

Computer Networks

Lab Task #10

Saad Ahmad

20P-0051

Task#1

Task#1

IP: 10.128.240.50.

$$(10)_{10} = 1010$$

$$(128)_{10} = 10000000$$

$$(240)_{10} = 11110000$$

$$(50)_{10} = 110010$$

IP Add: 00001010.10000000.11110000.00110010

Subnet: 11111111.11111111.11111111.11111100

Applying AND operation

Net
AND: 00001010.10000000.11110000.00110000

Broad
00001010.10000000.11110000.00110011

Network: 10.128.240.48

Broadcast: 10.128.240.51

Range of host address: 10.128.240.49,
10.128.240.50.

Task #2

Task #2

a) $192.168.100.25/28$.

IP = $192.168.100.25$.

$(192)_{10} = 11000000$

$(168)_{10} = 10101000$

$(100)_{10} = 1100100$

$(25)_{10} = 11001$

IP add: $11000000.10101000.01100100.00011001$

Subnet: $11111111.11111111.11111111.11110000$

Applying AND operator.

AND: $11000000.10101000.01100100.00010000$

Broadcast: $11000000.10101000.01100100.00011111$

Network: $192.168.100.16$.

Broadcast: $192.168.100.31$

T. # of host bit: 4

$$\text{T. \# of hosts} = 2^n - 2$$

$$= 2^4 - 2$$

$$= 14$$

$$b) 172.30.10.130/30$$

$$IP = 172.30.10.130.$$

$$172 = 10101100$$

$$30 = 11110$$

$$10 = 1010$$

$$130 = 10000010$$

$$IP \text{ add: } 10101100.00011110.00001010.10000010$$

$$\text{Subnet: } 11111111.11111111.11111111.11111100$$

~~AND~~ Applying AND operator

$$\text{AND: } 10101100.00011110.00001010.10000000$$

$$\text{Broad cast: } 10101100.00011110.00001010.10000011$$

Network: ~~192~~ 172.30.10. ~~128~~

Broadcast: 172.30.10.131

T. # of host bit : 2

T. # of hosts: $2^n - 2$

$$= 2^2 - 2$$

$$= 2.$$

c) 10.1.113.75/19

IP: 10.1.113.75

$$(10)_{10} = 1010$$

$$(1)_{10} = 1$$

$$(113)_{10} = 1110001$$

$$(75)_{10} = 1001011$$

IP add = 00001010.00000001.0110001.01001011

Sub net = 1111111.1111111.11100000.00000000

Applying AND operator

AND = 00001010.00000001.01100000.00000000

Broadcast = 00001010.00000001.01111111.11111111

Network = 10.1.⁹⁶~~95~~.0

Broadcast = 10.1.127.255

Pen went out ;)

T. # of host bit: 13

$$\begin{aligned}\text{T. # of hosts} &= 2^{n_B} - 2 \\ &= 2^{13} - 2 \\ &= 8190\end{aligned}$$

d) 198.133.219.250/24

IP = 198.133.219.250

$$(198)_{10} = 11000110$$

$$(133)_{10} = 10000101$$

$$(219)_{10} = 11011011$$

$$(250)_{10} = 11111010$$

IP Add: 11000110.10000101.11011011.11111010

Sub net: 11111111.11111111.11111111.00000000

Applying AND operator

AND: 11000110.10000101.11011011.00000000

Broadcast: 11000110.10000101.11011011.11111111

Network: 198.133.219.0

Broadcast: 198.133.219.255

T. # of host bit: 8

$$\text{T. \# of hosts} = 2^n - 2$$

$$= 2^8 - 2$$

$$= 254.$$

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

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

- How many subnets are there? 2
- How many bits should you borrow to create the required number of subnets? 1
- How many usable host addresses per subnet are in this addressing scheme? 126
- What is the new subnet mask in dotted decimal format? 255.255.255.128
- 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 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				

Task #4

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? 255.255.255.224
- 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 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
8				

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 Mask
R1	GigabitEthernet 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	GigabitEthernet 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	GigabitEthernet 0/1	192.168.10.161	255.255.255.224
	Serial 0/0/0	192.168.10.66	255.255.255.224
	Serial 0/0/1	192.168.10.130	255.255.255.224