

CSE344 HOMEWORK 3

1) PROBLEM SOLUTION

In this assignment, I first check the input files sent by the user while compiling. As in previous assignments, the accuracy of the input given by the user has been checked. For example, if $n \leq 0$, the program is terminated. After the program passes these checks, space is allocated for its parameters with malloc to read the values from the files. After the data in the file is read and a sufficient number of bytes are received, the matrix multiplication begins. 2 pipes are created for each child process and 8 pipes in total. It is used to communicate with each pipe, parent and child process. Since we have 4 child processes, I called 4 fork () functions in total. And I assigned pipes to each of them specially. To give an example from P2, first, a bi-directional pipe was created between the parent process and the child. Then the quarters that need to be sent to the child process are sent. After this step, the data sent by the parent is read using the child process read pipe. And the matrix product is done. The result obtained is sent to the parent with a string (There are spaces between the two values for easy parceling. For example "3456 1231 2131"). The parent process then parses this string and assigns it to C11 in the outputMatrix. These processes are applied in the same way for C12, C21 and C22. When each child process is finished, the SIGCHLD signal is captured by the catcher and counterSIGCHLD is incremented. When all child processes are finished, parent process outputMatrix is written and all singular values of C are written. Then all data with pointers are free. And by calling raise (SIGTERM), the program ends. Also, after reading the data from the input files, the files are closed.

NOTE: I read the input from the file as unsigned char. Also, if both of the given input files are the same, I print an error message and end the program.

2) SAMPLE OUTPUT

inputPathA:

≡ inputPathA

```
1 hbdsvgeqdbjhdsvkdvmbkndfnbljdsfnxcshbdsvgeqdbjhdsvkdvgeqdbjhd
```

InputPathB:

≡ inputPathB

```
1 hbdsvgeqdbjhdsvkdvmbkndfnbljdsfnxcshbdsvgeqdbjhdsvkdvgeqdbjhd
```

Makefile:

M makefile

```
1 target: hw3
```

```
2
```

```
3 ∨ hw3: Program.c
```

```
4 | gcc Program.c -o program -lm
```

```
5 ∨ clean:
```

```
6 | rm hw3
```

```
7
```

Terminal: (./program -i inputPathA -j inputPathB -n 3)

```
gram -i inputPathA -j inputPathB -n 3
```

First Matrix :

```
h b d s v g e q
d b j h d s v k
s d v m b k n d
f n b l j d s f
n x c s d h b d
s v g e q d b j
h d s v k s d v
g e q d b j h d
```

Second Matrix :

```
h b d s v g e q
d b j h d s v k
s d v m b k n d
f n b l j d s f
n x c s d h b d
s v g e q d b j
h d s v k s d v
g e q d b j h d
```

SIGCHILD

SIGCHILD

SIGCHILD

SIGCHILD

-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-

Output Matrix :

Second Matrix :

```
h b d s v g e q
d b j h d s v k
s d v m b k n d
f n b l j d s f
n x c s d h b d
s v g e q d b j
h d s v k s d v
g e q d b j h d
```

SIGCHILD

SIGCHILD

SIGCHILD

SIGCHILD

-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-

Output Matrix :

```
90814 90273 90533 92663 89382 90347 89803 89904
90516 89621 90494 92217 89119 90124 89282 89808
91473 90346 91379 93316 90149 91013 90420 90735
89520 88778 89553 91576 88289 89503 88778 89082
90007 89262 89854 91909 88910 89893 89577 89488
90947 90110 90795 92891 89644 90794 90182 90287
93626 92800 93406 95159 92009 92953 92552 92478
88093 87060 88020 89714 86634 87667 87043 87254
```

-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-

Singular Value Result :

722607.191 642.535 558.621 343.111 196.437 154.341 11.206 66.070

Terminated