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Computer Networks

Lab Task 10

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.

10.128.240.50/30

0 0001010 . 100 00000 . 1111 0000 . 0011 0010

Now for subnet

1111 1111 : 1111 1111 . 1111 1111 . 1111 1100

AND

000 01010 . 10000000 . 1111 0000 . 0011 0000

| Network id = 10.128.240.46 |

Broadcast

= 32 - 30 = 2

N-2

Network Id: 000 01010 . 10000000 . 1111 0000 . 0011000

Broadcast = 00001010 . 10000000 . 11110000 . 00110011

(Broadcast = 10.128.240.51)

For HOST

$$\frac{32-30}{2}$$

$2^2 - 2 = 2$ Number of host

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.

1) 192.168.100.25/28

Into binary form:
11000000.10101000.01100100.00011001

Now for subnet:
11111111.11111111.11111111.11110000

AND:
11000000.10101000.01100100.00010000

Network id=192.168.100.16

For Broadcast=32-28=4

11000000.10101000.0100100.0001111

Broadcast=192.168.100.31

For hosting:

2^4-2=14 host

2) 172.30.10.130/30

Into binary form:

10101100.00011110.00001010.10000010
Now for subnet:

11111111.11111111.11111111.11111100

AND:

10101100.00011110.00001010.10000000

Network id: 172.30.10.128

For Broadcast: 32-30=2

10101100.00011110.00001010.10000011

Broadcast id:172.30.10.131

For hosting:

2^2-2=2 uses

3) 10.1.113.75/19

Into binary form:

00001010.00000001.01110001.01001011

Now for subnet:
11111111.11111111.11100000.00000000

AND:

00001010.00000001.01100000.00000000

Network id=10.1.96.0

Broadcast=32-19=13

00001010.00000001.01111111.11111111

Broadcast id =10.1.127.255

For hosting:

$2^{13}-2=8190$ users.

4) 198.133.219.250/24

Into binary form:

11000110.10000101.11011011.11111010
Now for subnet:

11111111.11111111.11111111.00000000
AND:

11000110.10000101.11011011.00000000

Network id:198.133.219.0

Broadcast=32-24=8

11000110.10000101.11011011.11111111

Broadcast id:198.133.219.255

For hosting:

$2^8-2=254$ users

IPv4 Address/Prefix	Network Address	Broadcast Address	Total Number of Host Bits	Total Number of Hosts
192.168.100.25/28	192.168.100.16	192.168.100.31	4	14
172.30.10.130/30	172.30.10.128	172.30.10.131	2	2
10.1.113.75/19	10.1.96.0	10.1.127.255	13	8190
198.133.219.250/24	198.133.219.0	198.133.219.255	8	254

Task 3: Network Topology A

In Part 1, you have been given the 192.168.10.0/24 network address to subnet, with the following topology. Determine the number of networks needed and then design an appropriate addressing scheme.
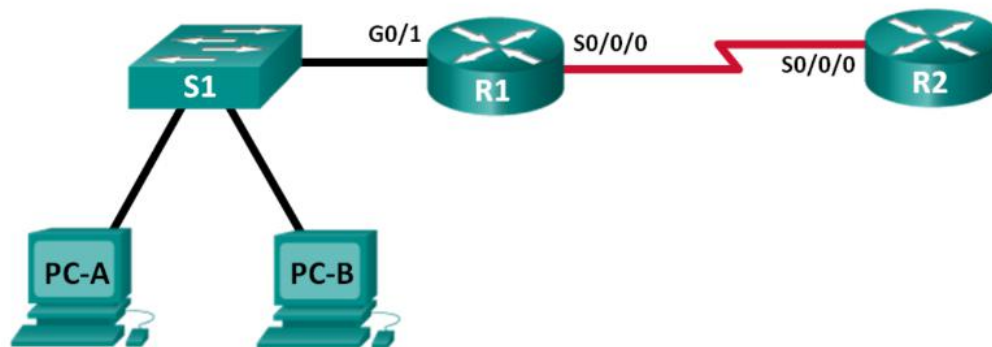
Step 1: Determine the number of subnets in Network Topology A.
a. How many subnets are there? ____2_____
b. How many bits should you borrow to create the required number of subnets? _____1 bit_____
c. How many usable host addresses per subnet are in this addressing scheme? __126_____
d. What is the new subnet mask in dotted decimal format? ___255.255.255.128_____
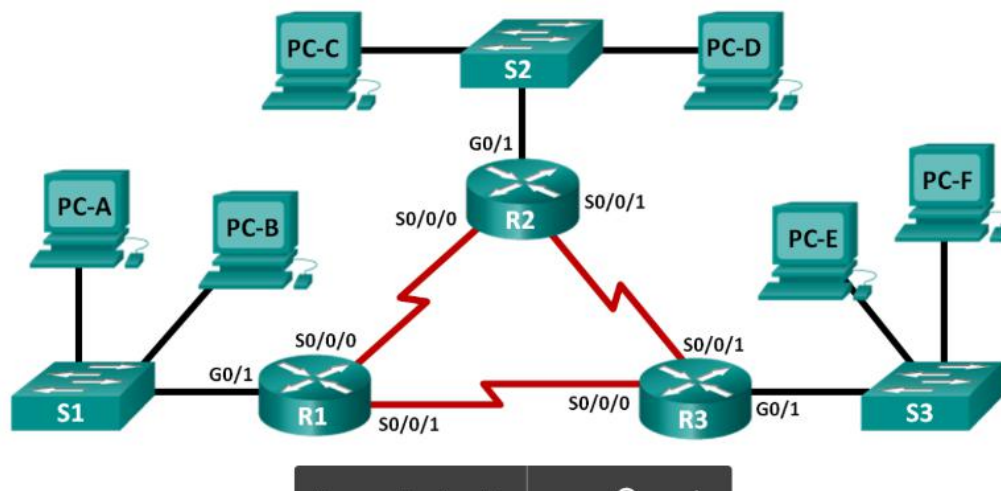e. How many subnets are available for future use?_____0_____

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

Subnet no	Subnet address	First unstable host address	Last 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: Network Topology B

The topology has changed again with a new LAN added to R2 and a redundant link between R1 and R3.
Use the 192.168.10.0/24 network address to provide addresses to the network devices. Also provide an IP
address scheme that will accommodate these additional devices. For this topology, assign a subnet to each
network.

Step 1: Determine the number of subnets in Network Topology B.
a. How many subnets are there? _____6_____
b. How many bits should you borrow to create the required number of subnets?_____3_____
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:

Subnet no	Subnet address	First unstable host address	Last 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	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	GigabitEthernet0/1	192.168.10.1	255.255.255.244
	Serial 0/0/0	192.168.10.33	255.255.255.244
	Serial 0/0/1	192.168.10.65	255.255.255.244
R2	GigabitEthernet0/1	192.168.10.97	255.255.255.244
	Serial 0/0/0	192.168.10.34	255.255.255.244
	Serial 0/0/1	192.168.10.129	255.255.255.244
R3	GigabitEthernet0/1	192.168.10.161	255.255.255.244

| Serial 0/0/0 | 192.168.10.66 | 255.255.255.244 |
| Serial 0/0/1 | 192.168.10.130 | 255.255.255.244 |