

CSE 344 - SYSTEM PROGRAMMING - HOMEWORK #2

GÖKHAN HAS - 161044067

First of all, I had a problem in reading the characters in the homework that had no equivalent in ascii but equivalent in extended ascii. I solved this problem by reading it as unsigned char. When I read in this way, I was able to read positively, not negative, including Turkish characters (such as ş, ı, ö).

In the homework, the parent process is running first and reading the input file. Input file is read as 20 bytes and desired operations are done using least_square_method. Since this calculation method is considered as the critical region, signal masking operations are performed. While the SIGINT signal can be successfully captured, the SIGSTP signal cannot be captured, that is, it cannot be blocked. This process then writes the coordinates to a temp file along with the estimated line. After that, SIGUSR2 signal is sent to the child process with the kill method. When file locking is done successfully, the two processes cannot write and read to temp file at the same time. Thus, complexity is prevented.

If a signal is detected in the critical region of the parent process, the signal numbers are printed towards the end of the parent process. If no signal is detected, an information message is printed.

The child process starts itself after receiving the SIGUSR2 signal from the parent process. It does the same in the critical region.

Then the parent process sends the SIGUSR1 signal and the child closes the process input file and deletes it.

If the SIGTERM signal is not sent by the user, I send myself SIGTERM at the end of the parent process (after the child process is completely finished) and close all files. I also delete the temp file (SIGTERM deletes itself).

```
gokhan@has: ~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02$ ls
161044067.c  161044067_report_HW02.doc  input  makefile
gokhan@has:~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02$ make
gcc 161044067.c -o program -lm
gokhan@has:~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02$ ls
161044067.c  161044067_report_HW02.doc  input  makefile  program
gokhan@has:~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02$ ./program
ERROR : Input/output error

##### PROGRAM USAGE #####
# Programs argument is -i and -o
# -i : read the contents of the file denoted by inputPath
# -o : write output to the file denoted
#####

gokhan@has:~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02$ ./program -i input -o
./program: option requires an argument -- 'o'
ERROR : Input/output error

##### PROGRAM USAGE #####
# Programs argument is -i and -o
# -i : read the contents of the file denoted by inputPath
# -o : write output to the file denoted
#####

gokhan@has:~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02$
```

```
EXPLORER  CSE344-SYSTEMS-PROGRAMMING/HW-02  input
1 asdibdbhasdbhasdbd
2 asdijbajjsdbahsdhbasdbd
3 asdibbasdbbhasdbhasdbd
4 sdhahbsdbbhhsdbhasdbda
5 asdibdbhasdbhasdbd
6 asdijbajjsdbahsdhbasdbd
7 asdibbasdbbhasdbhasdbd
8 sdhahbsdbbhhsdbhasdbda
9 asdibdbhasdbhasdbd
10 asdibdbhasdbhasdbd
11 asdijbajjsdbahsdhbasdbd
12 asdibbasdbbhasdbhasdbd
13 sdhahbsdbbhhsdbhasdbda
14 asdibdbhasdbhasdbd
15 asdijbajjsdbahsdhbasdbd
16 asdibbasdbbhasdbhasdbd
17 sdhahbsdbbhhsdbhasdbda
18 asdibdbhasdbhasdbd
19 asdibdbhasdbhasdbd
20 asdijbajjsdbahsdhbasdbd
21 asdibbasdbbhasdbhasdbd
22 sdhahbsdbbhhsdbhasdbda
23 asdibdbhasdbhasdbd
24 asdijbajjsdbahsdhbasdbd
25 asdibbasdbbhasdbhasdbd
26 sdhahbsdbbhhsdbhasdbda
27 asdibdbhasdbhasdbd
28 asdibdbhasdbhasdbd
29 asdijbajjsdbahsdhbasdbd
30 asdibbasdbbhasdbhasdbd
31 sdhahbsdbbhhsdbhasdbda
32 asdibdbhasdbhasdbd
33 asdibdbhasdbhasdbd
34 asdijbajjsdbahsdhbasdbd
35 asdibbasdbbhasdbhasdbd
36 sdhahbsdbbhhsdbhasdbda
37 asdibdbhasdbhasdbd
38 asdibdbhasdbhasdbd
39 asdijbajjsdbahsdhbasdbd
40 asdibbasdbbhasdbhasdbd
41 sdhahbsdbbhhsdbhasdbda
42 asdibdbhasdbhasdbd
43 asdibdbhasdbhasdbd
44 asdijbajjsdbahsdhbasdbd
45 asdibbasdbbhasdbhasdbd
46 sdhahbsdbbhhsdbhasdbda
47 asdibdbhasdbhasdbd
```

Example Input File

```
gokhan@has: ~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02
gokhan@has: ~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02
gokhan@has: ~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02
gokhan@has: ~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02 ./program -i input -o output

### PARENT PROCESS IS STARTED ###

### CHILD PROCESS IS STARTED ###

--> No signal in critical region

#####
#          READED BYTES      3290          #
#          ESTIMATED LINE EQUATION      164          #
#####

Mean Err : 13.752          SD Err : 12.189
Mean Err : 290.800          SD Err : 379.125
Mean Err : 17.463          SD Err : 16.560
Mean Err : 10.928          SD Err : 9.281
Mean Err : 280.816          SD Err : 365.454
Mean Err : 281.956          SD Err : 366.483
Mean Err : 291.131          SD Err : 379.554
Mean Err : 11.371          SD Err : 9.833
Mean Err : 14.144          SD Err : 12.740
Mean Err : 251.514          SD Err : 325.817
Mean Err : 289.452          SD Err : 376.832
Mean Err : 12.110          SD Err : 10.662
Mean Err : 11.425          SD Err : 10.145
Mean Err : 16.713          SD Err : 15.605
Mean Err : 273.333          SD Err : 355.382
Mean Err : 13.821          SD Err : 12.595
Mean Err : 19.425          SD Err : 18.900
Mean Err : 11.768          SD Err : 10.342
Mean Err : 11.809          SD Err : 10.209
Mean Err : 289.014          SD Err : 376.640
Mean Err : 14.567          SD Err : 13.082
Mean Err : 19.200          SD Err : 18.509
Mean Err : 3.439          SD Err : 1.829
Mean Err : 298.254          SD Err : 389.140
Mean Err : 276.539          SD Err : 359.591
Mean Err : 17.395          SD Err : 16.604
Mean Err : 10.446          SD Err : 8.941
Mean Err : 265.720          SD Err : 345.248
Mean Err : 292.740          SD Err : 381.345
Mean Err : 288.773          SD Err : 376.245
Mean Err : 10.543          SD Err : 9.315
Mean Err : 16.460          SD Err : 15.481
Mean Err : 268.378          SD Err : 348.676
Mean Err : 7.975          SD Err : 6.497
Mean Err : 281.159          SD Err : 365.511
```

```
gokhan@has: ~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02
Mean Err : 281.159          SD Err : 365.511
Mean Err : 11.362          SD Err : 9.818
Mean Err : 4.939          SD Err : 3.199
Mean Err : 301.912          SD Err : 393.877
Mean Err : 12.289          SD Err : 10.720
Mean Err : 20.528          SD Err : 19.834
Mean Err : 2.594          SD Err : 1.156
Mean Err : 11.776          SD Err : 10.294
Mean Err : 17.134          SD Err : 16.037
Mean Err : 287.528          SD Err : 374.718
Mean Err : 15.584          SD Err : 14.676
Mean Err : 11.308          SD Err : 10.317
Mean Err : 273.934          SD Err : 356.137
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### CHILD PROCESS IS FINISHED ###

--> SIGTERM IS CATCHED <--
gokhan@has: ~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02$ ls
161044067.c 161044067_report_HW02.doc makefile output program
gokhan@has: ~/Desktop/CSE344-SYSTEMS-PROGRAMMING/HW-02$
```

And all files is deleted (input and temp file).
The screenshots were sent in a folder for better review.