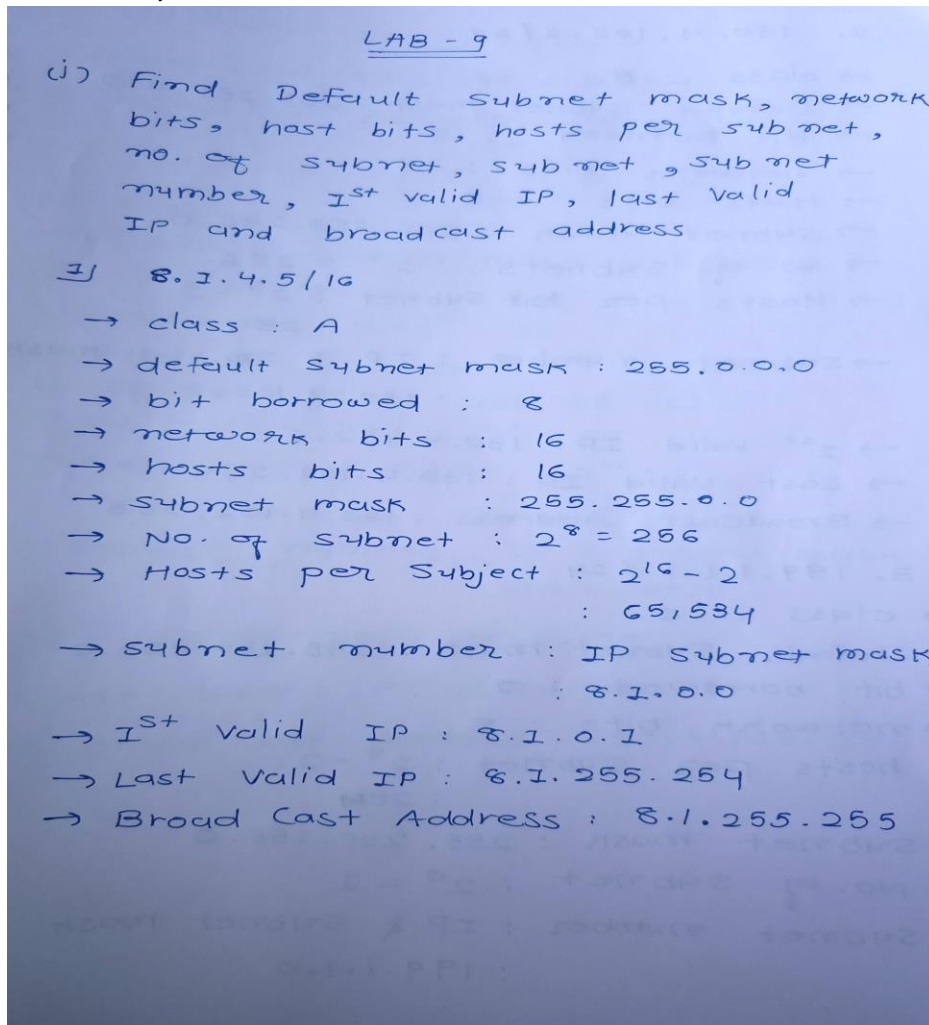**Date: 25 / 08 /2023**

Lab Practical #09:

Study of IP Addressing and sub-netting.

Practical Assignment #09:

1. Find default subnet marks, network bits, host bits, hosts per subnet, no of subnets, subnet number, 1st valid IP address, last valid IP address, and broadcast address.
    i.   8.1.4.5/16

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ii.   130.4.102.1/24

2.   130.4.102.1/24

→ class   : B
→ Default subnet mask : 255.255.0.0
→ Bit borrowed   : 8
→ network bits : 24
→ Hosts bits   : 8
→ Subnet mask : 255.255.255.0
→ No. of Subnets : 2^8 = 256
→ Hosts per bit Subnet : $2^8 - 2$
    : 254
→ Subnet number : IP & Subnet mask
    : 130.4.102.0

→ 1st Valid IP: 130.4.102.1
→ Last Valid IP : 130.4.102.254
→ BroadCast Address : 130.4.102.255

iii.   199.1.1.1/24

3. 199.1.1.1 / 24

→ class : c

→ Default Subnet mask : 255.255.255.0

→ bit borrowed : 0

→ network bits : 8

→ hosts per Subnet : $2^8 - 2$
                        : 254

→ Subnet mask : 255.225.255.0

→ No. of Subnet : $2^0 = 1$

→ Subnet number : IP & Subnet mask
                    : 199.1.1.0

→ 1st valid IP : 199.1.1.0

→ Last valid IP : 199.1.1.254

→ Broad Cast Address : 199.1.1.255

iv.   130.4.102.1/22

(iv) 130.4.102.1/22

→ class : B

→ Default subnet mask : 255.255.0.0

→ bit borrowed : 6

→ network bits : 22

→ Host bits : 10

→ Subnet mask : 255.255.252.0

→ No. of subnet : 2^6 = 64

→ Hosts per Subnet : 2^{10} -2
                            : 1022

→ Subnet number : IP & subnet mask
                            : 130.4.100.0

→ 1st valid IP : 130.4.100.1

→ Last valid IP : 130.4.103.254

→ Broad Cast Address : 130.4.103.255

v.   199.1.1.100/27

(v) 199.1.1.100 / 27

→ class : C

→ Default subnet mask : 255.255.255.0

→ bit borrowed : 3

→ network bits : 27

→ host bits : 5

→ subnet mask : 255.255.255.264

→ No. of subnet : $2^3 = 8$

→ Hosts per subnet : $2^5 - 2$
$= 30$

→ subnet number : IP & subnet mask
$: 199.1.1.96$

→ 1st valid IP: 199.1.1.97

→ last valid IP: 199.1.1.126

→ Broad cast IP: 199.1.1.127

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2. A host in a class C network has been assigned an IP address 192.168.17.9. Find the number of addresses in the block, the first address, and the last address.

(ii) A host in a class c network has been assigned an IP address 192.168.17.9 find the no. of addresses in the block the first address and the last address.

→ Here, class : c

   so, Host bit = 8

→ No. of Address in the block : $2^8 = 256$

→ (with valid host) : $(2^8 - 2)$

       = 256

→ Ist address : 192.168.17.0

→ last address : 192.168.17.255

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3. An address in a block is given as 185.28.17.9. Find the number of addresses in the block, the first address, and the last address.

(iii) An Address in a block is given as 185.28.17.9 find the no. of addresses in the block, the First address and last address.

Here, class : B

So, Hosts bit : 16

→ No. of Address in the block : 2^{16} = 65,536

→ with valid hosts : $2^{16} - 2$
$$: 65,534$$

→ 1st address :185.28.0.0
→ Last address : 185.28.255.255

4. A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/28. What is the first address, last address, number of addresses in a block.

(iv) A block of addresses is granted to a small organization. we know that one of the address is 205.16.37.39/28. What is the First address, last address, number of addresses in block.

→ Here, class : C

→ bit borrowed : 4

so, host bit : 4

→ No. of addresses in the block : $2^4 = 16$

→ with valid host : $2^4 - 2$
$$: 14$$

→ 1st address : 205.16.37.32

→ Last address : 205.16.37.47.

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5. Subnet the IP address 216.21.5.0 into 30 hosts in each subnet. Find Class, Default Mask, Bit Borrowed, New subnet mask, No. of Hosts & Subnet, Network Ranges (Subnets).

(V) Subnet the IP address 216.21.5.0 into 30 hosts in each subnet. Find class, default mask, bit borrowed, new subnet mask, No. of hosts & subnet, Network Ranges (subnet).

Here, class : C

→ Default mask : 255.255.255.0

→ Here, 30 hosts in each subnet means $(2^5 - 2)$

so host bit = 5

  Network bit = 27

So, IP = 216.21.5.0 /27

→ bit borrowed = 3

→ new subnet mask : 255.255.255.254

→ No. of subnets : $2^3 = 8$

→ No of Hosts per subnet : $2^5 - 2 = 30$

→ Network Ranges (subnets) :

subnet 1 : 216.21.5.0 to 216.21.5.31

subnet 2 : 216.21.5.32 to 216.21.5.63

   and so on upto 8 subnet.

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6. Subnet the IP address 192.10.20.0 into 52 hosts in each subnet. Find Class, Default Mask, Bit Borrowed, New subnet mask, No. of Hosts & Subnet, Network Ranges (Subnets).

(vi) Subnet the IP address 192.10.20.0 into 52 hosts in each subnet find class, Default Mask, bit borrowed, new Subnet mask, No of hosts & subnet, Network Ranges (subnet).

→ Here, class : C

→ Default Subnet mask : 255.255.255.0

→ Here, 52 hosts in each Subnet mean $52 < (2^6 - 2) \Rightarrow 52 . < 62$

so, hosts bits = 6

→ bit borrowed = 2

→ Network bits = 26

so, IP will be 192.10.20.0/26

→ New Subnet mask : 255.255.255.192

→ No. of subnets = $2^2 = 4$

→ No. of valid hosts per Subnet : $2^6 - 2$
                                    $= 62$

→ Network Ranges (subnets):

Subnet 1: 192.10.20.0 to 192.10.20.63

Subnet 2: 192.10.20.64 to 192.10.20.127

    and so on upto 4 subnet.