CS 640 Introduction to Computer Networks

Quiz 1

Write your name on the exam. Write something for every question. Students who do not write something for everything lose out over students who write down wild guesses. You will get some points if you attempt a solution but nothing for a blank sheet of paper. Write something down, even wild guesses. Problems take long to read but can be answered concisely.

Question	Maximum	Score
1	8	
2	12	
Total	20	

Question 1 – layering

a) What are the benefits of using layers to structure the functionality of computer networks?

Layers with clear interfaces between them make it easier to implement all the protocols that make the network work by focusing the implementer's attention on a smaller task. The separation introduced by layers also facilitates the evolution of the functionality provided by the network by allowing different layers to change independently.

b) Give the name and position for the five layers of the OSI architecture used in the current Internet. Also give a one sentence description for the functionality of each layer.

1 Physical layer – implements the transfer of bits between two connected computers.
2 Datalink layer – deals with transferring frames between connected computers, it does error detection, and in the case of multi-access links handles the multiplexing.
3 Network layer – end to end delivery of packets (between computers not necessarily directly connected)
4 Transport layer – ensures reliable and in order delivery of data and multiplexes the network communication of multiple processes on the same computer
5 (7) Application layer – implements useful services such as email, the web, remote login, chat, etc.

Question 2 – CRC

A data link layer protocol uses the CRCs for error detection. Its frames contain fixed size 2 byte messages followed by a 4 bit CRC computed using the generator 10001.

a) What will the checksum be for a frame with payload 0010101111010001?

0101

b) Will the CRC check detect if the first bit in the frame gets flipped?

Yes, because the checksum for the corrupted message will be 1101.

c) Will the CRC check detect if the second and tenth bit get flipped?

No, because the checksum for the corrupted message will be 0101.

d) Will the CRC check detect if the third, fourth, fifth, and sixth bit get flipped?

Yes, because the checksum for the corrupted message will be 1010.