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Core Network Concepts and Terminology

Last Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

First Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Due Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## Instructions

Homework files are in Word for Windows format.

You download them from the book’s website.

In a chapter, your teacher may assign you questions to complete.

To begin typing your answer, click after the right angle brackets.

### A State of Siege

 1. a) What is a DDoS attack?

>>>

 b) In what two ways was the KrebsOnSecurity.com DDoS attack unusual?

>>>

 c) What do we mean by the “Internet of Things”?

>>>

 d) What happens when a host cannot reach a Domain Name System server?

>>>

 e) What specific security weakness did the Mirai malware use to propagate from machine to machine?

>>>

### Anything, Anytime, Anywhere

 2. When was commercial activity on the Internet first allowed?

>>>

 3. a) What services do Internet service providers provide?

>>>

 b) In Figure 1-2, through which ISP(s) will traffic pass if a packet from Hawaii.edu goes to Panko.com?

>>>

 c) Through which ISP(s) will traffic pass if a packet from Microsoft.com goes to the mobile phone in the lower right of Figure 1-2?

>>>

 d) In Figure 1-2, through which ISP(s) may traffic pass if a packet from Microsoft.com goes to Panko.com? (Hint. There are multiple possible answers.)

>>>

 4. a) What do we call any device connected to the Internet?

>>>

 b) When you use a laptop to connect to the Internet, is it a host? Explain in terms of the definition of *host*.

>>>

 c) When you use the Internet, are *you* a host? Explain in terms of the definition.

>>>

 5. a) What continuing changes in the Internet are contributing to its ability to support new applications constantly?

>>>

 b) What are the characteristics of the Internet of Things?

>>>

 6. a) Who owns the Internet?

>>>

 b) Who is in charge of the Internet?

>>>

 c) What is the role of the IETF?

>>>

 7. a) Why is the Internet’s ability to give broad access a good thing?

>>>

 b) What danger does it bring?

>>>

 8. a) What does “Inter” in Internet mean.

>>>

 b) Why is this significant?

>>>

### Outside the Internet

 9. a) Why is the Internet often depicted as a cloud?

>>>

 b) Why is the Internet not about sending messages between hosts?

>>>

 10. a) Distinguish between client and server hosts.

>>>

 b) What type of devices are most servers?

>>>

 11. a) What are networked applications?

>>>

 b) Is the client always a browser?

>>>

 c) Is the server always a webserver?

>>>

 12. a) What two processes does the network stack provide?

>>>

 b) What is the maximum size of an IP packet?

>>>

 c) What does the transport process do to the application message if it is short enough to fit in a single packet If the application message is too long?

>>>

 d) What does the transport process add to the application message or fragment?

>>>

 e) What is the resulting message called?

>>>

 f) What does the internet process do with each TCP segment?

>>>

 13. What are the three parts of an IP packet?

>>>

 14. a) What does the internet process on the destination host do when a packet arrives for it?

>>>

 b) What does the transport process on the destination host do with multiple TCP segments from a single application message? (This answer is not short.)

>>>

### Inside the Internet

 15. a) How many bits long are IPv4 addresses?

>>>

 b) Convert 00000001 00000010 00000000 11111111 to dotted decimal notation (spaces have been added). (Note: 00000001 is 1).

>>>

 c) Convert 5.6.0.255 to a 32-bit IP address (add spaces between groups of 8 bits). (Note: 5 is 0000101, not 101.)

>>>

 16. a) What are the three parts of an IP packet? (Yes, this is a repeat of an earlier question.)

>>>

 b) In which part will you find the source and destination IP addresses?

>>>

 c) Which of these addresses will routers use to deliver the IP packet?

>>>

 17. a) What does a router do when an IP packet arrives?

>>>

 b) What is router forwarding called?

>>>

 c) In Figure 1-17, suppose that 60.3.27.47 transmits a packet to 128.171.17.13. When Router C receives the packet, what will be its routing choices?

>>>

 18. a) Distinguish between data links and routes.

>>>

 b) In Figure 1-15, how many data links are there when the packet travels to Host 5.6.7.8?

>>>

 c) How many routes will there be?

>>>

 d) In general, when a source host sends a packet to a destination host, will there probably be more data links or routes along the way? Explain. (The answer is not in the text.)

>>>

 19. a) There are six routers between the source and destination host. How many transport processes will be involved? Explain.

>>>

 b) How many internet processes will be involved? Explain.

>>>

 20. Why does the Internet need supervisory protocols?

>>>

 21 a) What type of host gets a dynamic IP address?

>>>

 b) What type of host gets a static IP address?

>>>

 c) Why is a static IP address needed for this type of host?

>>>

 d) Does a DHCP server give a host the same IP address each time?

>>>

 22. a) Distinguish between the originating host, the DNS server, and the target host.

>>>

 b) What is the purpose of a DNS lookup?

>>>

 c) Does the originating host need to contact the DNS host each time it sends a packet to the target host? Explain.

>>>

### Single Networks, Data Links, and Physical Links

 23. a) Distinguish between physical links and data links.

>>>

 b) In a point-to-point single network, how many physical links will there be when a packet is transmitted?

>>>

 c) How many data links?

>>>

 24. a) In Figure 1-22, how many physical links will there be when Router A sends a Packet to Router B.

>>>



 b) How many data links will there be?

>>>

 c) When Client Host Y sends a packet to Router B, how many physical links will there be?

>>>

 d) Data links?

>>>

 e) When Client Host Y sends a packet to Server Host X, how many physical links will there be?

>>>

 f) Data links?

>>>

 25. a) Are packets carried inside frames, or are frames carried inside packets?

>>>

 b) A host sends a packet to another host. There are ten single networks along the way. How many hosts will there be?

>>>

 c) How many data links?

>>>

 d) How many routes?

>>>

 e) How many frames?

>>>

 f) How many packets?

>>>

 g) To what device will the first host transmit a frame containing a packet?

>>>

 h) To what device will the final router address a frame?

>>>

 26. a) Are all data link addresses EUI-48 addresses?

>>>

 b) In which header are source and destination IP addresses found?

>>>

 c) In which header are source and destination data link addresses found?

>>>

 d) What kind of data link address do Ethernet networks use?

>>>

 e) What kind of data link address do Wi-Fi networks use.

>>>

 f) Why do hosts need two addresses?

>>>

### Internet Routers and Personal Access Routers

 27. a) Compare Internet core routers with home access routers in terms of functionality.

>>>

 b) Compare them in terms of routing complexity.

>>>

 c) Compare corporate access points and Internet access routers with wireless access point capabilities.

>>>

### End of Chapter Questions

Thought Questions

1-1. In Figure 1-28, when Host A transmits a packet to Host B, how many physical links, data links, and routes will there be along the way? How many packets and frames? How many switches and routers? (Hint: the answers are in the figure, but work it out yourself.)

>>>

1-2 Repeat for Host C sending a packet to Host E.

>>>

1-3. Repeat for Host A to Host C.

>>>

1-4. Repeat for Host E and Router 3.

>>>

1.5. Repeat for Router 1 and Router 3.

>>>

1-6. Repeat for Router 1 and Router 2.

>>>

Perspective Questions

**1-7.** What was the most surprising thing you learned in this chapter?

>>>

**1-8.** What was the most difficult thing in this chapter for you? Why was it difficult?