Workshop – 3 Submission

Answer – 1:

(I) The two IP addresses must have the same first 16 bits in order to belong to the same subnet as in class B 16 bits are for network and 16 are for hosts. So, we first need to convert these two IP addresses to binary representation.

- 129.127.8.8 : 10000001 01111111 00001000 00001000
- 129.127.104.8 : 10000001 01111111 01101000 00001000

So, here the first 16 bits are the same, so the given two IP addresses belong to the same subnet.

Explanation: For the given IP addresses the subnet blocks are as given below:

Address : 129.127.8.8

Netmask : 255.255.0.0 = 16

Network : (129.127.0.0) / 16

Broadcast : 129.127.255.255

HostMin : 129.127.0.1

HostMax : 129.127.255.254

So considering these both the IP addresses, they come under the Hostmin and Hostmax range, thus two IP addresses belong to the same IP address.

(II) Netmask : 255.255.255.0 = 24

Now here 24 is the class C subnet mask. Considering class C it has 24 bits are network bits and 8 bits are host bits. The Two IP address must have the same first 24 bits, thus it belongs to the same subnet.

So, we first need to convert these two IP addresses to binary representation.

- 129.127.8.8 : 10000001 01111111 00001000 00001000
- 129.127.104.8 : 10000001 01111111 01101000 00001000

Here the first 24 bits are not the same thus the given two IP addresses do not belong to the same subnet.

Subnet Block for IP address (129.127.8.8)/24

HostMin : 129.127.8.1

HostMax : 129.127.8.254

Hosts/Net : 254

Subnet Block for IP address (129.127.104.8)/24

HostMin : 129.127.104.1

HostMax : 129.127.104.254

Hosts/Net : 254

These both the IP addresses belong to different subnet blocks. Thus these two IP addresses 129.127.8.8 and 129.127.104.8 do not belongs to the same IP address.

Answer – 2:

There are certain constraints considered on the IP addresses for the interfaces at each router are as follows:

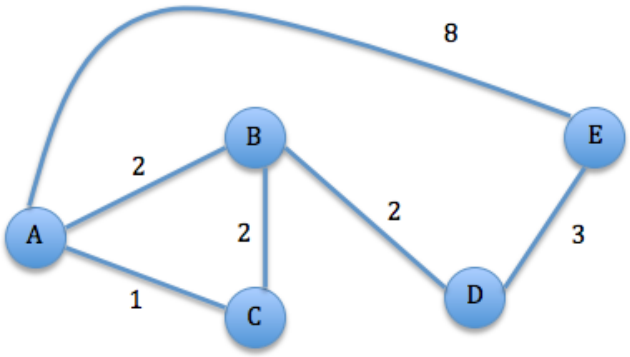
- The broadcast and IP address must not need to be the same as used.
- The same for the network and IP address must not need to be same as used.
- The private IP address of any host should not be the same as the IP address in that network.
- The IP address must need to belong to the same subnet masks.

For the router, the most efficient subnet mask is the /30 subnet mask. The reason is that in /30 subnet mask 4 IP addresses are being present in out of which 2 are used to connect the router and the other two are used to broadcast and for the network. So, in short, there will be 0 IP wastage.

.Answer – 3:

The reason behind IP checksum only covers the header, not the data because performing checksum over the data will result in a very slow speed. When considering millions of packets per sec are directed by the router and in case if the checksum if applied to all the data this will eventually reduce the packet processing speed.

Answer – 4:



Routing Algorithms:

(I) Distance Vector Algorithm

Least cost path for routing: $dx(y) = minv\{c(x,v) + dv(y)\}$

Considering Reference Node E

For Iteration 1:

Destination	Cost	NextHop
A	8	A
D	3	D

From A	Cost
A	0
B	10
C	9

Updating Routing Table:

Destination	Cost	NextHop
A	8	A
D	3	D
B	10	A
C	9	A

For Iteration 2:

Destination	Cost	NextHop
A	8	A
D	3	D
B	10	A
C	9	A

From D	Cost
D	0
B	5

Updating Routing Table:

Destination	Cost	NextHop
A	8	A
D	3	D
B	5	D
C	9	A

For Iteration 3:

Destination	Cost	NextHop
A	8	A
D	3	D
B	10	A
C	9	A

From A	Cost
B	0
A	7
C	7

Updating Routing Table:

Destination	Cost	NextHop
A	7	D
D	3	D
B	5	D
C	7	D

Final Routing Table:

Destination	Cost	NextHop
A	7	D
B	5	D
C	7	D
D	3	D
E	0	X

(II) Dijkstra's Algorithm

V	A	B	C	D	E
E	8(E)	Infinity	Infinity	3(E)	0(E)
D	8(E)	5(D)	Infinity	3(E)	-
B	7(B)	5(D)	7(B)	-	-
A	7(B)	-	7(B)	-	-
C	-	-	7(B)	-	-

TO NODE	PATH	LENGTH
A	E > D > B > A	7
B	E > D > B	5
C	E > D > B > C	7
D	E > D	3
E	E	0

Answer – 5:

The topics that I would like to discuss about are as follows:

- Dijkstra's algorithm for routing
- Distance Vector for routing in depth

As these two algorithms are crucial for all of us in this subject and has even wide use in computer science theories.