

ICOM 5026-090: Computer Networks

Homework 5

(You don't have to due this homework in class, but you have to do it in order to prepare the Test 2.)

On Textbook: Andrew S. Tanenbaum, "Computer Networks," Forth Edition, Prentice Hall, 2003.

Pages 474-480:

1. Give two example computer applications for which connection-oriented service is appropriate. Now give two examples for which connectionless service is best.

Answer:

File transfer, remote login, and video on demand need connection-oriented service. On the other hand, credit card verification and other point-of-sale terminals, electronic funds transfer, and many forms of remote database access are inherently connectionless, with a query going one way and the reply coming back the other way.

2. Are there any circumstances when connection-oriented service will (or at least should) deliver packets out of order? Explain.

Answer:

Yes. Interrupt signals should skip ahead of data and be delivered out of sequence. A typical example occurs when a terminal user hits the quit (kill) key. The packet generated from the quit signal should be sent immediately and should skip ahead of any data currently queued up for the program, i.e., data already typed in but not yet read.

3. Datagram subnets route each packet as a separate unit, independent of all others. Virtual-circuit subnets do not have to do this, since each data packet follows a predetermined route. Does this observation mean that virtual-circuit subnets do not need the capability to route isolated packets from an arbitrary source to an arbitrary destination? Explain your answer.

Answer:

Virtual circuit networks most certainly need this capability in order to route connection setup packets from an arbitrary source to an arbitrary destination.

7. Consider the network of Fig.5-7 on the textbook, but ignore the weights on the lines. Suppose that it uses flooding as the routing algorithm. If a packet sent by A to D has a maximum hop count of 3, list all the routes it will take. Also tell how many hops worth of bandwidth it consumes.

Answer:

It will follow all of the following routes: ABCD, ABCF, ABEF, ABEG, AGHD, AGHF, AGEH, and AGEF. The number of hops used is 24.

9. Consider the subnet of Fig.5-13(a) on the textbook. Distance vector routing is used, and the following vectors have just come in to router C: from B: (5, 0, 8, 12, 6, 2); from D: (16, 12, 6, 0, 9, 10); and from E: (7, 6, 3, 9, 0, 4). The measured delays to B, D, and E, are 6, 3, and 5, respectively. What is C's new routing table? Give both the outgoing line to use and the expected delay.

Answer:

Going via B gives (11, 6, 14, 18, 12, 8).

Going via D gives (19, 15, 9, 3, 9, 10).

Going via E gives (12, 11, 8, 14, 5, 9).

Taking the minimum for each destination except C gives (11, 6, 0, 3, 5, 8). The outgoing lines are (B, B, -, D, E, B).