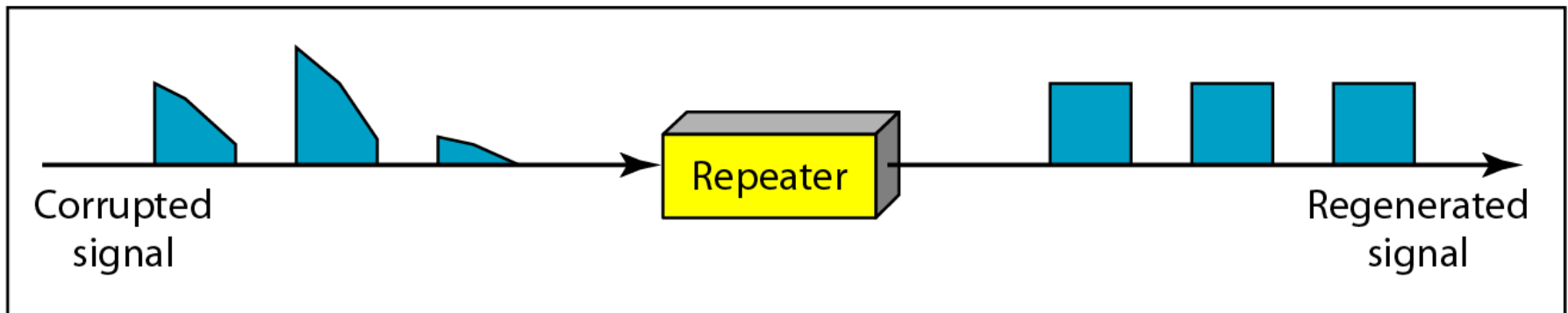it has no filtering capability.

Note

A repeater is a regenerator,
not an amplifier.
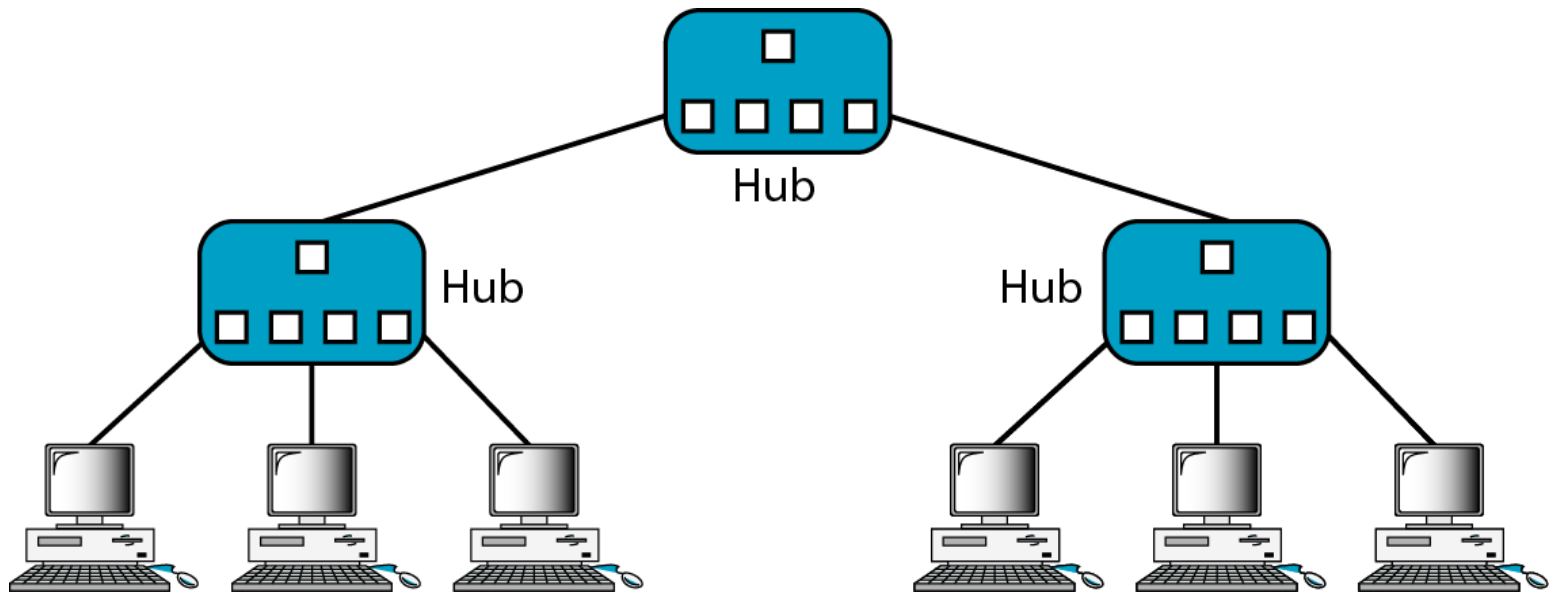
Function of a repeater

a. Right-to-left transmission.

b. Left-to-right transmission.

A hierarchy of hubs

Note

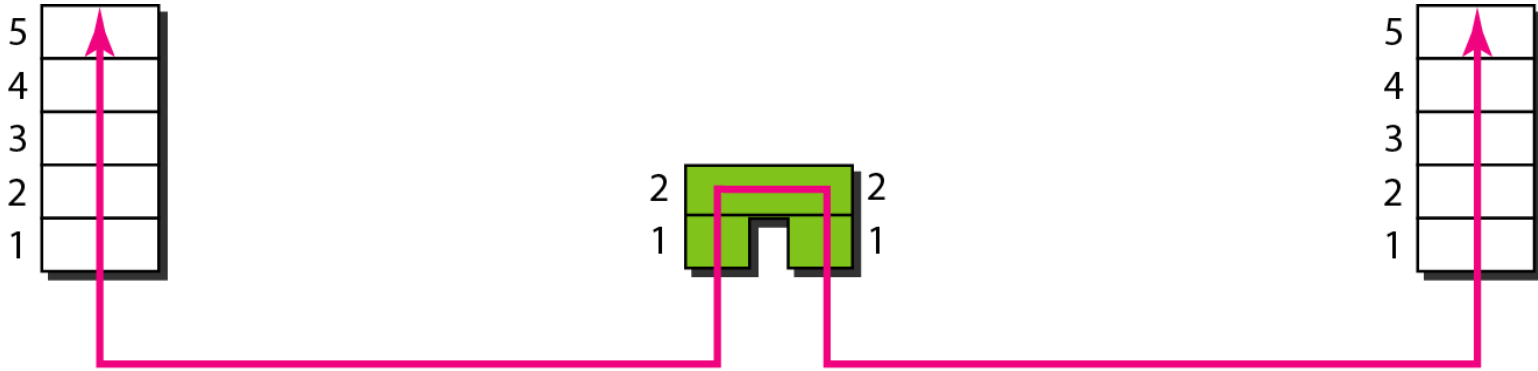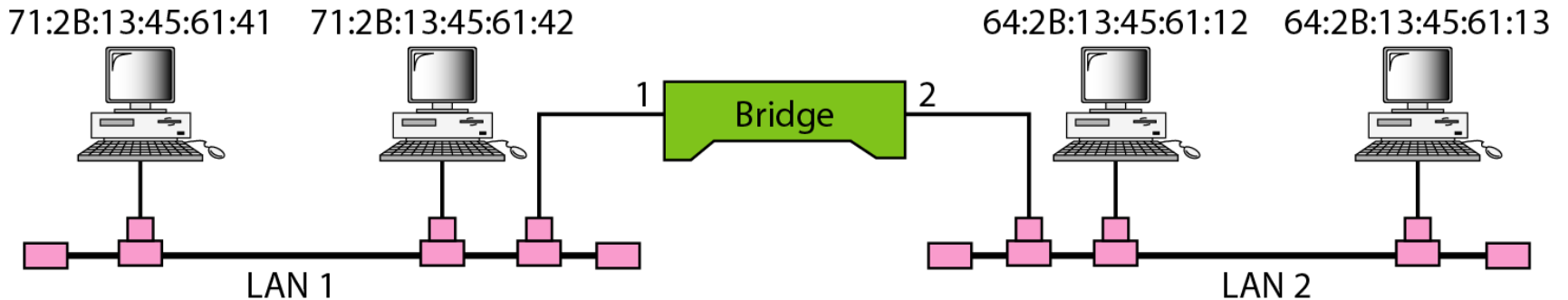**A bridge has a table used in filtering decisions.**

A bridge connecting two LANs

Address	Port
71:2B:13:45:61:41	1
71:2B:13:45:61:42	1
64:2B:13:45:61:12	2
64:2B:13:45:61:13	2

Bridge Table

71:2B:13:45:61:41   71:2B:13:45:61:42

64:2B:13:45:61:12   64:2B:13:45:61:13

Bridge

LAN 1

LAN 2

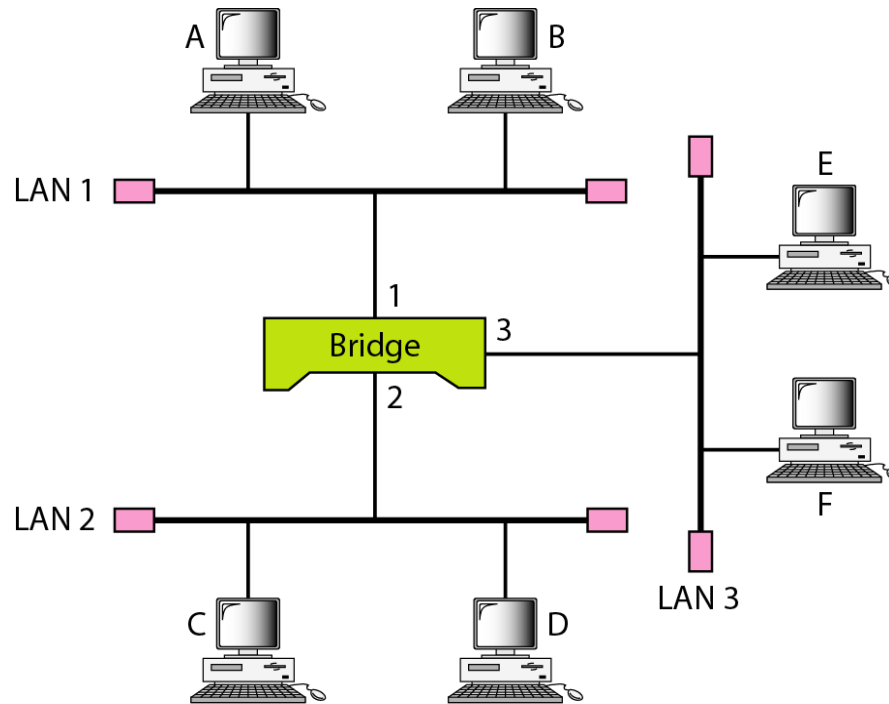**Note**

A bridge does not change the physical (MAC) addresses in a frame.

A learning bridge and the process of learning

Address	Port

a. Original

Address	Port
A	1

b. After A sends
a frame to D

Address	Port
A	1
E	3

c. After E sends
a frame to A

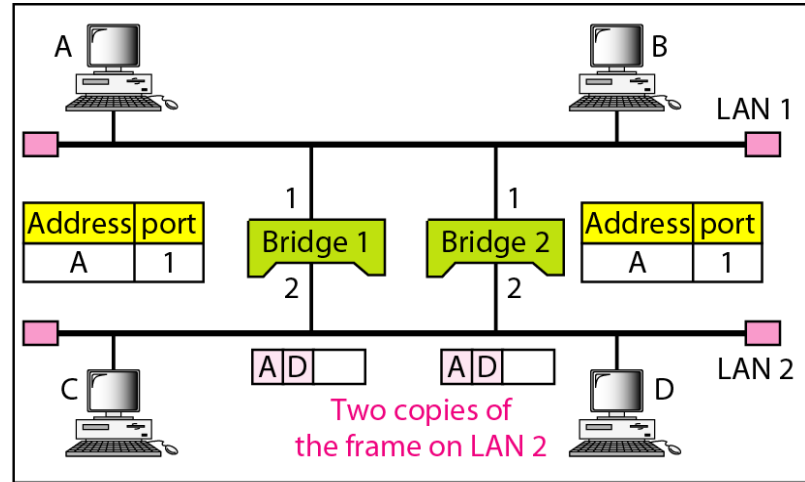| Address	Port
A	1
E	3
B	1

d. After B sends
a frame to C
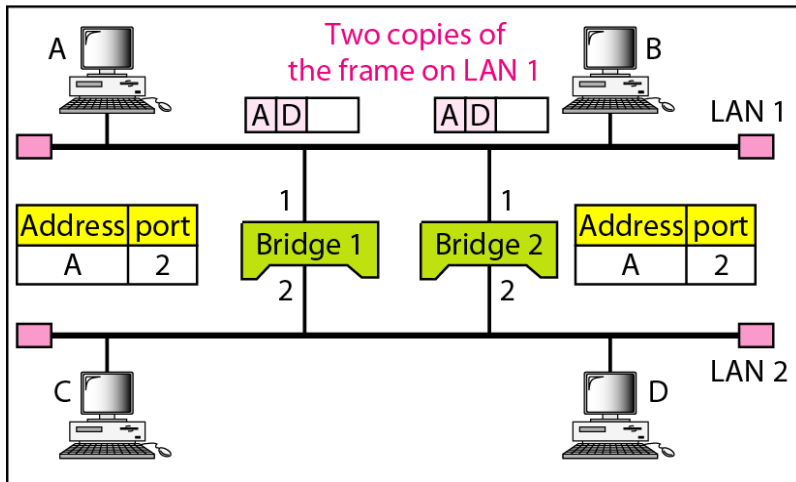
Loop problem in a learning bridge
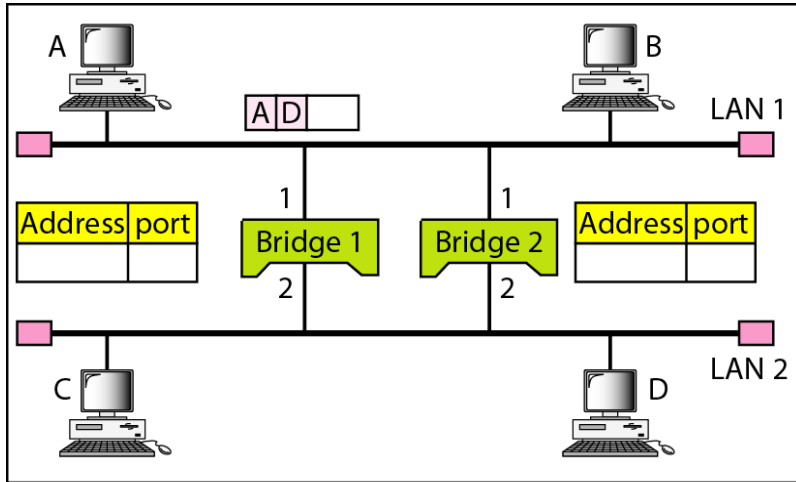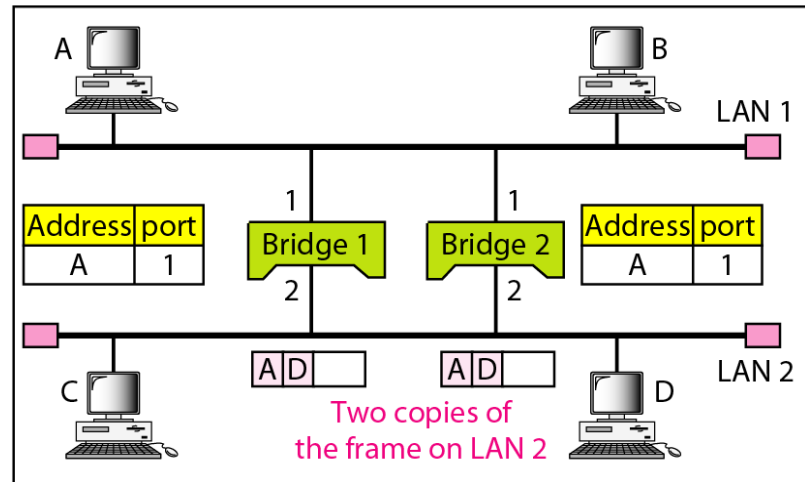

a.   Station A sends a frame to station D

b.   Both bridges forward the frame

c.   Both bridges forward the frame

d.   Both bridges forward the frame

Routers connecting independent LANs and WANs