Peter Julius M. Estacio

Grouped with:

Niño Aloysius V. De Mesa

Christian James S. Madariaga

ENGG 151.01-A

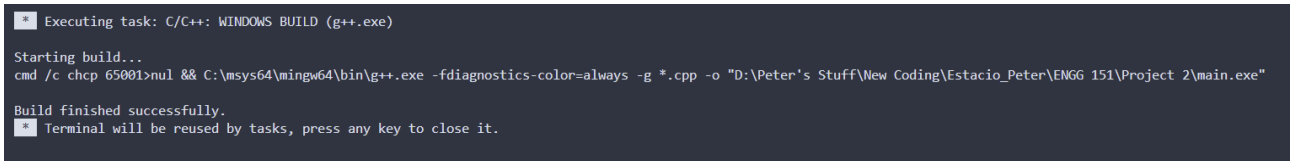
February 25, 2026

Progress Report 1 for Project 2: Fourier Transform

As of February 25, 2026, initial progress has been made with Niño Aloysius V. De Mesa and Christian James S. Madariaga to implement the Discrete Fourier Transform calculations given the basic test signal. The results were printed to console and verified to be accurate. The functions for reading the signal file and verifying numbers as `int` or `double` numbers were integrated from Project 1. A function was written to convert input frequencies to their equivalent values in rad/s. Lastly, the function for calculating the Discrete Fourier Transform was programmed. It takes input parameters (the signal file name, the signal duration, the sampling rate, the starting and end frequencies, and the number of steps taken) and modifies arrays allocated in the main program for the real part, imaginary part, magnitude, and phase values of the calculations. Results small enough or close enough to 0 are clamped to 0, specifically if the absolute value of the real part is less than 1E-08. Further work includes accepting arguments when run from the command line, file output according to specifications, and implementing output to console for only calculations with 10 steps or less. The screenshot of the results shown are below.

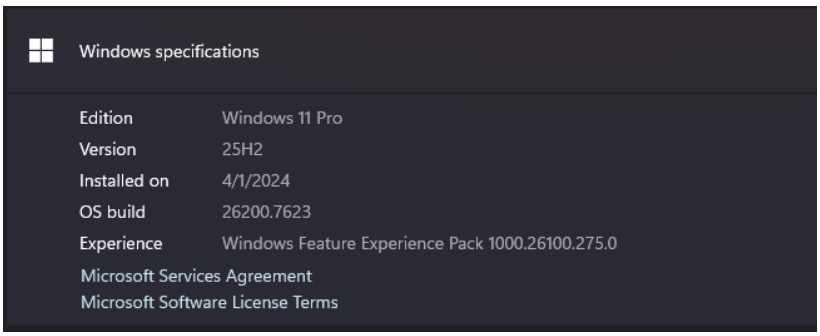
```
PS D:\Peter's Stuff\New Coding\Estacio_Peter\ENGG 151\Project 2> ./main
Signal file 'x.signal' with starting index 0 and duration 32 read.

Rectangular Results
==================================
Frequency (Hz)   Real Part       Imaginary Part
4.000000        -16.016414      -1.271327
4.500000        -2.091738       23.908673
5.000000        14.523652       1.379051
5.500000        0.000000        0.000000
6.000000        4.458294        0.479847
6.500000        0.000000        -0.000000
7.000000        2.498667        0.291875
7.500000        0.000000        -0.000000
8.000000        1.690067        0.206077

Polar Results
==================================
Frequency (Hz)   Magnitude       Phase (Degrees)
4.000000        16.066792       -175.461577
4.500000        24.000000       95.000000
5.000000        14.588977       5.424093
5.500000        0.000000        90.000000
6.000000        4.484042        6.143102
6.500000        0.000000        -90.000000
7.000000        2.515656        6.662659
7.500000        0.000000        -90.000000
8.000000        1.702584        6.951986
PS D:\Peter's Stuff\New Coding\Estacio_Peter\ENGG 151\Project 2>
```

sample screenshot – executable main.exe run and resulting output to console

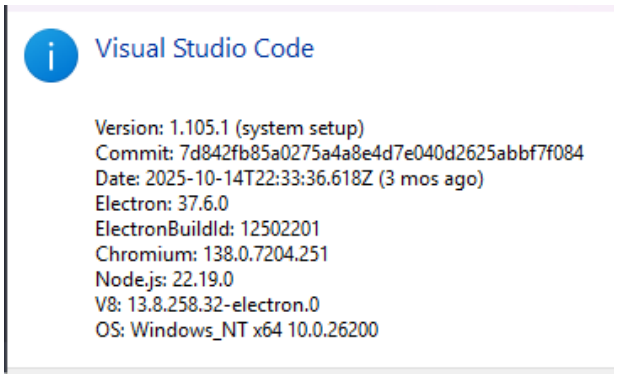


sample screenshot – compilation on Visual Studio Code

compiler version – gcc version 15.2.0 (Rev8, Built by MSYS2 project)



operating system - Windows 11 Pro, 25H2, build 26200.7623



IDE – Visual Studio Code ver 1.105.1