Important notes:

Groups of students with a maximum of 5 students per group

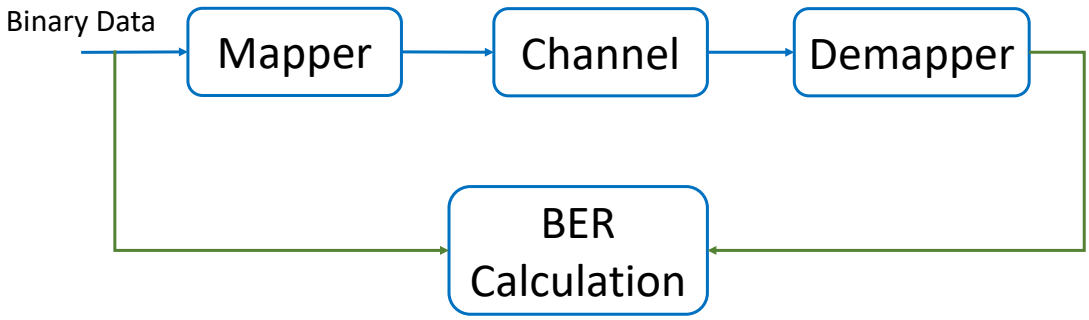
- The report should be Clear and Organized and must be commented.
- The Code must be Clear and Organized and must be commented.
- All figures should be correctly labeled.
- The cheater and cheatee of any part of the project will get 0 marks.
- The project is due 12/5/2023 at midnight.
- Late policy is -2 grades per day.
- The Hard Deadline is 14/5/2023 at midnight. No Submmition is allowed after it.
- The allowed Tool is Matlab.
- Any Communications Built-in function is not allowed, like PSKmod/Demod,…etc.

Points will be deducted if any of the instructions above are not followed.

Project details

The project aims to introduce the students to the simulation of Digital Communication systems using BaseBand Equivlant.

The System Block Diagram



- ***The Mapper***

The first block in the communication system under consideration is the mapper. The mapper takes the I/P data bits and produces the symbols to be transmitted on the channel. The Required modulation schemes are:

1. Coherent BPSK
2. QPSK
3. 8-PSK
4. Coherent OOK
5. Coherent 8-ASK
6. QAM
7. 8-QAM
8. 16-QAM
9. Coherent BFSK
10. Differential BPSK

Note:

All These modulation schemes will be used with gray-encoded Data.

- ***The channel***

The channel is an AWGN channel**.** In this model, the channel adds noise to the transmitted signal. In MATLAB, the command "randn" should be used to generate the AWGN, Then multiplied in prober scale factor Proportional to $\sqrt{N_o/2}$ and the modulation Scheme.

- ***The Demapper***

The simple demapper in the model under consideration will take the output of the channel and decide on the symbol transmitted. The output bit stream of the receiver is compared to the input bit stream and the BER is calculated.

- ***Requirements***

• All simulations are done on the baseband equivalent system, with no carriers.
• It is required to plot curves for the BER vs. Eb/No for the four modulation schemes. On the same graph, the theoretical BER or a tight upper bound should be drawn for each one of the 10 modulation schemes. Comment on the results.

- E_b/N_o range is -2:1:10 dB