National University of Computer and Emerging Sciences, Lahore Campus

Quiz ……4 [BS(CS): Section C] Fall 2023

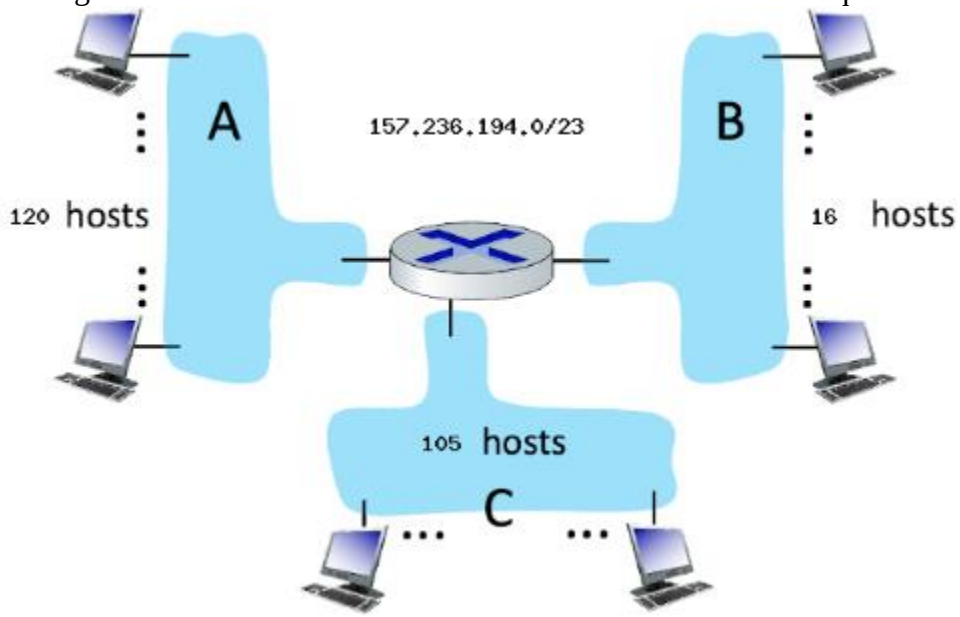
Computer Networks (Code: CS3001) **Quiz Date: Novemer 16, 2023**

Total Marks: 10 **Duration: 20 -Minutes**

Name ---------- Roll #---------- Section --------

Q: Consider the router and the three attached subnets below (A and B and C). The number of hosts is also shown below. The subnets share the **23** high-order bits of the address space: **157.236.194.0/23**.

Assign subnet addresses to each of the subnets (A and B and C) so that the amount of address space assigned is minimal, and at the same time leaving the largest possible contiguous address space available for assignment if a new subnet were to be added. Then answer the questions below.



1. Is the given address space public or private?

2. How many hosts can there be in this address space?

3. What is the subnet address of subnet A? (CIDR notation)

4. What is the broadcast address of subnet A?

5. What is the starting host address of subnet A?

6. What is the ending host address of subnet A?

7. What is the subnet address of subnet B? (CIDR notation)

8. What is the broadcast address of subnet B?

9. What is the starting host address of subnet B?

10. What is the ending host address of subnet B?
11. What is the subnet address of subnet C? (CIDR notation)

12, What is the broadcast address of subnet C?

13. What is the starting host address of subnet C?

14. What is the ending host address of subnet C?

Solution:

1. The given address space **157.236.194.0/23** is public.

2. Maximum number of hosts = 2^x - 2 = 2^9 - 2 = **510**. The reason we have to subtract 2 from the final number is because there are always 2 addresses allocated for each address block: the subnet ID (the first address) and the broadcast address (the last address);.

3. Subnet A has **120** hosts, so it will need at least 122 addresses (for the subnet ID and broadcast address). The least number of bits that satisfy this is 7 bits. Knowing that, we take the prior subnet and add 32, the result of which is **157.236.195.0/25**

4. The broadcast address of subnet A = **157.236.195.127/25**, because it is the last address in the IP range.

5. The first IP address of subnet A = **157.236.195.1/25**, found by adding 1 to the subnet address.

6. The last IP address of subnet A = **157.236.195.126/25**, found by subtracting 1 from the broadcast address.
(Note: If a student has written it as **157.236.195.120/25**, then this can be taken as correct considering that this may be the last host address (having only 120 available hosts)).

7. Subnet B has **157** hosts, so it will need at least 159 addresses (for the subnet ID and broadcast address). The least number of bits that satisfy this is 8 bits. The resulting subnet address = **157.236.194.0/24**

8. The broadcast address of subnet B = **157.236.194.255/24**, because it is the last address in the IP range.

9. The first IP address of subnet B = **157.236.194.0/24**, found by adding 1 to the subnet address.

10. The last IP address of subnet B = **157.236.194.1/24**, found by subtracting 1 from the broadcast address.
(Note: If a student has written it as **157.236.194.157/24/24**, then this can be taken as correct considering that this may be the last host address (having only 157 available hosts).

11. Similar to the prior subnet, subnet C has 105 hosts, so it will need at least 107 addresses (for the subnet ID and broadcast address). The least number of bits that satisfy this is 7 bits. The resulting subnet address = **157.236.195.128/25**

12. The broadcast address of subnet A = **157.236.195.25/25**, because it is the last address in the IP range.

13. The first IP address of subnet A = **157.236.195.129/25**, found by adding 1 to the subnet address.

14. The last IP address of subnet A = **157.236.195.254/25**, found by subtracting 1 from the broadcast address.
(Note: If a student has written it as **157.236.195.233/25**, then this can be taken as correct considering that this may be the last host address (having only 105 available hosts,).