COMPSCI 314 S2T Assignment 3
2009
Switching and Routing

Department of Computer Science
The University of Auckland

*This assignment contributes **5%** of your overall course mark. Submit your assignment in **PDF** format 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 on Assignments.*

Assignment Drop Box *(https://adb.ec.auckland.ac.nz/adb/).*
Departmental Policy on Cheating on Assignments *(http://www.cs.auckland.ac.nz/CheatingPolicy.php)*

[Total: 50 marks]

Q1. Choice of solution [20 marks]

For each of the following cases, state whether you would choose a *repeater*, a repeating *hub*, a bridging *switch*, or a small IP *router* to connect the systems together. Explain each answer in one or two sentences. Assume that all these devcices are available on the local market, and that you are trying to save as much money as possible. [5 marks each]

a) Two PCs and an IP telephone in the same house need to be connected to a single-port ADSL modem.

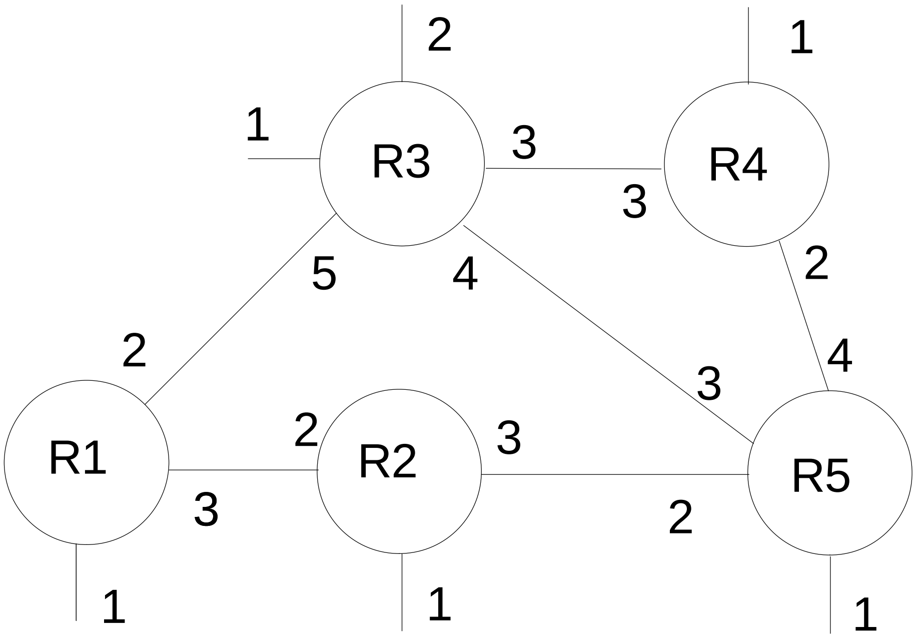
b) You have agreed to let your neighbours use your broadband connection by connecting their Ethernet switch to a spare 10 Mb/s port on your modem, using Category 5 UTP cable. Their house is 150 metres away.

c) Same as b) but running 100Mb/s (100BaseTX) Ethernet.

d) Three small businesses in the same building agree to share a single connection to the Internet, and they have negotiated with an Internet Service Provider to share a block of IP addresses. They need to keep their internal traffic secret from each other. What device should they buy to connect their Ethernet switches (one per business) to the Ethernet port on the ISP's modem?

Q2. Distance Vector Routing [30 marks]

Consider the following network of RIP routers:



The routers are named R1 to R5 and each one has its interfaces numbered starting from 1. They have the following (fictional) IP addresses:

R1	192.0.2.1
R2	192.0.2.2
R3	192.0.2.3
R4	192.0.2.4
R5	192.0.2.5

They also each connect to one or more local subnets with (fictional) address ranges:

R1	172.16.*.*	(interface 1)
R2	10.1.*.*	(interface 1)
R3	192.168.1.*	(interface 1) and 10.2.*.* (interface 2)
R4	192.168.10.*	(interface 1)
R5	192.168.100.*	(interface 1)

a) Draw up the **initial** RIP Distance Vector routing table for **R3**, as shown for another example in slide 23 of lecture 20. (A simple tabulated list is OK.) [10 marks]

Name	Destination IP	First Hop IP	Interface	Distance	Timestamp
R1	192.0.2.1	etc...			

b) Assuming the link metrics are all 1, work out the **final** DV table for **R2 (not R3)** in the same format. Don’t bother with the timestamps. (Hint: you don’t need to write any software to work out the result that the Bellman-Ford algorithm would find, especially when ignoring the timestamps.) [10 marks]

c) Assume the link between **R2** and **R5** breaks. Describe what happens to the table you have worked out for **R2** and give the new table after things have settled down again. [10 marks]
