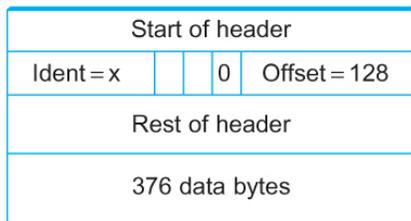
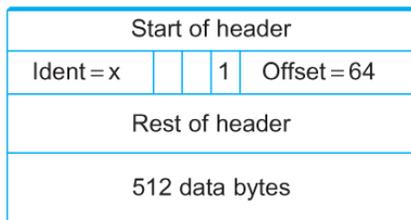
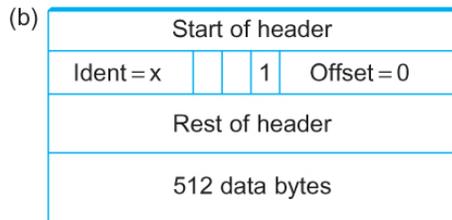


CSC 8560 – Network Layer Assignment

1. Exercise 39, page 293 from the textbook:

Suppose the fragments from the Figure below all pass through another router onto a link with the MTU of 380 bytes, not counting the link header. Show the fragments produced. If the packet were originally fragmented for this MTU, how many fragments would be produced? (You do not need to show the packets for this last part.)



2. Exercise 55, page 297 from the textbook:

Suppose a router has built up the routing table shown in the table below.

Subnet Number	Subnet Mask	Next Hop
128.96.39.0	255.255.255.128	Interface 0
128.96.39.128	255.255.255.128	Interface 1
128.96.40.0	255.255.255.128	R2
192.4.153.0	255.255.255.192	R3
default		R4

The router can deliver packets directly over interfaces 0 and 1, or it can forward packets to routers R2, R3 or R4. Describe what the router does with a packet addressed to each of the following destinations:

- (a) 128.96.39.10
- (b) 128.96.40.12
- (c) 128.96.40.151
- (d) 192.4.153.17
- (e) 192.4.153.90

3. Exercise 68, page 302 from the textbook:

An organization has been assigned the prefix 212.1.1/24 (class C) and wants to form subnets for four departments, with hosts as follows:

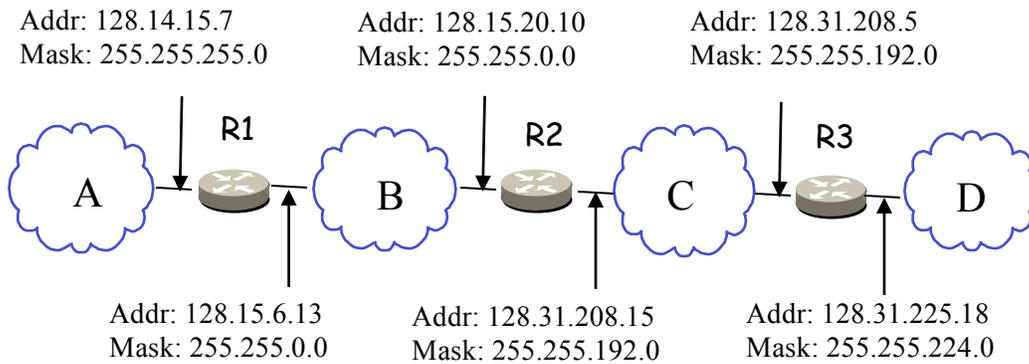
- A 75 hosts
- B 35 hosts
- C 20 hosts
- D 18 hosts

There are 148 hosts in all.

- a) Give a possible assignment of subnet masks to make this possible.
- b) Suggest what the organization might do if department D grows to 32 hosts.

4. [Network Addresses]

Consider the internetwork below. Addr and Mask specify to the IP addresses assigned to the router interfaces.



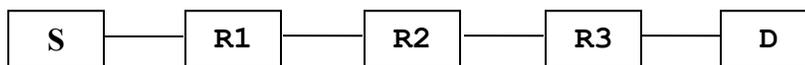
Two hosts H1 and H2 have been configured with addresses 128.31.30.40 and 128.31.198.6. Which network if any, can they be placed on (among A, B, C, D), and what would their subnet mask be ?

5. [Error Control]

Suppose that a router receives an IP datagram of length greater than the MTU (Maximum Transmission Unit) of the outgoing link and the DF (Do not Fragment) bit in the IP header of the datagram is set to 1. What does the router do?

6. [Traceroute]

Assume there are three routers R1, R2 and R3 between a source S and a destination D, and that the middle router (R2) decrements the TTL, but incorrectly forwards the IP datagram when the incoming TTL was 1.



Describe what happens when you are running *traceroute* from S to D. What is the path that traceroute would learn?

7. [Addresses]

List three key differences between MAC and IP addresses.