Lab05

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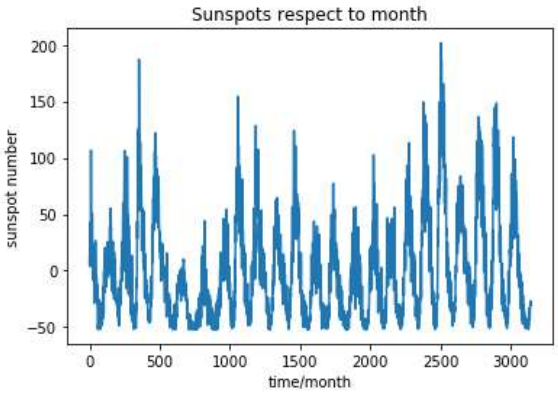
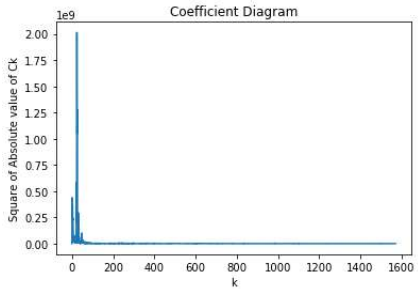
Question 1

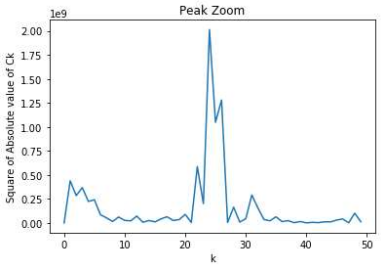
The purpose of the script is to use Fourier transform to perform Fourier analysis and find certain results upon analysing.

A. a) Just looking at the sunspots diagram (on the right) and counting the peaks, it is reasonable to make an estimation about 125 month per cycle.



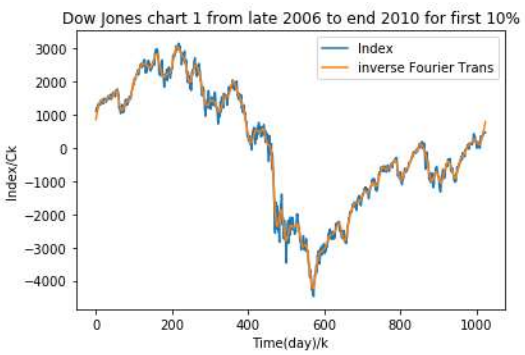
b)

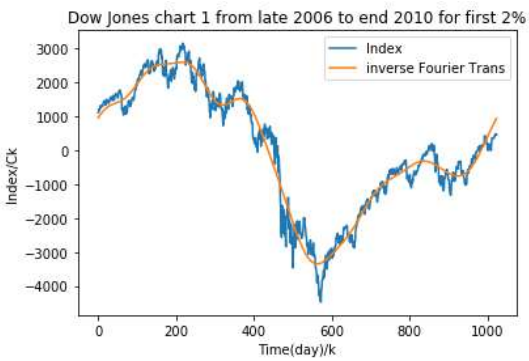




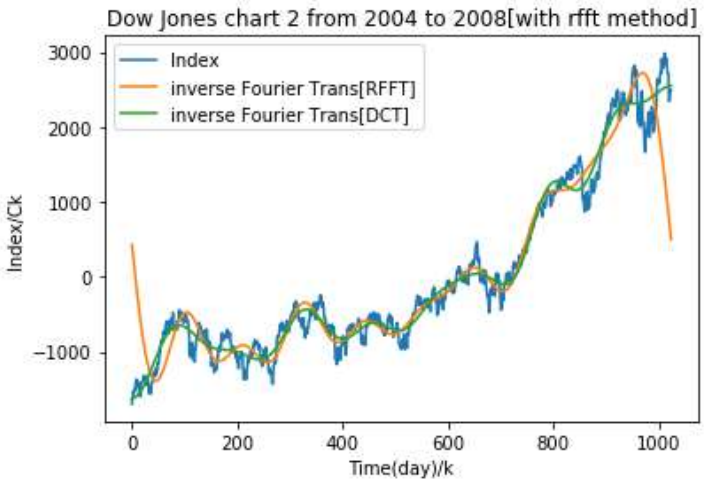
c) By using numpy.where function, it outputted k=24 which leads to 130.95 which is about 131 months per cycle.

B. c)When Fourier coefficient is to zero, the new inversed Fourier transformation plot is following the same trend as before but more curve and smooth .

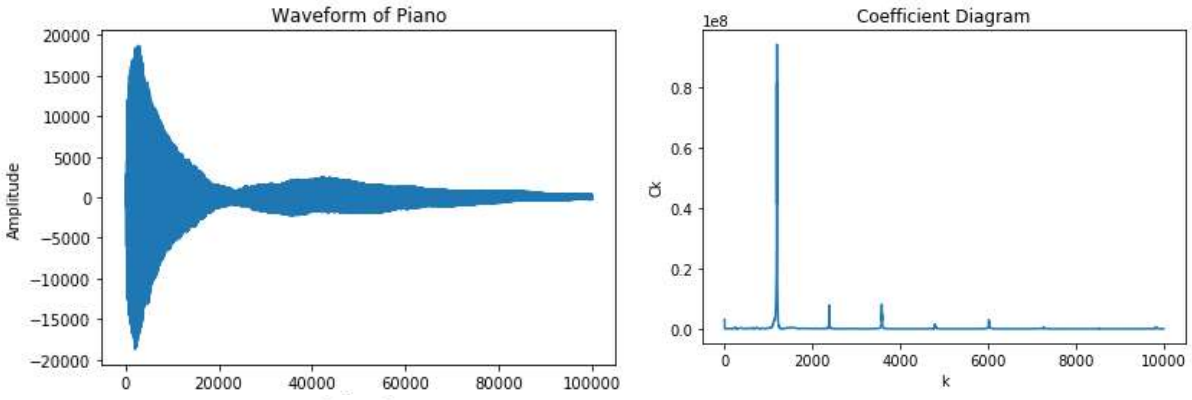




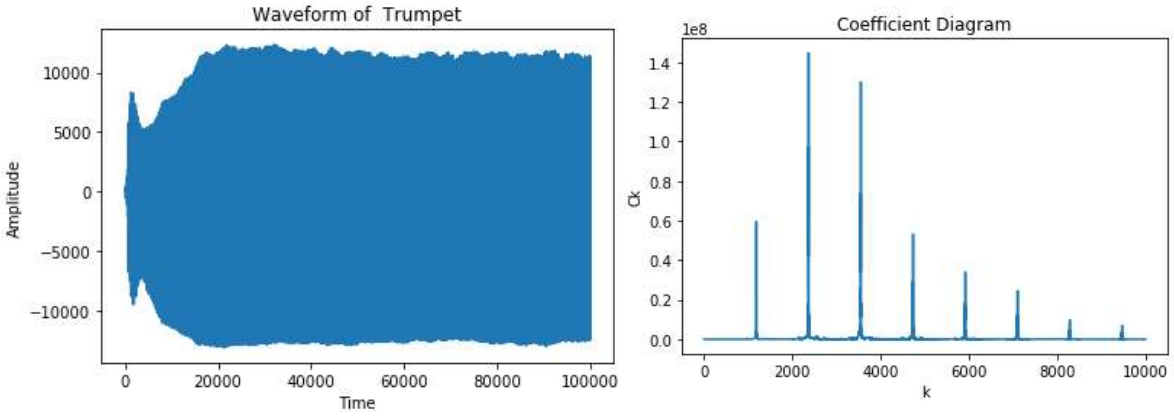
C. By the single pattern increase like pattern which data have, it had revealed that cosine transform which discrete transform have the beginning and the end on the same value.



D. a)

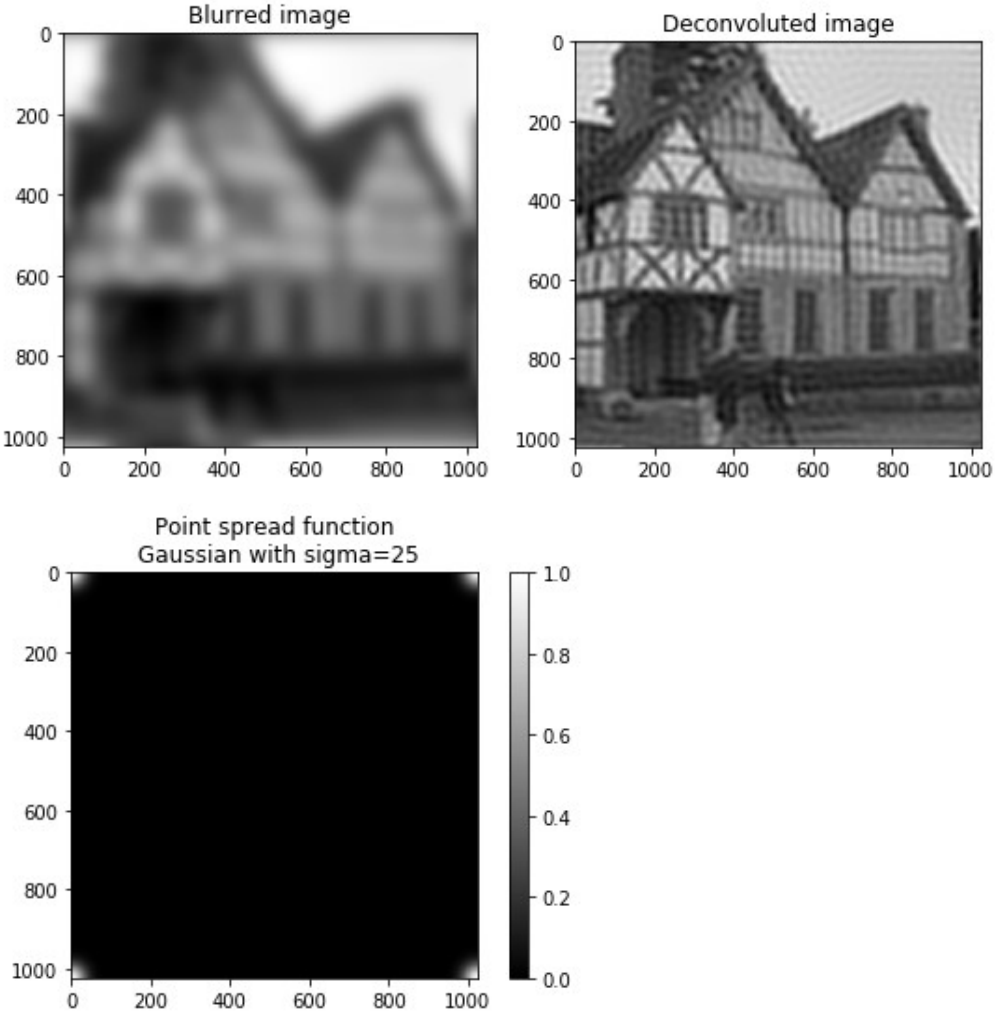


b)



By simulating both instruments' waveform, we can compute Fourier coefficient for Fourier analysis. However, trumpet's coefficient's diagram is somewhat different than what was expected that it has several peaks, which means it is the combination of several different pitch from the same note. Furthermore, it is computed as follow: For piano, k is 1190, which is 524Hz (C5 pitch). For trumpet, k is 2367, which is 1044 Hz (C6 pitch)

Question 2


Blurred image
Deconvoluted image
Point spread function
Gaussian with sigma=25
0
200
400
600
800
1000
0.0
0.2
0.4
0.6
0.8
1.0