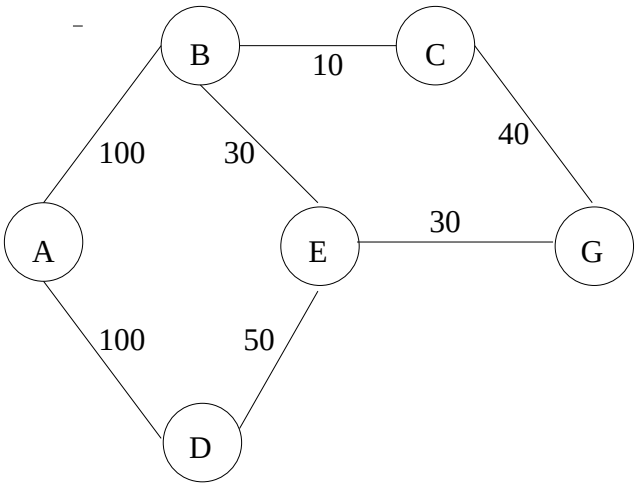
CS 4251 Computer Networks II **Spring Semester, 2003**

Homework 4

Assigned: March 7 *Due: March 13 (in class)*

Note: Late homeworks will NOT be accepted, however your lowest homework grade will be dropped.

1. Chapter 7, problem 26.
2. In class we discussed the option to use two queues on an output link, one for high priority traffic and one for low priority traffic. This might be used, for example, in ATM to treat cells with cell loss priority (CLP) set to 1 differently. Explain how the basic scheme can "starve" the low priority traffic by never giving it access to the link. Design a scheme that will give the low priority traffic access to a r bits per second for a link with rate R bits per second. How does this affect the performance of the high priority traffic?
3. Consider the topology below, where the bandwidth capacity is listed next to each link. Suppose there are seven connections in the topology, as follows: (A-B-C), (D-A-B), (A-B-E), (B-E-G), (C-G), (C-G), (D-E-G), where each list gives the source, the series of intermediate nodes, and the destination. For example, (A-B-C) means a connection that begins at node A, traverses node B, and terminates at node C. Compute the max-min fair share bandwidth allocations, showing your work.



4. For the problem above, explain what happens when connection (A,B,E) ends. What computation occurs and what is the new set of allocations?
5. The ATM ABR service allows a connection to specify a minimum rate. Why might this be useful? Suppose connection (A,B,E) requires a minimum rate of 30. Is this possible? What will be the effect on the rest of the allocations?
6. Chapter 9, problem 20. "Multiplexing gains" refers to the benefit of using the same link(s) for multiple connections that have time varying behavior. The goal is that when some connection need higher bandwidth, other connections need lower bandwidth, allowing for good sharing.