

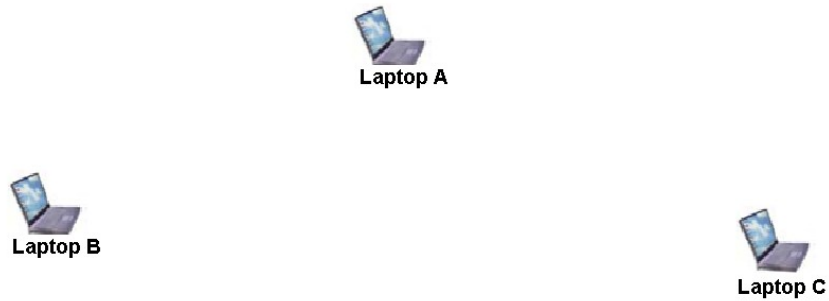
18-345
Introduction to Telecommunication Networks
Homework 4

October 27th, 2008

Due: November 3rd, 2008

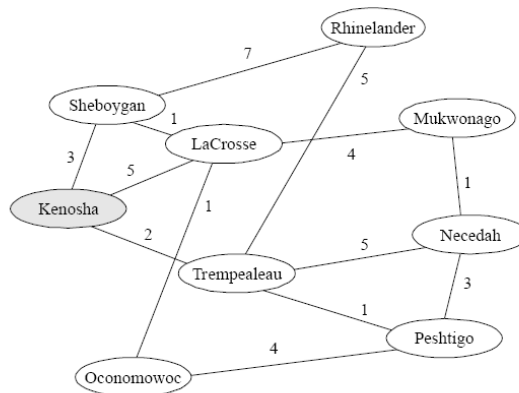
(Please submit your homework to Angela.Miller@Wean.8215, before 4:30pm on Nov. 3rd)

1. An Ad hoc wireless network consists of three laptops: **A**, **B** and **C**. One process on Laptop **B** is uploading a large file (300 MB) to Laptop **A** as fast as possible, with average throughput of 6Mbps.



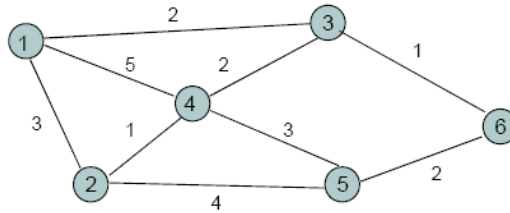
- a. After a few seconds, the same process on Laptop **C** starts to upload a large file to Laptop **A** as well. All of a sudden, the throughput on Laptop **B** drops dramatically (~ 0.5 Mbps). Explain what happens.
- b. RTS/CTS is then turned on for all the laptops. Assume RTS/CTS adds 20% overhead to the transmission time. What is the average throughput on Laptop **B**?

2. You just moved to Kenosha, Wisconsin, and you would like to find the shortest routes to the following cities: LaCrosse, Mukwonago, Necedah, Oconomowoc, Peshtigo, Rhinelander, Sheboygan, and Trempealeau. The map is show below, with travel times marked on each route between cities.



Use Dijkstra's algorithm to find the spanning tree rooted at Kenosha. This is equivalent to finding the shortest paths from Kenosha to each of the other towns. At each iteration of the algorithm, please evaluate the nodes in alphabetical order. Also, draw the resulting spanning tree rooted at Kenosha.

3. Consider the network shown in Figure 7.30 in Leon-Garcia.



- a. Use the Bellman-Ford algorithm to find the set of shortest paths from all nodes to destination node 3
 - b. Now continue the algorithm after the link between node 3 and 4 goes down.
4. (Pb. 8.6 In Leon-Garcia): A host in a organization has an IP address 150.32.64.34 and a subnet mask 255.255.240.0. What is the address of this subnet? What is the range of IP addresses that a host can have on this subnet?
5. (Pb. 8.7 in Leon-Garcia): A university has 150 LANs with 100 hosts in each LAN.
- a. Suppose the university has one Class B address. Design an appropriate subnet addressing scheme?
 - b. Design an appropriate CIDR addressing scheme.