

Subnetting

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B

Lab Homework #12

i) $12.0.0.0/27$

* Subnet mask

$$255.0.0.0$$

$$11111111.00000000.00000000.00000000/27$$

* $n = ?$

Class A has 8 bits

$$27 - 8 = 19$$

$$n = 19$$

$$2^n = 2^{19} = \text{Total subnets}$$

* Updated subnet

$$\underbrace{11111111.11111111.11111111}_{N}. \underbrace{11100000}_{14} / 27$$

$$\Rightarrow 224$$

$$255.255.255.224$$

* Perform AND operation

$$12.0.0.00000000$$

$$11111111.11111111.11111111.11100000$$

$$12.0.0.0 \Rightarrow$$

first subnet

=> finding Host = ?

||||| . ||||| . ||||| . |||00000

$$\text{hosts} = 2^5 = 32$$

Subnet 1

12.0.0.0/27
12.0.0.31/27
255.0.0.224/27
12.0.0.1/27
⋮
12.0.0.30/27

NID

BID

Subnet Mask

usable Ips

Subnet 2

12.0.0.32/27
12.0.0.63/27
255.0.0.224/27
12.0.0.33/27
⋮
12.0.0.62/27

NID

BID

Subnet Mask

Available/
usable Ips

Subnet 3

12.0.0.64/27
12.0.0.127/27
255.0.0.224/27
12.0.0.65/27
⋮
12.0.0.126/27

NID

BID

Subnet mask

Usable Ips

Subnet 4

| | |
|----------------|---------------|
| 12.0.0.128/27 | NID |
| 12.0.0.159/27 | BID |
| 255.0.0.224/27 | Subnet mask |
| 12.0.0.129/27 | } usable IP's |
| ⋮ | |
| 12.0.0.158/27 | |

ii) 12.0.0.0/15

* 12.0.0.0000 0000 /15

* Subnet Mask

| | | | | | | |
|---|------------|---------------------|---------------------|----------|--|----------|
| 12.0000 0000.0000 0000.0000 0000 /15 | | | | | | |
| 255. 0.0.0 | | | | | | |
| <table border="0"> <tr> <td> </td> <td>0000 0000.</td> <td>0000 0000.0000 0000</td> </tr> <tr> <td><u>N</u></td> <td></td> <td><u>H</u></td> </tr> </table> | | 0000 0000. | 0000 0000.0000 0000 | <u>N</u> | | <u>H</u> |
| | 0000 0000. | 0000 0000.0000 0000 | | | | |
| <u>N</u> | | <u>H</u> | | | | |

* $n = ?$

• Class A has 8 bits

$$15 - 8 = 7$$

$$n = 7$$

$$2^n = 2^7 = 128 \text{ subnets}$$

* Updated Mask

| | | | | | | |
|--|----------|----------|----------|---------------|--|--|
| . 0. 0000 0000.0000 0000 /15 | | | | | | |
| <table border="0"> <tr> <td><u>N</u></td> <td></td> <td><u>H</u></td> </tr> <tr> <td>255. 254. 0.0</td> <td></td> <td></td> </tr> </table> | <u>N</u> | | <u>H</u> | 255. 254. 0.0 | | |
| <u>N</u> | | <u>H</u> | | | | |
| 255. 254. 0.0 | | | | | | |

* AND operation

12. 0000 0000. 0000 0000 - 0000 0000 / 15

1111 1111. 1111 1110. 0000 0000. 0000 0000

12. 0. 0. 0 \Rightarrow 1st subnet

* Hosts

1111 1111. 1111 1110. 0000 0000. 0000 0000 / 15

$$2^1 = 2$$

$$\boxed{2^1 = 2}$$

Subnet 02

12. 0. 0. 0 / 15

NID

12. 1. 255. 255 / 15

BID

255. 254. 0. 0 / 15

Subnet Mask

12. 0. 0. 1 / 15

12. 1. 255. 254 / 15

Usable Ip's

Subnet 02

12. 2. 0. 0 / 15

NID

12. 3. 255. 255 / 15

BID

255. 254. 0. 0 / 15

Subnet Mask

12. 2. 0. 1 / 15

12. 3. 255. 254 / 15

Usable Ip's

Subnet 03

12. 4. 0. 0 / 15
12. 5. 255. 255 / 15 BID
12. 4. 0. 1 / 15
⋮
12. 5. 255. 254 / 15

} usable IP's

Subnet 04

12. 6. 0. 0 NID
12. 7. 255. 255 BID
255. 254. 0. 0 / 15 Subnet Mask
12. 6. 0. 1 / 15
⋮
12. 7. 255. 254 / 15

} usable IP's

Qn03 :-

140. 10. 10. 0 / 17

i) 140. 10. 00001010 . 00000000 / 17

ii) Subnet Mask

255. 255. 0. 0 / 17

1111 1111 . 1111 1111 . 0000 0000 . 0000 0000 / 17

$$n = ?$$

class B has 16 bits

$$17 - 16 = 1$$

$$n = 1 \quad 2^1 = 2 \Rightarrow \text{subnets}$$

3) updated subnet

$$11111111 \cdot 11111111 \cdot 10000000 \cdot 00000000 / 17$$

$$255 \cdot 255 \cdot 128 \cdot 0$$

4) AND operation

$$140 \cdot 10 \cdot 00001010 \cdot 00000000 / 17$$

$$11111111 \cdot 11111111 \cdot 10000000 \cdot 00000000 / 17$$

$$140 \cdot 10 \cdot 0 \cdot 0 \Rightarrow \text{1st subnet}$$

5) Finding Hosts = ?

$$11111111 \cdot 11111111 \cdot 10000000 \cdot 00000000 / 17$$

$$h = 2^7 = 128$$

subnet 01

$$140 \cdot 10 \cdot 0 \cdot 0 / 17$$

NED

$$140 \cdot 10 \cdot 127 \cdot 255 / 17$$

BED

$$255 \cdot 255 \cdot 128 \cdot 0 / 17$$

subnet Mask

140.10.0.1 /17
⋮
140.10.127.254 /17

} usable
IP's

Subnet 02

140.10.128.0 /17 NID

140.10.255.255 /17 BID

255.255.128.0 /17 Subnet Mask

140.10.128.1 /17
⋮
140.10.255.254 /17

} usable
IP's