

# Data Communication Programming Assignment 1

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*Line coding schemes to implement : NRZ-L ,NRZ-I ,Manchester, Differential Manchester, AMI , Scrambling schemes : B8ZS,HDB3 and PCM , DM*

## Specification report

The Language we used : Python

Following are the libraries used:

- a. Numpy
- b. OS library
- c. Matplotlib

- We create separate files for different encoding schemes like : NRZ-L, NRZ-I, Manchester, Differential Manchester, and AMI (Alternate Mark Inversion).
- Implemented scrambling techniques: B8ZS and HDB3.
- Modulation techniques PCM and DM are included for analog input.
- User selects either analog or digital input at the start.
- Based on user input:
  - Required encoding scheme or modulation technique is applied.
  - A plot for the technique is displayed.
  - Longest palindrome in the data stream is identified and shown.
  - Demodulation is also performed.

### *Demodulation Option:*

After the modulated or encoded graph is displayed, the program will prompt the user to perform demodulation:

- If the user chooses "Yes," the program performs demodulation and displays the original input.
- If the user chooses "No," the program ends, and no demodulation occurs.

- The time complexity of longest palindrome is  $O(n^2)$

## How to Run the Programs:

### *Environment Setup:*

- Install Python and set up on your system .
- Install the required libraries (Numpy, OS, and Matplotlib) if they aren't already available, so command to install libraries is : `pip install numpy matplotlib`

## Following are the Resources Used:

1. ChatGPT (For solving errors).
2. Github (For taking ideas).

**3. Geeks for Geeks ( to understand libraries).**