Project #2 Questions and Answers

This is a collection of Q&A that has been submitted with regard to Project #2.

1. Can you give us the output of what you got for mean and stdev for the testFile.txt. I want to make sure I'm understanding exactly what numbers you need.

   Here is an example: test='This is a test';
   When you convert 'test' to asci values, this is how it will look:
   as=116 104 105 115 32 105 115 32 97 32 116 101 115 116

   Since 'test' has spaces and I only want the letters (notice also that 116 is lower case t and not capital T), this is how my ascii sequence will look after I map to a 5-bit domain:

   asciiseq = 25 13 14 24 NaN 14 24 NaN 6 NaN 25 10 24 25

   Where the NaN are spaces that I am not going to use in my calculations:
   meanTest = mean(asciiseq(lindex))
   meanTest = 18.5454545454545

   Where lindex is a vector containing only the index of letters.

2. I have another question however, what do you mean by stream in the bin2QPSK function. What should the format for stream look like in that function input?

   Your function will take a "stream" of bits (as an input) that are 0s and 1s. The function will convert the data stream input to symbols, or encoded QPSK numbers using the formula stated in the instructions of the report.

3. For Part B in the lab, the formula for the QPSK encoding is given by $Sn(i) = (-1).\wedge(bn(2.*i)) + j.*(-1).\wedge(bn(2*i+1))$. What if the series has an odd number of bits? Should the last QPSK value only have real part?

   Just add an extra 0 bit.

4. Just making sure. You mentioned that you will also check Part B by inserting QPSK directly into the decoder. In which case, it matters what standard (add extra 0 or extra 1) you use to encode. I will add an extra 0.

   In that case they are symbols (even bits!) all you need to do is to decode.

5. Do we need to put the matlab code in the report that is due on March 29?
   Yes, "code listing and readability" - Report is now due March 29, 2015 - 3:05 pm

6. In the project #2 number 6: said "if theoretical BER is 10^-3, then you need about 10^5 bits to get a reliable estimate" I know BER can be calculated by using Q(2*SNR), ans given BER, we should be about to find the SNR, but I dont know how to get the "10^5" given BER is 10^-3?

   Could you give some hint how to decide the wave length with SNR or BER is given?

   BER is the ratio of dividing the number of bits that are in error over the total number of bits you receive. For example if your length is 10 bits and 1 bit is in error, then your BER is 0.1 (meaning 1 bit every 10 bits). Now if I tell you that the BER is 10^(-5), that means that for every 10000 bit you have 1 bit in error. So what I am suggesting is that if your BER = 10^(-3), you should at least have 10^5 bits so you have reliable estimate of the theoretical BER, which you are going to need in your report.

   Now, BER is approximately equals to the prob. of error (total probability), especially when the number of bits are large. So you must use the Pe we discussed in class and how it relates to SNR. and then how SNR relates to the amplitude of your waveform (+A or -A).

7. In the second function S=Pulse(Bits, SNR) you tell us to construct a waveform with Amplitude +/- A, however, you never specified a T parameter. Am I to assume that you want us to define this as a constant within the function?
   Also, when we define the SNR, that is linear SNR correct? So we should make the function input SNR as dB or linear?

   Those are designed parameters - so that is part of your work. SNR is entered in dB (as an input of your transceiver function). When you perform your calculations, you do it in linear form. When you plot, you put the horizontal axis in SNR.

8. What is the difference between a new line and a carriage return? From all the research that I have done, it does not seem like there is a way to differentiate between a new line and a carriage return in the textfile.

   New line: decimal 10 and CR decimal 13. .   I think they were created mainly to handle how characters are output to an external device, for example a printer. But yes they seem to be the same with the exception that your code will distinguish between a CR and LF. Try

   T1=char(10); T2=char(13); if T1==T2, a=1;else a=0;end, a

9. For the output Qtext.mean and Qtext.std: How should these numbers be output? Should they be decimals (a number, not necessarily an integer, between 0 and 31, like for instance 19.263) or binary (between '00000' and '11111', like for instance '01100'). If they need to be in binary, rounding will be necessary. Should they be rounded up or down? Producing the mean and std in decimals makes more sense to me, since they can have decimals in them (in general, Qtext.mean and Qtext.std won't be integers.)

   Five bit domain: I mean in the range up to 31. Once you convert to decimal, you should estimate the mean and the std.

10. For the output Qtext.outtext, how can this be a vector? For instance, you can't have multiple lines in a file of differing lengths, nor can you compare a vector of strings to a text file.

    You have to read all the characters in the file. Those characters can be placed in a single variable, which I call vector of characters (yes, it is vector of size 1xN with a class char, where N is the number of characters). In other words, there will be N characters in the file; therefore, your vector must have N characters too.