CMPE 244
Homework Base Band Signal and Spectrum Analysis

1. Given a base band signal in discrete form, x(0) = 1.0, x(1) = 0.75, x(2) = 0.5, x(3) = 0.25,
1.1. Find X(0), X(1), X(2), and X(3) by calculating DFT;
1.2. Find its power spectrum P(0), P(1), …, P(3);
1.3. Find its energy index eta of P(0) + P(1) vs. the entire energy of the signal.

2. Compile and build FFT sample code for LPC 1769 platform or your target platform and your host development platform (Linux or Windows) to verify hand calculation of DFT and the its power spectrum by provide screen captures of your computed result on the host platform.

Note: The fft sample code is provided here from the github:
https://github.com/hualili/CMPE242-Embedded-Systems-/blob/master/2018S-26-fft.c

3. Given a base band signal 1 and 0 in two periods (2T), sample this two periods function with N = 256 points, then
3.1. compute its power spectrum, and
3.2. use excel to plot the power spectrum.
Note the power spectrum plot has to be even function, verify it.

4. Submission:
4.1. pdf file of your hand calculation;
4.2. photos of screen capture of your computer computing result;
4.3. source code (C/C++ or Python) and instruction for compilation and build if C/C++;
4.4. Put all these files in a zip file.

(END)