COMPSCI 314 S1 C   Assignment 3

Department of Computer Science
The University of Auckland
Due Wednesday 18 May 05, 11:59 pm

*This assignment will contribute 40/300 = 13.3% to your coursework mark,
and 4% to your overall course mark.*

Submit your assignment via the DropBox, either in PDF (preferred), or in MS Word format.

1. **LLC and Ethernet**   [15 marks]

   (a) What is meant by an Ethernet 'group' MAC address? Which bit in an Ethernet MAC address indicates that it is a group address?   [2 marks]

   (b) Describe one widely-used example of an Ethernet group MAC address (i.e. explain what it is, and how it is used).   [3 marks]

   (c) Explain briefly what an LLC (Link Layer Control) protocol does.   [4 marks]

   (d) Describe the layout for a packet carrying an AppleTalk PDU over an IEEE 802.3 LAN. *(Do this by writing a brief description for each field in the overall packet. Indicate which fields are part of the various encapsulation headers.)*   [6 marks]

2. **Physical Transmission**   [13 marks]

   (a) Draw a diagram of an optical fibre, and explain briefly how signals are transmitted through it.   [3 marks]

   (b) List some differences between single-mode and multi-mode fibre. Give examples of situations where one of these is more suitable than the other.   [4 marks]

   (c) Briefly describe Wavelength-Division Multiplexing? Why is it useful?   [3 marks]

   (d) What is an 'optical amplifier?' Where would you find one in use? What advantage is gained by using an optical amplifier in that situation?   [3 marks]

3. **WANs, Virtual Circuits**   [12 marks]

   (a) Explain what is meant by 'best effort' routing; illustrate your answer by describing how IP uses best-effort routing.   [2 marks]

   (b) What is the difference between a routing algorithm and a routing protocol? Briefly describe the algorithm used for 'distance vector' routing.   [3 marks]

   (c) What is meant by a 'Virtual Circuit?' Give two examples of network technologies that support Virtual Circuits.   [3 marks]

   (d) What advantages could Virtual Circuits provide, as compared with IP and its 'best-effort' routing?   [4 marks]