CS335 Sample Test

Disclaimer:

This sample test is provided to give you examples of the "kinds of questions" that might be asked on the test. However, the sample test does not provide a comprehensive coverage of the material that might be on the test. All material covered in class is "fair game" for the test.

1.) Describe connection-oriented vs. connectionless service. What transport layer protocols are realizations of each of these concepts?

Answer:

Connection-oriented

Exchange control packets before sending data (establish a connection) (handshake)
Not a real connection (but the peers at some layers see it that way)
Often provides reliable transfer
May have flow and congestion control

Connectionless

No handshake
Usually unreliable
No flow or congestions control

TCP – Connection-oriented
UDP - Connectionless

2.) What are the advantages/disadvantages of a layered architecture? What layer is SMTP written for? What layer is UDP written for?

Answer:

Advantages:

Easier to implement (divide and conquer)
Easier to upgrade (change one layer, other layers are not affected as long as interface between layers remains constant).

Disadvantages:

Cannot optimize across layers

3.) Compare circuit switching and packet switching. What are the advantages and disadvantages?

Answer:

Circuit Switching

All resources from end-to-end are reserved

May have to wait if all resources are not available

Telephone network is example (calls are not interrupted, but busy signals are possible)

Resources are unused during "idle" periods of connection

Packet Switching

Better utilization of resources

Cannot guarantee availability of resources

4.) What are time division and frequency division multiplexing (TDM and FDM)? Describe a data channel might be shared using each method.

Answer:

Time Division Multiplexing

Entire resource is allocated to one use in time slices

Frequency Division Multiplexing

Signal is broken into bands where each use gets a dedicated band.

5.) Describe each of the following:

Answer:

a. *Processing Delay – the time required to examine the packet's header and determine where to direct the packet.*
b. *Queuing Delay – the time the packet spends waiting for transmission while packets that are ahead of it are transmitted.*
c. *Transmission Delay – The actual time required to "spit out " the packet. That is, get it out of the server and on its way to the next hop.*
d. *Propagation Delay – the amount of time required for a bit to travel over the link to the destination.*

6.) For each of these protocols, indicate whether data can arrive/depart out of order:

a. TCP
b. UDP
c. HTTP

7.) In a layered architecture, each layer provides a virtual conversation between peers. How is this virtual conversation realized?

8.) How do peer-to-peer architectures differ from client-server architectures? In terms of the socket API, what do you think would be different?

9.) What is an RFC? What is its purpose?

10.) What is a Domain Name Server? What is its purpose?

11.) Describe the basic mechanism used to provide Domain Name Service.

12.) What are the advantages of using a distributed database for DNS?

13.) What is DNS caching? Why is it a good idea? How do we know that the data in the cache is up-to-date?

14.) What is the purpose of each of the following socket API and associated function calls?

a. socket
b. connect
c. accept
d. bind
e. listen
f. fork
g. WSAStartup
h. close
i. shutdown
j. htonl
k. htons
l. gethostbyname
m. receiveFrom

15.) If you were to implement a basic webpage server, which of the following would be relevant to your work? Why?

a. HTTP protocols
b. SMTP protocols
c. UDP protocols
d. TCP protocols

16.) What are transport layer multiplexing and demultiplexing?

17.) What critical information must be contained in a UDP segment?

18.) Why might a TCP segment contain more information than a UDP segment? What kind of information might this include?

19.) Suppose a go-back-n protocol, with n=10, sends segments 0-9 to a peer that is currently expecting sequence number 0. However, segments 2 and 7 are corrupted in transmission. In what order will the receiver accept and acknowledge the 10 segments? (Hint: This is a bit of a trick question.)

20.) In the previous question, how many times will each of the segments be transmitted?

21.) Suppose a selective repeat protocol with a send window=[0..9], sends segments 0-9 to a peer with a receive window that is currently accepting segments [0-9]. However, segments 7 and 2 are corrupted in transmission. In what order is the receiver likely to accept and acknowledge the 10 segments?

22.) In the previous question, how many times will each of the segments be transmitted?

23.) What is the principal disadvantage in using a “stop and wait” protocol?