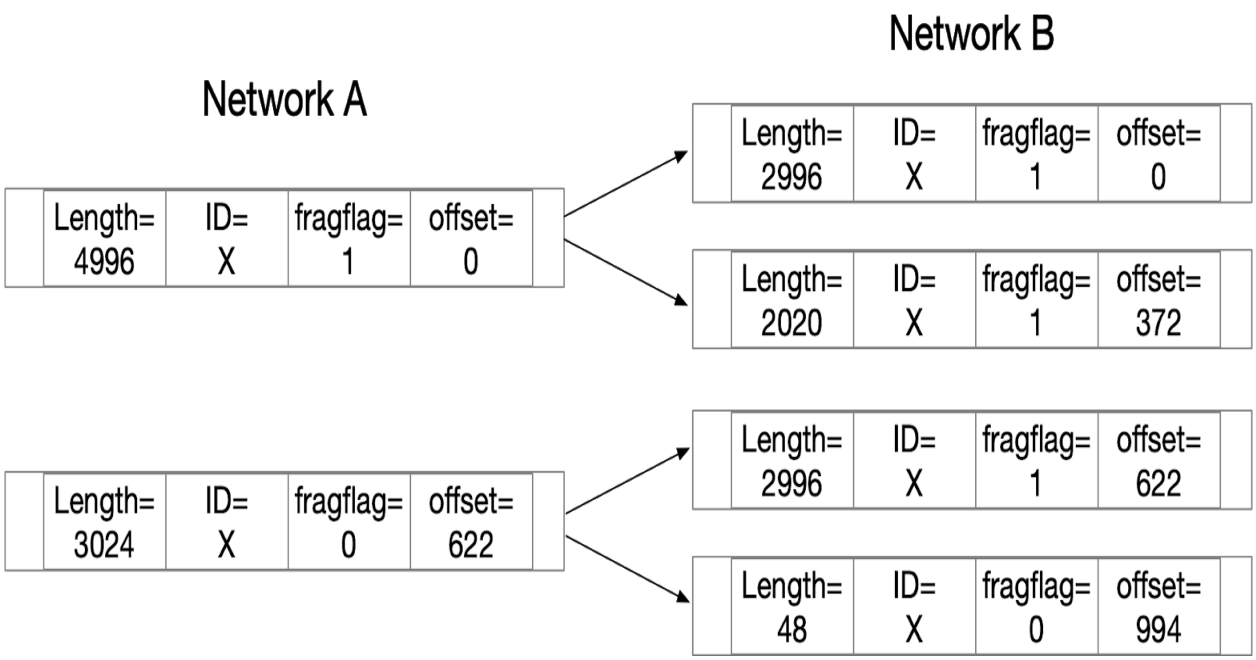
CSci 4211 Homework #3
Due Day: April 8th

1. a. Since the MTU of network A is 5000, thus the original IP packet has 2 fragments which are shown as following:

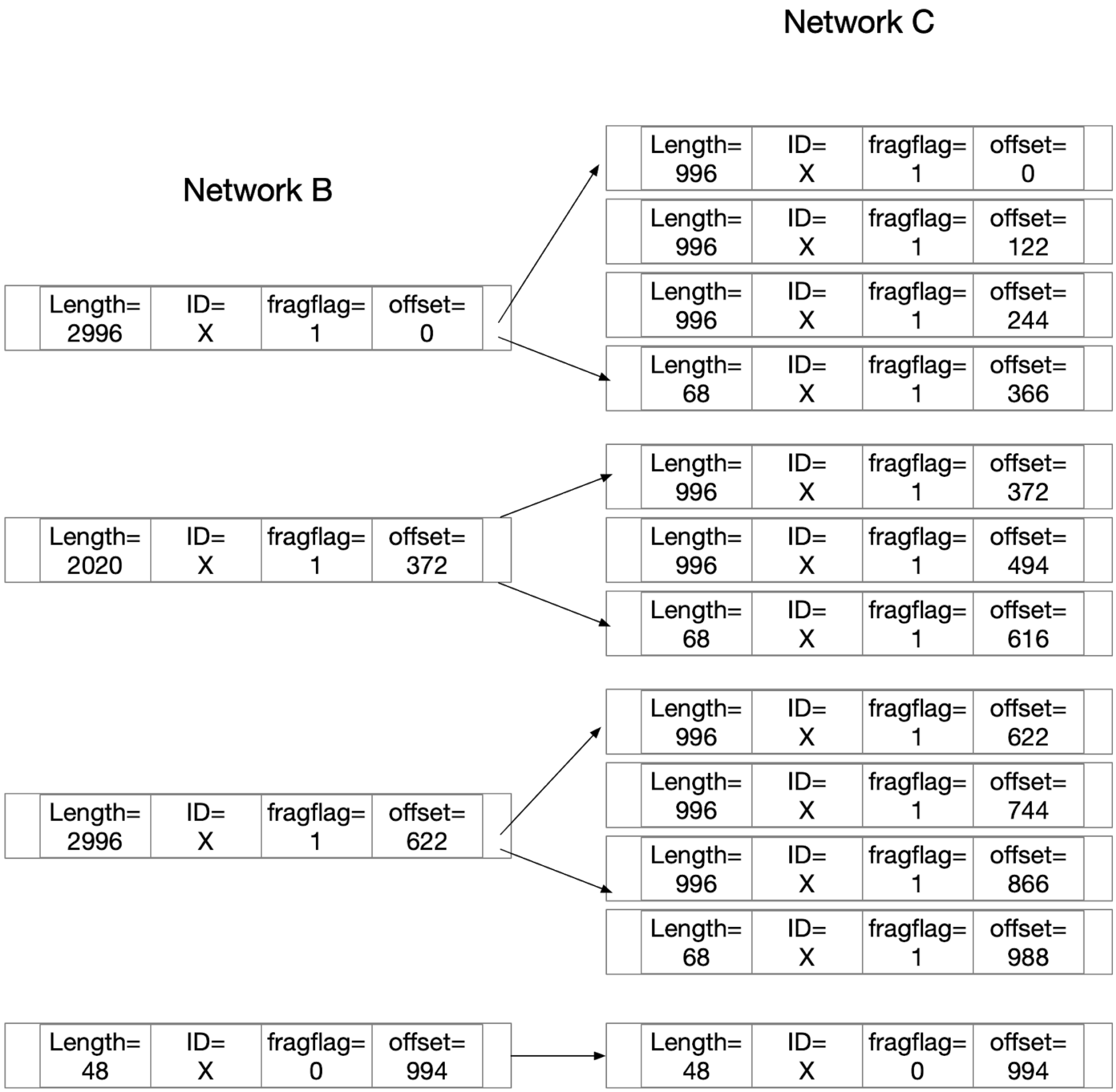
	Length= 4996	ID= X	fragflag= 1	offset= 0	

	Length= 3024	ID= X	fragflag= 0	offset= 622	

Thus, when entering network B from A, all three fragments will be fragmented into following:



b. Similarly as in (a), the fragmentation is shown as following:


Network C
Network B
Length= 2996 | ID= X | fragflag= 1 | offset= 0
Length= 996 | ID= X | fragflag= 1 | offset= 0
Length= 996 | ID= X | fragflag= 1 | offset= 122
Length= 996 | ID= X | fragflag= 1 | offset= 244
Length= 68 | ID= X | fragflag= 1 | offset= 366
Length= 2020 | ID= X | fragflag= 1 | offset= 372
Length= 996 | ID= X | fragflag= 1 | offset= 372
Length= 996 | ID= X | fragflag= 1 | offset= 494
Length= 68 | ID= X | fragflag= 1 | offset= 616
Length= 2996 | ID= X | fragflag= 1 | offset= 622
Length= 996 | ID= X | fragflag= 1 | offset= 622
Length= 996 | ID= X | fragflag= 1 | offset= 744
Length= 996 | ID= X | fragflag= 1 | offset= 866
Length= 68 | ID= X | fragflag= 1 | offset= 988
Length= 48 | ID= X | fragflag= 0 | offset= 994
Length= 48 | ID= X | fragflag= 0 | offset= 994

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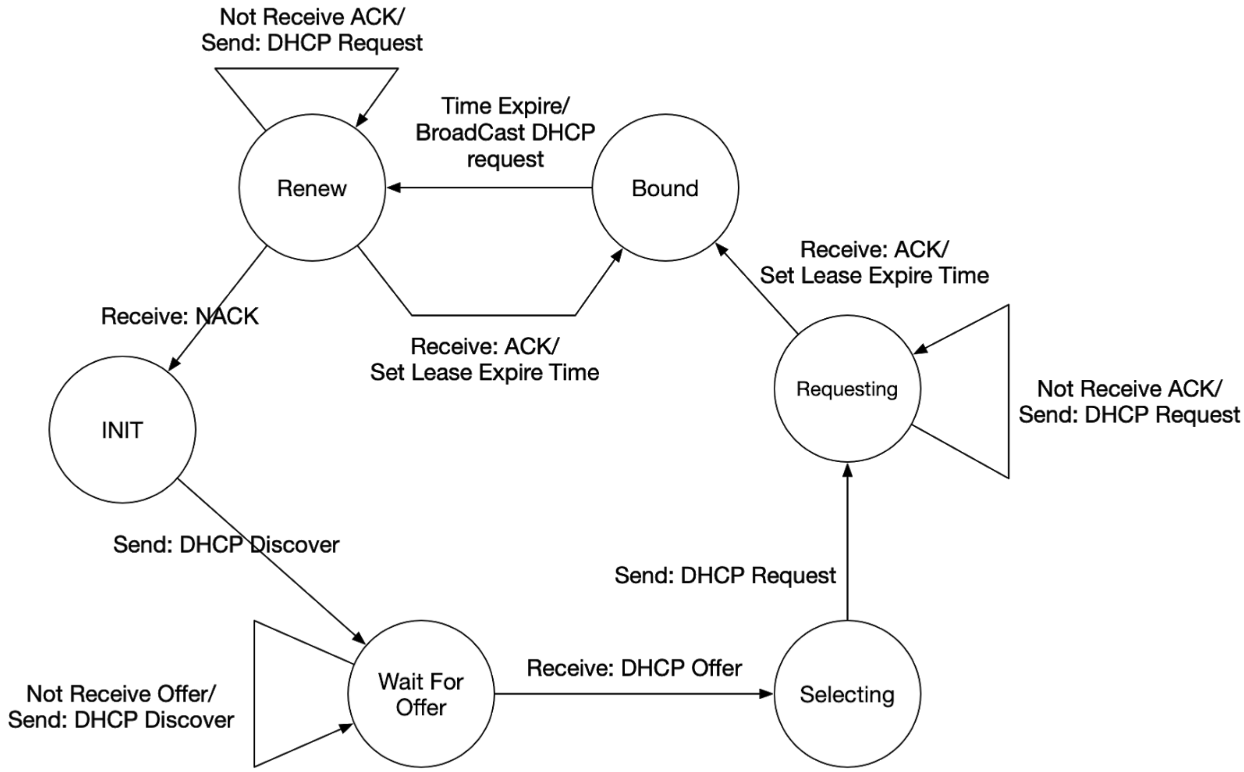
2. Any solution follows the textbook or slides would be accepted.



3. If the network part of address doesn't match, it will go to the default nexthop.

a. 135.46.[00111111].10 matches 135.46.[11111111].0/23, thus go Interface 1.
b. 135.46.[00111001].14 matches 135.46.[00111000].0/22, thus go Interface 0.
c. 135.46.[00110100].2 matches nothing, thus go default Router 2.
d. 192.53.[00101000].7 matches 192.53.[00101000].0/23, thus go Router 1.
e. 192.53.[00111000].7 matches nothing, thus go default Router 2.

4. They are both queuing discipline in packet scheduling to determine the order in which queued packets are transmitted over an outgoing link.

   Under round robin queuing discipline, packets are sorted into classes as with priority queuing. However, rather than there being a strict service priority among classes, a round robin scheduler alternates service among the classes. In the simplest form of round robin, a class 1 packet is transmitted, followed by a class 2 packet, and so on.

   Weighted Fair Queue differs from round robin in that each class may receive a differential amount of service in any interval of time. Specifically, each class, i , is assigned a weight, *wi.* Under WFQ, during any interval of time during which thera are class i packets to send, class i will then be guaranteed to receive a fraction of service equal to *wi/(Σwj)*, where the sum in the denominator is taken over all classes that also have packets queued for transmission.

In terms of QoS scenario, WFQ is more feasible than round robin since the service time of each time will depend on the assigned weight.

5.

(1) Longer addressing space, more addresses available.
(2) Fix size IP Header allows for faster processing of the IP datagram by a router. A new encoding of options allows for more flexible options processing.
(3) Flow labeling enables sender's special request of handling on flows, such as a non-default quality of service or real-time service.
(4) No fragmentation. Fragmentation and reassembly is a time-consuming operation; removing this functionality from the routers and placing it squarely in the end system considerably speeds up IP forwarding within the network.
(5) No checksum. Because the transport-layer and link-layer in the Internet perform checksumming, this functionality could be redundant in the network layer. This is also for fast IP packet processing since checksum needed to be recomputed at every router.