CS 6380 Computer Networks **Fall Quarter, 1997**

Homework 5

Assigned: November 18 *Due: November 25*

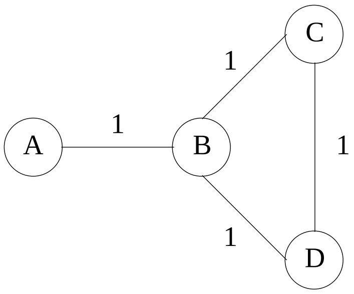
Reminder: Late homeworks will NOT be accepted!

1. Tannenbaum, 5.8

2. At a certain router, an IP datagram consisting of 926 data bytes is to be fragmented for transmission on a network with a maximum data field of 256 bytes. The header length of the original datagram is 36 bytes. Assuming that all fragments are of the maximum length (except the last one) find the values of the header length, total length, fragment offset and "more" fields for each fragment.

3. Because of segmentation, an IP datagram can arrive in pieces. The IP layer at the receiving host must put these pieces together until the original datagram is complete. Describe the data structures that must be maintained by the IP layer for the purpose of piecing together datagrams. State the processing that occurs when an IP fragment is received. Describe the processing in the form of pseudocode that accesses the fields of the IP fragment and your data structures, and makes modifications as necessary.

4. As mentioned in class, distance vector routing algorithms have the property that "good news" travels quickly, while "bad news" travels slowly. Demonstrate this using the network shown below:



   (a) Assume that the link (A,B) is initially down. Show the row corresponding to destination A for the distance tables at each node.
   (b) Now assume the link (A,B) is repaired. Give the distance vector exchange messages that allow all the nodes to discover that the link is repaired. How many are there?
   (c) Now assume the link fails again, thus the cost goes to infinity. How many distance vector exchange messages will be needed for all node to discover this?

5. Use the UNIX utility `traceroute` to determine the routers on the path from your host to other hosts in the Internet (e.g., synchrologic.com, cs.ucl.ac.uk). List three interesting details about routes that you can extract from your traceroute examples. (To do this, you should read the man page for `traceroute`, using the UNIX command `man traceroute`, so that you know how `traceroute` works.)