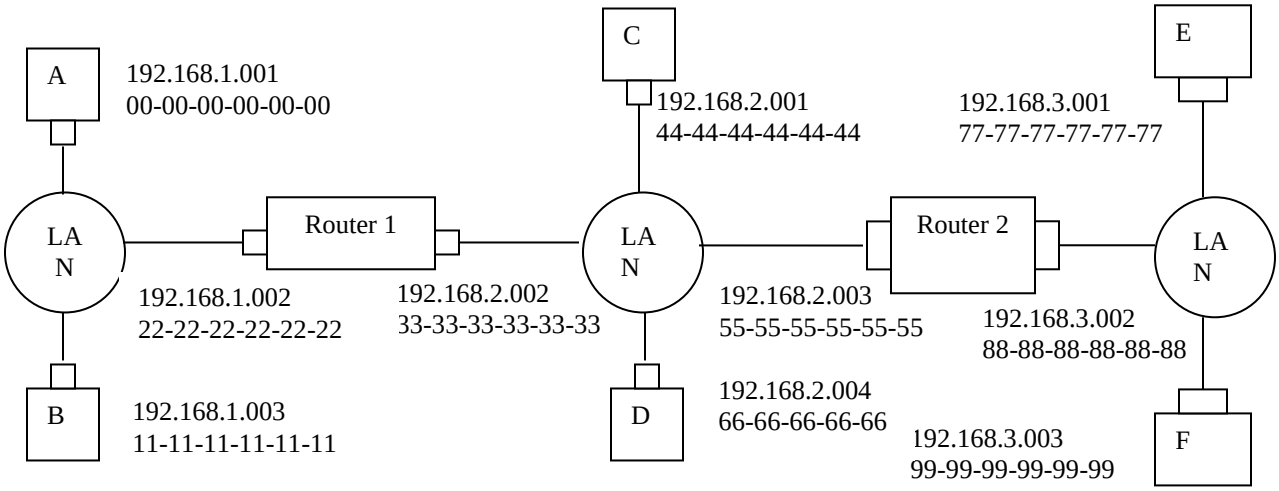
Introduction to Computer Networks
Homework 5

[1] **(1 point)**Consider using cyclic redundancy check to error detection. If the sender and receiver have agreed on a generator G = 10011, and suppose that the data D has the value of 1010101010. What is the checksum should be? Aka. What is the value of R? Show your calculation steps for credits.

[2] **(3 points)** Consider three LANs interconnected by two routers, as shown below.



(a) Host E is sending an IP data gram to Host B. Suppose all of the ARP tales are up to date. List all frames that are transmitted on all the three LANs by filling in the table.

	Sender	Type (ARP request, ARP response, or regular data)	Source MAC address	Destination MAC address	Source IP	Destination IP
1	E					
2						
3						
4						

[3] **(2 points)** Suppose node A and B are on the same 10Mbps Ethernet bus, and the propagation delay between the two nodes is 325 bit times. Suppose node A begins transmitting a frame and, before it finishes, node B begins transmitting a frame. Can A finish transmitting before it detect that B has transmitted? Why or why not? *Hint: suppose at time t = 0 bit times, A begins transmitting a frame. In the worst case, A transmits a minimum-sized frame of 512+64 bit times. So A would finish transmitting the frame at t = 512+64 bit times. Thus, the answer is no. if B's signal*

reaches A before bit time t = 512+64bits. In the worst case, when does B's signal reach A?

[4] Suppose four nodes, A, B, C, and D are all connected to a hub via 10Mbps Ethernet cables. The distance between the hub and these four nodes are 300m 400m, 500m, and 700m, respectively. Recall that the CSMA/CD protocol is used for this Ethernet. Assume that the signal propagation speed is $2*10^8$ m/sec.

(a) **(2 points)** What is the minimum required frame length? What is the maximum required frame length?

(b) **(2 points)** If all frames are 1500bits long, find the efficiency of this Ethernet.