Date: 06/09/2024

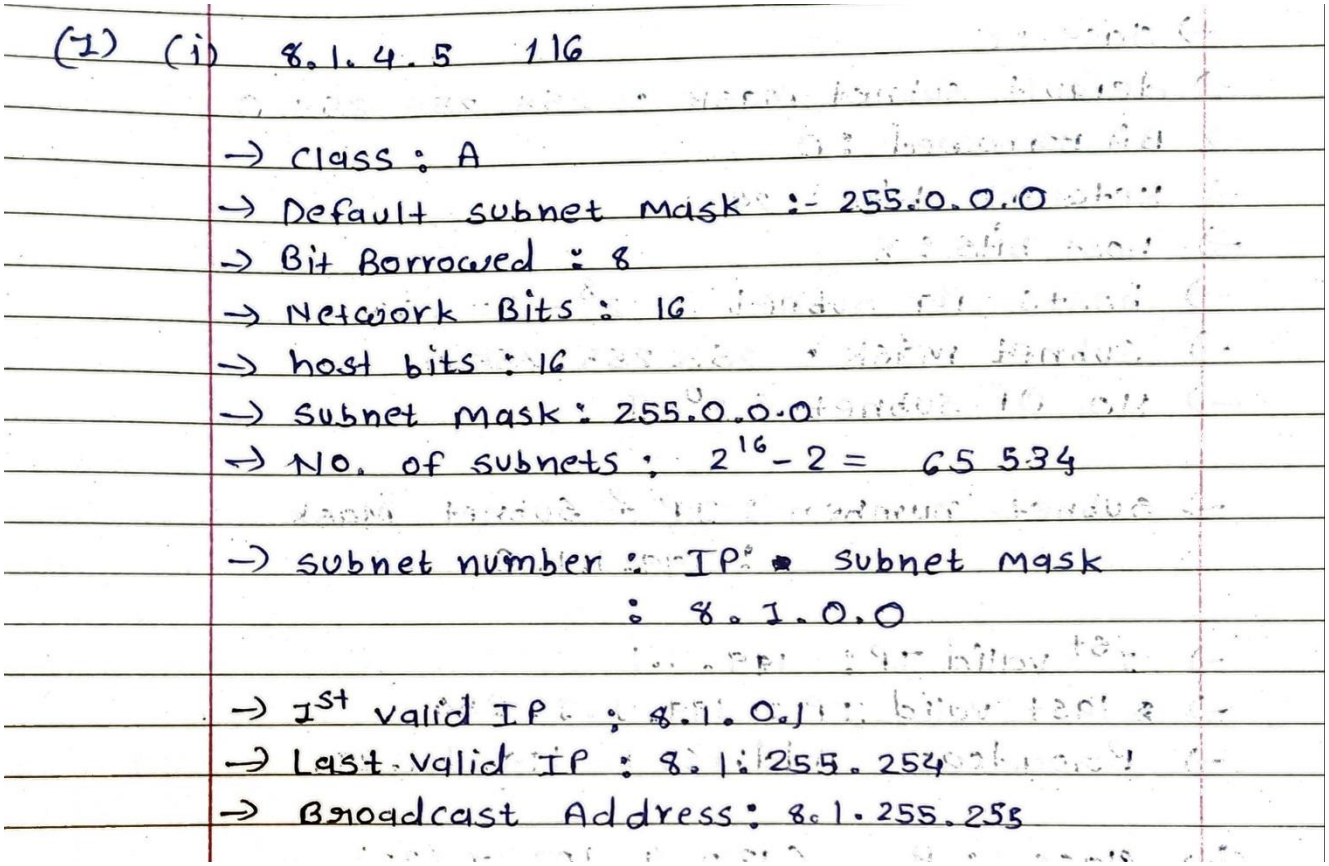
Lab Practical #09:

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

(ii) 130.4.102.1/24

→ 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 : 130.4.102.0
→ 1st valid IP : 130.4.102.1
→ last valid IP : 130.4.102.254
→ Broadcast Address : 130.4.102.255

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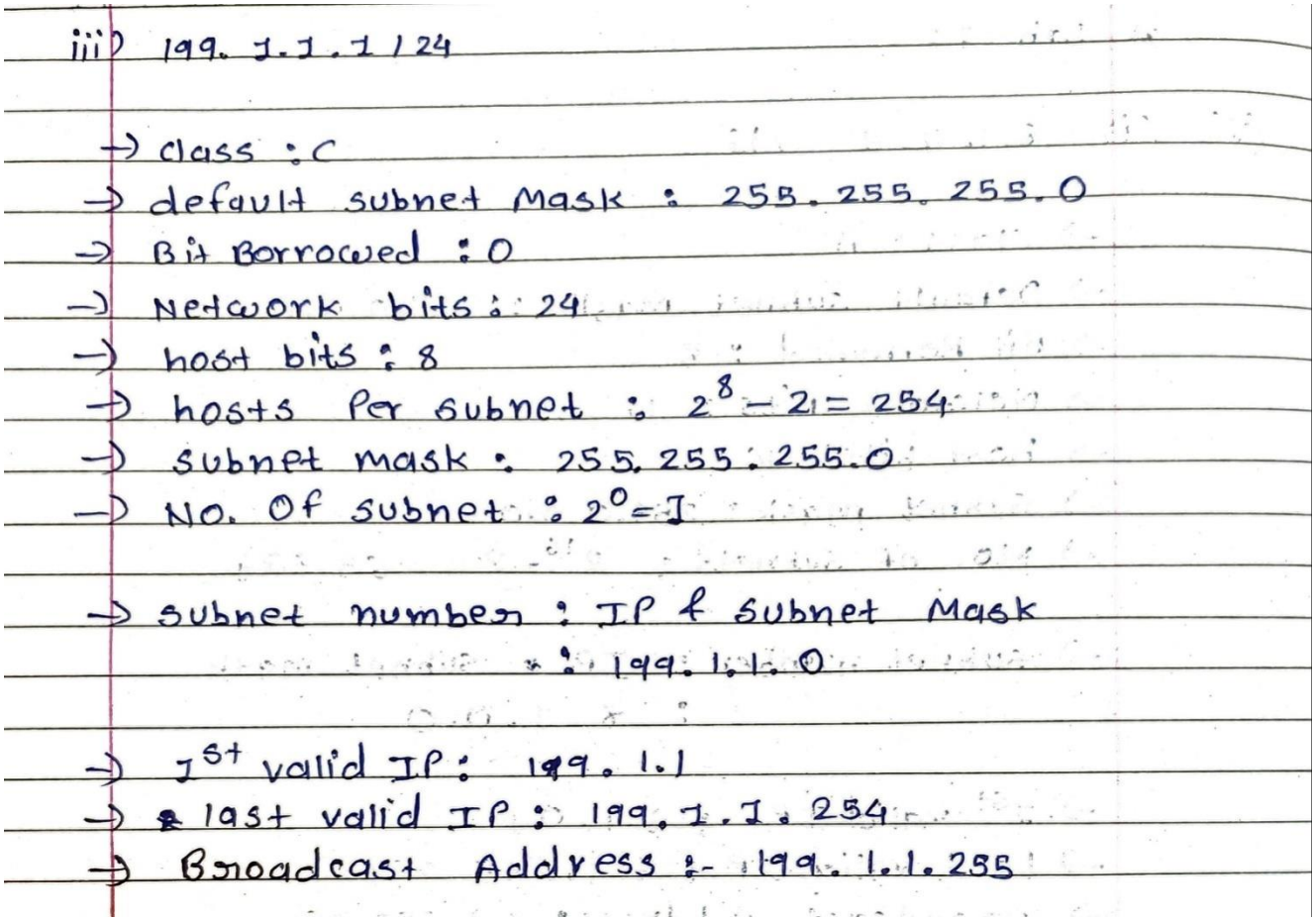
iii. 199.1.1.1/24



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iv. 130.4.102.1/22

(iv) Class : B (130.4.102.1/22)

→ default subnet mask : 255.255.0.0
→ bits borrowed : 6
→ network bits : 22
→ host bits : 10
→ 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
→ Broadcast Address : 130.4.103.255

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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
→ hosts bit : 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
→ Broadcast 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.

(2) A host in a class C Network has been Assigned an IP Adress 192.168.17.9. Find the no. of Adresses 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 : $(2^8 - 2 = 254)$

→ 1st 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.

(3) An Address in a block is given as 185.28.17.9 Find the No. of Addresses in the block, the first Address & the last Address

Here, Class : B

→ So, host Bit : 16

→ No. of Address in the block : 2^{16} = 65536

→ (with valid host) : (2^{16} - 2) = 65534

→ 1st Address : 185.28.0.0

→ last Address : 185.28.255.255

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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.

(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

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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).

(5) subnet the IP Adress 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 : 210.21.5.32 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).

(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 $52 < (2^6 - 2) \Rightarrow 52 < 62$

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 subnets.