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).