

COE 342, Term 012

Data & Computer Communications

Programming Assignment #4

Due Date: Wednesday 22/05/02

- Q.1.** Write a program that implements a polynomial divisor to compute the Cyclic Redundancy Check (CRC) code for a given message. The polynomial divisor should be implemented based on the general structure given on the book based on linear feedback shift registers. The program should read from a file the pattern P specifying the divisor, and the message M for which the frame check sequence is to be computed. The transmitted message should be generated in another file including the pattern P. The same program should be used to check whether the received message is in error or not. Use a flag in the file to indicate whether the program should compute the FCS of the message or check whether the message is in error or not. For example, if the flag is 0, the program computes the FCS for the transmitted message and appends it to it. Otherwise, it assumes that the message in the file is the received message and reports whether it is received correctly or in error.
- Q.2.** Use the examples given in the book and the homework to verify the correctness of your implementation. Verify both the generation of the FCS and that the transmitted message will have a remainder of 0.
- Q.3.** Using $CRC-CCIT=X^{16}+X^{12}+X^5+1$, and the message $M=0100110001110000111100000111110101101000$ of length 40 bits do the following:
- (i) Check whether the CRC circuit will detect all single bit errors or not, including errors in the FCS bits.
 - (ii) Use a random generator to randomly select 4 different bit positions in the transmitted message including the FCS bits. Make these bits in error and check whether the received message with errors injected will be detected or not. Do that for 1000 times, and report on the percentage of faulty messages detected.

Submit a hard copy of your solution along with a soft copy in a floppy disk with a README file indicating how your program is used along with the examples used in Q2.