COMP90007 Internet Technologies
Semester 2, 2021
Assignment 1

Due date: August 25th Wednesday 4:00 pm (Melbourne Time)

This assignment is worth 5% of the total marks for the subject. This assignment has 5 questions. The weighting of each question is shown beside the question. **Answers must be submitted as a PDF file via the COMP90007 Assignment 1 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 point)

What are the benefits of using a 5-layer hybrid network reference model over OSI and TCP/IP reference models, respectively? (Please answer this question briefly in a few sentences. Excessively long answers will not be accepted.)

Question 2 (1 point)

Given 5 images, each containing 1280 x 720 pixels (3 bytes/pixel), what is the latency to send all of these images together over (1) a 256kbps modem? (2) a 1Gbps broadband link? The distance between the sender and the receiver is 1,500 km, and we assume the speed of the signal for both cases is 200,000 km/second. Show your calculations.

Question 3 (1 point)

Given a noisy channel with 16kHz bandwidth, signal-to-noise (S/N) ratio of 20dB, what is the max data rate of this channel if 8-level digital signals are used?

Question 4 (1 point)

Given 4-bit original data D = 1000, what is transmitted if Hamming code is used for error correction (assume the odd parity is used)? Show your calculations.

Question 5 (1 point)

We have introduced that there are six service primitives for implementing a simple connection-oriented service (as shown in Table 1).

Pick an **HTTP based website of your choice** and capture the packets exchanged using Wireshark, depicting the trace created when you access a website via a web browser/wget. (Note: Please review the steps and context that was covered in the Wireshark Lab exercise in Week 2 for this question.)

Select any **two of the service primitives** from Table 1 and use the **TCP stream** captured in your Wireshark trace, do the following: provide screenshots of your **Flow Graph diagram** and explain what information in this graph corresponds to the two primitives you selected, and why? Please ensure that the graphs are legible in the PDF document, else relevant penalties will be applied.

Primitive	Meaning
LISTEN	Block waiting for an incoming connection
CONNECT	Establish a connection with a waiting peer
ACCEPT	Accept an incoming connection from a peer
RECEIVE	Block waiting for an incoming message
SEND	Send a message to the peer
DISCONNECT	Terminate a connection

Table 1 Service Primitives