

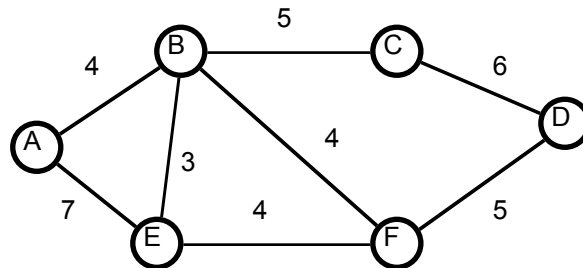
THE UNIVERSITY OF AUCKLAND

Department of Computer Science COMPSCI 314 S1 C 2004 : Assignment 4 Due Tuesday May 18 2004, 4.00 pm.

You must show working – no visible working may mean no marks.

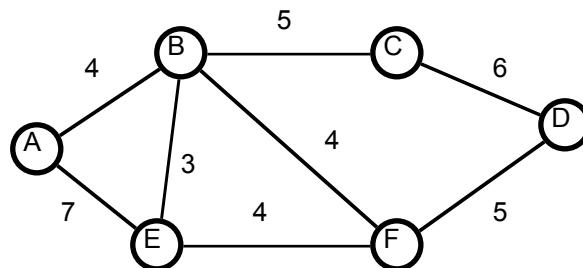
Submit the answer on A4 paper to the correct assignment hand-in box at the Resource Centre.

- Q1.** Use Dijkstra's algorithm to evaluate the costs from Node A to node D in the diagram, with link costs as shown



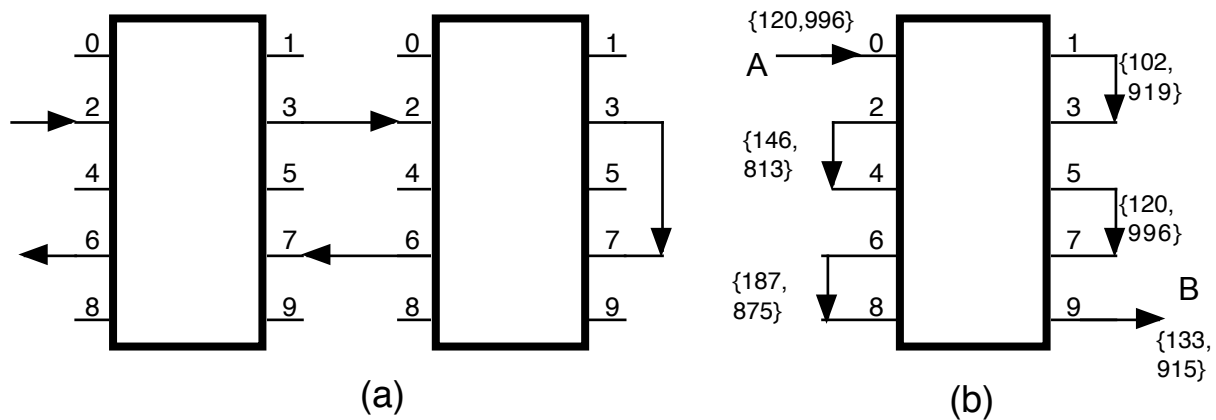
[8 marks]

- Q2.** Use the Bellman-Ford algorithm to compute the costs between nodes for the network below (the same as for Q 1), using the link costs shown beside each connection. Present your results in tables similar to those of Table 7.4 on Shay p 462 2nd Ed (Table 10.5 p 498, 3rd Ed).



[10 marks]

- Q3.** When testing networks and network components it is often useful to “loopback” a connection so that a given circuit goes through a switch several times, as in (a) below, or even (b). One advantage is that it allows all testing to be done at one end.



The remainder of this question uses diagram (b).

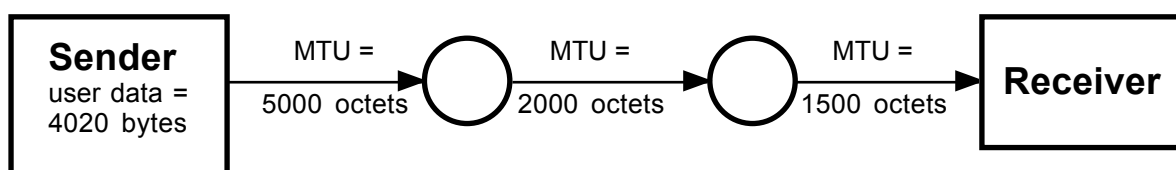
Each link shows two virtual circuit numbers, the first for data travelling in the direction of the arrows (from A to B) and the second for data travelling in the reverse direction (from B to A).

- What is the virtual circuit number of messages from A when received at B? [1 mark]
- What is the virtual circuit number of messages from B when received at A? [1 mark]
- Construct the routing tables to implement the connections shown. [8 marks]
- How must the routing tables be changed to connect directly between ports 0 and 5, bypassing ports 1, 2, 3 and 4? [2 marks]

[12 marks]

- Q4.** A user record of 4020 bytes (4000 data + 20 IP header) is transmitted over a TCP/IPv4 link as below. (The 4000 bytes includes any TCP header.) Show the IPv4 fragments that arrive at the receiver, giving appropriate values for all quantities concerned with fragmentation and reassembly.

Include the IPv4 headers in your calculation, but not any TCP or similar header.



[10 marks]

TOTAL = 40 marks
