

CSCI 4760 – Computer Networks
Spring 2024
Quiz 4

Name: _____ **Student ID:** _____

Question 1 (0.25 points)

A network subnet has a mask of 255.255.254.0 How many usable host addresses will this subnet provide? Please, just type the number in decimal

Question 2 (0.25 point)

Name two advantages of SDN compare to Traditional IP

Question 3 (0.5 point)

Consider a datagram network using 32-bit host addresses. Suppose a router has four links, numbered 0 through 3, and packets are to be forwarded to the link interfaces as follows: (Refer the image above)

Match the following five entries (destination addresses) of a forwarding table that uses longest prefix matching, with their correct link interfaces to which packets are forwarded.

<i>forwarding table</i>	
Destination Address Range	Link Interface
11001000 00010111 00010000 00000000 through 11001000 00010111 00010111 11111111	0
11001000 00010111 00011000 00000000 through 11001000 00010111 00011000 11111111	1
11001000 00010111 00011001 00000000 through 11001000 00010111 00011111 11111111	2
otherwise	3

Address

Interface

11001000 00010111 00010

11001000 00010111 00011000

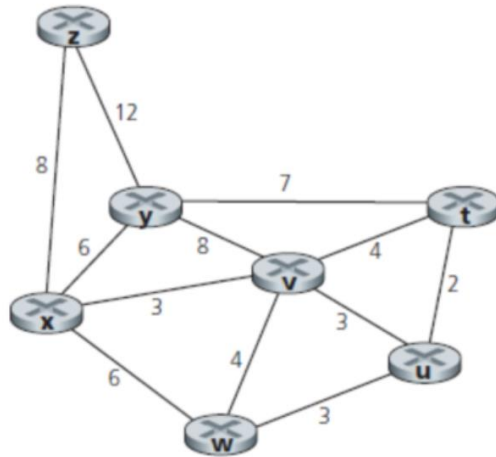
11001000 00010111 00011

11001000 00010111 001

11001001 00010111 001

Question 4 (0.75 points)

Consider the following network.



With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from t to all network nodes

Step	N'	D(u), P(u)	D(v), P(v)	D(y), P(y)	D(x), P(x)	D(z), P(z)	D(w), P(w)
0	t						
1							
2							
3							
4							
5							
6							

Then use this table to make the forwarding table for t.

Forwarding Table

Destination	Link
x	
y	
z	
w	
u	
v	

Question 5 (0.5 points)

For the network summarized by the numbers 193.23.8.0/22

- a. Address is Class _____ IP address
- b. Divide the address in to 2 parts for two organizations? For each organization, specify the range of address and subnet.

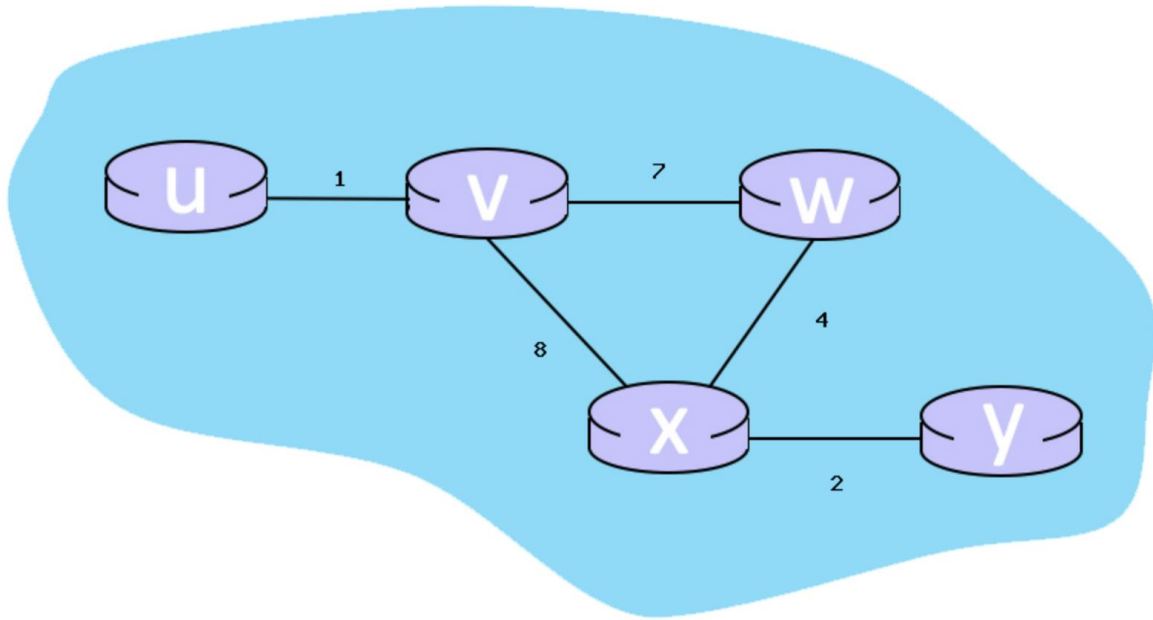
Question 6 (0.5 points)

Consider a datagram network using **10-bit host addresses**. Suppose a router uses longest prefix matching and has the following forwarding table

Prefix Match	Interface
0	0
01	1
000	2
Otherwise	3

For each interface, specify address range and number of addresses.

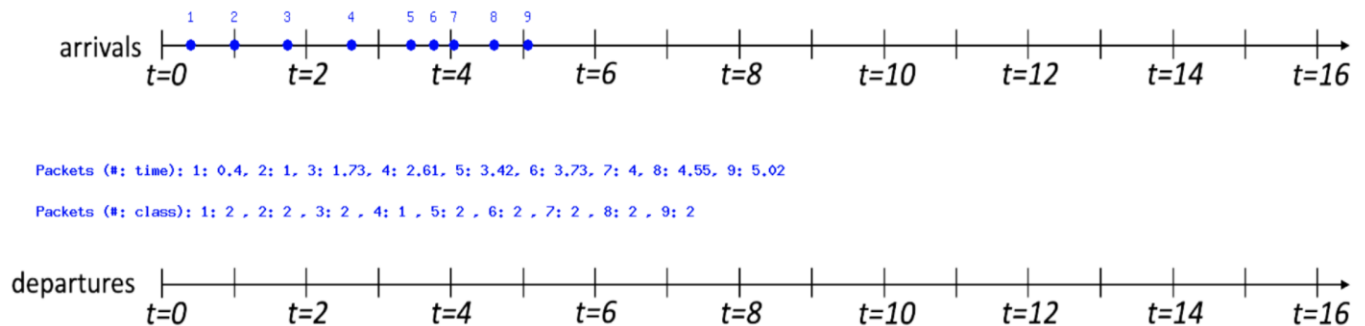
Question 7 (0.25 points)



What are the initial distance vectors for router 'W'? Write your answer as u,x,v,w,y and if a distance is ∞ , write 'x' .

When the algorithm converges, what are the distance vectors from router 'W' to all routers? Write your answer as u,x,v,w,y

Question 8 (0.5 points)



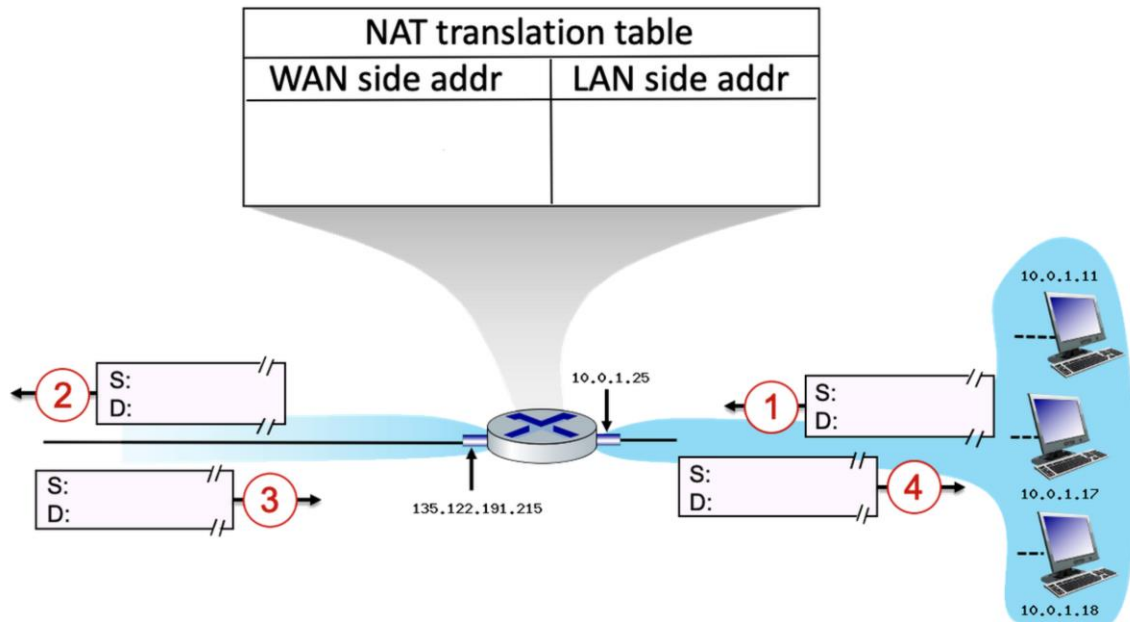
Consider the arrival of 9 packets to an output link at a router in the interval of time $[0, 5]$, as indicated by the figure below. We'll consider time to be "slotted", with a slot beginning at $t = 0, 1, 2, 3$, etc. Packets can arrive at any time during a slot, and multiple packets can arrive during a slot. At the beginning of each time slot, the packet scheduler will choose one packet, among those queued (if any), for transmission according to the packet scheduling discipline (that you will select below). Each packet requires exactly one slot time to transmit, and so a packet selected for transmission at time t , will complete its transmission at $t+1$, at which time another packet will be selected for transmission, among those queued.

In the case of **Round Robin**, there will be three classes of traffic (1, 2, 3), with lower class numbers having higher priority.

At $t=3$, which packet is sent out?

At $t=6$, which packet is sent out?

Question 9 (0.5 points)

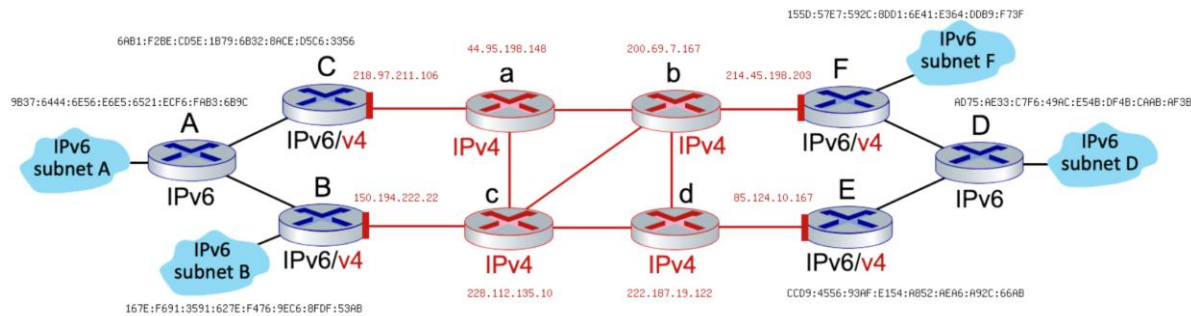


Suppose that the host with IP address 10.0.1.18 sends an IP datagram destined to host 128.119.178.189. The source port is 3463, and the destination port is 80.

Now consider the datagram at step 1, after it has been transmitted by the router. What is the source IP address for this datagram? What is the destination IP address for this datagram?

Now consider the datagram at step 3, after it has been transmitted by the router. What is the source IP address for this datagram? What is the destination IP address for this datagram?

Question 10 (0.5 points)



Consider the network shown above which contains four IPv6 subnets, connected by a mix of IPv6-only routers(shaded blue), IPv4-only routers (shaded red) and dual-capable IPv6/IPv4 routers (shaded blue with red interfaces to IPv4 routers).

Suppose that a host of subnet A wants to send an IPv6 datagram to a host on subnet D. Assume that the forwarding between these two hosts goes along the path: A --> C --> a --> b --> F --> D

Instruction: To specify source and destination address, use name of router and , IP version. For example if it is router F and IPV6, write it as F,IPV6

What is the source address of F to D datagram?

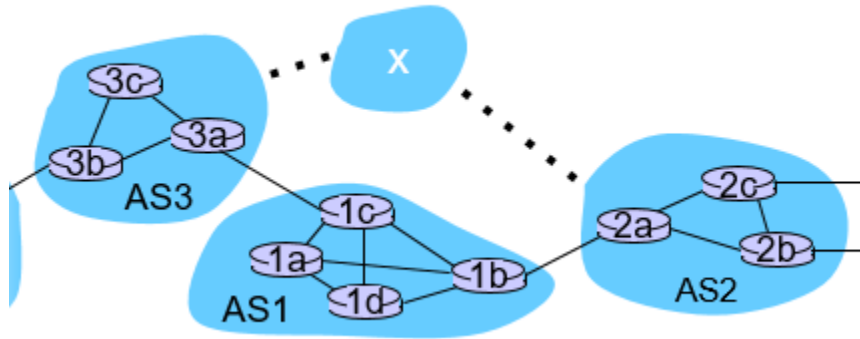
What is the destination address of this F to D datagram?

What is the source address of a to b datagram?

What is the destination address of this a to b datagram?

Question 11 (0.5 point)

Assume we have eBGP, IBGP and OSPF. Fill in the blank with eBGP, IBGP or OSPF.



1b learns from _____ protocol that subnet *x* is reachable from AS2

1d learns from _____ protocol that subnet *x* is reachable from 1b

1d learns from _____ protocol the shortest path to 1b