CSEE-5110: HW quiz 7, Nov 12, 2015

1. (20 points total)

   (a) (10 points) Suppose an ISP owns the block of addresses of the form 134.193.128.0/24. Suppose it wants to create 4 subnets (A, B, C, D) from this block, with each block having the same number of IP addresses. What are the prefixes (of form a.b.c.d/x) for the 4 subnets?

   A: 134.193.128.0/26
   B: 134.193.128.64/26
   C: 134.193.128.128/26
   D: 134.193.128.192/26

   (b) (10 points) Indicate the subnet (A, B, C, D) to which each packet below should forwarded, or if the packet should be forwarded to another network (i.e. the subnet is not locally located).

   - 134.193.128.235: D
   - 134.193.128.37: A
   - 128.243.14.110: Forward
   - 134.193.128.123: B
   - 134.193.128.154: C

2. (5 points) Consider a router with a switch fabric, 4 input and 4 output ports. If the line speed is 100Mbps, how fast must the switch fabric be to eliminate input queueing? 400Mbps

3. (10 points) A 4,568 octet datagram with ID = 351 and which includes a 20 octet IP header is to be transmitted across several networks from source to destination. An intermediate network can handle payloads of only 1,500 octets. Therefore the original IP packet needs to be fragmented. Show the data length, ID, more flag, and fragment offset field for the resulting IP fragments.

Segment	Length	ID	Flag	Offset
1	1500	351	1	0
2	1500	351	1	185
3	1500	351	1	370
4	128	351	0	555

4. (5 points) Consider two 100Mbps LANs A and B connected by a bridge. Each LAN has 10 stations. 40% of traffic from LAN A is destined for LAN B and 20% of traffic from LAN B is destined for LAN A. Given that all stations have data to send, *write down the expression only* for the maximum possible transmission rate of stations on each LAN.

$$\begin{aligned} 10X_A + 2X_B &= 100 \\ 4X_A + 10X_B &= 100 \end{aligned}$$