Name : Ibrar
Roll no : 19P-0104
Computer Networks LAB
Section (B)

(LAB HOMEWORK 12)

Q:1) 12.0.0.0/27

(i) 12.0.0.00000000/27

(ii) Subnet mask

255.0.0.0

11111111.00000000.00000000.00000000/27

(iii) n = ?

→ we have to find n according to network because prefix of IP is given.

By default class A have 8-bits

So:

$$27 - 8 = 19$$

$\boxed{n = 19}$

$2^n = 2^{19}$ = Total subnets.

(iv) Update subnet

$\underbrace{11111111 \cdot 11111111 \cdot 11111111 \cdot 111}_{N}\underbrace{00000}_{H}/27$

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1

$\hookrightarrow = 224$

Scanned with CamScanner

(v) Perform AND operation of IP address and update subnet mask.

12 . 0 . 0 . 00000000 /27
AND 11111111 . 11111111 . 11111111 . 11100000
12 . 0 . 0 . 0 → first subnet

⇒ finding host
11111111 . 11111111 . 11111111 . 11100000 /27
↳ $2^5 = 32$

$h = 32$

Subnet (1)

12 . 0 . 0 . 0/27	Network ID
12 . 0 . 0 . 31/27	Broadcast ID
255 . 0 . 0 . 224/27	Subnet Mask
12 . 0 . 0 . 1/27 — to — 12 . 0 . 0 . 30/27	(Usable IP)

Subnet (2)

12 . 0 . 0 . 32/27	Network ID
12 . 0 . 0 . 63/27	Broadcast ID
255 . 0 . 0 . 224/27	Subnet Mask
12 . 0 . 0 . 33/27 — to — 12 . 0 . 0 . 62/27	Usable IP

Scanned with CamScanner

Subnet (3)

12.0.0.64/27 Network ID

12.0.0.127/27 Broadcast ID

255.0.0.224/27 Subnet Mask

12.0.0.65/27 — to — 12.0.0.126/27 Usable IP

Subnet (4)

12.0.0.128/27 Network ID

12.0.0.159/27 Broadcast ID

255.0.0.224/27 Subnet Mask

12.0.0.129/27 — to — 12.0.0.158/27 Usable IP

Q:2) 12.0.0.0/15

(i) 12.0.0.00000000/15

(ii) Subnet mask 12.00000000.00000000.00000000/15

↳ 255.0.0.0

$\underbrace{11111111}_{N}.\underbrace{00000000.00000000.00000000}_{H}$ /15

(iii) n = ?

-: By default class A have 8-bits

So 15 − 8 = 7

n = 7

$2^n = 2^7 = 128$ subnets

Scanned with CamScanner

(iv) Updated Subnet

$$\underbrace{11111111 \cdot 11111110}_{N} \cdot \underbrace{00000000 \cdot 00000000}_{H} /15$$

$$2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 = 254$$

255 · 254 · 0 · 0

(v) Perform AND operation of IP address and updated subnet mask.

12 · 00000000 · 00000000 · 00000000 /15

11111111 · 11111110 · 00000000 · 00000000

12 · 0 · 0 · 0 ⟶ 1st Subnet

h = ?

11111111 · 11111110 · 00000000 · 00000000 /15

$2^1 = 2$

$h = 2$

Subnet (1)

12 · 0 · 0 · 0/15	Network ID
12 · 1 · 255 · 255/15	Broadcast ID
255 · 254 · 0 · 0/15	Subnet Mask
12 · 0 · 0 · 1/15 — to — 12 · 1 · 255 · 254/15	Usable IP

Scanned with CamScanner

(Subnet 2)

12.2.0.0/15	Network ID
12.3.255.255/15	Broadcast ID
255.254.0.0/15	Subnet Mask
12.2.0.1/15 — to — 12.3.255.254/15	Usable IP

(Subnet 3)

12.4.0.0/15	Network ID
12.5.255.255/15	Broadcast ID
255.254.0.0/15	Subnet Mask
12.4.0.1/15 — to — 12.5.255.254/15	Usable IP

(Subnet 4)

12.6.0.0	Network ID
12.7.255.255	Broadcast ID
255.254.0.0/15	Subnet Mask
12.6.0.1/15 — to — 12.7.255.254/15	Usable IP

Scanned with CamScanner

Q:3 140.10.10.0/17

(i) 140.10.00001010.00000000/17

(ii) Subnet Mask

255.255.0.0/17

11111111.11111111.00000000.00000000/17

(iii) find n? according to networks

-: as class B have by default 16-bits

17 − 16 = 1

n = 1 , 2^1 = 2 subnets

(iv) Find updated subnet mask

11111111.11111111.10000000.00000000/17

255.255.128.0

(v) Perform AND operation of IP address and update subnet Mask

140.10.00001010.00000000/17

AND 11111111.11111111.10000000.00000000/17

140.10.0.0 — 1st subnet

finding hosts?

11111111.11111111.10000000.00000000/17

$(h = 2^7 = 128)$

Scanned with CamScanner

(Subnet 1)

140.10.0.0/17	Network ID
140.10.127.255/17	Broadcast ID
255.255.128.0/17	Subnet Mask
140.10.0.1/17 — to — 140.10.127.254/17	Usable IP

(Subnet 2)

140.10.128.0/17	Network ID
140.10.255.255/17	Broadcast ID
255.255.128.0/17	Subnet Mask
140.10.128.1/17 — to — 140.10.255.254/17	Usable IP

Scanned with CamScanner