

# ITS323 – Quiz 5

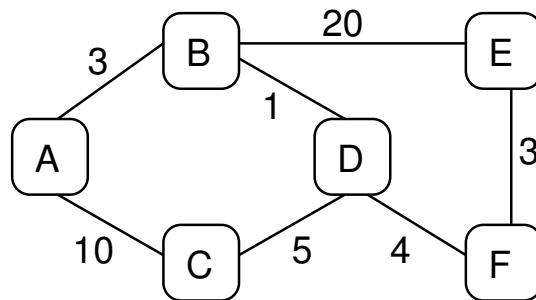
Introduction to Data Communications, Semester 1, 2010

Prepared by Steven Gordon on 2 September 2010

ITS323Y10S1Q05, Steve/Courses/ITS323/Assessment/Quiz5.tex, r1392

## Question 1 [4 marks]

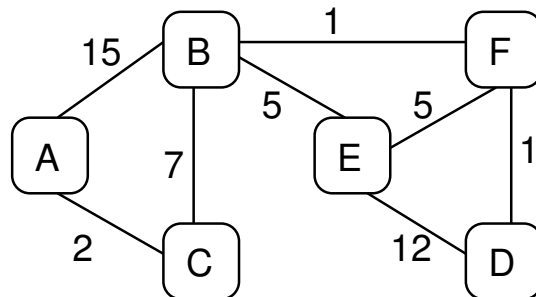
Consider the network below. Draw and complete the routing table for node [ B | D | E | B | A | B ] (you must include *cost* in the routing table as well as the other required information).



**Answer.** Although paths are shown in the tables below, they should not be in your answer.

Node B			
Dest	Path	Next	Cost
A	B-A	A	3
C	B-D-C	D	6
D	B-D	D	1
E	B-D-F-E	D	8
F	B-D-F	D	5

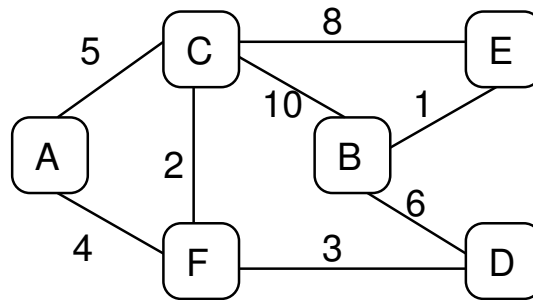
Node D			
Dest	Path	Next	Cost
A	D-B-A	B	4
B	D-B	B	1
C	D-C	C	5
E	D-F-E	F	7
F	D-F	F	4



**Answer.** Although paths are shown in the tables below, they should not be in your answer.

Node E			
Dest	Path	Next	Cost
A	E-B-C-A	B	14
B	E-B	B	5
C	E-B-C	B	12
D	E-F-D	F	6
F	E-F	F	5

Node B			
Dest	Path	Next	Cost
A	B-C-A	C	9
C	B-C	C	7
D	B-F-D	F	2
E	B-E	E	5
F	B-F	F	1



**Answer.** Although paths are shown in the tables below, they should not be in your answer.

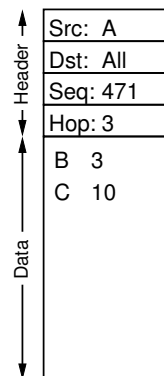
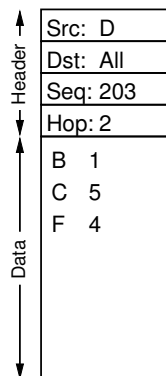
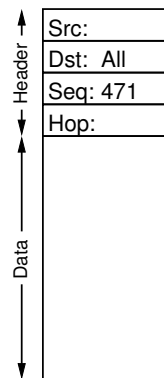
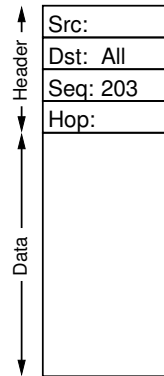
Node A			
Dest	Path	Next	Cost
B	A-F-D-B	F	13
C	A-C	C	5
D	A-F-D	F	7
E	A-C-E	C	13
F	A-F	F	4

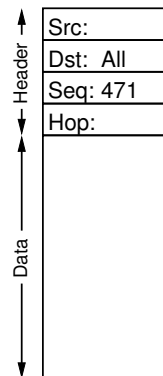
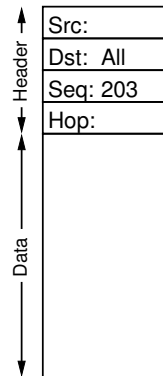
Node B			
Dest	Path	Next	Cost
A	B-D-F-A	D	13
C	B-E-C	E	9
D	B-D	D	6
E	B-E	E	1
F	B-D-F	D	9

### Question 2 [4 marks]

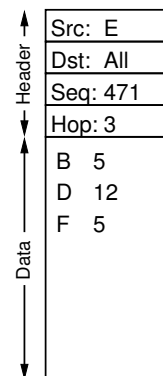
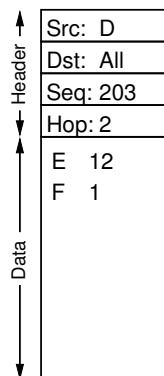
Assume link state routing is used in the network from Question 1. Each node informs all other nodes of the status of its links by sending a Link State Packet (LSP). The LSP contains a header and data. Complete the LSP that node [ D | A | D | E | D | C ] sends. The hop limit should be chosen as the smallest value such that all nodes will be reached.

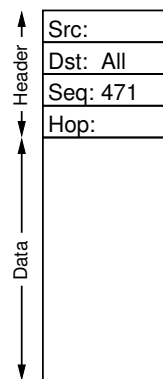
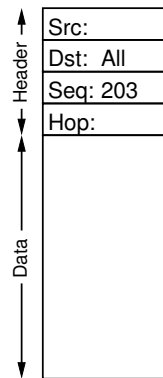
**Answer.** The source address (Src) should be that of the node originally sending the packet. The hop limit (Hop) should be the maximum of the minimum number of hops from source to each destination. The data should contain information about the end-points of each link and the cost of the corresponding links.



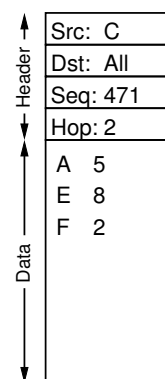
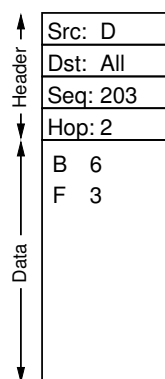


**Answer.** The source address (*Src*) should be that of the node originally sending the packet. The hop limit (*Hop*) should be the maximum of the minimum number of hops from source to each destination. The data should contain information about the endpoints of each link and the cost of the corresponding links.





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**Question 3** [2 marks]

- (a) How many cables (links) are necessary in a [ star | mesh | ring | bus | star | ring] topology LAN that has [ 20 | 10 | 25 | 15 | 30 | 20] computers?

**Answer.** Assuming 20 computers. With a mesh topology a link is needed for each pair of computers. With 20 computers there are  $20 \times 19 / 2 = 190$  links. With a star topology each computer has a link to the central hub/switch, hence 20 links. In a bus topology a single link is used; all computers attach to that link. With a ring topology each computer has a link to its two neighbours in the ring, hence same number of links as computers, i.e. 20 links.

- (b) What is a disadvantage of the topology in part (a) when compared to a [ mesh | ring | mesh | mesh | mesh | star] topology?

**Answer.** A star topology relies on the central hub/switch—if it fails the entire network fails. A mesh topology needs many links/interfaces, making installation very complex. In a ring topology if one link fails then no computers can communicate. With a bus topology the link is shared by all computers.