

COMPSCI 314 S2C Assignment 3 2011

Department of Computer Science The University of Auckland

*This assignment contributes 5% of your overall course mark. Submit your assignment **as a single PDF file** to the **Assignment Drop Box**. Include all **workings** and **explanations**. Marks will be deducted for ambiguous solutions. Zero marks are awarded if the answers contain no explanation. Also, refer to the Departmental policy on cheating and plagiarism. Cut-and-paste without acknowledgment of the source is not acceptable.*

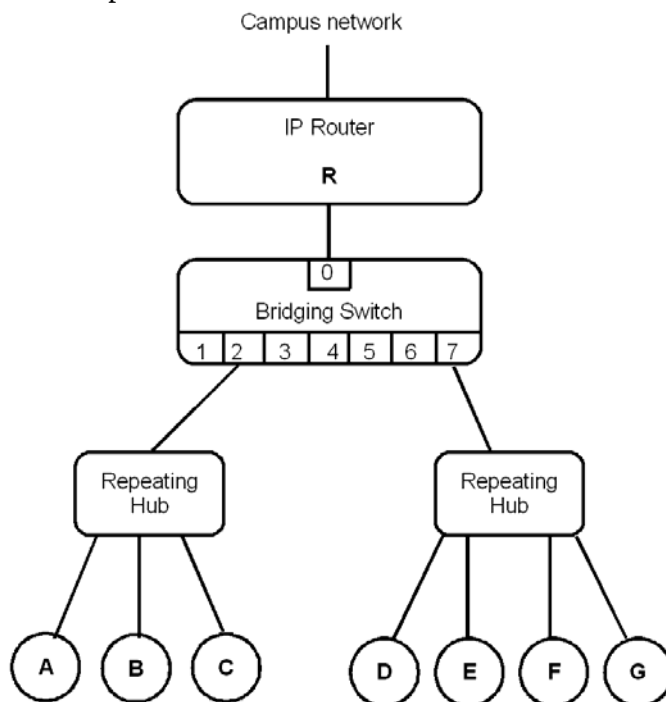
Assignment Drop Box (<https://adb.ec.auckland.ac.nz/adb/>).

Departmental Policy on Cheating on Assignments: see Assignments page of the course web site.

[Total: 50 marks]

[5 marks for each sub-question]

Consider the network drawn below. All the links are serial Ethernet. A, B,...G are the MAC addresses of various computers and R is the MAC address of the IP router's interface connected to the switch. The ports on the switch are numbered for convenience.



The switch needs a routing table to tell it which MAC address is found on which port, with entries like C: 2, G: 7, etc. (Address C is on port 2, address G is on port 7, etc.) Initially, this table is empty.

Q1. Learning process [20 marks]

- a) A sends a packet to C. What gets added to the routing table? Explain your answer.
- b) A sends a packet to D. What gets added to the routing table? Explain your answer.
- c) What will cause the entries C: 2 and G: 7 to be added to the routing table?
- d) What will cause the entry R: 0 to be added to the routing table?

Q2. Internet access [10 marks]

A wants to contact *mybank.example.com*, a server out in the Internet, using TCP.

- a) List the main steps that will occur, mentioning your assumptions.
- b) Will these steps cause anything to be added to the routing table in the switch?

Q3. Router tables [10 marks]

The router also contains its own routing table for IP addresses.

- a) What is the minimum information this table will need at start-up?
- b) Will the router need to learn anything when A contacts *mybank.example.com*? If so, what?

Q4. Security [10 marks]

- a) Computer E contains malicious software that is capturing all packets on its Ethernet interface. Is A at risk? Explain your answer.
- b) If A encrypts data sent to *mybank.example.com* using A's private RSA key, will the user be safer? Explain your answer.