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Section:

BSCS - 5B

Computer Networks Lab 10

FAST-NUCES Peshawar Campus

Task 1 : Determine Network Address of the following IP Address

IP address : 10.128.240.50/30. Also, determine broadcast and range of host addresses.

Calculating Number of Hosts

IP Address:
          10.128.240.50/30

Subnet Mask:
          255.255.255.252

Result :

No of hosts: 32 - 30 = 2

- Convert the **IP address** and subnet mask into binary.

     IP address:
                    000011110 10000000 11110000 00110010

     Subnet Mask:
                    11111111 11111111 11111111 11111100

- **Perform and operation and network address**

     AND:
                    00001010 10000000 11110000 00110000
     Network Address:
                    10.128.240.48

- **Identifying broadcast address**

     Network in binary:
                    00001010 10000000 11110000 00110000
     Broadcast in binary:
                    00001010 1000000 11110000 00110011

Network in decimal :
                    10.128.240 48/30
Broadcast in decimal :
                    10.128.240 51/30

 1st Range :
                    10.128.240.49
                    00001010 10000000 11110000 00110001
2nd Range:
                    10.128.240.50
                    00001010 10000000 111100000 0011001

Task 2 : Determine the network and broadcast addresses and number of hosts bits and hosts for the given IPv4 addresses and prefixes in the following table.

IPv4 Address Prefix	Network Address	Broadcast Address	Total no of Hosts bits	Total no of Hota
192.168.100.25/28	192.168.100.0/28	192.168.100.31	4	2^4-2 = 14
172.30.10.130/30	172.30.10.0/28	172.30.10.131	4	2^4-2 =14
10.1.113.75/19	10.1.96.0	110.1.127.255	13	2^13-2=8190
198.133.219.250/24	198.133.219.0	198.133.219.255	8	2^8-2=254

Calculations

Part A

IP address:
192.168.100.25/28

IP address:
11000000.10101000.01100100.11110000

SubMask:
11111111.11111111.11111111.11110000

AND:
11000000.10101000.01100100.00010000

Network address:
192.168.100.16

Total host-bits:
32-28=4

Broadcast:
11000000.10101000.01100100.00011111
192.168.100.31

Total host-number:
24 -2=14

Part B

IP address:
172.30.10.130/30

IP address:
10101100.00011110.00001010.10000010

SubM:
11111111.11111111.11111111.11111100

AND:
10101100.00011110.00001010.10000000

Network address:

172.30.10.128

Total hostbits:

32-30=2

Broadcast:

10101100.00011110.00001010.10000011 172.30.10.131

Total hostnum:

22 - 2=20

Part C

IP address:

10.1.113.75/19

IP address:

00001010.00000001.01110001.01001011

SubM:

11111111.11111111.11100000.00000000

AND:

00001010.00000001.01100000.00000000

Network address:

10.1.96.0

Total hostbits:

32-19=13

Broadcast:

00001010.00000001.01111111.11111111 10.1.127.255

Total hostnum:

2^13-2 =81

Part D

IP address:

198.133.2193250/24

IP address:

11000110.10000101.11011011.11111010

SubM:

11111111.11111111.11111111.00000000

AND:

11000110.10000101.11011011.00000000

Network address:

198.133.219.0

Total hostbits:

32-24=8

Broadcast:

11000110.10000101.11011011.11111111 198.133.219.255

Total host number:

2^8 -2=254

Task-3:

Determine the number of networks needed and then design an appropriate addressing scheme.

a. How many subnets are there?
    2
b. How many bits should you borrow to create the required number of subnets?
    1bit
c. How many usable host addresses per subnet are in this addressing scheme?
    126
d. What is the new subnet mask in dotted decimal format?
    255.255.255.128
e. How many subnets are available for future use?
    0

Sub-net no	Sub-net address	First unstable host address	First unstable host address	Broadcasting address
1	192.168.10.0	192.168.10.1	192.168.10.126	192.168.10.127
2	192.168.10.128	192.168.10.129	192.168.10.254	192.168.10.255

Task 4:

a. How many subnets are there?
    6
b. How many bits should you borrow to create the required number of subnets?
    3bits
c. How many usable host addresses per subnet are in this addressing scheme?
    30
d. What is the new subnet mask in dotted decimal format?
    255.255.255.244
e. How many subnets are available for future use?
    2

Step 2: Record the subnet information. Fill in the following table with the subnet information:

Sub-net no	Sub-net address	First unstable host address	First unstable host address	Broadcasting address
1	192.168.10.0	192.168.10.1	192.168.10.30	192.168.10.31
2	192.168.10.32	192.168.10.33	192.168.10.62	192.168.10.63
3	192.168.10.64	192.168.10.65	192.168.10.94	192.168.10.95
4	192.168.10.96	192.168.10.97	192.168.10.126	192.168.10.127
5	192.168.10.128	192.168.10.129	192.168.10.158	192.168.10.159
6	192.168.10.160	192.168.10.161	192.168.10.190	192.168.10.191
7	192.168.10.192	192.168.10.193	192.168.10.222	192.168.10.223
8	192.168.10.224 1	192.168.10.225	192.168.10.254	192.168.10.255

Step 3:

Assign addresses to network devices in the subnets.

a. Fill in the following table with IP addresses and subnet masks for the router interfaces:

Device	Interface	Ip address	Subnet
R1	Gig a Ethernet 0/1	192.168.10.1	255.255.255.224
	Serial 0/0/0	192.168.10.33	255.255.255.224
	Serial 0/0/1	192.168.10.65	255.255.255.224
R2	Gig a Ethernet 0/1	192.168.10.97	255.255.255.224
	Serial 0/0/0	192.168.10.34	255.255.255.224
	Serial 0/0/1	192.168.10.129	255.255.255.224
R3	Gig a Ethernet 0/1	192.168.10.161	255.255.255.224
	Serial 0/0/0	192.168.10.6	255.255.255.224
	Serial 0/0/1	192.168.10.130	255.255.255.224

END