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Sem: VI

Roll.no: 5

Subject: DC & CN

Assignment:

1. Consider the following network and requirements. Determine ~~the~~ NA ~~the~~.

i) Class A network = 10.10.10.10 and
Required no. of subnets = 100

Subnets = 100

$(1100100) = 7 \text{ bits}$

For class A new default mask
= 255.0.0.0

1111111 00000000 00000000 00000000

So, we reserve 7 bits,

Subnet mask = 11111111 11111(1)0 00000000 00000000
= 255.255.0.0

10.0.0.0

~~10.10.0.0~~ 10.2.0.0

10.4.0.0

10.6.0.0

i
}

10.10.0.0

Thus the range is,

10.0.0.0 ^{host} → 10.1.255.255

10.2.0.0 ^{host} → 10.3.255.255

10.4.0.0 → 10.5.255.255

10.6.0.0 → 10.7.255.255

10.8.0.0 → 10.9.255.255

10.10.0.0 → 10.11.255.255

For 10.10.10.10

network ID: 10.10.0.0

broadcast ID: 10.11.255.255

valid host ID: 10.10.0.1 to 10.11.255.254

Total usable host in each subnet

$$= \frac{17}{2} \quad 768 - 2 = 766$$

$$= 126 \text{ } 171030$$

ii) Class B network = 172.16.0.0 & Require no. of
subnets = 100

Step 1:

Required Subnet = 100

$$= 1100100 (> \text{bits})$$

Step 2: Class B, So

default mask = 255.255.0.0

$$= 11111111.11111111.00000000.00000000$$

$$\text{Reserve } (> \text{bits}) = 11111111.11111111.11111111.11111111$$

Step 3:

Increment value is 2

$$172.16.0.0 \xrightarrow{\text{host}} 172.16.1.255$$

$$172.16.2.0 \rightarrow 172.16.3.255$$

$$172.16.4.0 \rightarrow 172.16.5.255$$

$$172.16.6.0 \rightarrow 172.16.7.255$$

$$172.16.8.0 \rightarrow 172.16.9.255$$

Total usable host in each subnet
 $= 2^{12} - 2 = 512 - 2 = 510$
 ~~$= 426$~~

For 172.16.0.0

network ID = 172.16.0.0

broadcast ID = 172.16.1.255

valid host address = 172.16.0.1 - 172.16.1.254

iii) Class C network = ~~10.10.10.10~~ 192.168.1.100
 8 Subnet = ~~1000~~ 5

Step 1:

Req^d Subnet = 5

$= (101)$

Step 2: Class C,

Default mask = 255.255.255.0

$= 11111111.11111111.11111111.00000000$

Reserve (3 bits) = $11111111.11111111.11111111.11100000$
 $= 255.255.255.224$

Step 3: Increment is 32

192.168.1.0 $\xrightarrow{\text{host}}$ 192.168.1.31

192.168.1.32 \rightarrow 192.168.1.63

192.168.1.64 \rightarrow 192.168.1.95

192.168.1.96 \rightarrow 192.168.1.127

Total usable host in
 each subnet: $2^5 - 2$
 $= 630$

For 192.168.1.100

network address: 192.168.1.96

broadcast address: 192.168.1.127

valid host address: 192.168.1.97 - 192.168.1.126

② If two devices A & B are assigned with
 address:

Device A: 172.16.17.30/20

Device B: 172.16.28.15/22

Qⁿ: Determine the subnet each address belongs
 Calculate the total number of usable host
 address for each subnet

→ Solⁿ:

① Device A:

Step-1: Required subnet: 20 (10100)

Step-2: Class B,

⊗ default mask: 255.255.0.0

: 11111111.11111111.00000000.00000000

Step-3: ~~Increment~~ reserve 5 bit ⑧

11111111.11111111.11110000.00000000

Increment value is 8.

172.16.0.0 → 172.16.7.255

172.16.8.0 → 172.16.15.255

172.16.16.0 → 172.16.23.255

172.16.24.0 → 172.16.31.255

172.16.32.0 → 172.16.39.255

Total no. of available host for each
subnet = ~~2¹¹~~ $2^{11} - 2$
= ~~2046~~ 2046

For 172.16.17.30

network ID: 172.16.16.0

broadcast ID: 172.16.23.255

⑩ Device B:

Step 1: Required subnet = 22 (10110)

Step 2: Class B

Default mask: 255.255.0.0

11111111.11111111.00000000.00000000

reserve 5 bit

11111111.11111111.11110000.00000000

Step 3: Increment 8

6

range

172.16.0.0 → 172.16.7.255

172.16.8.0 → 172.16.15.255

172.16.16.0 → 172.16.23.255

172.16.24.0 → 172.16.31.255

172.16.32.0 → 172.16.39.255

⋮

Total usable host ID

$$= 2^{8*11} - 2$$

$$= \del{2046} 2046$$

For 172.16.28.15

Network ID: 172.16.24.0

Broadcast ID: 172.16.31.255

2i)

⇒ Soln:

Step 1: Client s: 101

Step 2: Class C, 50

Subnetmask: 11111111.11111111.11111111.11110000

Step 3: Incremental value is 8.

192.168.1.0 — 192.168.1.7

192.168.1.8 — 192.168.1.15

192.168.1.16 — 192.168.1.23

192.168.1.24 — 192.168.1.31

192.168.1.96 — 192.168.1.104

For 192.168.1.100

Network ID = 192.168.1.96

broadcast ID = 192.168.1.104

Valid host ID = 192.168.1.97 — 192.168.1.103

$$\begin{aligned} \text{Total usable host ID} &= 2^3 - 2 \\ &= 6 \end{aligned}$$

ii)

⇒ Sol:

Step 1: Clients = 100 (1100100)

Step 2: Class B as so

Subnet mask

.1111111.1111111.1111111.10000000

Step 3:

Increment value is 128.

172.31.10.0 - 172.31.10.127

172.31.10.128 - 172.31.10.255

For 172.31.10.101

Network Id: 172.31.10.0

broadcast Id: 172.31.10.127

Valid host Id: 172.31.10.1 - 172.31.10.126

 Total usable host Id: $2^7 - 2$
 = 126

2u)

2) Solⁿ:

Step 1: ~~200~~ 200.200.1.64 /27
27(11011)

Step 2: Class C

Subnet mask: 11111111.11111111.11111111.11110000

Step 3: Increment value is 8.

200.200.1.0 → 200.200.1.7

200.200.1.8 - 200.200.1.15

}

200.200.1.64 - 200.200.1.72

For 200.200.1.64

network address: 200.200.1.64

broadcast address: 200.200.1.72

Usable host address: 200.200.1.65 - 200.200.1.71

Total host address = $2^3 - 2$
= 6

7. Given IP 156.154.81.56 / 26.

1. Solⁿ:

Step 1: 26 (11010)

Step 2: Class B

Subnet mask: 11111111.11111111.11110000.00000000

Step 3: Increment (8)

156.154.0.0 - 156.154.7.0

156.154.8.0 - 156.154.15.255

⋮

156.154.80.0 - 156.154.87.255

For 156.154.81.56

Net ID: 156.154.80.0

Broadcast ID: 156.154.87.255

Usable IP address = $2^4 - 2$

= 2046

6.

⇒ IP add - 192.168.18.0

Required 28 computers.

Step 1: 28 (11100)

Step 2: Class C

Subnet mask: 11111111.11111111.11111111.11110000

Step 3: Increment value is 8.

192.168.18.0 - 192.168.18.7

192.168.18.8 - 192.168.18.15

}

192.168.18.48 - 192.168.18.55

For each department

Network Address	Range of host IP	Broadcast Address
192.168.18.0	192.168.18.1 - 192.168.18.6	192.168.18.7
192.168.18.8	192.168.18.9 - 192.168.18.14	192.168.18.15
192.168.18.16	192.168.18.17 - 192.168.18.22	192.168.18.23
192.168.18.24	192.168.18.25 - 192.168.18.30	192.168.18.31
192.168.18.32	192.168.18.33 - 192.168.18.38	192.168.18.39
192.168.18.40	192.168.18. ⁴¹ 39 - 192.168.18.46	192.168.18. 47 ⁴⁷
192.168.18.48	192.168.18.49 - 192.168.18.55	192.168.18. 56 ⁵⁵