CENG 3131: Lab for Telecom & networks – Lab 5 Cyclic Redundancy Coding

Goals: To understand how CRC hardware generates CRC check bits.

1. Introduction

Review the pin configurations for a 74LS86 Quad Two-Input Exclusive OR and a 74LS74 Dual D Flip-Flop. Review the circuit in Lecture 12.

2. TASK 1: 5-bit CRC generator

Using Multisim, construct a 5-bit CRC generator with polynomial $X^5+X^4+X^2+1$. Use a 74LS74 Dual D Flip-Flop and a 74LS86 Quad Two-Input Exclusive OR. You will need one switch to be your Input (I) and another switch to be your clock. Attach LEDs to the Q's and the Input (I).

1. Operate the circuit to generate the check bits of D = 1010101101.

Question:

1. Include your circuit in the report.
2. Name different types of n-bit CRC. Convert polynomial $X^{11}+X^7+X^3+X^1+1$ to binary message.
3. Demonstrate your simulation to the TA.

3. TASK 2: Error Detection in Receiver

Examine the Examples of CRC in Lecture 12.

1. Let the transmitted message T_r = 1011001101001110. Input the transmitted message into your simulation in task 1.
2. Change the fifth bit from the left of the Transmitted message (yellow part). Then input the transmitted message into your simulationagain.

Question:

1. For part 1 task 2, show the remainder and discuss your conclusions in the report.
2. For part 2 task 2, show the remainder and discuss your conclusions in the report.

4. Laboratory Report

No later than 7 days from the starting time of your lab section, provide the TA a hard copy of a lab report following the CENG 3311 Lab report Template given on the Black Board. You can write it down in the lab book or include your report in the lab book. Each student will submit one lab report to the TA. Your report should have the reporting requirements needed for all tasks. **The TA will take off a significant number of points if you don't follow the lab template.**

5. GRADING POLICY

1. Completion of Task 1 with results included in lab report (50%)
2. Completion of Task 2 with results included in lab report (40%)
3. Completeness, quality, and correctness of the lab report (10%)