# * Lab - 9 *

(1) Find default subnet mask, network bits, host bits, hosts per subnet, no. of subnets, subnet number, 1st valid IP, last valid IP and broadcast address.

(i)    8. 1. 4. 5 / 16.

→ class        :  A
→ default subnet  :  255.0.0.0
    mask.
→ bit   borrowed  :  8
→ network  bits  :  16.
→ host   bits   :  16.
→ Subnet  mask    :  255. 255. 0. 0
→ No. of  subnets  :  $2^8$  = 256.
→ Hosts per  subnet  :  $2^{16} - 2$ = 65,534

→ Subnet  number  :  IP @ subnet mask.
                    :  8. 1. 0. 0

→ 1st  Valid  IP   :  8. 1. 0. 1
→ Last  valid  IP  :  8. 1. 255. 254.
→ Broadcast  Address  :  8. 1. 255. 255

(ii)    130. 4. 702. 1 /24

→ Class : B.
→ default subnet mask : 255.255.0.0
→ bit borrowed : 8
→ network bits : 24
→ Host bits : 8
→ subnet mask : 255.255.255.0
→ No. of subnets : $2^8 = 256$.
→ Hosts per subnet : $2^8 - 2 = 254$.

→ Subnet number : IP & subnet mask
                                    : 130. 4. 702. 0

→ 1$^{st}$ Valid IP : 130. 4. 702. 1
→ Last Valid IP : 130. 4. 702. 264
→ Broadcast Address : 130. 4. 702. 255


(iii)    199. 1. 1. 1 /24

→ class : C
→ default subn't mask : 255.255.255.0
→ bit borrowed : 0.
→ network bits : 24
→ host bits : 8.
→ hosts per subnet : $2^8 - 2 = 254$
→ subnet mask : 255.255.255.0.
→ No, of subnet : $2^0 = 1$

→ subnet number : IP & subnet mask
: 199.7.7.0

→ 1st valid IP : 199.7.7.1
→ 2nd valid IP : 199.7.7.254
  Last

→ Broad cast Address : 199.7.7.255.

(iv)  130.4.102.7/22

→ 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

→ Class : C
→ default subnet mask : 255.255.255.0.
→ bit borrowed : 3
→ network bits : 27
→ host bits : 5
→ Subnet mask : 255.255.255.224.
→ 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

(2)

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) : $(2^8 - 2) = 256$

→ 1$^{st}$ address : 192.168.17.0.
→ Last address : 192.168.17.255.


(3)

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, host bit : 16.

→ No. of Address in the block : $2^{16} = 65,536$
  → (with valid host) : $(2^{16} - 2) = 65,534$

→ 1$^{st}$ 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.

→ 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.

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).

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 : 255.255.255.224.

→ 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.

(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 (subnet)

→ Here, Class : C
  → default subnet mask : 255.255.255.0

→ Here, 52 hosts in each subnet means 52 < ($2^6 - 2$) ⟹ 52 < 62.

So, host 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.