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# Title: Lab3 - Notes and Observations

# Description: This pdf contains Lab 3 notes/observations and test snapshots


It was interesting to see the use of pipes as inter-process communication for processes to exchange information and essentially execute UNIX style command line pipes within C programs. It took a little for me to understand how dup2() and pipe() work to handle redirection and deal with the upstream and downstream ends of the pipe. Reading through the manuals and following along with the lab was helpful to understand everything a bit better. The usage of write() in Step 2 is something I want to spend some more time with as I am not very familiar with it. The professor helped me better understand how execlp works and how it uses a null pointer as a sentinel to know when there are no more arguments to read. I also included sys/types and sys/ipc libraries for this lab per the prompt instructions (although I believe the professor and TA said these weren't actually necessary).

I noticed when running Step 2 I sometimes get different formatting of the output/print statements. This was especially noticeable when running the program on the CSUMB server compared to my Virtual Machine. After talking with the TA, he helped understand it is most likely again related to I/O buffering and is expected as long as our code matches the prompt. It has been helpful to really dive in and test the code on different machines to get a better grasp on how everything works.


**Test Output Verifications:**

**Step 1:**

```
nickf@nickf:~/cst334/wk3$ ls
lab3step1    lab3step2    lab3step3    Makefile
lab3step1.c  lab3step2.c  lab3step3.c
nickf@nickf:~/cst334/wk3$ ./lab3step1
lab3step1
lab3step1.c
lab3step2
lab3step2.c
lab3step3
lab3step3.c
Makefile
nickf@nickf:~/cst334/wk3$
```

Screenshot of running "ls | more" from the command line to demonstrating Step 1 program is executing the pipe:

```
nickf@nickf:~/cst334/wk3$ ls | more
lab3step1
lab3step1.c
lab3step2
lab3step2.c
lab3step3
lab3step3.c
Makefile
```

**Step 2:**

```
nickf@nickf:~/cst334/wk3$ ./lab3step2

Writer on the upstream end of the pipe -> 1 arguments

Reader on the downstream end of the pipe
. / l a b 3 s t e p 2
nickf@nickf:~/cst334/wk3$
```

**Step 3:**

```
nickf@nickf:~/cst334/wk3$ ./lab3step3
root:x:0:0:root:/root:/bin/bash
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
nickf@nickf:~/cst334/wk3$
```

Screenshot of the running "cat /etc/passwd | grep root" from the command line demonstrating Step 3 program is executing the pipe:

```
nickf@nickf:~/cst334/wk3$ cat /etc/passwd | grep root
root:x:0:0:root:/root:/bin/bash
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
nickf@nickf:~/cst334/wk3$
```