

## **CSE 283 Study Guide**

### **Chapter One Terms**

Know the meaning and significance of the following terms. For acronyms, make sure you know what the letters stand for.

Bandwidth  
Circuit Switching  
Datagram network  
End System  
Guided medium  
Internet Backbone  
ISP  
Nodal Processing delay  
Packet Loss  
Packet Switching  
Physical Media  
Propagation delay

Protocol  
Queuing Delay  
RFC  
RTT  
Socket  
Total nodal delay  
Traffic Intensity  
Transmission delay  
Unguided medium

### **Chapter One Skills and Knowledge**

1. Write the term that defines message format, the order in which messages are sent and received and the actions taken by network entities message transmission, receipt.
2. List what is defined by a network protocol.
3. State the unit of measure normally used to describe network transmission rate.
4. Given a list of network components identify which are hosts or end systems.
5. State what is described by a Request for comments (RFC) and where they be can be found. State whether the contained information is open or proprietary.
6. State what is maintained by the Internet Engineering Task Force (IETF).
7. List the type of communication services provided to network applications by the internet.
8. List the two major models used to describe the communication between two hosts.
9. Identify fundamental differences between circuit switched and packet-switched networks.
10. State what type of network is described in terms of link bandwidth and switch capacity, provides no "sharing" of resources, has a guaranteed performance and requires a setup period prior to communication between hosts.
11. State what type of network breaks data into discrete chunks, "shares" network resources and dedicates full link bandwidth to each chunk of data when transmitting.
12. List the advantages of packet switching as compared to circuit switching.

13. List the advantages of circuit switching as compared to packet switching.
14. Describe how frequency division and time division can be used to divide network bandwidth or identify instances of each.
15. Describe what is meant by statistical multiplexing and how it is related to TDM and FDM.
16. Name the primary reason messages are segmented in a packet switched network.
17. State what is asymmetric in an ADSL.
18. State the role performed by a local area network (LAN) as related to the internet.
19. Given a communication medium, indicate whether it is guided or unguided.
20. Indicate which type of medium can be expected to have the highest and lowest bandwidth when considering twisted pair, coaxial cable, fiber optic cable.
21. Given descriptions of the connectivity of several ISPs identify which are tier-1, tier-2 or tier3 (local ISPs).
22. State when queuing occurs at a router and what results if queue capacity is exceeded.
23. List the four sources of packet or nodal delay.
24. Based on given processing, queuing, transmission, and propagation delays calculate total delay for a given piece of data.
25. Given the length of the link and the propagation speed for the link medium, calculate the propagation delay.
26. Given the bandwidth of a network link and the size of the data to be transmitted, calculate the transmission delay for the data.
27. List the five protocol layers of the internet in order from lowest to highest.
28. State generally what each protocol layer does to the data received from the level above on the sending host and what each protocol layer does to data received from the level below on the receiving host.

## Chapter Two Terms

Know the meaning and significance of the following terms. For acronyms, make sure you know what the letters stand for.

|                                      |                                       |
|--------------------------------------|---------------------------------------|
| Authoritative DNS Server             | Out-of-band                           |
| Bandwidth-sensitive application      | Overlay network                       |
| Client                               | P2P                                   |
| Conditional Get                      | Persistent connection with pipelining |
| Conical Hostname                     | Persistent connection w/ pipelining   |
| Connectionless unreliable service    | POP                                   |
| Connection-oriented reliable service | Web Proxy Server                      |
| Cookie                               | RFC                                   |
| DNS                                  | Root DNS Server                       |
| DNS caching                          | Server                                |
| Elastic applications                 | SMTP                                  |
| FTP                                  | Socket                                |
| HTTP                                 | TCP                                   |
| IMAP                                 | TLD DNS Server                        |
| In-band                              | UDP                                   |
| IP                                   | Web cache                             |
| IP address                           | Torrent                               |
| Local DNS Server                     | Bit torrent chunk                     |
| Loss-tolerant application            | Overlay network                       |
| Mime encoding                        |                                       |
| Non-persistent connection            |                                       |

## Chapter Two Skills and Knowledge

1. Given a description of the interaction between two hosts, identify which of the hosts is the client and which is the server or state that hosts are following a peer-to-peer paradigm.
2. Determine the transport layer service that should be used by an application based upon its data loss, timing, and bandwidth requirements.
3. State which Internet transport layer protocol is connection oriented.
4. State which Internet transport layer protocol provides reliable, in-order byte-stream data transfer.
5. List the services provided by the UDP (User Datagram Protocol).
6. State which Internet transport layer protocol provides connectionless service.
7. Given an application layer protocol service requirement, identify whether the TCP or UDP protocols should be used.
8. Describe what is performed by the server according to the HTTP protocol.
9. Name and describe the primary difference between HTTP 1.0 and 1.1.
10. HTTP is a stateless protocol, describe what this means.
11. State the port number normally associated with an HTTP server.

12. Given a description of the communication between an HTTP server and client. Determine whether the pair is using persistent HTTP or non-persistent HTTP and whether parallel connections are being used.
13. Given a HTTP request or response message identify and interpret the command line and header lines.
14. Identify messages containing a conditional get.
15. Identify the purpose of the HTTP GET, POST, HEAD, PUT, and DELETE messages in HTTP.
16. Describe the advantages of using a conditional GET message in HTTP.
17. Describe how cookies can be used to store state.
18. Identify when Conditional Get client-side caching is used.
19. Identify what is performed by the clients and servers using the FTP (file transfer protocol).
20. Describe why FTP client/server communication is considered “out of band.”
21. Name the public domain protocol commonly used by a user agent to send mail.
22. Name the public domain protocol used by a mail server to send an email message to another mail server.
23. Name two public domain protocols commonly used by user agents to download mail from a mail server.
24. Identify advantages and disadvantages of POP3 and IMAP mail access protocols.
25. State the reason MIME encoding (multimedia mail extension) is required under the SMTP protocol.
26. List four reasons DNS uses a distributed database instead a centralized database.
27. Given a DNS lookup scenario, identify the local, authoritative, and root name servers involved
28. Describe why an iterative query might be used instead of a recursive query.
29. Identify recursive and iterative queries in a DNS lookup scenario.
30. State why DNS servers cache RR records.
31. Write the Type A, NS, CNAME, MX resource record formats and describe what each field will contain for a given record type.
32. State what information a networked application must have access to in order to send a message to another application using TCP/IP or UDP/IP.
33. Describe the relationship between a using particular port number with TCP/IP and using the same port number using UDP/IP.
34. Identify a connection oriented protocol in which a server must establish a separate connection with each client and data is sent and received via socket associated streams.
35. Identify a protocol in which an application could use the same socket to communicate with several other applications. At the application level this protocol requires that each data transmission have an explicitly stated address and port number.
36. Describe when it would be necessary to explicitly specify a port number when creating a DatagramSocket and when it would not be.

37. Given a scenario describe how web caching might be used to solve it.
38. State the disadvantages of using a centralized directory in a peer to peer file sharing system.
39. Describe why the technique called *rarest first* is used in the bit torrent system.
40. Explain the importance of 'tit-for-tat' in the bit torrent system.
41. Describe how a peer can join a peer to peer network that does not have a centralized server and find other peers.

## Coding

Be able to implement simple (not multi-threaded) UDP and TCP clients and servers that send and receive java primitives in the form of bytes using objects and methods of the following classes. You will have access to the Sun Java API documentation available to you during the exam.

DatagramPacket  
DatagramSocket  
InetAddress  
InetSocketAddress  
Socket  
ServerSocket

ByteArrayInputStream  
ByteArrayOutputStream  
DataInputStream  
DataOutputStream  
Scanner