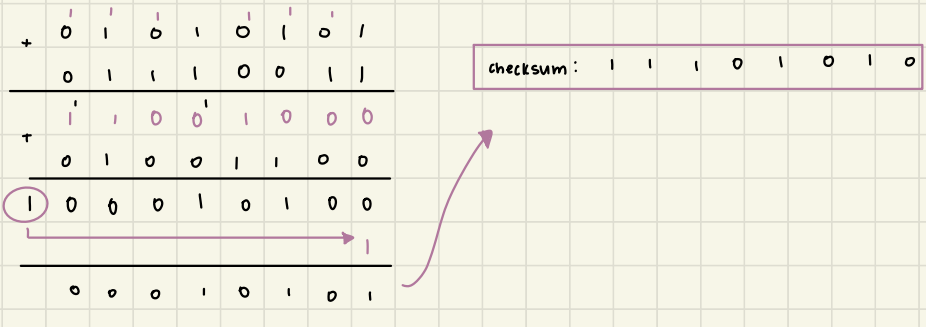
Daniela Perez
302118479
CSC 138-04

Homework 3

1. (15 points) Both TCP and UDP use 1's complement for their checksum values:
   a. Suppose that you have the following 8-bit bytes: 01010101, 01110011, and 01001100. Calculate the 1's complement of the sum of all of these 8-bit bytes (that is, add them all together and then determine the 1's complement from that sum), being sure to handle the overflow as described in the text in a circular fashion. Note that TCP and UDP use 16-bit words in computing the checksum, but only 8-bits are used here for simplicity.



   b. Is it possible that a 1-bit error will go undetected by the checksum? If yes, explicitly state how this can happen. (If you change 1 bit of 1st 8 bit)

To detect errors, the receiver adds the bytes plus the checksum, thus 1 bit errors will be detected.

   c. Is it possible that a 2-bit error will go undetected by the checksum? If yes, explicitly state how this can happen. (If you change 2 bits)

2 bit error can go undetected by the checksum. For example, as shown in lecture 3-1 slide 23, if the last 2 digits are inverted (ex: 01 → 10 and 10 → 01) the checksum will be the same.

2. (15 points) Suppose we have a TCP connection that has a 1 ms RTT where the sender has 50,000 bytes of data to send with no losses or congestion. Assume that the receiver has an initial advertised window of 10,000 bytes and reads 2,000 bytes of data every two seconds.
   a. What is the advertised window after one second?
   b. What is the advertised window after two seconds?
   c. What is the advertised window after fifty seconds?

a) 0 because 1,000 bytes are buffered and the receiver hasn't read it yet.

b) 2,000 since the receiver reads 2,000 bytes for every 2 seconds.

c) 10,000 since all of the 50,000 bytes would've been transferred, thus the receiver's buffer would be empty.