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## CHAPTER 15

# Connecting LANs, Backbone Networks, and Virtual Networks

## Solutions to Odd-Numbered Review Questions and Exercises

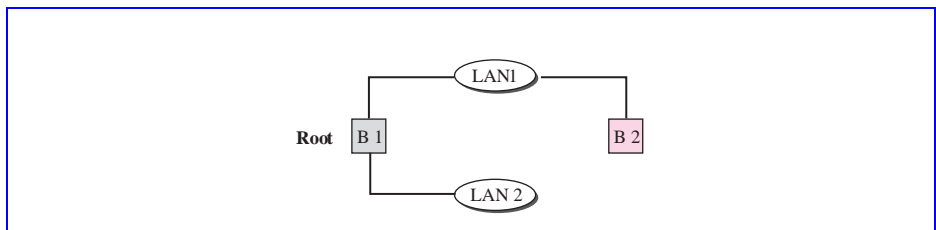
### Review Questions

1. An *amplifier* amplifies the signal, as well as noise that may come with the signal, whereas a *repeater* regenerates the signal, bit for bit, at the original strength.
3. A *transparent bridge* is a bridge in which the stations are completely unaware of the bridge's existence. If a bridge is added or deleted from the system, reconfiguration of the stations is unnecessary.
5. A *hub* is a *multiport repeater*.
7. In a *bus backbone*, the topology of the backbone is a *bus*; in a *star backbone*, the topology is a *star*.
9. Members of a *VLAN* can send broadcast messages with the assurance that users in other groups will not receive these messages.
11. Stations can be grouped by *port number*, *MAC address*, *IP address*, or by a combination of these characteristics.

### Exercises

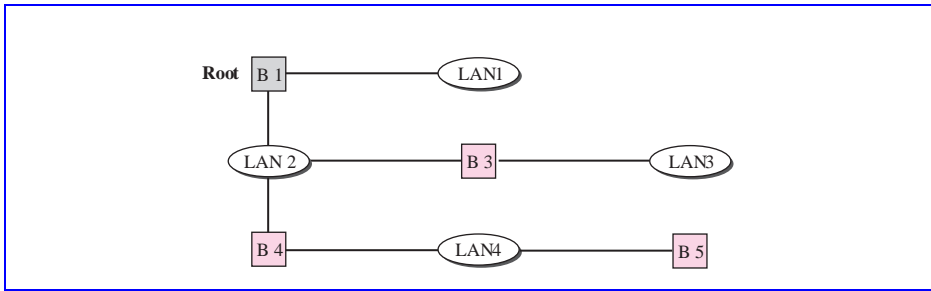
13. Figure 15.1 shows one possible solution. We made bridge B1 the root.

**Figure 15.1** Solution to Exercise 13



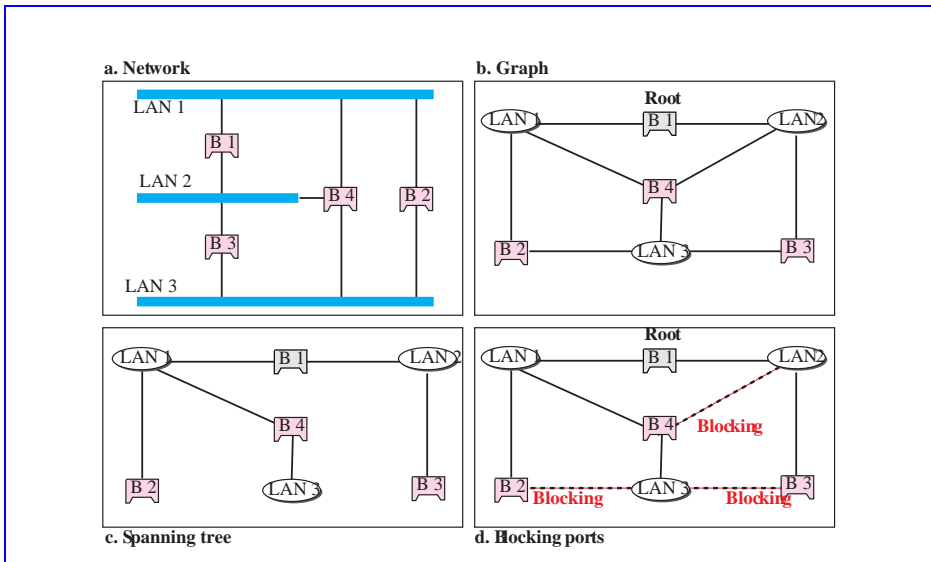
15. Figure 15.2 shows one possible solution.

**Figure 15.2** *Solution to Exercise 15*



17. Although any **router** is also a **bridge**, replacing bridges with routers has the following consequences:
- Routers are more expensive than bridges.
  - Routers operate at the first three-layers; bridges operates at the first two layers. Routers are not designed to provide direct filtering the way the bridges do. A router needs to search a routing table which is normally longer and more time consuming than a filtering table.
  - A router needs to decapsulate and encapsulate the frame and change physical addresses in the frame because the physical addresses in the arriving frame define the previous node and the current router; they must be changed to the physical addresses of the current router and the next hop. A bridge does not change the physical addresses. Changing addresses, and other fields, in the frame means much unnecessary overhead.
19. Figure 15.3 shows one possible solution. We have shown the network, the graph, the spanning tree, and the blocking ports.

**Figure 15.3** *Solution to Exercise 19*



21. A *bridge* has more overhead than a *repeater*. A *bridge* processes the packet at *two layers*; a *repeater* processes a frame at *only one layer*. A bridge needs to search a table and find the forwarding port as well as to regenerate the signal; a repeater only regenerates the signal. In other words, a bridge is also a repeater (and more); a repeater is not a bridge.

