CSE 344
SYSTEMS PROGRAMMING

HOMEWORK 01

REPORT

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1. Part 1

In that part, programA uses file locks to outputPathA.txt for two processes of programA. It reads inputPathA.txt files for distinct programAs. Then executes the each 32 bytes to 16 complex numbers and writes them into outputPathA.txt common file.

inputPathA1.txt

```
1   a0a1a2a3a4a5a6a7a8a9b0b1b2b3b4b
2   a0a1a2a3a4a5a6a7a8a9b0b1b2b3b4b
3   a0a1a2a3a4a5a6a7a8a9b0b1b2b3b4b
4   a0a1a2a3a4a5a6a7a8a9b0b1b2b3b4b
5   a0a1a2a3a4a5a6a7a8a9b0b1b2b3b4b
6   a0a1a2a3a4a5a6a7a8a9b0b1b2b3b4b
7
```

inputPathA2.txt

```
1   00000000000000000000000000000009
2   11111111111111111111111111111119
3   22222222222222222222222222222229
4   33333333333333333333333333333339
5   44444444444444444444444444444449
6   55555555555555555555555555555559
7   66666666666666666666666666666669
8   77777777777777777777777777777779
9   88888888888888888888888888888889
10  99999999999999999999999999999999
11  66666666666666666666666666666669
12  66666666666666666666666666666669
13  66666666666666666666666666666669
14  66666666666666666666666666666669
15  66666666666666666666666666666669
16
```

While programA processes running, programB processes are also executed synchronizedly. Each programB processes reads outputPathA.txt commonly and computes fast fourier transform then writes into common outputPathB.txt file. To synchronize this processes file locking mechanism is used. While writing outputs, programB processes writes to outputPathA.txt “DELETED” in beginning of each used lines linearly. I couldn’t have time to delete each line and found that kind of solution.

While writing programA, it reads and deletes programB synchronized:

```
DELETED 97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
DELETED 48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,57 +i10,
DELETED 97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
DELETED 97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
DELETED 49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,57 +i10,
97 +i48,97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
97 +i48,97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,57 +i10,
97 +i48,97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,57 +i10,
```

After programB finishes:

```
DELETED 97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
DELETED 48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,48 +i48,57 +i10,
DELETED 97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
DELETED 97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
DELETED 49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,49 +i49,57 +i10,
DELETED 97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
DELETED 97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
DELETED 50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,50 +i50,57 +i10,
DELETED 97 +i49,97 +i50,97 +i51,97 +i52,97 +i53,97 +i54,97 +i55,97 +i56,97 +i57,98 +i48,98 +i49,98 +i50,98 +i51,98 +i52,98 +i10,
DELETED 51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,51 +i51,57 +i10,
DELETED 52 +i52,52 +i52,52 +i52,52 +i52,52 +i52,52 +i52,52 +i52,52 +i52,52 +i52,52 +i52,52 +i52,52 +i52,52 +i52,52 +i52,57 +i10,
DELETED 53 +i53,53 +i53,53 +i53,53 +i53,53 +i53,53 +i53,53 +i53,53 +i53,53 +i53,53 +i53,53 +i53,53 +i53,53 +i53,53 +i53,57 +i10,
DELETED 54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,57 +i10,
DELETED 55 +i55,55 +i55,55 +i55,55 +i55,55 +i55,55 +i55,55 +i55,55 +i55,55 +i55,55 +i55,55 +i55,55 +i55,55 +i55,55 +i55,57 +i10,
DELETED 56 +i56,56 +i56,56 +i56,56 +i56,56 +i56,56 +i56,56 +i56,56 +i56,56 +i56,56 +i56,56 +i56,56 +i56,56 +i56,56 +i56,57 +i10,
DELETED 57 +i57,57 +i57,57 +i57,57 +i57,57 +i57,57 +i57,57 +i57,57 +i57,57 +i57,57 +i57,57 +i57,57 +i57,57 +i57,57 +i57,57 +i10,
DELETED 54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,57 +i10,
DELETED 54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,57 +i10,
DELETED 54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,57 +i10,
DELETED 54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,57 +i10,
DELETED 54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,54 +i54,57 +i10,
```

programB writes FFT into outputPathB.txt:

```
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
384.000 +384.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,393.000 +346.000i,33.234 +-20.506i,38.000 +9.000i,20.506 +33.234i,-9.000 +38.000i,-33.234 +20.506i,-38.000 +-9.000i,-20.506 +-33.234i,
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
392.000 +392.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,400.000 +353.000i,33.234 +-21.920i,39.000 +8.000i,21.920 +33.234i,-8.000 +39.000i,-33.234 +21.920i,-39.000 +-8.000i,-21.920 +-33.234i,
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
400.000 +400.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,407.000 +360.000i,33.234 +-23.335i,40.000 +7.000i,23.335 +33.234i,-7.000 +40.000i,-33.234 +23.335i,-40.000 +-7.000i,-23.335 +-33.234i,
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
408.000 +408.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,414.000 +367.000i,33.234 +-24.749i,41.000 +6.000i,24.749 +33.234i,-6.000 +41.000i,-33.234 +24.749i,-41.000 +-6.000i,-24.749 +-33.234i,
416.000 +416.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,421.000 +374.000i,33.234 +-26.163i,42.000 +5.000i,26.163 +33.234i,-5.000 +42.000i,-33.234 +26.163i,-42.000 +-5.000i,-26.163 +-33.234i,
424.000 +424.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,428.000 +381.000i,33.234 +-27.577i,43.000 +4.000i,27.577 +33.234i,-4.000 +43.000i,-33.234 +27.577i,-43.000 +-4.000i,-27.577 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
440.000 +440.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,442.000 +395.000i,33.234 +-30.406i,45.000 +2.000i,30.406 +33.234i,-2.000 +45.000i,-33.234 +30.406i,-45.000 +-2.000i,-30.406 +-33.234i,
448.000 +448.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,449.000 +402.000i,33.234 +-31.820i,46.000 +1.000i,31.820 +33.234i,-1.000 +46.000i,-33.234 +31.820i,-46.000 +-1.000i,-31.820 +-33.234i,
456.000 +456.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,456.000 +409.000i,33.234 +-33.234i,47.000 +0.000i,33.234 +33.234i,0.000 +47.000i,-33.234 +33.234i,-47.000 +-0.000i,-33.234 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,

```

After programB processes execution unsorted fast fourier transform results are written and programC goes to sort it.

2. Part 2

In that part, output of programB executions the outputPathB.txt file is created and complex numbers’ fast fourier transform results are going to be sorted using merge sort algorithm. In that algorithm, merge sort is used to sort indexes of each complex numbers lines. After that execution, creating a temp file to get the unsorted version of outputPathB.txt and swaps the lines in live using sorting indexes. After the sort in file, removing the temp text file after closing it and closes each openned file.

OutputPathB.txt File Sorted:

```
384.000 +384.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,393.000 +346.000i,33.234 +-20.506i,38.000 +9.000i,20.506 +33.234i,-9.000 +38.000i,-33.234 +20.506i,-38.000 +-9.000i,-20.506 +-33.234i,
392.000 +392.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,400.000 +353.000i,33.234 +-21.920i,39.000 +8.000i,21.920 +33.234i,-8.000 +39.000i,-33.234 +21.920i,-39.000 +-8.000i,-21.920 +-33.234i,
400.000 +400.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,407.000 +360.000i,33.234 +-23.335i,40.000 +7.000i,23.335 +33.234i,-7.000 +40.000i,-33.234 +23.335i,-40.000 +-7.000i,-23.335 +-33.234i,
408.000 +408.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,414.000 +367.000i,33.234 +-24.749i,41.000 +6.000i,24.749 +33.234i,-6.000 +41.000i,-33.234 +24.749i,-41.000 +-6.000i,-24.749 +-33.234i,
416.000 +416.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,421.000 +374.000i,33.234 +-26.163i,42.000 +5.000i,26.163 +33.234i,-5.000 +42.000i,-33.234 +26.163i,-42.000 +-5.000i,-26.163 +-33.234i,
424.000 +424.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,428.000 +381.000i,33.234 +-27.577i,43.000 +4.000i,27.577 +33.234i,-4.000 +43.000i,-33.234 +27.577i,-43.000 +-4.000i,-27.577 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
432.000 +432.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,435.000 +388.000i,33.234 +-28.991i,44.000 +3.000i,28.991 +33.234i,-3.000 +44.000i,-33.234 +28.991i,-44.000 +-3.000i,-28.991 +-33.234i,
440.000 +440.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,442.000 +395.000i,33.234 +-30.406i,45.000 +2.000i,30.406 +33.234i,-2.000 +45.000i,-33.234 +30.406i,-45.000 +-2.000i,-30.406 +-33.234i,
448.000 +448.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,0.000 +0.000i,449.000 +402.000i,33.234 +-31.820i,46.000 +1.000i,31.820 +33.234i,-1.000 +46.000i,-33.234 +31.820i,-46.000 +-1.000i,-31.820 +-33.234i,
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779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
779.000 +410.000i,4.828 +-5.586i,-9.000 +2.000i,0.828 +-7.586i,-1.000 +2.000i,-0.828 +-8.414i,7.000 +2.000i,-4.828 +-10.414i,779.000 +375.000i,35.234 +-35.991i,34.000 +2.000i,31.234 +22.820i,-1.000 +45.000i,-31.234 +21.991i,-36.000 +2.000i,-35.234 +-40.820i,
```
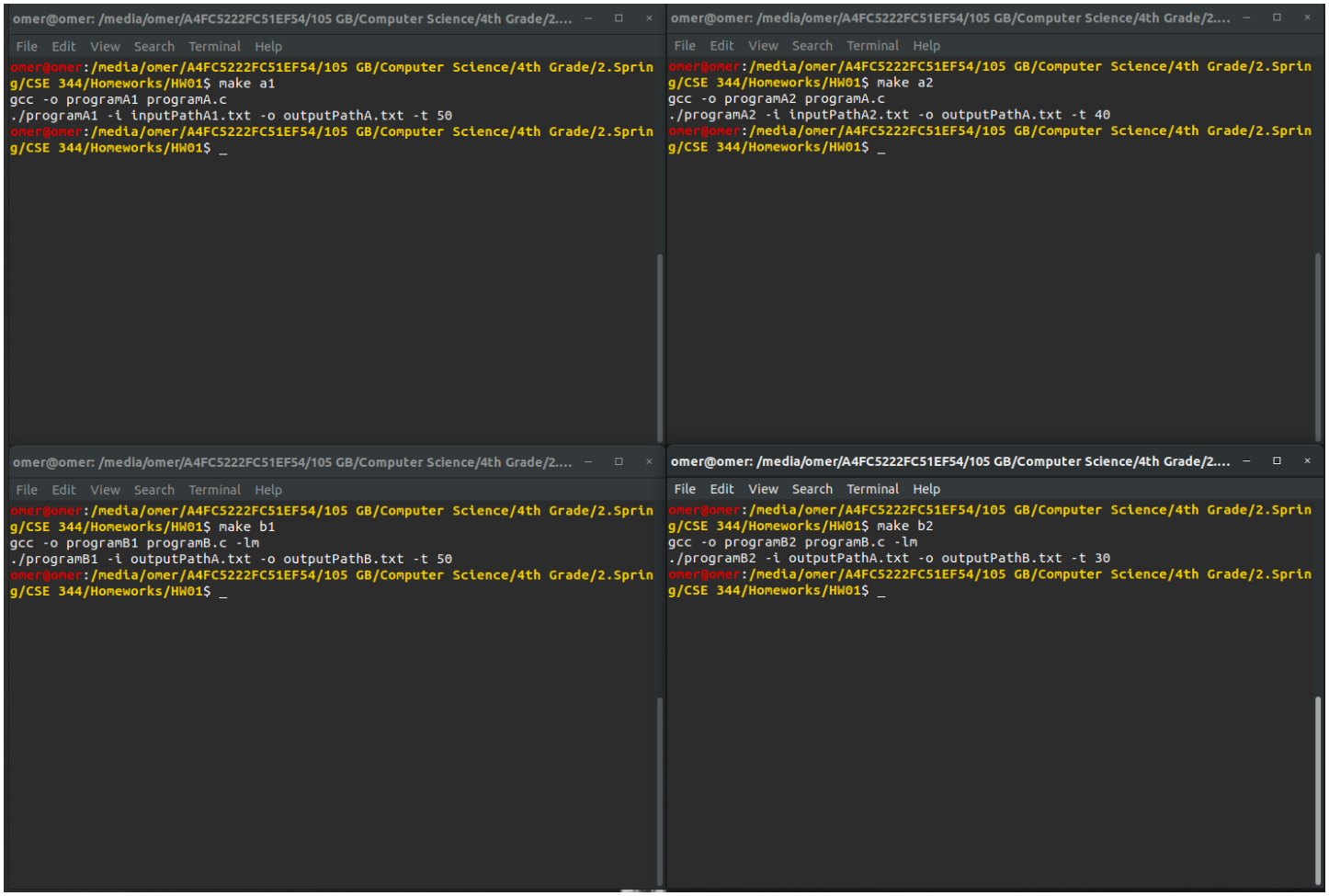

Compiler Result:



Notes:

- I run the processes with short inputs. I used fsync() function to use kernel buffer synchronized for long inputs but not resulted succesfully.
- For long input files, it may crush for running.
- In .zip file I will be sending my own input files and makefile file.