HOMEWORK #1

Due: 18.03.2019 – 23:59

Signals & Systems for Computer Engineering

(Spring – 2019)

Write a Python (version 3.7.x) code that performs the following **functions**:

a) visualizes two non-periodic discrete time signals by entering their amplitude values with respect to sampling numbers within the predefined boundaries (for example if boundaries of x[n] and y[n] are entered as (4, 6) and (1,2) respectively then sample values as `x[4]=1, x[5]=2, x[6]=2` , `y[1]=3, y[2]=-1` will be entered manually and a graph that includes both intervals will be drawn. Undefined values will be accepted as zero).
Your function should work as shown below:
>> python functionA.py 4 6 1 2 1 2 2 3 -1

b) calculates and **draws** standard normalized form of the signals:
>> python functionB.py xLowerB xUpperB yLowerB yUpperB X_0 X_1 … X_n Y_0 Y_1 …Y_n

c) calculates convolution of the signals:
>> python functionC.py xLowerB xUpperB yLowerB yUpperB X_0 X_1 … X_n Y_0 Y_1 …Y_n

d) calculates convolution of standard normalized forms of the signals:
>> python functionD.py xLowerB xUpperB yLowerB yUpperB X_0 X_1 … X_n Y_0 Y_1 …Y_n

Use the following discrete signals for demonstration of each function above:

1. x[n]=0, 1, 2, 2, 1, 0 for n=0 to 5

   y[n]=1, 2, 3, 4 for n=0 to 3

2. x[n]=0, 2, 4, 4, 2, 0 for n=0 to 5

   y[n]=1, 2, 3, 4 for n=0 to 3

3. x[n]=0, 2, 4, 4, 2, 0 for n=0 to 5

   y[n]=2, 4, 6, 8 for n=0 to 3

4. x[n]=-2, 2, -2, 2, -2, 2 for n=0 to 5

   y[n]= -1, 1, -1, 1, -1, 1, -1, 1, -1, 1, -1 for n=-5 to 5

(You should get 16 outputs in total)

IMPORTANT NOTES:

- ➔ You can't use libraries for your calculations except plotting tools and the data structures you want to use (e.g. numpy for using arrays, etc.)
- ➔ You are asked to upload only 5 files in your zip file (4 .py files and 1 .pdf file). PLEASE don't send any other file.
- ➔ Put all your outputs (plots, charts, etc.) in a report file.
- ➔ Give a brief explanation of your code in your report.
- ➔ Use comment outs on the necessary lines in your code **AND** put your name and number at the top of your code.
- ➔ As a third grade student, please type your code orderly **AND** write your report tidy.
- ➔ Don't put fancy covers in your report, name and number at the left-top corner would be enough.
- ➔ **The code you typed must WORK (as the manner of syntax). Otherwise you will get zero point for that homework. The Teaching Assistants won't fix or debug your code to get it work.**