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## Chapter 2 Solutions

### Review Questions

- Which of the following is a limitation of early networks that used a daisy-chain method of connecting computers? (Choose all that apply.)
  - Total number of computers that could be connected**
  - The processing speed of the computers connected
  - Cable length**
  - No Internet access
- Which of the following is true of a repeater?
  - Receives frames and forwards them
  - Determines which network to send a packet
  - Receives bit signals and strengthens them**
  - Has a burned-in MAC address for each port
- Which of the following is true of a hub? (Choose all that apply.)
  - Usually has just two ports
  - Transmits regenerated signals to all connected ports**
  - Usually has four or more ports**
  - Works with MAC addresses
- Which of the following is the unit of measurement by which a hub's bandwidth is usually specified?
  - Bytes per second
  - Bits per second**
  - Packets per second
  - Bytes per minute
- Which of the following describes how devices connected to a hub use the speed at which the hub can transmit data?
  - Bandwidth optimization
  - Bandwidth dedication
  - Bandwidth sharing**
  - Bandwidth multiplier
- Which of the following is a likely indicator light on a hub? (Choose all that apply.)
  - CRC error
  - Link status**
  - Connection speed**
  - Activity**
  - Signal strength
- Which of the following describes how devices connected to a switch use the speed at which the switch can transmit data?
  - Dedicated bandwidth**

- b. Half-duplex bandwidth
  - c. Half-scale bandwidth
  - d. Shared bandwidth
8. What does a switch use to create its switching table?
- a. Source IP addresses
  - b. Destination logical addresses
  - c. Destination physical addresses
  - d. Source MAC addresses**
9. What purpose does the timestamp serve in a switching table?
- a. Tells the switch when to forward a frame
  - b. Tells the switch how long to wait for a response
  - c. Tells the switch when to delete an entry**
  - d. Tells the switch how long it has been running
10. What feature of a switch allows devices to effectively communicate at 200 Mbps on a 100 Mbps switch?
- a. Uplink port
  - b. Full-duplex mode**
  - c. Shared bandwidth
  - d. Bit strengthening
  - e. Frame doubling
  - f. Signal regeneration
11. To which device is a wireless access point most similar in how it operates?
- a. Hub**
  - b. Switch
  - c. NIC
  - d. Router
12. What's the purpose of an RTS signal in wireless networking?
- a. It allows the AP to request which device is the transmitting station.
  - b. It allows the AP to tell all stations that it's ready to transmit data.
  - c. It allows a client to notify the AP that it's ready to send data.**
  - d. It allows a client to request data from the AP.
13. Which of the following is a common operational speed of a wireless network?
- a. 10 Kbps
  - b. 110 Gbps
  - c. 600 Kbps
  - d. 11 Mbps**
14. Which of the following is a task performed by a NIC and its driver? (Choose all that apply.)
- a. Provides a connection to the network medium**
  - b. Converts bit signals into frames for transmission on the medium
  - c. Receives packets from the network protocol and creates frames**
  - d. Adds a header before sending a frame to the network protocol

- e. **Adds error-checking data to the frame**
15. Which of the following best describes a MAC address?
- a. A 24-bit number expressed as 12 decimal digits
  - b. **Two 24-bit numbers, in which one is the OUI**
  - c. A 48-bit number composed of 12 octal digits
  - d. A dotted decimal number burned into the NIC
16. Under which circumstances does a NIC allow inbound communications to pass through the interface? (Choose all that apply.)
- a. The source MAC address is the broadcast address.
  - b. **The destination MAC address matches the built-in MAC address.**
  - c. **The destination MAC address is all binary 1s.**
  - d. The NIC is operating in exclusive mode.
17. How does a protocol analyzer capture all frames?
- a. It configures the NIC to capture only unicast frames.
  - b. It sets all incoming destination addresses to be broadcasts.
  - c. **It configures the NIC to operate in promiscuous mode.**
  - d. It sets the exclusive mode option on the NIC.
  - e. It captures only multicast frames.
18. In Windows 10, which of the following displays information about currently installed NICs?
- a. **Network Connections**
  - b. NICs and Drivers
  - c. Local Area Networks
  - d. Computers and Devices
19. Which of the following is the purpose of an SSID?
- a. Assigns an address to a wireless NIC
  - b. Acts as a unique name for a local area connection
  - c. Acts as a security key for securing a network
  - d. **Identifies a wireless network**
20. Which of the following describe the function of routers? (Choose all that apply.)
- a. Forward frames from one network to another
  - b. **Connect LANS**
  - c. Attach computers to the internetwork
  - d. **Work with packets and IP addresses**
21. What information is found in a routing table?
- a. Computer names and IP addresses
  - b. **Network addresses and interfaces**
  - c. MAC addresses and ports
  - d. IP addresses and MAC addresses
22. You currently have 15 switches with an average of 20 stations connected to each switch. The switches are connected to one another so that all 300 computers can communicate with each other in a single LAN. You have been detecting a high percentage of broadcast frames on this

- LAN. You think the number of broadcasts might be having an impact on network performance. What should you do?
- Connect the switches in groups of five, and connect each group of switches to a central hub.
  - Upgrade the switches to a faster speed.
  - Reorganize the network into smaller groups and connect each group to a router.**
  - Disable broadcast forwarding on the switches.
23. Review the routing table in Figure 2-25. Based on this figure, where does the router send a packet with the source network number 1.0 and the destination network number 3.0?
- EthA
  - WAN A
  - WAN B**
  - None of the above
24. If a router receives a packet with a destination network address unknown to the router, what does the router do?
- Send the packet out all interfaces.
  - Discard the packet.**
  - Add the destination network to its routing table.
  - Query the network for the destination network.
25. Which of the following is true about routers? (Choose all that apply.)
- Forward broadcasts
  - Use default routes for unknown network addresses**
  - Forward unicasts**
  - Used primarily to connect workstations

## Hands-On Projects

### Hands-On Project 2-1

Step 9: The packets between Computer2 and Computer3 are captured by Computer1 because the hub repeats all transmissions to all connected ports. All computers connected to a hub (bus logical topology) receive all transmissions.

### Hands-On Project 2-2

Step 9: Computer1 captured the ARP packets because they are broadcast packets, and a switch forwards all broadcasts to all connected ports. The ICMP packets are unicast packets, and the switch forwards them only to the port where the destination computer is connected.

Step 10: The ARP protocol is used to resolve a known IP address to a computer's MAC address.

### Hands-On Project 2-3

Step 7: Answers will vary. There might be speed indicators, activity indicators, and collision indicators.

Step 10: Answers will vary. There might be speed and duplex indicators.

## Critical Thinking

### Challenge Lab 2-1

In the memo, students should answer these questions:

- What filter options (if any) did you configure in Wireshark?

The filter should be `icmp`.

- What commands did you use to generate packets on the network?

The `ping` command can be used to generate packets.

- What IP addresses did you attempt to communicate with?

Answers will vary.

- What was your result? Is your computer attached to a hub or switch? Why did you come to this conclusion?

Answers will vary. Students' conclusions should be based on whether they captured all packets sent, which would indicate a hub, or only those addressed to their station, which would indicate a switch.

### Challenge Lab 2-2

In the memo, students should answer these questions:

- What type of packets does Trace Route use?

Trace Route uses ICMP packets.

- What's the response each router sends back to your computer?

The router sends back an ICMP TTL Expired message.

- How does your computer get a response from each router between your computer and the destination?

The first set of packets sent by Trace Route has the TTL value 1, causing the first router to send back a TTL expired message. The next set of packets has the TTL value 2, causing the second router to respond with a TTL expired message, and so forth, until the packets have a TTL value adequate to reach the target device.

### Case Project 2-1

Answers will vary. The memo should state that hubs should be replaced by switches to eliminate collisions and allow each station to have the switch port's full bandwidth. The switch should be at least 100 Mbps, which might require upgrading NICs, too.

### Case Project 2-2

Answers will vary. The memo should state that a router can be added to the network to make the broadcast domains smaller; IP addressing needs to be changed to reflect multiple subnets.

### Case Project 2-3

Answers will vary. Students should look up the terms and write a brief explanation of each one.