

National University of Computer and Emerging Sciences, Lahore Campus
Quiz5 [BS(CS): Section E] Fall 2023

Computer Networks (Code: CS3001)

Quiz Date: Novemer 23, 2023

Total Marks: 15

[CLO 3]

Duration: 25 -Minutes

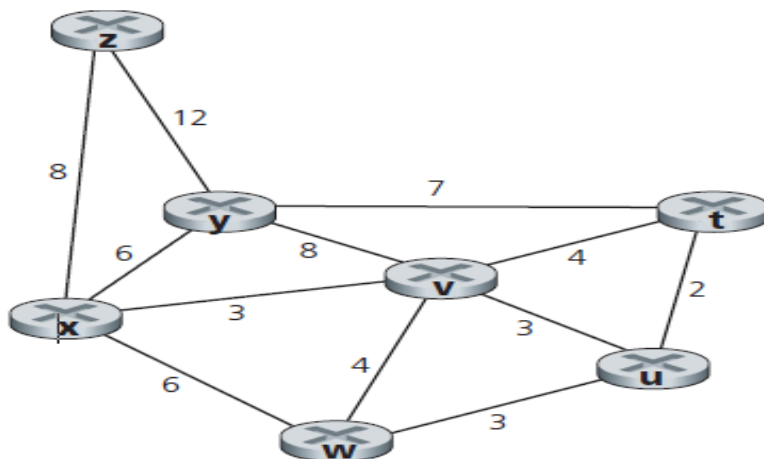
Name ----- Roll #----- Section -----

Q 1: What is meant by a control plane that is based on logically centralized control? In such cases, are the data plane and the control plane implemented within the same device or in separate devices? Explain [2]

Q2: Is it necessary that every autonomous system use the same intra-AS routing algorithm? Why or why not? [0.5+1.5=2]

Q3: Consider the following network. With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from **x** to all network nodes. Show the working of the algorithm in the form of a tabular summary for all iterations (i.e., distance and predecessor for all network nodes during each iteration). Moreover, provide the least-cost-path tree from node **x** and resulting forwarding table in **x**.

[7+2+2=11]



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Start writing your answers from here onwards. Yu can use backside of this sheet if needed.

Answers:

Q 1: Logically centralized control means that a logically central routing controller computes and distributes the forwarding tables to be used by each and every router, and each router does not compute its forwarding table, unlike the per-router control. In the case of logically centralized control, the data plane and control plane are implemented in separate devices; the control plane is implemented in a central server or multiple servers, and the data plane is implemented in each router.

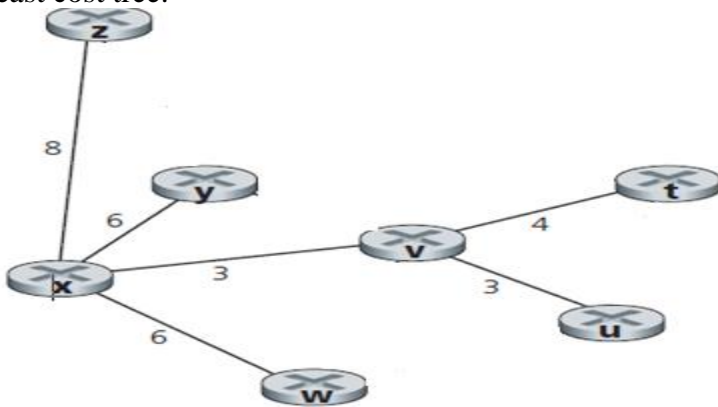
Q2: No. Each AS has administrative autonomy for routing within an AS.

Q3:

Tabular Summary

Step	N'	$D(t),p(t)$	$D(u),p(u)$	$D(v),p(v)$	$D(w),p(w)$	$D(y),p(y)$	$D(z),p(z)$
0	x	∞	∞	3,x	6,x	6,x	8,x
1	xv	7,v	6,v	3,x	6,x	6,x	8,x
2	xvu	7,v	6,v	3,x	6,x	6,x	8,x
3	xvuuv	7,v	6,v	3,x	6,x	6,x	8,x
4	xvuwy	7,v	6,v	3,x	6,x	6,x	8,x
5	xvuwyt	7,v	6,v	3,x	6,x	6,x	8,x
6	xvuwytz	7,v	6,v	3,x	6,x	6,x	8,x

Least cost tree:



resulting forwarding table in x:

destination	outgoing link
v	(x,v)
u	(x,v)
t	(x,v)
w	(x,w)
y	(x,y)
z	(x,z)