Add to your framework the following features:

A. Correlation

1) Apply direct correlation between the input signals and plot the output.
2) Compute the time delay with the help of correlation as discussed in the lab
3) Classify weather the input signal belongs to Class A or Class B depending on the average value of the max correlation for each category as discussed in the lab.

   Note: the files for testcases can be found in the correlation lab folder

B. Filtering

Implement FIR filters, ask the user for the input signal to be filtered, type of filter he wants (low, high, band pass and band stop) and his specifications, according to it choose the appropriate window w (n), the appropriate infinite impulse response h(n), compute N and then compute the needed coefficients, finally convolve the input signal with the computed coefficients, draw the resulted signal and save the coefficients to text file.

Notes

i) the specification will 1) sampling frequency, 2) cut off frequency (in case of low and high filters) f1 and f2 in case of (band pass and band stop filters) 3) stop attenuation δ_s 4) transition band
ii) don't forget to adjust frequencies using half transition band to suit the window method
iii) frequencies should be normalized by dividing it by sampling frequency after being taken from user
iv) don't forget that coefficients are symmetric and N should be odd.
v) In test cases related to filtering you should apply filtering in two ways, the direct method (convolution in time domain) and the fast method (multiplication in frequency domain). In both approaches you should use the convolution and dft and idft functions you already implemented in the package.

You should plot the outputs of both tasks and also you must use the compare signal function to indicate that that the testcase have passed successfully.