

COMP90007 Internet Technologies

Semester 1, 2022

Assignment 1

Due date: April 4th Monday 5:00 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 the OSI model over the TCP/IP reference model? Please answer this question briefly in a few clear dot points of your own based on what you understood from the associated topics. Excessively lengthy answers or a direct copy of content from our book or other resources will not be accepted.

Question 2 (1 point)

Given 4 images, each containing 1024×256 pixels and 4 bytes/pixel, what is the latency to send all of these images together over (1) a 56kbps modem? (2) a 1Mbps broadband link? The distance between the sender and the receiver is 6000 km, and we assume the speed of the signal for both cases is 300,000 km/second. Show your calculations clearly.

Question 3 (1 point)

Given a noisy channel with 32kHz bandwidth, signal-to-noise (S/N) ratio of 20dB, what is the max data rate of this channel if 4-level digital signals are used? Show your calculations clearly.

Question 4 (1 point)

Given 4-bit original data as Data = 1010, what is transmitted if Hamming code is used for error correction (assume even parity is being used)? Show your steps and calculations and explain each step with a brief comment next to them.

Question 5 (1 point)

If we use Flag Bytes with Byte Stuffing to create frames in Data Link Layer, what would be the final total sequence of characters to be sent under the following conditions. If Flag Byte is the character Z for this particular case and ESC still maintains the same meaning as it had from our lectures. Explain your result/steps briefly. The data to be sent originally is the following sequence of characters: C B H Z Z K K Z H B C.