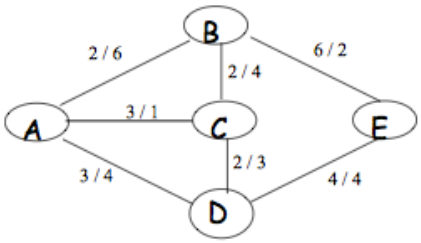
1. What are the benefits of IPv6 over IPv4?
2. Describe both Link-State & Distance Vector approaches to routing.
3. Classify RIP/OSPF/BGP according to the following metrics: LS or DV, Intra-AS or Inter-AS, Centralized or Distributed
4. Many network engineering problems are about resource allocation – namely the allocation of a set of finite resources amongst users with certain needs. Suppose there are 3 users competing for a 90 mbps link. Users 1 and 2 want 50 mbps each and User 3 wants 10 mbps. My solution is to give each one 30 mbps. Is this fair?
5. We discussed max-min fair in class. What is the max- min fair allocation? What is the TCP fair solution?
6. Consider the communication graph below. The edge labels are of the form a / b, where a is the cost in dollars of using that link and b is the delay in seconds of using that link. Run Dijkstra's algorithm on this graph and find the optimal route from A to E.




7. For the communication graph above, state the distance vector table that would be computed by node D using the distance vector algorithm.
8. Did you notice that the previous two questions (6 &7) were not well defined? Remember that when you see the word "optimal", you should first ask what is the optimality metric? Is it cost? Or is it delay? Compute both the delay optimal route and the cost optimal routes.
9. In the resource allocation problem, you were asked to compute a "fair" solution. Again, you need to ask first what is the fairness metric? What are some notions of fairness?
10. Compare the Dijkstra Shortest Spanning Tree to the Minimum-cost Broadcast Spanning Tree for the graph in Question 6.
11. Bonus Question: Consider a wireless network. Does carrier sensing always work in wireless networks? What MAC does WiFi (802.11) use? Describe it and compare it to the MAC used in Ethernet.