

COMP90007 Internet Technologies

Semester 2 2020, Assignment 2

Due date: 19 October 2020, Monday, 5 PM (Melbourne Time)

This assignment is worth 5% of the total marks for the subject. The weighting of each question is shown beside the question. Answers must be submitted as a PDF file via the COMP90007 Assignment 2 submission link on Canvas. **As usual, late submissions will attract a penalty of 10% per day or part thereof.** Please ensure your name, username and student Id are clearly presented on the answer documents you submit on Canvas. Submissions should only contain the question number and the answer (*please do not repeat the text of questions in your submission*). **Answers should be typed and not handwritten.** Questions can be answered by studying the material covered. **All work should be your original individual effort/work.**

Question 1 (1 mark)

The shortest path routing is used on a network shown in Figure 1, with the weight of each edge marked in the label.

- (1) What are the weights of shortest paths from E to the other 5 nodes, respectively? Show all your calculation and the steps of using Dijkstra's algorithm (Please use a table like the one shown on Slide 50 of Network Layer).
- (2) Which links are in the network graph but not in the sink tree of node E?

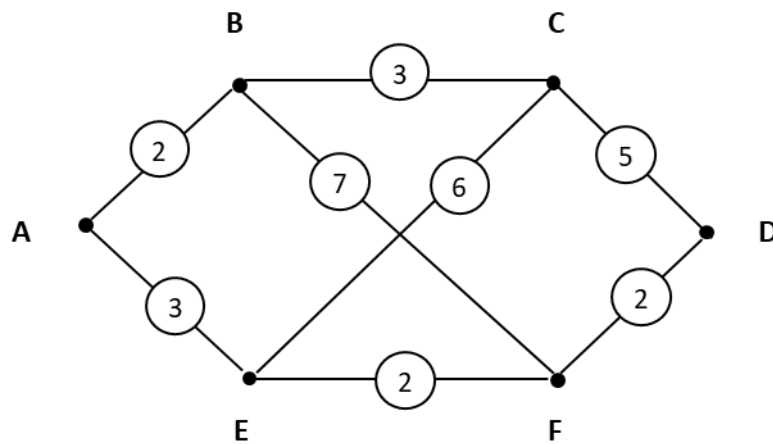


Figure 1 Network with nodes A-F

Question 2: (1 mark)

We have studied that four parameters define quality of service: Bandwidth, Delay, Jitter, and loss. The requirements for these parameters vary among applications and the quality of service perceived by users. Some applications require that high priority to be given to a parameter while other applications may require low priority for the same parameter. In the table below, please write 'High', 'Medium' or 'Low' against each parameter for all applications. Note, High means that a particular application require High need for quality for that parameter. For example, High in the Delay parameter column would mean that the particular application has high priority for delay to be minimized.

Application	Bandwidth	Delay	Jitter	Loss
ZOOM Meeting				
Online Shopping				
VoIP				
Bank Transactions				

Question 3: (1 mark)

Suppose an end-to-end network connection is using the TCP protocol on ethernet service. What is the maximum data size from an application that can be transmitted in one TCP segment, including overheads from TCP and IPv4 but excluding the overhead(s) imposed by the data link layer? How will your answer change if the transport layer protocol is UDP instead of TCP?

Question 4: (1 mark)

Congestion and buffer windows are used at sender and receiver ends to avoid network issues in TCP transport protocol. Describe:

- 1) What are the roles of these windows on sender and receiver sides?
- 2) What are the implications of using large vs. small window sizes on sender and receiver sides?

Question 5: (1 mark)

Suppose that the TCP Tahoe congestion window was at 39 KB when the time out occurred. How big will the window size be if the next four transmission bursts are all successful and threshold was set at 20 KB?