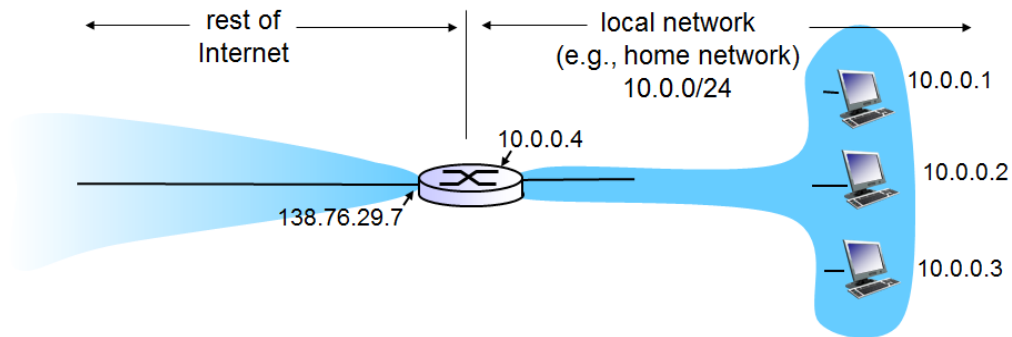# CEN335-01: COMPUTER NETWORKS
Final Exam Sample Questions and Solutions Part-2

1- Consider the Figure below:

Assume host 10.0.0.1 wants to send datagram from its port 3345 to IP address 128.119.40.186 with port number 80. Assume also router uses port number 5001. Show the Source and destination IP addresses and port numbers for each step by considering NAT in the following Figure.
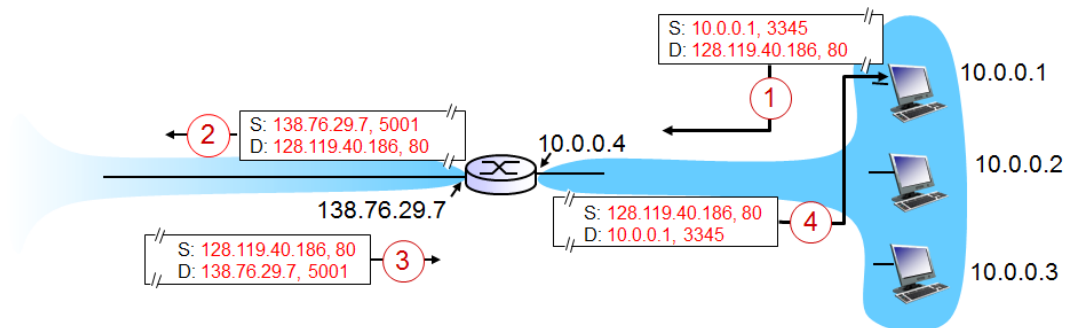
2- Consider the network graph given in the following figure.

Show the operation of Dijkstra's (Link State) algorithm for computing the least cost path from u to all destinations. Fill the table given below.
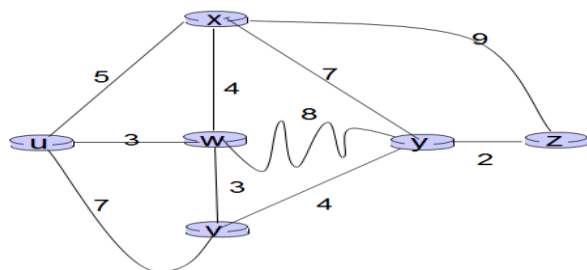
Step	N'	D(**v**) p(v)	D(**w**) p(w)	D(**x**) p(x)	D(**y**) p(y)	D(**z**) p(z)
0	u	7,u	(3,u)	5,u	∞	∞
1	uw	6,w		(5,u)	11,w	∞
2	uwx	(6,w)			11,w	14,x
3	uwxv				(10,v)	14,x
4	uwxvy					(12,y)
5	uwxvyz					

3- Consider the network graph now in the following.

What are distance vectors in nodes B, and C? Give distance vectors as $d_x(y)$ where it represents minimum cost from x to y.
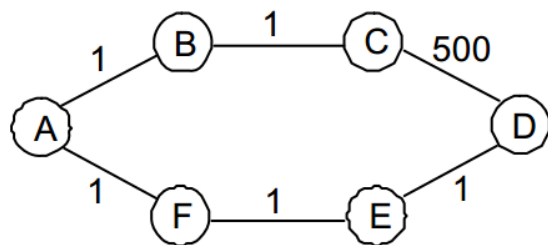
$d_B(A) = 1$

$d_B(C) = 1$
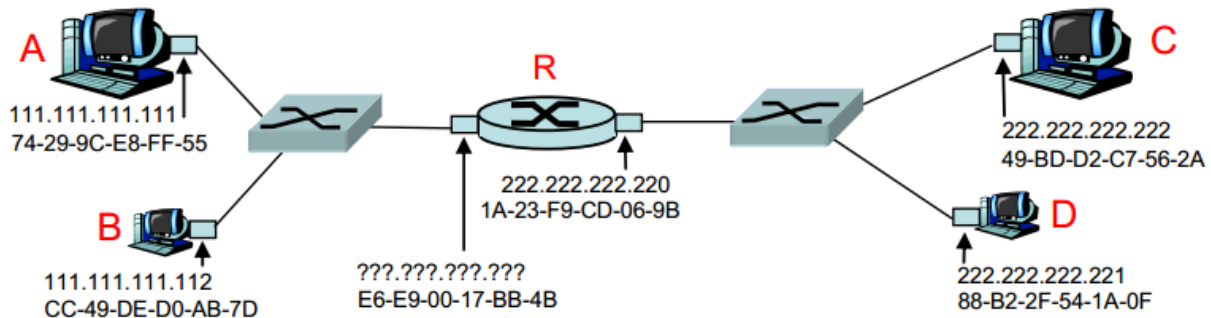
$d_B(D) = 4$

$d_B(E) = 3$

$d_B(F) = 2$

$d_C(A) = 2$

$d_C(B) = 1$

$d_C(D) = 5$

$d_C(E) = 4$

$d_C(F) = 3$

4- Assume you are given to LAN scenario below:

a-) Assign an IP address to the leftmost interface of the router, given that the subnet part of IP addresses are 24 bits.

Answer: any address starting with 111.111.111.* is fine (except for * being 111 and 112).

b-) Suppose A wants to send an IP datagram to B and knows B's IP address. Must A also know B's MAC address to send the datagram to B? If so, how does A get this info? If not, explain why not.

Answer: Yes, since B is on the same subnet, it will need to know B's MAC address. This will be done through the ARP protocol.

c-) Suppose A wants to send an IP datagram to C and knows C's IP address. Must A also know C's MAC address to send the datagram to C? If so, how does A get this info? If not, explain why not.

Answer: No, A will forward the frame to the router, and the router will then de-capsulate the datagram and then re-encapsulate the datagram in a frame to be sent over the right subnet. R will need to run ARP in this case to get C's MAC address, but A will not).

d-) Suppose that R has a datagram (that was originally sent by A) to send to C. What are the MAC addresses on the frame that is sent from R to C? What are the IP addresses in the IP datagram encapsulated within this frame?

Answer: source IP: 111.111.111.111, dest IP: 222.222.222.222. source MAC: 1A-23-F9-CD-06-9B (right interface of R), dest MAC: 49-BD-D2-C7-56-2A (node C).