CO1: Design and implement error detection techniques within a simulated network environment.

Assignment 1: Design and implement an error detection module.

Due on: 27-30 January 2020 (in your respective lab classes)

Report due on: 25 January 2019

Design and implement an error detection module which has four schemes namely LRC, VRC, Checksum and CRC. Please note that you may need to use these schemes separately for other applications (assignments). You can write the program in any language. The Sender program should accept the name of a test file (contains a sequence of 0,1) from the command line. Then it will prepare the data frame (decide the size of the frame) from the input. Based on the schemes, codeword will be prepared. Sender will send the codeword to the Receiver. Receiver will extract the dataword from codeword and show if there is any error detected. Test the same program to produce a PASS/FAIL result for following cases.

(a) Error is detected by all four schemes. Use a suitable CRC polynomial (list is given in next page).

(b) Error is detected by checksum but not by CRC.

(c) Error is detected by VRC but not by CRC.

[Note: Inject error in random positions in the input data frame. Write a separate method for that.]

Polynomial Name	Polynomial	Use
CRC-1	$x + 1$	Parity
CRC-4-ITU	$x^4 + x + 1$	ITU G.704
CRC-5-ITU	$x^5 + x^4 + x^2 + 1$	ITU G.704
CRC-5-USB	$x^5 + x^2 + 1$	USB
CRC-6-ITU	$x^6 + x + 1$	ITU G.704
CRC-7	$x^7 + x^3 + 1$	Telecom systems, MMC
CRC-8-ATM	$x^8 + x^2 + x + 1$	ATM HEC
CRC-8-CCITT	$x^8 + x^7 + x^3 + x^2 + 1$	1-Wire bus
CRC-8-Maxim	$x^8 + x^5 + x^4 + 1$	1-Wire bus
CRC-8	$x^8 + x^7 + x^6 + x^4 + x^2 + 1$	General
CRC-8-SAE	$x^8 + x^4 + x^3 + x^2 + 1$	SAE J1850
CRC-10	$x^{10} + x^9 + x^5 + x^4 + x + 1$	General
CRC-12	$x^{12} + x^{11} + x^3 + x^2 + x + 1$	Telecom systems
CRC-15-CAN	$x^{15} + x^{14} + x^{10} + x^8 + x^7 + x^4 + x^3 + 1$	CAN
CRC-16-CCITT	$x^{16} + x^{12} + x^5 + 1$	XMODEM,X.25, V.41, Bluetooth, PPP, IrDA, CRC-CCITT
CRC-16	$x^{16} + x^{15} + x^2 + 1$	USB
CRC-24-Radix64	$x^{24} + x^{23} + x^{18} + x^{17} + x^{14} + x^{11} + x^{10} + x^7 + x^6 + x^5 + x^4 + x^3 + x + 1$	General
CRC-32-IEEE802.3	$x^{32} + x^{26} + x^{23} + x^{22} + x^{16} + x^{12} + x^{11} + x^{10} + x^8 + x^7 + x^5 + x^4 + x^2 + x + 1$	Ethernet, MPEG2
CRC-32C	$x^{32} + x^{28} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{20} + x^{19} + x^{18} + x^{14} + x^{13} + x^{11} + x^{10} + x^9 + x^8 + x^6 + 1$	General
CRC-32K	$x^{32} + x^{30} + x^{29} + x^{28} + x^{26} + x^{20} + x^{19} + x^{17} + x^{16} + x^{15} + x^{11} + x^{10} + x^7 + x^6 + x^4 + x^2 + x + 1$	General
CRC-64-ISO	$x^{64} + x^4 + x^3 + x + 1$	ISO 3309
CRC-64-ECMA	$x^{64} + x^{62} + x^{57} + x^{55} + x^{54} + x^{53} + x^{52} + x^{47} + x^{46} + x^{45} + x^{40} + x^{39} + x^{38} + x^{37} + x^{35} + x^{33} + x^{32} + x^{31} + x^{29} + x^{27} + x^{24} + x^{23} + x^{22} + x^{21} + x^{19} + x^{17} + x^{13} + x^{12} + x^{10} + x^9 + x^7 + x^4 + x + 1$	ECMA-182