Lab 11
Haq Nawaz

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TASK 1 :

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

00001010.10000000.11110000.00110010   (IP address)
11111111.11111111.11111111.11111100
_____   And operation
00001010.10000000.11110000.00110000   Network Id
00001010.10000000.11110000.00110011   Broadcast Id

Change to Decimal

18.128.240.48
18.128.240.51

Range of host addresses is two

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

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
128.107.14.191/22	128.107.12.0	128.107.15.255	10	1022
172.16.104.99/27	172.16.104.96	172.16.104.127	5	30

Rough Work :
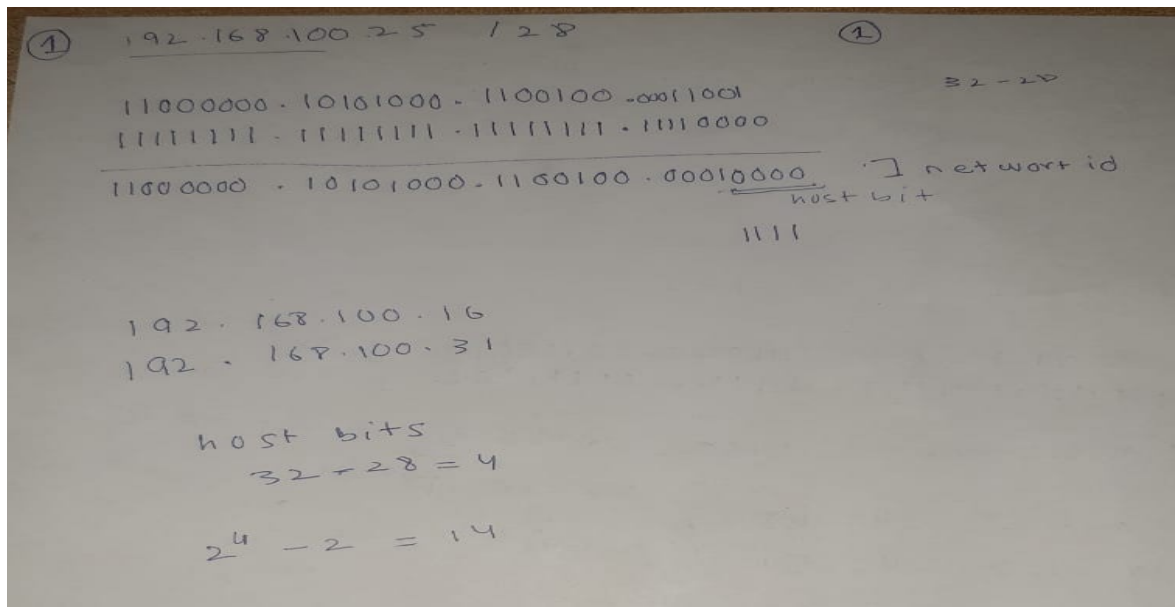
② 172 . 30 . 10 . 130   / 30

10101100 . 00011110 . 0000 1010 . 1000 0010
11111111 . 11111111 . 1111 1111 . 1111 1100
10101100 . 00011110 . 00001010 . 1000 0000] networkid
                                          └→ host bit

                                    11

172 . 30 . 10 . 128] two host
172 . 30 . 10 . 131

                        number of host
$2^2 - 2 = 4 - 2 = 2$

                                                    3

10 . 1 . 113 . 75 / 19
00001010 . 00000001 . 01110001 . 01001011
11111111 . 11111111 . 11100000 . 00000000
00001010 . 0000000 1 . 01100000 . 00000000
                                host bit

                              32 - 19 = 13

10 . 1 . 96 . 0   ] 13 host
10 . 1 . 127 . 255

$2^{13} - 2 = 8190$

198 . 133 . 219 . 250 / 24

11000110 . 10000101 . 11011011 . 11111010
11111111 . 11111111 . 11111111 . 00000000
11 000110 . 10000101 . 11011011 . 00000000   32 - 24
                                    8 host

198 . 133 . 219 . 0   ] network
198 . 133 . 219 . 255
                      254 # of hosts
$2^8 - 2 = 254$

⑤ 128.107.14.191   /22

1000 0000 .011 01011. 0000 1110 . 10111111
1111 1111 . 1111 1111 . 1111 1100 . 00000000
_____ host bit 10
10000000 . 011 01011. 0000 1100 .00000000
                                   11 .11111111

128 . 107 . 12 . 0
128 . 107 . 15 . 255

$2^{10} - 2 = 1022$

⑥ 172.16.104.99   /27

10101100 . 00010000 . 11 01000 . 01100011
1111 1111 . 11 1 11111 . 11 111111 . 11 100000
_____ host bit 45
10101100 .00010000. 11 01000 . 01100000
                                  11111

                                              32 - 27 = 5

172 .16.104.96
172 . 16 .104. 127

$2^5 - 2 = 30$

Topology A:

TASK 3

192.168.10.3
255.255.255.128

192.168.10.129
255.255.255.128

192.168.10.130
255.255.255.128

2960-24TT
Switch0

2911
Router0

2911
Router1

PC-PT
PC0

PC-PT
PC1

192.168.10.1
255.255.255.128

192.168.10.2
255.255.255.128
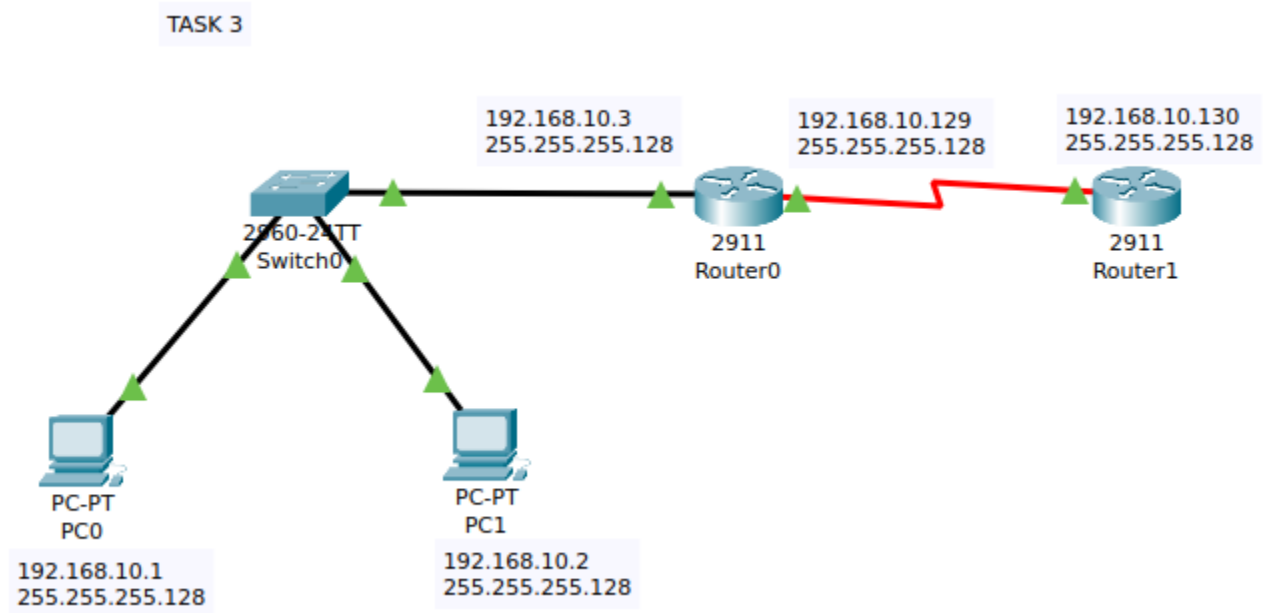
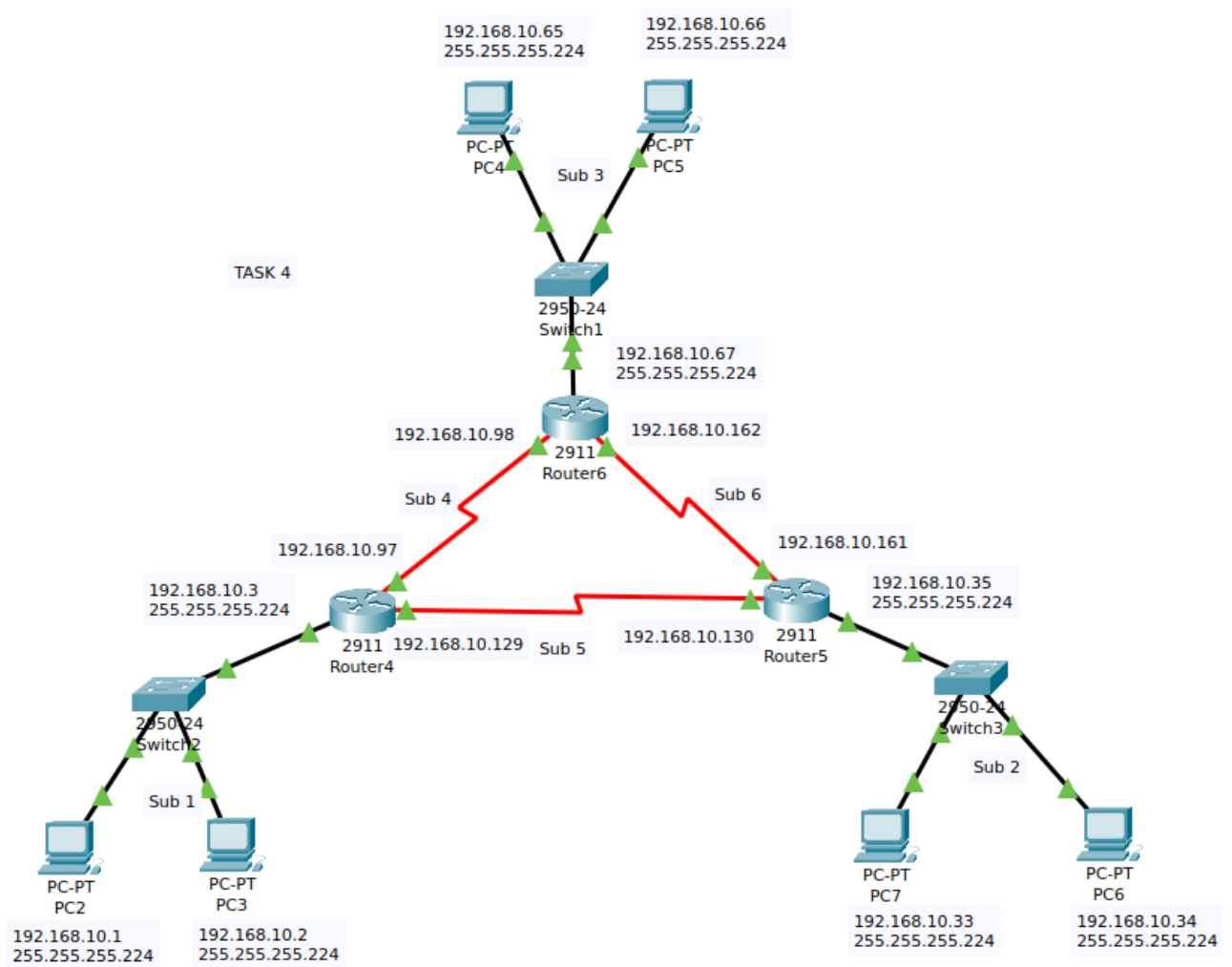Step 1: Determine the number of subnets in Network Topology A.

a. How many subnets are there? ___2___

b. How many bits should you borrow to create the required number of subnets? __1_____

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.

Subnet Number	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
0	192.168.10.0	192.168.10.1	192.168.10.126	192.168.10.127
1	192.168.10.128	192.168.10.129	192.168.10.254	192.168.10.255
2				
3				

Topology B:

192.168.10.65
255.255.255.224

192.168.10.66
255.255.255.224

PC-P
PC4   Sub 3

PC-PT
PC5

TASK 4

2950-24
Switch1

192.168.10.67
255.255.255.224

192.168.10.98   192.168.10.162
2911
Router6

Sub 4   Sub 6

192.168.10.97   192.168.10.161

192.168.10.3
255.255.255.224

192.168.10.35
255.255.255.224

2911 192.168.10.129 Sub 5   192.168.10.130 2911
Router4   Router5

2950-24
Switch2

2950-24
Switch3

Sub 1   Sub 2

PC-PT
PC2

PC-PT
PC3

PC-PT
PC7

PC-PT
PC6

192.168.10.1
255.255.255.224

192.168.10.2
255.255.255.224

192.168.10.33
255.255.255.224

192.168.10.34
255.255.255.224

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? __255.255.255.224__

e. How many subnets are available for future use? ___2___

Step 2: Record the subnet information.

Subnet Number	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
0	192.168.10.0	192.168.10.1	192.168.10.30	192.168.10.31
1	192.168.10.32	192.168.10.33	192.168.10.62	192.168.10.63
2	192.168.10.64	192.168.10.65	192.168.10.94	192.168.10.95
3	192.168.10.96	192.168.10.97	192.168.10.126	192.168.10.127
4	192.168.10.128	192.168.10.129	192.168.10.158	192.168.10.159
5	192.168.10.160	192.168.10.161	192.168.10.190	192.168.10.191
6	192.168.10.192	192.168.10.193	192.168.10.222	192.168.10.223
7	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.

Device	Interface	IP Address	Subnet Mask
R4	GigabitEthernet 0/0	192.168.10.3	255.255.255.224
	Serial 0/3/0	192.168.10.97	255.255.255.224
	Serial 0/3/1	192.168.10.129	255.255.255.224
R5	GigabitEthernet 0/0	192.168.10.35	255.255.255.224
	Serial 0/3/0	192.168.10.161	255.255.255.224
	Serial 0/3/1	192.168.10.130	255.255.255.224
R6	GigabitEthernet 0/0	192.168.10.67	255.255.255.224
	Serial 0/3/0	192.168.10.98	255.255.255.224
	Serial 0/3/1	192.168.10.162	255.255.255.224

Rough Work :