

COMP90007 Internet Technologies

Semester 1, 2022

Assignment 2

Due date: Wednesday 11 May 2022 5PM (Melbourne Time: AEST)

This assignment is worth 5% of the total marks for the subject. This assignment has 5 questions. The mark of each question is shown beside the question. **Answers must be submitted as a PDF file via the COMP90007 Assignment 2 submission link in Canvas by the due date. Late submissions will attract a penalty of 10% per day (or part thereof).**

Please ensure your name and student ID are clearly presented on your submission. **Submission should only contain the question number and the answer (do not repeat the text of questions in your submission).** Please present all steps of the solutions for questions involving calculations and/or derivations, otherwise relevant penalties will be applied. Questions can be answered in a few sentences. Excessively long answers will not be accepted. **Please type your answers and save as PDF. Handwritten assignments using tablet or scanned will not be accepted.**

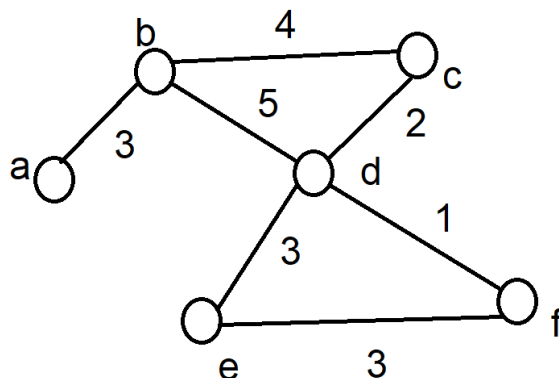
All work presented must be your original individual effort/work.

Question 1 (1.5 marks)

Given the following network which is represented as a graph where nodes are routers and link costs are shown on the edges:

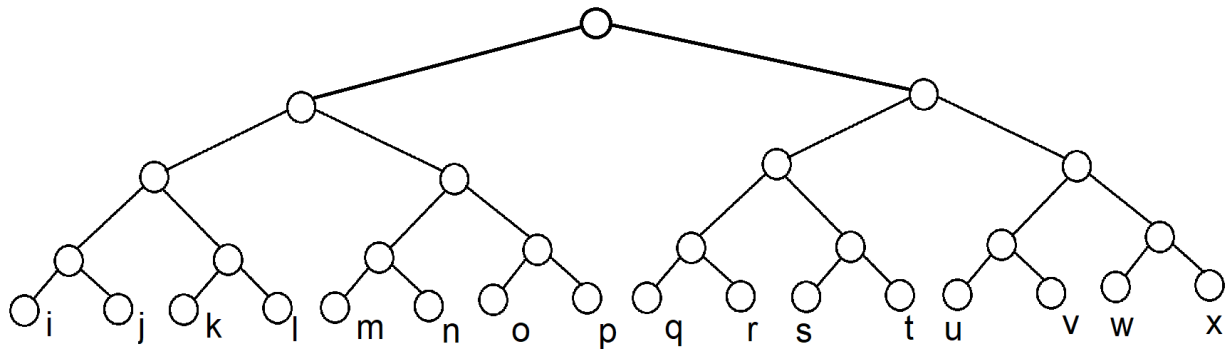
A) **(0.5 mark)** Please give the full form of the LSPs for all the nodes in this network using figures -- clearly label your drawings (and no handmade drawings please).

B) **(1 mark)** Then if we were to use Dijkstra's algorithm instead, using the notation in the book and with figures showing your steps similar to the example in the book, find the sink tree step by step for node labelled "a". (Again, clearly label your figures and no handmade figures please... You do not need to explicitly draw the sink tree at the end i.e., after clearly showing all of your steps.)



Question 2 (0.5 marks)

We have decided to use the Adaptive Tree Walk protocol where the structure is given as below. In this case, if stations p, s and v appear to have something to send right now, show step by step, what the protocol would do in detail. Explain each step with a brief sentence as dot points.



Question 3 (1 mark)

A video conferencing applications supports video, audio and text chat as modes of communication.

- (1) Which transport protocol should be used to carry each of these three channels (video, audio, text)? Elaborate on the reasons for your choices as dot points.
- (2) What happens if a packet is lost for each of these channels?

Question 4 (1 mark)

- (1) What capabilities does the Transport layer add to the Network layer?
- (2) Why is it important for these layers to be separate?
- (3) What would happen if they were merged into a single layer?

Question 5 (1 mark)

A client-server application uses TCP over a network where all packets take 1ms to be transmitted between machines. In this application, the client opens a TCP connection with a 3-way handshake to the server. It transmits a single packet of 1KB of data to the server in the same packet as its final ACK for the 3-way handshake. When this packet is acknowledged it commences the disconnection process. During this whole process, no packets are lost

- (1) Copy and complete the sequence/timing diagram below, showing all the packets being transmitted.
- (2) How long does the process take from commencing transmission of the first packet until the last packet is received?
- (3) How does this compare to using UDP send a single packet?

