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Abstract:

This report presents the implementation and analysis of an Orthogonal Frequency Division Multiplexing (OFDM) system and covers several key components:

1. **Modulation Schemes**: Different modulation schemes such as BPSK, $\pi/2$-BPSK, QPSK, and 64-QAM are implemented in the `Modulators.py` file. These schemes are used to convert the input bit stream based off the 8-bit ASCII conversion of the string "WirelessCommunicationSystemsandSecurityJustinNgo" into suitable symbols ready for transmission.

2. **OFDM Processing**: The `OFDM.py` file houses all the relevant functions used to produce an OFDM output, and handles the bulk of the processing. The OFDM function is responsible for running the serial-to-parallel conversion, Inverse Fast Fourier Transform (IFFT), cyclic prefix insertion, and also graphs the output.

3. **Main Execution**: The `main.py` file generates the bit stream used for processing from the aforementioned phrase and is where the OFDM function is called to run the system for each modulation scheme.

4. **Visualization**: A sample of 2 symbols generated from the OFDM system is plotted for visualization and highlights the cyclic prefix and symbol boundaries.