CSE 344 System Programming
Homework #2 Report

Firstly I write 2 loops for taking arguments again and again.My first loop takes command line arguments from user with fgets.Then, with strtok parse's command line arguments for every child and find every processes for child's until see any | (pipe).When I get strings with fgets it takes '\n' (enter) character to.So when I want to quit with :q, my commandLineArg takes '\n' character too.So I control '\n' character too for quit with :q properly.Then my second loop, creates child processes count of arguments. I have argumentsize – 1 pipe. In second loop I create my pipes too.I created my pipes with two dimension.Fİrst dimension is count of my pipes.Second dimension is for input and output ends.Then I control pipes for closing input and output ends and duplicating them with STDIN and STDOUT.First pipe and last pipe needs different implementation.Because first pipe does not need read end.And last pipe does not need write end.Middle pipes have both STDIN and STDOUT but in middle pipes I need to close every pipe other then used 2 pipes.End I closed unused ends after making dup() too.Every closing end and dup operation contains print error and exit statements for catching error. Then I run my command with execl() after settings pipes properly.I write every child's pid,argument work time to my timestamp file.I generate a new timestamp file for each execution program.Then at default statement, I close every parent pipe because the wont be used.After all forks, I use waitpid() for waitin all childs to finish it's tasks and don't make any zombie process.For signal handeling, I write sigintHandler and sigtermHandler for catching SIGINT and SIGTERM signal.Preventing them to finishparent process.They only finished child processes.And with this handlers I inform user when any of this signals has arrived.I could not handle SIGKILL signal because when I call it, It stops executing program imediately.It can not be catched.I used valgrind for control memory leaks and it could not find any memory leak.I writed makefile with clean.Looked for any zombi process with ps aux | grep 1.1 is my program name.Could not find any zombie processes.

I tried my program for this inputs:

```
ps aux | grep 1
ls -l | grep "a" | awk '{print $9}'
ls
ls | grep main
sort < myfile.txt
ls -l | grep file | awk '{print $9}' | xargs cat
```

I tried many others but did not seed notice any problem.