



Zagazig University

3rd Year

Computer and Systems Engineering Department



Faculty of Engineering

CSE 324 - Computer Integrated Circuits

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Audio compression 2 methods using MATLAB.

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Audio compression 2 methods (DCT & FFT) using MATLAB.

Compression techniques:

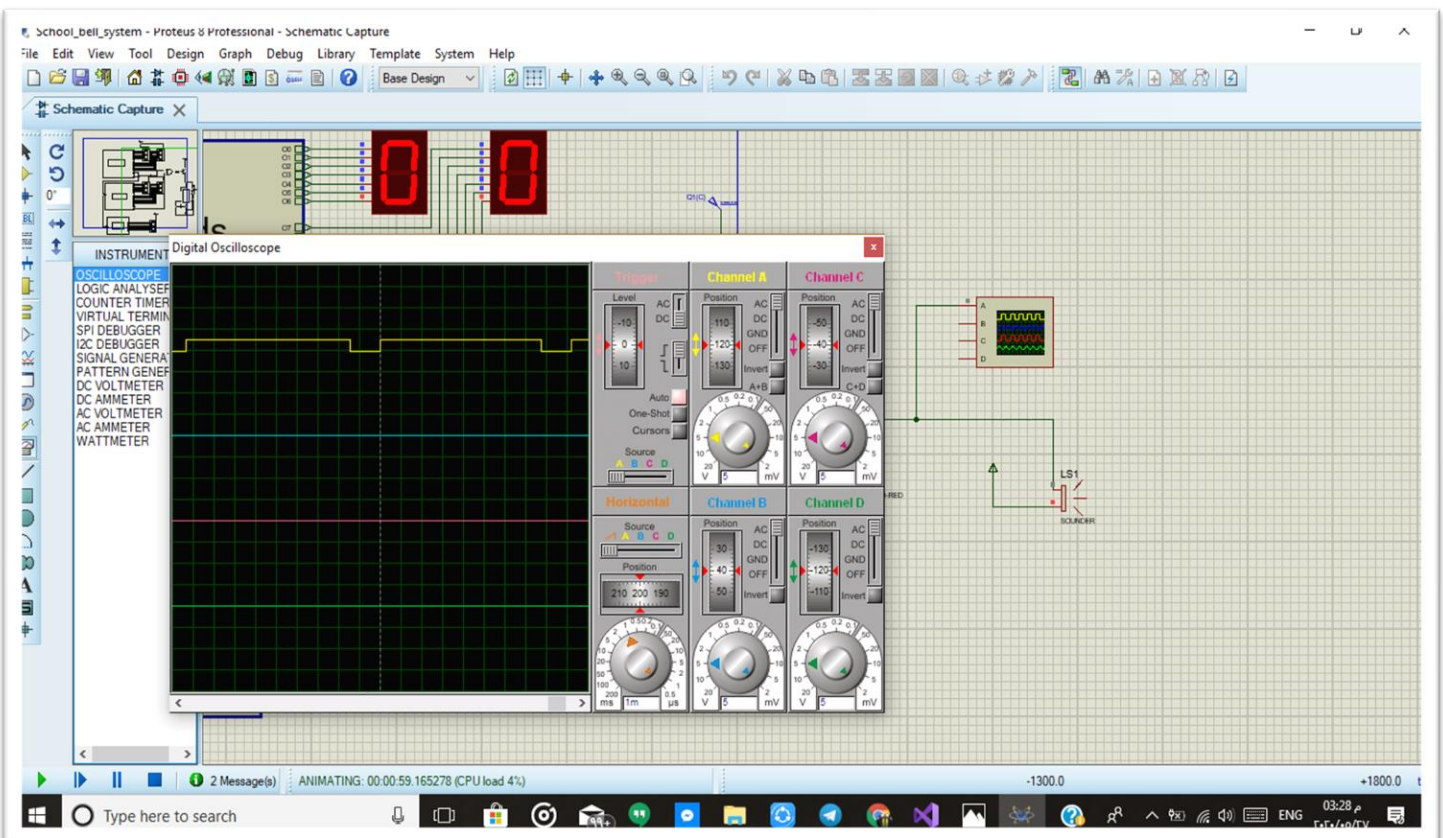
we have three main techniques to compress:

- 1- Fast Fourier Transform (FFT)
- 2- Discrete Cosine Transform (DCT)
- 3- Wavelet Transform (WT)

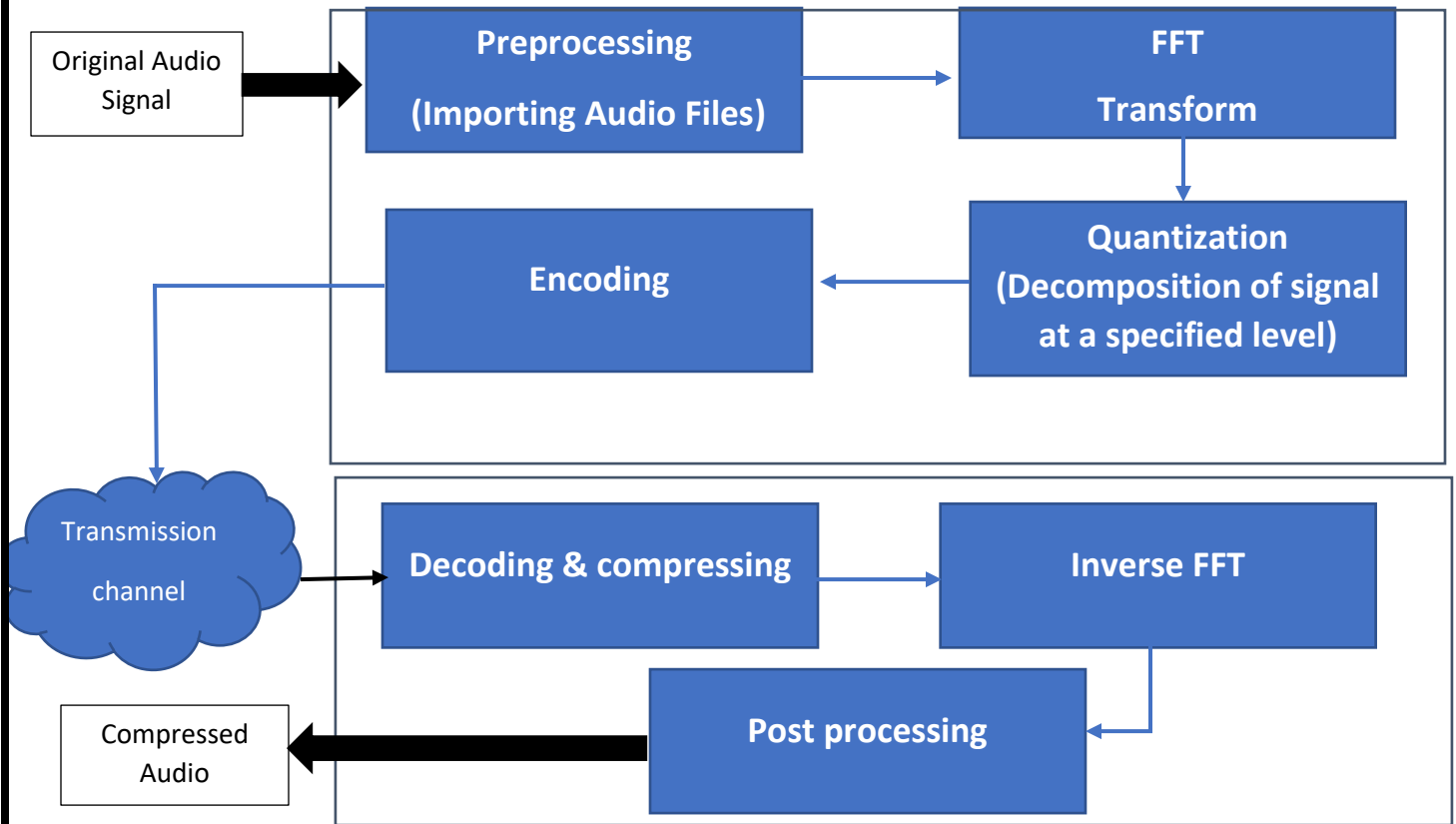
In this project I used 2 methods (FFT & DCT) to compress an audio signal I have recorded with my voice in 10 seconds as required

1- In (FFT) method I used FFT to convert the signal from time domain to frequency domain. It is because an operation that is hard to perform in time-domain may be very simple in frequency domain.

In frequency domain we can easily get rid of some undesired frequencies (noise) and compress the audio signal.

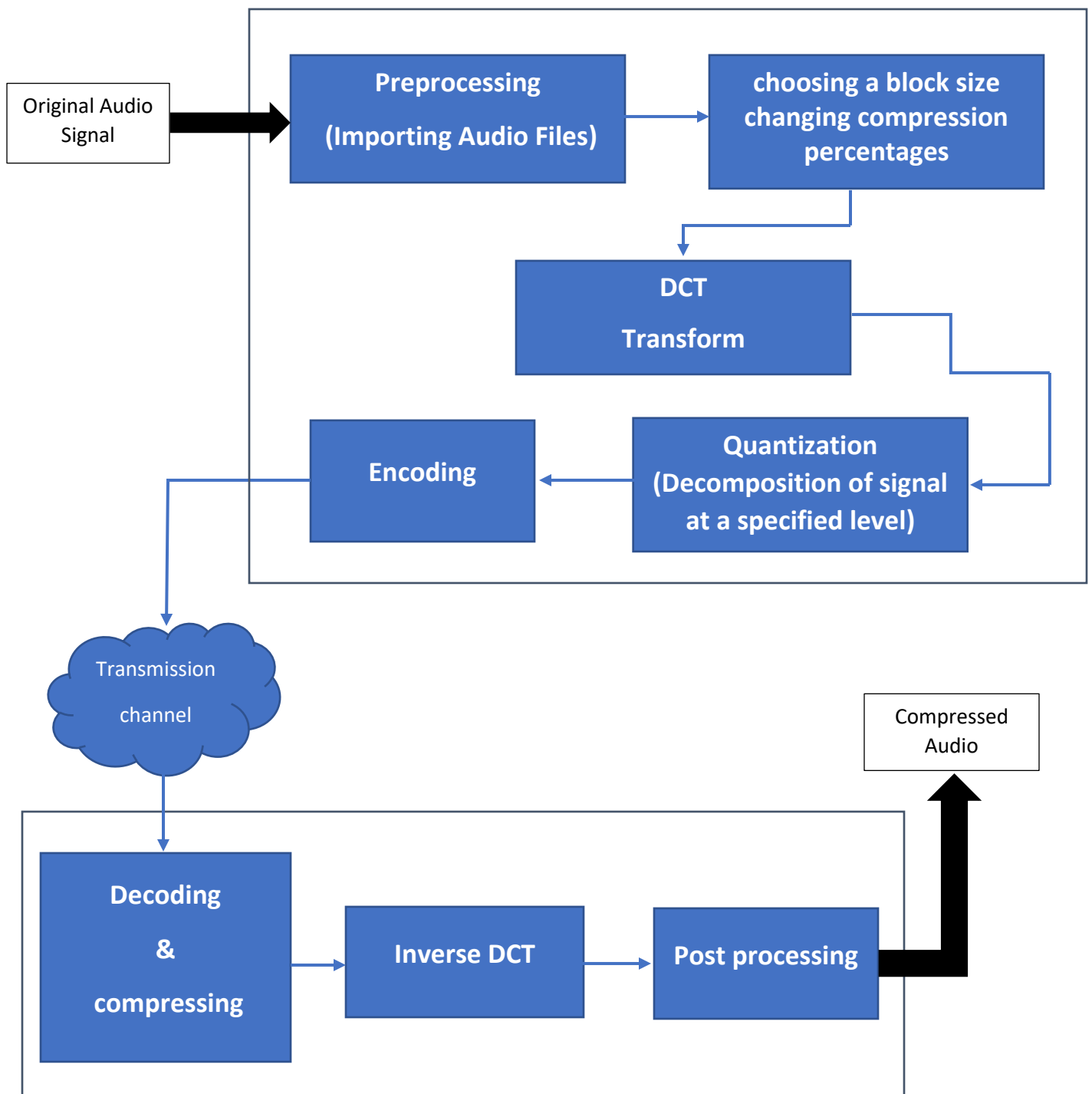


Block diagram:

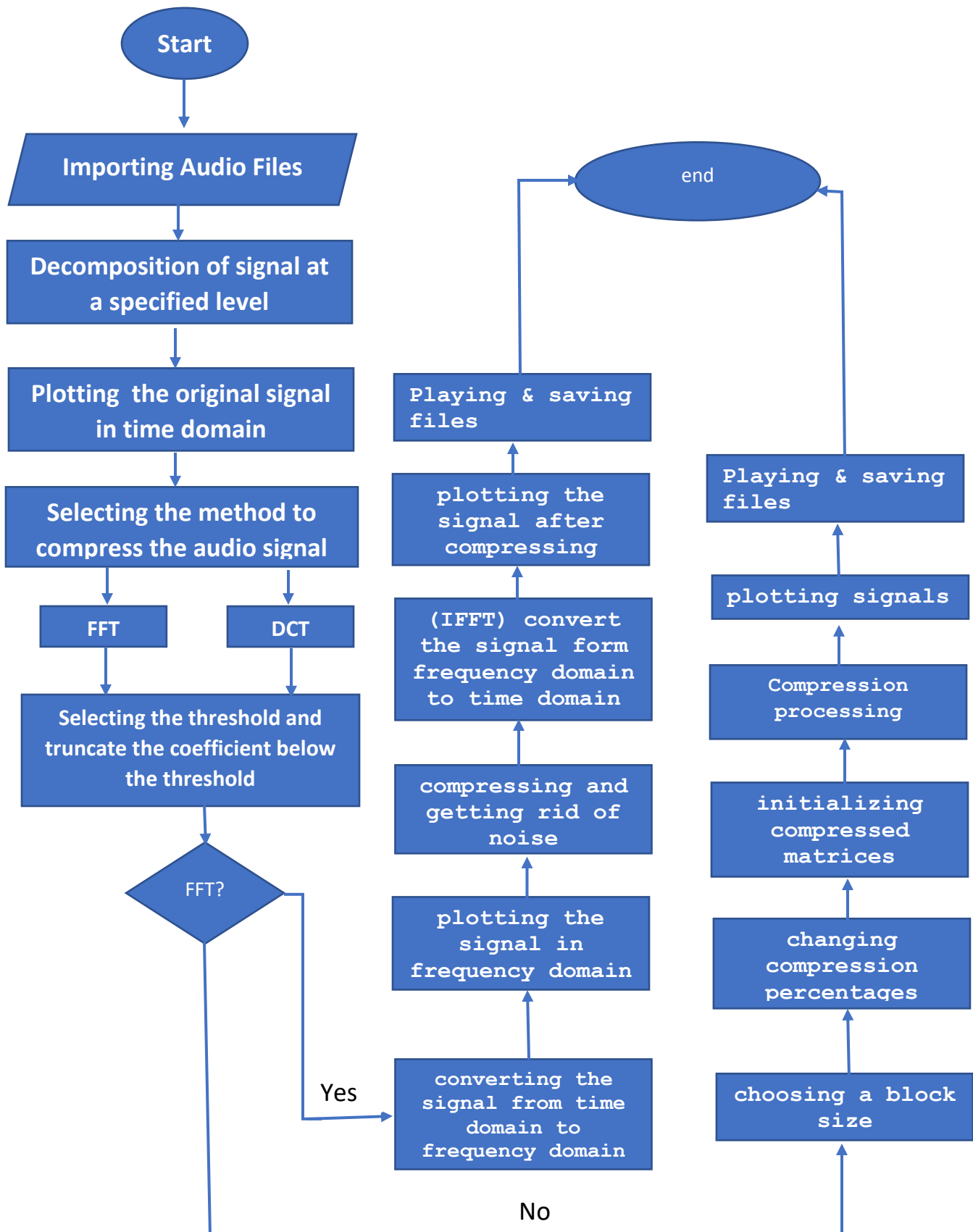


(DCT) method: At present, DCT is widely used transforms in image and video compression algorithms. Its popularity is due mainly to the fact that it achieves a good data compaction; because it concentrates the information content in a relatively few transform coefficients.

Block diagram:

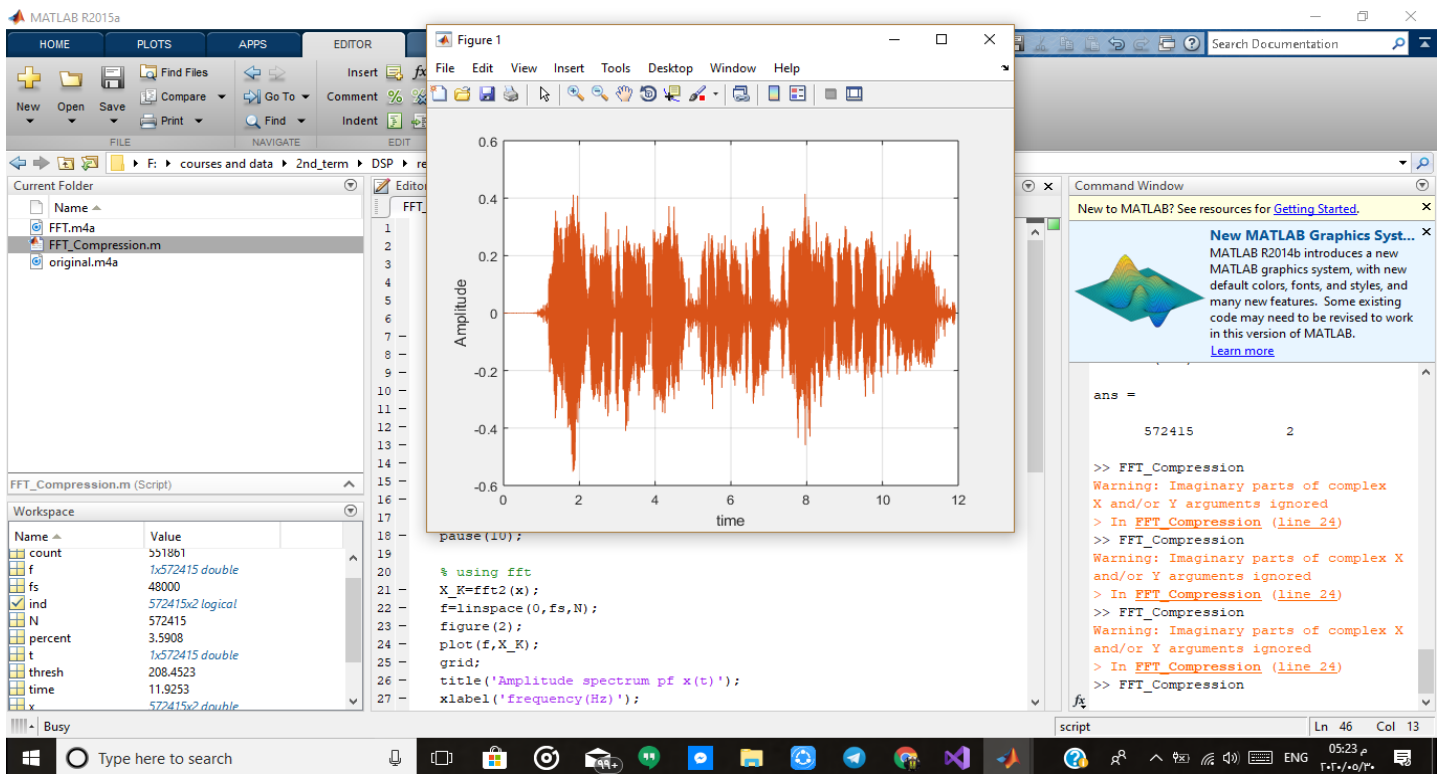


This is the flow chart that contains the steps I worked through:

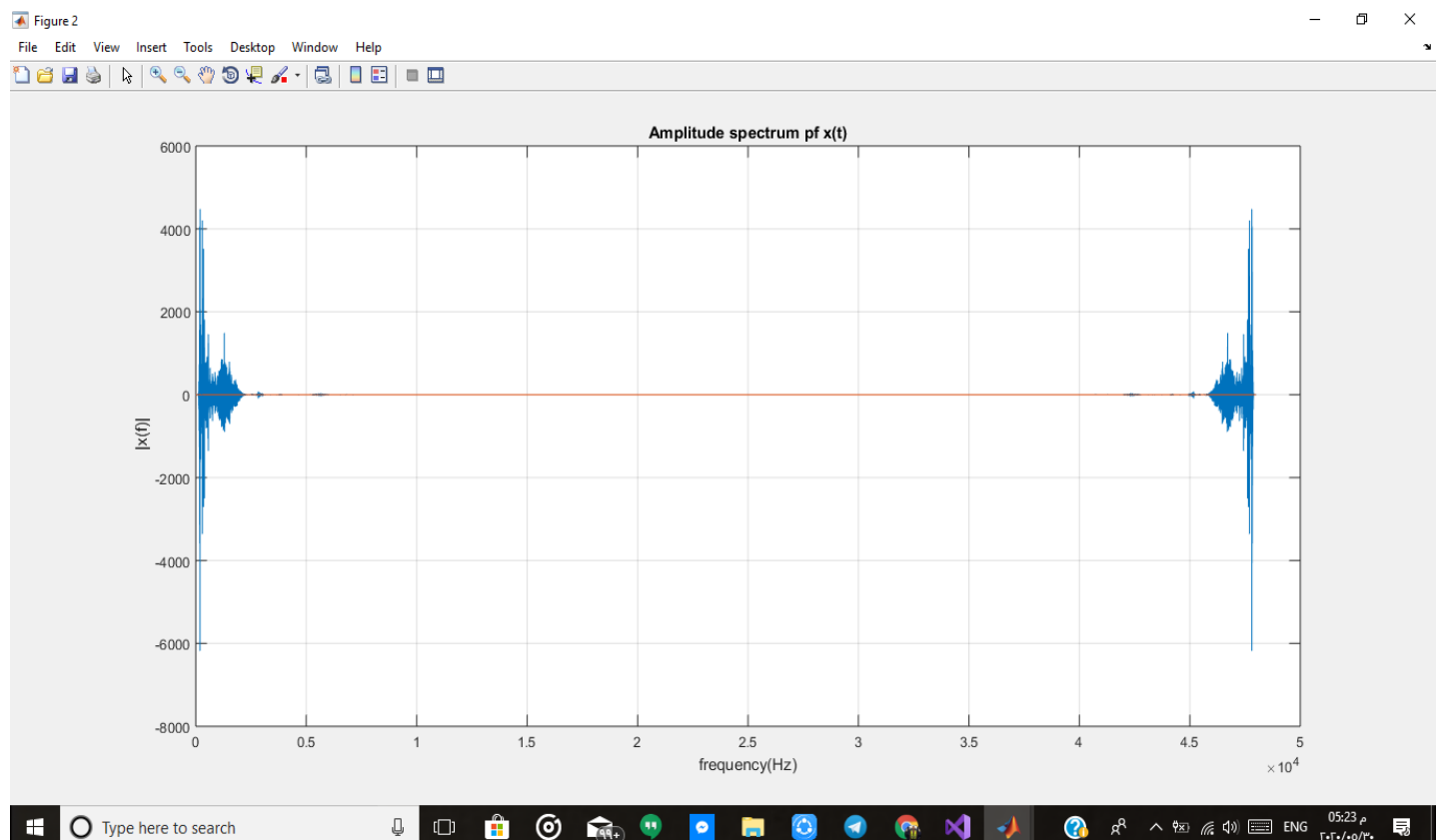


FFT plotting diagrams:

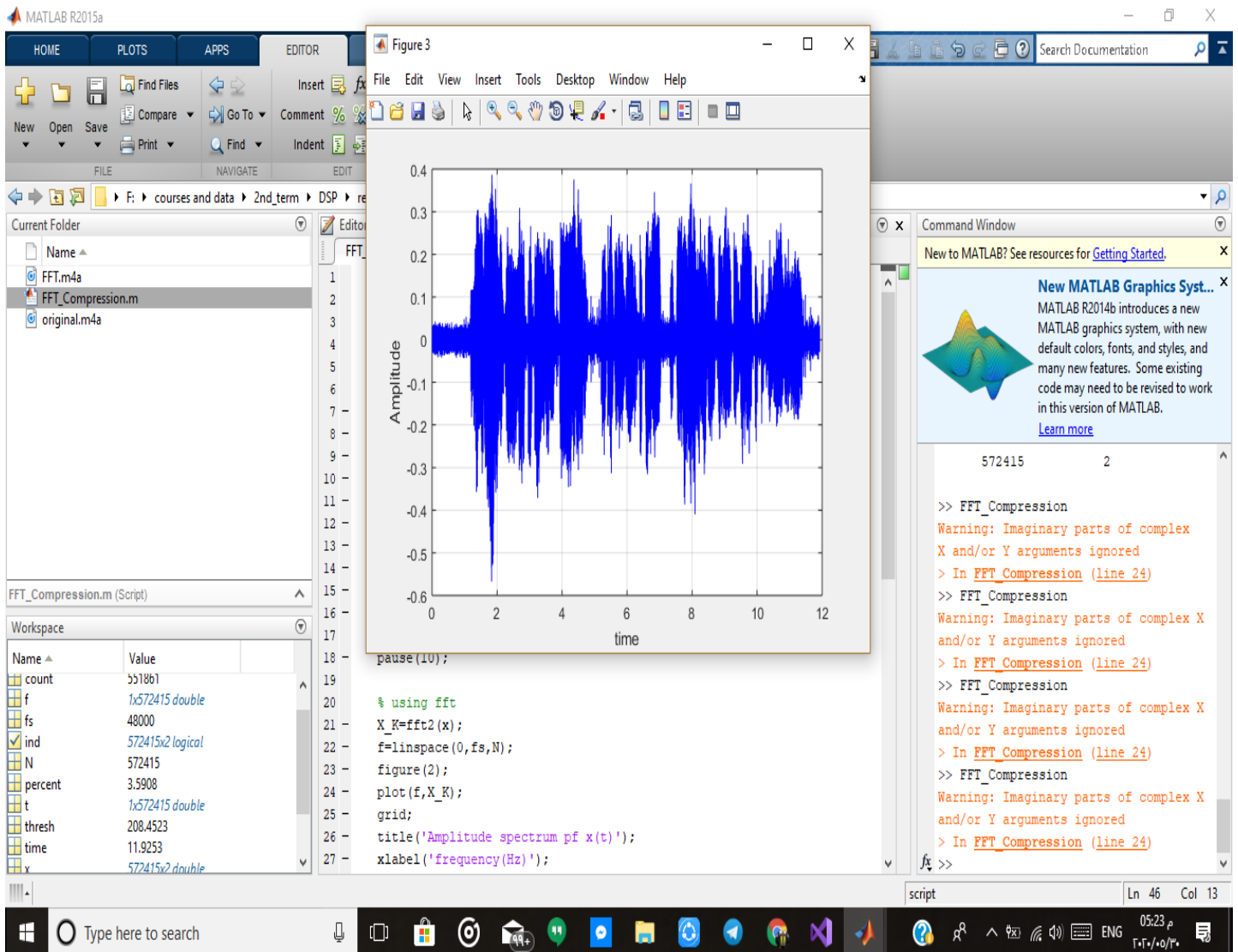
Original signal in time domain:



Original signal in frequency domain:

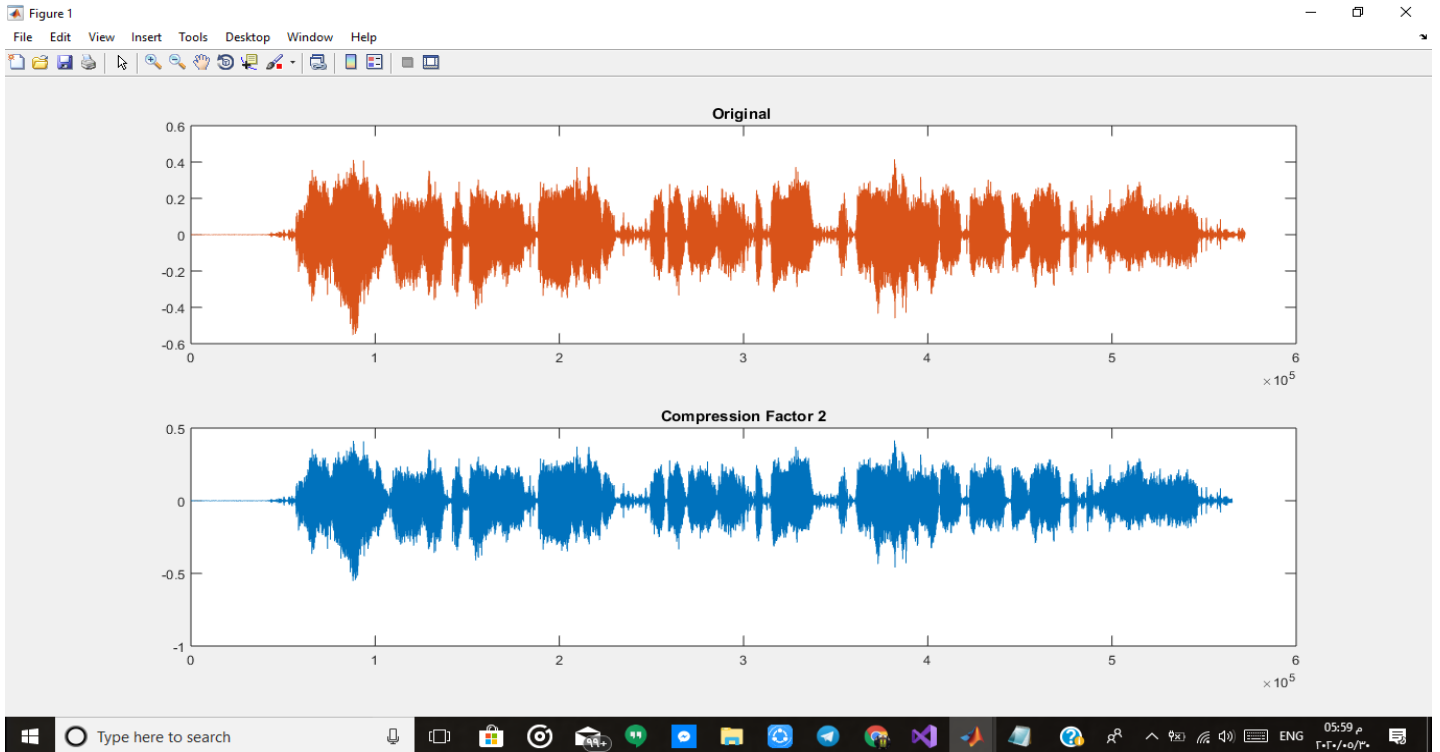


Signal after compression in time domain:

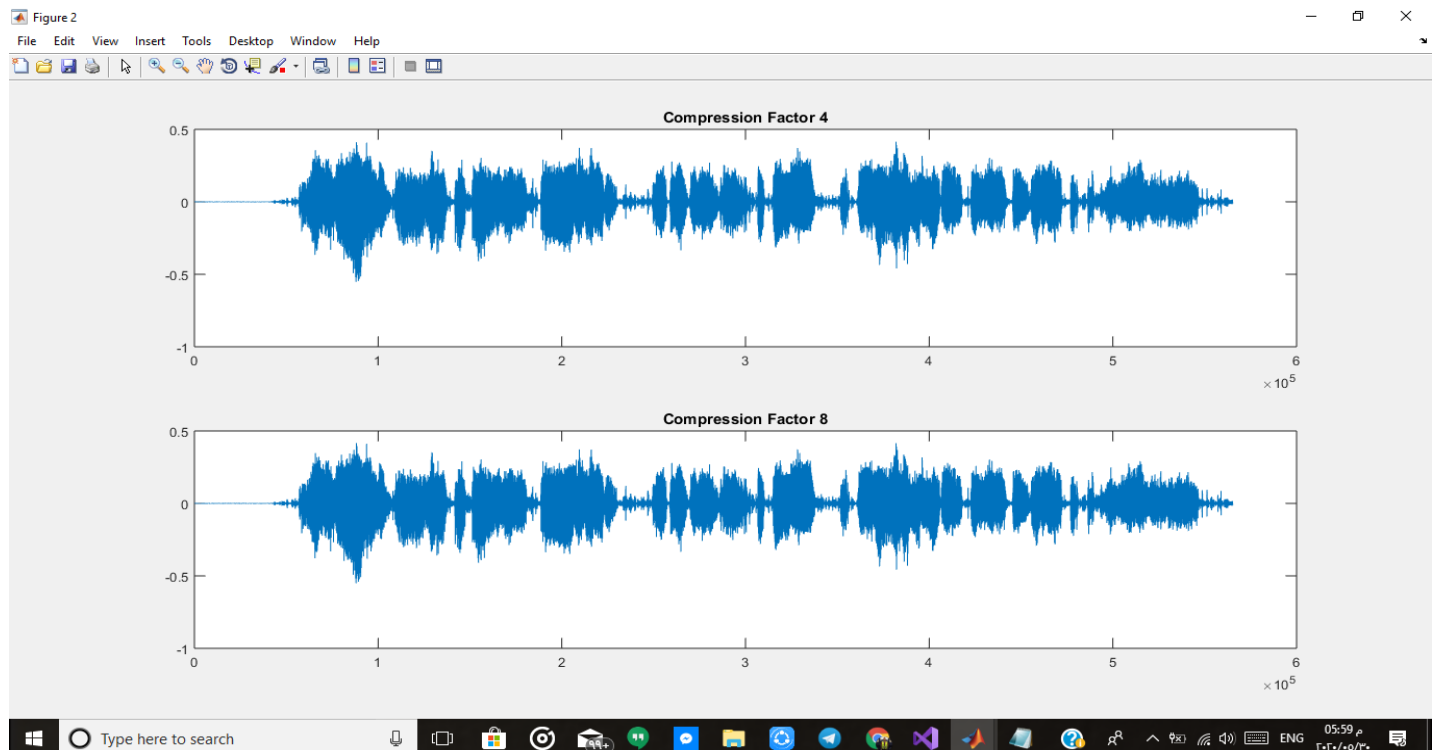


DCT plotting Diagrams:

Original signal and compressed ginal with factor2:

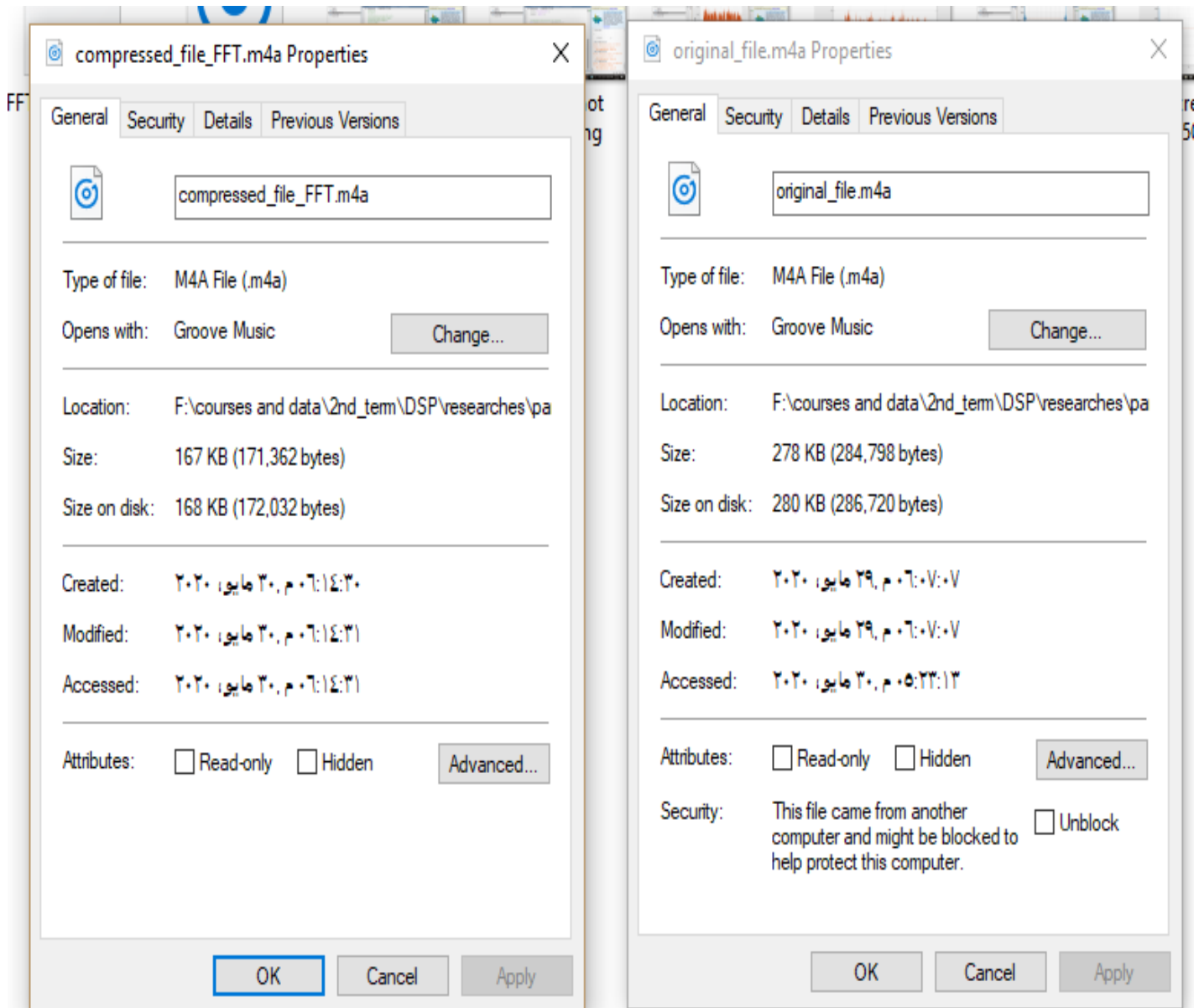


Compressed signals with factor 4 & 8:

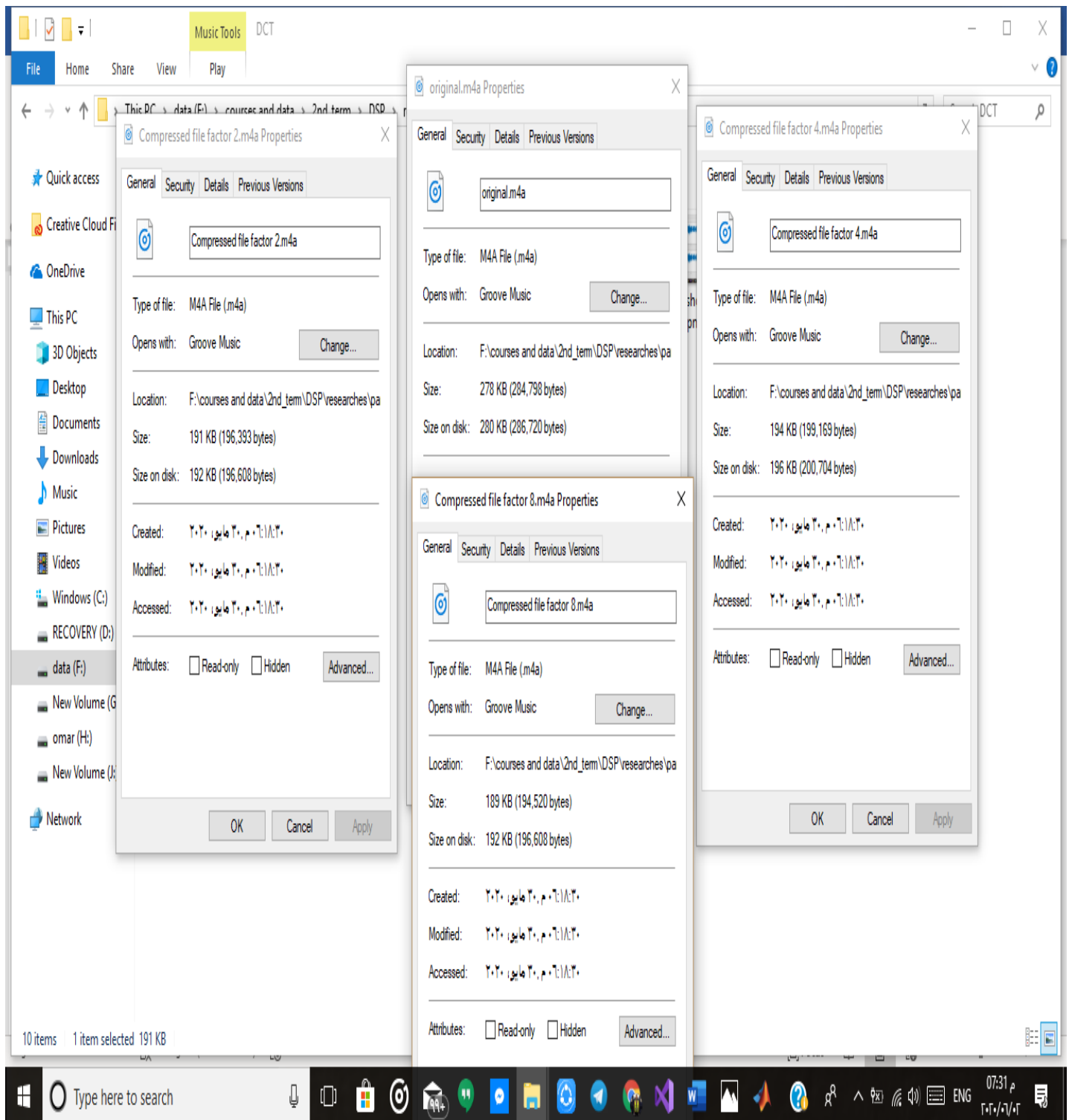


Comparison between FFT & DCT:

In FFT method the code was fairly easy and simple, and I was able to change the frequencies as I want and I was able to reduce some of the noise but not all, and I was able to reduce the size of the original file as shown.



In DCT method the code needed to make matrices and was fairly complicated and I couldn't reduce the noise, but the advantage of the DCT method that I can easily compress the audio signal with any factors (2, 4, 8) and reduce the original audio file's size with different factors as shown.



References and links:

- 1- Udemy - Digital Signal Processing (DSP) From Ground Up™ with MATLAB 2018-10 course.

<https://bit.ly/2XqJ2jd>

- 2- <https://bit.ly/3eH95sk>

- 3- Some tutorials videos on you tube helped me