CS320: Internetworking
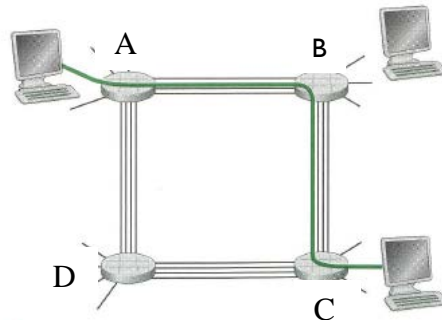## Fall 2021

Writing Assignment #1

- Name only: _____
- Release date: Sep 01, 2021 (Wednesday), 2:15 pm
- Due date: Sep 08, 2021 (Wednesday), 1:00pm
- It should be done INDIVIDUALLY; **Show ALL your work**
- Total: 10 pts

1. Consider the following circuit-switched network. There are 4 circuits on each link. Label the four switches A, B, C, and D, going in the clockwise direction.

Figure 1.13 ♦ A simple circuit-switched network consisting of four switches and four links

a. What is the maximum number of simultaneous connections that can be in progress at any one time in this network?

[1 pt]

b. Suppose that all connections are between switches A and C. What is the maximum number of simultaneous connections that can be in progress?

[1 pt]

c. Suppose we want to make four connections between switches A and C, and another four connections between switches B and D. Can we route these calls through the four links to accommodate all eight connections? If yes/no, why?

[2 pts]

2. We consider sending real-time voice from Host A to Host B over a packet-switched network (VoIP). Host A converts analog voice to a digital 64 kbps bit stream on the fly. Host A then groups the bits into 56-byte packets. There is one link between Hosts A and B; its transmission rate is 2 Mbps and its propagation delay is 10 msec. As soon as Host A gathers a packet, it sends it to Host B. As soon as Host B receives an entire packet, it converts the packet's bits to an analog signal. How much time elapses from the time a bit is created (from the original analog signal at Host A) until the bit is decoded (as part of the analog signal at Host B)?

[3 pts]

3. Suppose N packets arrive simultaneously to a link at which no packets are currently being transmitted or queued. Each packet is of length L and the link has transmission rate R. What is the average queuing delay for the N packets?

[3 pts]