IT510 P: Programming Assignment 1

September 20, 2018

Objective: Implement Line coding encoder and scrambler with digital data generator

- Digital data generator: generates completely random data sequence and a random sequence with some fixed sub-sequences like eight consecutive zeros. It should also return the longest palindromic sequence in the generated data.

- Line coding schemes to be implemented: NRZ-L, NRZ-I, Manchester, Differential Manchester, AMI.

- Scrambling schemes: B8ZS, HDB3.

Language used: Any programming language can be used except MATLAB and similar options like Scilab or GNU octave.

Input: Ask user for digital data stream generation i.e. whether user wants completely random sequence or a random sequence with fixed sub-sequences (usually used for scrambling) and the type of encoding. For encoding you need to provide user with various options (NRZ-L, NRZ-I, Manchester, Differential Manchester, AMI). If user asks for AMI, you need to pop a query whether scrambling is needed or not, if answer is yes next query would ask about the type of scrambling.

Output: Digital data stream given, longest palindrome in that data stream, digital signal produced and in case of scrambling, scrambled signal produced.

Competitive Coding: You can improve the time complexity of the code for example for finding the longest palindrome in data stream and scrambling.

Submission date and expected deliverables: 25 October 2018. You are expected to submit your code, give a demo about your project working and a one-page specification report (duly typed in LaTeX) mentioning the language and libraries used, assumptions considered, how to run the code, references, etc.

Note: You can do your project individually or in groups of two or at maximum three students.

Extra credit: Implement Line coding decoder
This is outside the scope of lab assignment marks and is for extra +5 marks in theory. In this, along with the encoding code you need to provide corresponding

decoding of the scheme chosen i.e. after encoding results are displayed you need to ask the user whether you want to decode the signal. If user says yes, then decode according to the chosen scheme and produce back the digital stream. But, *it is important to decode the signal by analysing the encoded signal parameters and not the direct data values.*