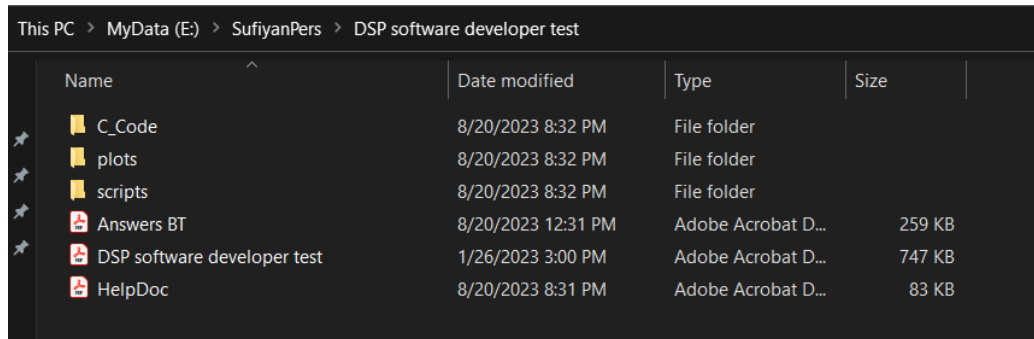
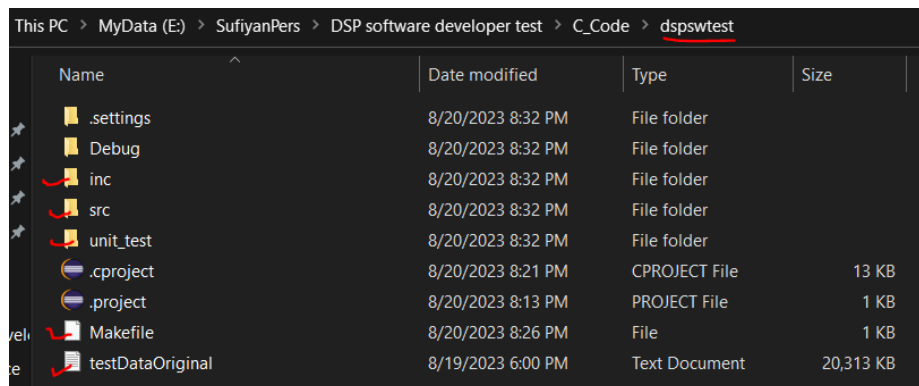


Folder Structure for DSP Software Developer Test:



Name	Date modified	Type	Size
C_Code	8/20/2023 8:32 PM	File folder	
plots	8/20/2023 8:32 PM	File folder	
scripts	8/20/2023 8:32 PM	File folder	
Answers BT	8/20/2023 12:31 PM	Adobe Acrobat D...	259 KB
DSP software developer test	1/26/2023 3:00 PM	Adobe Acrobat D...	747 KB
HelpDoc	8/20/2023 8:31 PM	Adobe Acrobat D...	83 KB

- **C_code:** This directory houses the C program solutions for the questions in the DSP software developer tes.pdf.
 - **Inc:** Contains header files shared among different tasks.
 - **Src:** Includes main.c, task1.c, task2.c, and task3.c. The task numbering corresponds to the question numbers.
 - **Unit_test:** This folder contains test.c, which is utilized for testing DC offset estimation under varying conditions, including SNR, DC offset, F_s , and f .



Name	Date modified	Type	Size
.settings	8/20/2023 8:32 PM	File folder	
Debug	8/20/2023 8:32 PM	File folder	
inc	8/20/2023 8:32 PM	File folder	
src	8/20/2023 8:32 PM	File folder	
unit_test	8/20/2023 8:32 PM	File folder	
.cproject	8/20/2023 8:21 PM	CPROJECT File	13 KB
.project	8/20/2023 8:13 PM	PROJECT File	1 KB
Makefile	8/20/2023 8:26 PM	File	1 KB
testDataOriginal	8/19/2023 6:00 PM	Text Document	20,313 KB

- **scripts:** Within this directory, you'll find MATLAB simulation programs designed to illustrate concepts discussed in Task 2 and Task 4. These scripts serve as valuable tools for generating the plots presented in the accompanying answer sheet "Answers_BT.pdf." They provide visual support to enhance the understanding of the solutions provided.
- **Answers_BT.pdf:** This comprehensive pdf file comprises detailed responses to the questions asked in the test.
- **HelpDoc.pdf:** This document serves as a helpful guide, describing the folder hierarchy and providing instructions on executing code pertaining to specific questions presented in the test. It offers clarity and guidance for efficient navigation.

Guidance for Code Navigation:

This section offers clear instructions on navigating the code for specific questions and provides guidance on building and running it effectively.

- Main.c as the Task Driver: The Main.c file serves as the task driver, allowing the invocation of any specific task corresponding to a particular question. It's important to note that only one task can be executed at a time.
- Task-specific Code:
 - Task1.c: This file houses the code responsible for parsing a text file and updating the buffer with time domain samples as requested in Task 1.
 - Task2.c: Within this file, you'll find the code for DC offset estimation, aligning with the requirements of Task 2.
 - Task3.c: Task 3's code resides here and focuses on enhancing DC offset estimation through the application of a moving average filter for noise suppression.

Building the Code:

Within the C_code folder, you'll find two main modules: src and unit_test. To build the main code, which encompasses all the tasks, follow these steps:

1. Navigate to the 'dspswtest' folder.
2. Execute the following commands:
 - make clean
 - make all

This will generate an executable file in the same directory named 'dspswtest'. You can use this executable to run various tasks. Here's how you can check or run specific tasks:

- Task 1: Refer to the screenshot provided to see how to check or run Task 1.

```
Lenovo@DESKTOP-3K5BTGN MINGW64 ~/eclipse-workspace/dspswtest,  
$ ./dspswtest.exe task1  
Successfully parsed 100000 samples
```

- Task 2: The screenshot illustrates how to check or run Task 2.

```
Lenovo@DESKTOP-3K5BTGN MINGW64 ~/eclipse-workspace/dspswtest/Debug  
$ ./dspswtest.exe task2  
***** Averaged DC Offset Estimation for all window *****  
Antenna 0 DC Offset: 0.250542  
Antenna 1 DC Offset: 0.600154  
Antenna 2 DC Offset: 0.458353  
Antenna 3 DC Offset: 0.567767  
Antenna 4 DC Offset: 0.754139  
Antenna 5 DC Offset: 0.343744  
Antenna 6 DC Offset: 0.432010  
Antenna 7 DC Offset: 0.475845
```

- Unit Test: The screenshot demonstrates how to run the unit test

```

MINGW64/c/Users/Lenovo/eclipse-workspace/dpswtest/Debug x
Lenovo@DESKTOP-3K5BTGN MINGW64 ~/eclipse-workspace/dpswtest/Debug
$ ./dpswtest.exe snr=7 fs=3000 f=300 dc=.25

***** Command Usage *****
arguments: <snr=10> <fs=4000> <f=400> <dc=.25>
ex: ./unitTest snr=10 fs=4000 f=400 dc=.25

***** Running Unit test *****
snrdb[7.00] samplingFreq[3000.00] signalFrequency[300.00] dcOffset[0.25]
***** Averaged DC Offset Estimation for all window *****
Antenna 0 DC Offset: 0.249454
Antenna 1 DC Offset: 0.250110
Antenna 2 DC Offset: 0.249475
Antenna 3 DC Offset: 0.249380
Antenna 4 DC Offset: 0.250295
Antenna 5 DC Offset: 0.250273
Antenna 6 DC Offset: 0.250060
Antenna 7 DC Offset: 0.250157

***** Validating test *****
Ant[0] Test Passed: Estimated DC ofsset almost identical with reference : Est Error 0.218211%, max allowed err 5%
Ant[1] Test Passed: Estimated DC ofsset almost identical with reference : Est Error 0.043818%, max allowed err 5%
Ant[2] Test Passed: Estimated DC ofsset almost identical with reference : Est Error 0.209866%, max allowed err 5%
Ant[3] Test Passed: Estimated DC ofsset almost identical with reference : Est Error 0.248057%, max allowed err 5%
Ant[4] Test Passed: Estimated DC ofsset almost identical with reference : Est Error 0.118060%, max allowed err 5%
Ant[5] Test Passed: Estimated DC ofsset almost identical with reference : Est Error 0.109132%, max allowed err 5%
Ant[6] Test Passed: Estimated DC ofsset almost identical with reference : Est Error 0.024101%, max allowed err 5%
Ant[7] Test Passed: Estimated DC ofsset almost identical with reference : Est Error 0.062951%, max allowed err 5%

```