Homework 5

CST 311, Introduction to Computer Networks, Spring 2020

READ INSTRUCTIONS CAREFULLY BEFORE YOU START THE HOMEWORK.

This homework is due on Sunday, May 3, 2020.

Homework must be submitted electronically through iLearn on https://ilearn.csumb.edu by 11:55 pm on the due date. Late homeworks will not be accepted.

Homework must in pdf format only. Any other formats will not be accepted. You must submit a single file for the entire homework. The naming convention of the file should be HW5_yourlastname.pdf. **Put your name in the document as well.** Your homework submission should present the problems in the original order and be properly labeled.

This homework is worth 50 points. Each part of a question carries equal weight unless specified otherwise.

Name: _____Adam Ayala_____

Link Layer

1. (20 points) Calculate the 2-dimensional parity of the following bit sequences: 1001010, 1111111, 0000000, 0101010, 1101101, 0110010, 0011001
    a. Consider odd parity

1 0 0 1 0 1 0 | 0
1 1 1 1 1 1 1 | 0
0 0 0 0 0 0 0 | 1
0 1 0 1 0 1 0 | 0
1 1 0 1 1 0 1 | 0
0 1 1 0 0 1 0 | 0
0 0 1 1 0 0 1	0
0 1 0 0 1 1 0	0

b. Consider even parity

```
1 0 0 1 0 1 0 | 1
1 1 1 1 1 1 1 | 1
0 0 0 0 0 0 0 | 0
0 1 0 1 0 1 0 | 1
1 1 0 1 1 0 1 | 1
0 1 1 0 0 1 0 | 1
0 0 1 1 0 0 1 | 1
------------------|---
1 0 1 1 0 0 1 | 0
```

2. (10 points) Calculate the checksum of the following 16-bit strings:
   a. A2B4 and FE9C

```
1010  0010   1011    0100
1111   1110   1001    1100
---------------------------------
1010  0001   0101    0001

0101   1110   1010   1110 = checksum
```

   b. D789 and FF91

```
1101   0111    1000    1001
1111    1111    1001    0001
---------------------------------
1101    0111    0001    1011

0010    1000   1110    0100 = checksum
```

3. (20 points) Calculate the CRC for the following. Give the bit string that must be sent (that includes the CRC).

   a. D = BA78, G = 1001

```
                ____1__0101 0111_0001_001_
          1001 | 1011  1010  0111  1000  000
                 1001
                   10  10
                   1001
                     1110
                     1001
                      1110
                      1001
                       1111
                       1001
                        1101
                        1001
                         1001
                         1001
                             01000
                               1001
                                   1000
                                   1001
                                       1
```

1011 1010 0111 1000 000
1
1011 1010 0111 1000 001

   b. D = F096, G = 1101

```
                ____1 0111_0101_0000_1__________________
          1101 | 1111  0000  1001  0110  000
                 1101
                   1000
                   1101
                    1010
                    1101
                     1110
                     1101
                        1110
                        1101
                           1101
                           1101
                               001100
                                  1101
                                     100
```

1111 0000 1001 0110 000
100
1111 0000 1001 0110 100