Homework 2

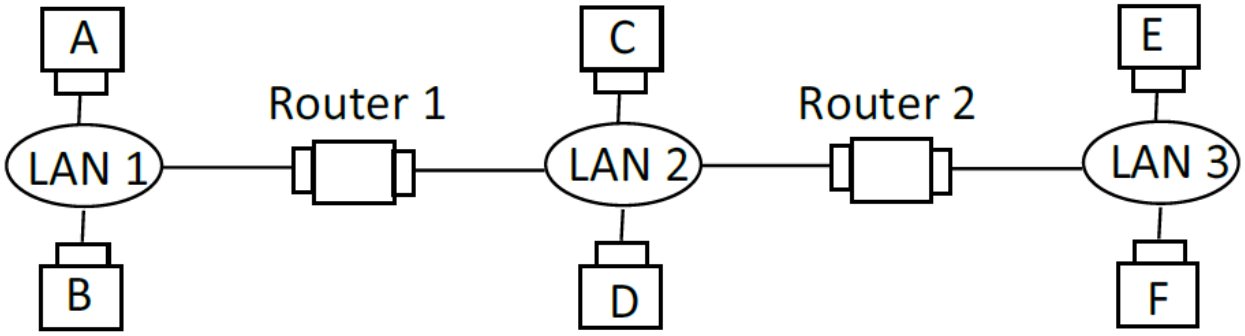
Network Architecture I, Fall 2016

Due: paper submission, September 22nd 10:00 am

(paper submission in class and electronic submission on Bb)

1) In CSMA/CD, after the fifth collision, what is the probability that a node chooses K=10? The result K=10 corresponds to a delay of how many seconds on a 10 Mbps Ethernet?

2) Consider three LANs interconnected by two routers, as shown in the diagram below.



(a) Assign IP addresses to all the interfaces. For subnet 1 use address of the form 111.111.111.xxx; for subnet 2 use address of the form 122.222.222.xxx; and for subnet 3 use addresses of the form 133.133.133.xxx.

(b) (randomly) Assign MAC addresses to all the adapters.

(c) Consider sending and IP datagram from Host A to Host F. Suppose all of the ARP tables are up to date. Enumerate all the steps as done for the single-router example.

(d) Repeat (c), now assuming that the ARP table in the sending host is empty (and the other tables are up to date).

3) Suppose a CSMA/CD network is running 100 Mbps over a 1-km cable with no repeaters. The signal speed in the cable is 400,000km/sec.

   a. Compute the following:
      i. End-to-end propagation delay.
      ii. Worst-case (i.e., the longest) collision detection time.
      iii. Minimum frame size. (Hint: the frame size should be big enough to be transmitted during the full worst case collision detection time)

   b. Suppose we increase the bandwidth from 100 Mbps to 1 Gbps, how does it affect the above three values?

Laboratory Homework

Laboratory Homework Part 1: using ipconfig(Windows) or ifconfig (Unix/Linux)
ipconfig is a command line tool used to control the network connections on Windows machines. The Linux/Unix equivalent of ipconfig is ifconfig. For more detail, refer http://www.ss64.com/nt/ipconfig.html.

Answer to the following questions after trying various options.

1. What are the Physical and IP addresses of the host?

2. How many bits are for the subnet mask? What is the subnet (not subnet mask) of the host?

Laboratory Homework Part 2: arp

3. Try 'arp' command in order to

    a. show the current ARP table of an interface of your host
    b. delete all current entries of the ARP table of an interface of your host
    c. show the ARP table again after a web browsing
    d. show the ARP table again after a few minutes of no network activity