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CptS 370  
Program 1 Ideas

First thing I need to do to replicate the commands using system calls is to fork my process multiple times. There needs to be 3 forks to create 3 child processes, child, gchild, ggchild. The ggchild needs to execute the ps -A command, then send its results to the gchild process to execute the grep command with argv[1] as a parameter. Finally the gchild command need to send its results to child to run the wc -l command.

In order to execute these commands I will use execlp() to execute these commands, then I will have to send the executed results to the other processes by using dup2() and pipes. However, because we are sending data between 3 processes we need two pipes, one to connect ggchild and gchild, and the other to connect gchild and child. Then we use dup2() where the first argument is the pipe file descriptor pipe[0] for read pipe[1] for write, and the second argument will be either STDOUT\_FILENO for writes or STDIN\_FILENO for reads. We need to use dup2() once in ggchild to send data, we need to use dup2() twice in gchild to receive data from ggchild and send data to child, and finally we need to use dup2() once in child to receive the data. In addition, each process needs to wait for others in order to correctly execute for example parent waits for child, child waits for gchild, gchild waits for ggchild.

Finally we have to be sure to close all file descriptors so arguments will not continue to look for more arguments.

Sample Outputs:  
Text

Description automatically generated