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**Grouped with:**

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**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

```

* Executing task: C/C++: WINDOWS BUILD (g++.exe)

Starting build...
cmd /c chcp 65001>nul && C:\msys64\mingw64\bin\g++.exe -fdiagnostics-color=always -g *.cpp -o "D:\Peter's Stuff\New Coding\Estacio_Peter\ENGG 151\Project 2\main.exe"


Build finished successfully.
* Terminal will be reused by tasks, press any key to close it.
```

sample screenshot – compilation on Visual Studio Code

```


PS D:\Peter's Stuff\New Coding\Estacio_Peter> g++ -v
Using built-in specs.
COLLECT_GCC=C:\msys64\mingw64\bin\g++.exe
COLLECT_LTO_WRAPPER=C:/msys64/mingw64/bin/./lib/gcc/x86_64-w64-mingw32/15.2.0/lto-wrapper.exe
Target: x86_64-w64-mingw32
Configured with: ../gcc-15.2.0/configure --prefix=/mingw64 --with-local-prefix=/mingw64/local --with-native-system-header-dir=/mingw64/include --libexecdir=/mingw64/lib --enable-bootstrap --enable-checking=release --with-arch=nocona --with-tune=generic --enable-mingw-wildcard --enable-languages=c,lto,c++,fortran,ada,objc,obj-c++,jit --enable-shared --enable-static --enable-libatomic --enable-threads=posix --enable-graphite --enable-fully-dynamic-string --enable-libstdcxx-backtrace=yes --enable-libstdcxx-filesystem-ts --enable-libstdcxx-time --disable-libstdcxx-pch --enable-lto --enable-libgomp --disable-libssp --disable-multilib --disable-rpath --disable-win32-registry --disable-nls --disable-werror --disable-symvers --with-libiconv --with-system-zlib --with-gmp=/mingw64 --with-mpfr=/mingw64 --with-mpc=/mingw64 --with-isl=/mingw64 --with-pkgversion='Rev8, Built by MSYS2 project' --with-bugurl=https://github.com/msys2/MINGW-packages/issues --with-gnu-as --with-gnu-ld --with-libstdcxx-zoneinfo=yes --disable-libstdcxx-debug --enable-plugin --with-boot-ldflagss=-static-libstdc++ --with-stage1-ldflags=-static-libstdc++
Thread model: posix
Supported LTO compression algorithms: zlib zstd
gcc version 15.2.0 (Rev8, Built by MSYS2 project)
PS D:\Peter's Stuff\New Coding\Estacio_Peter>
```

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

 Windows specifications

Edition	Windows 11 Pro
Version	25H2
Installed on	4/1/2024
OS build	26200.7623
Experience	Windows Feature Experience Pack 1000.26100.275.0
Microsoft Services Agreement	
Microsoft Software License Terms	

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

 Visual Studio Code

Version: 1.105.1 (system setup)  
Commit: 7d842fb85a0275a4a8e4d7e040d2625abbf7f084  
Date: 2025-10-14T22:33:36.618Z (3 mos ago)  
Electron: 37.6.0  
ElectronBuildId: 12502201  
Chromium: 138.0.7204.251  
Node.js: 22.19.0  
V8: 13.8.258.32-electron.0  
OS: Windows\_NT x64 10.0.26200

IDE – Visual Studio Code ver 1.105.1