Operating System HW1 Programming Documentation

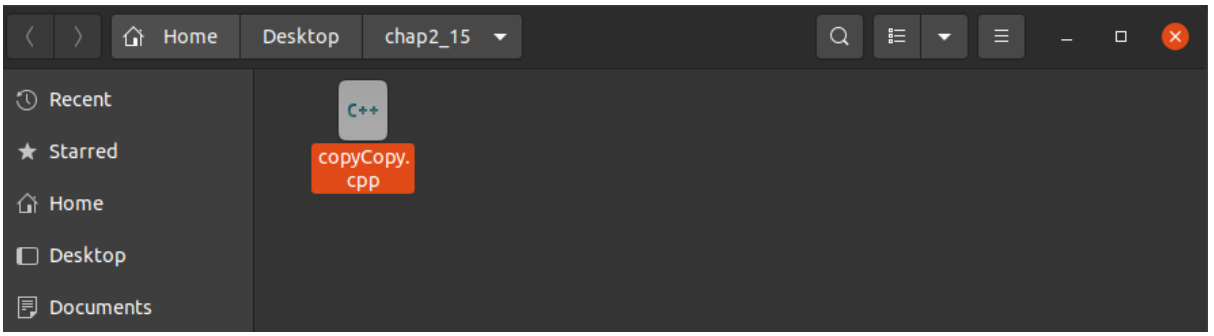
鄭琳玲, 資工三, 108590056

I. General Settings

- Operating System: Linux
- IDE: Atom
- Terminal: platformio-ide-terminal
    - To install terminal:
        - File -> Settings
        - Click "+" (install)
        - Search for a terminal package called "platformio-ide-terminal"
        - Click "install".
        - Press “Control + ‘ “ to toggle the terminal

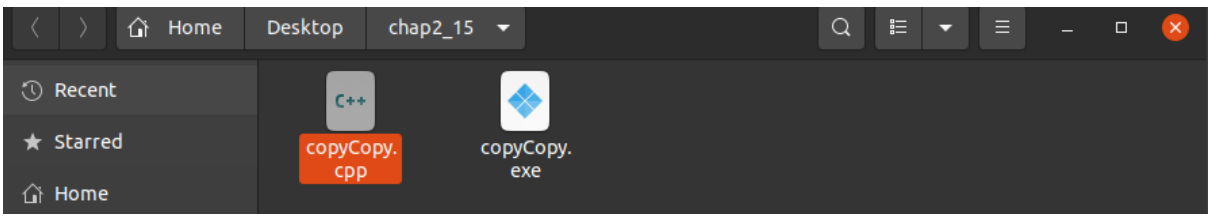
II. Chapter 2.15

1. Go to the Chap2_15 folder and open the terminal on the folder or open the copyCopy.cpp file using Atom and open the terminal there.



2. Enter `g++ -g copyCopy.cpp -o copyCopy.exe` to generate an .exe file if it doesn’t exist in the folder. If an .exe exists, enter `./copyCopy.exe` to run the program.

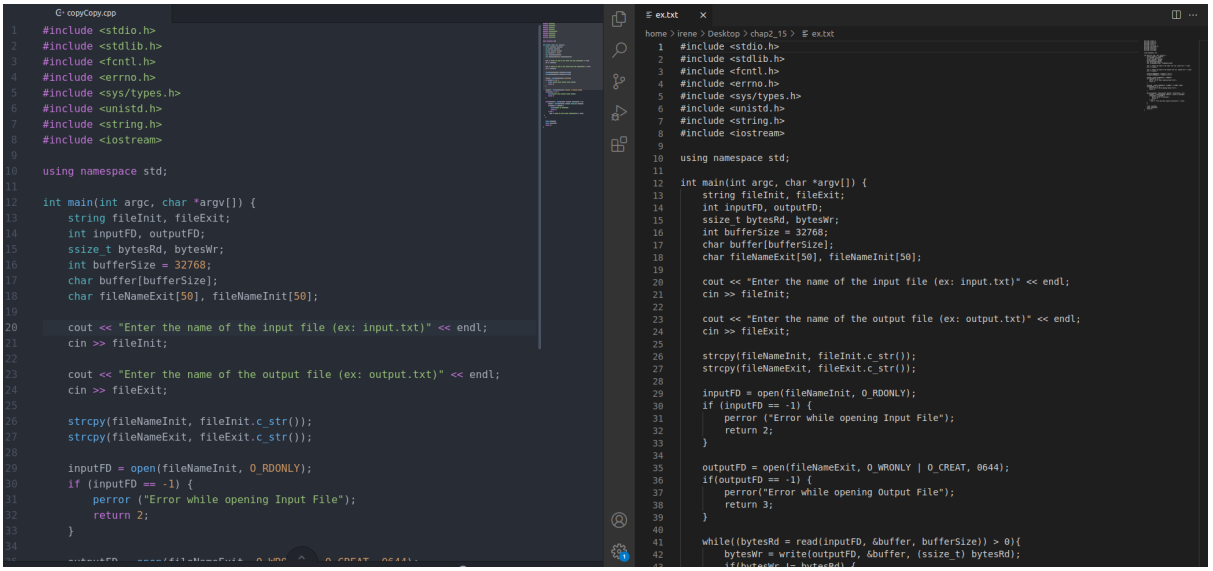
```
irene@ubuntu:~/Desktop/chap2_15$ g++ -g copyCopy.cpp -o copyCopy.exe
```



3. Then type in the file name you wanted to copy. If the file exists, the program will ask you to enter the name of the output file.

```
irene@ubuntu:~/Desktop/chap2_15$ ./copyCopy.exe
Enter the name of the input file (ex: input.txt)
copyCopy.cpp
Enter the name of the output file (ex: output.txt)
ex.txt
File has been copied successfully
```

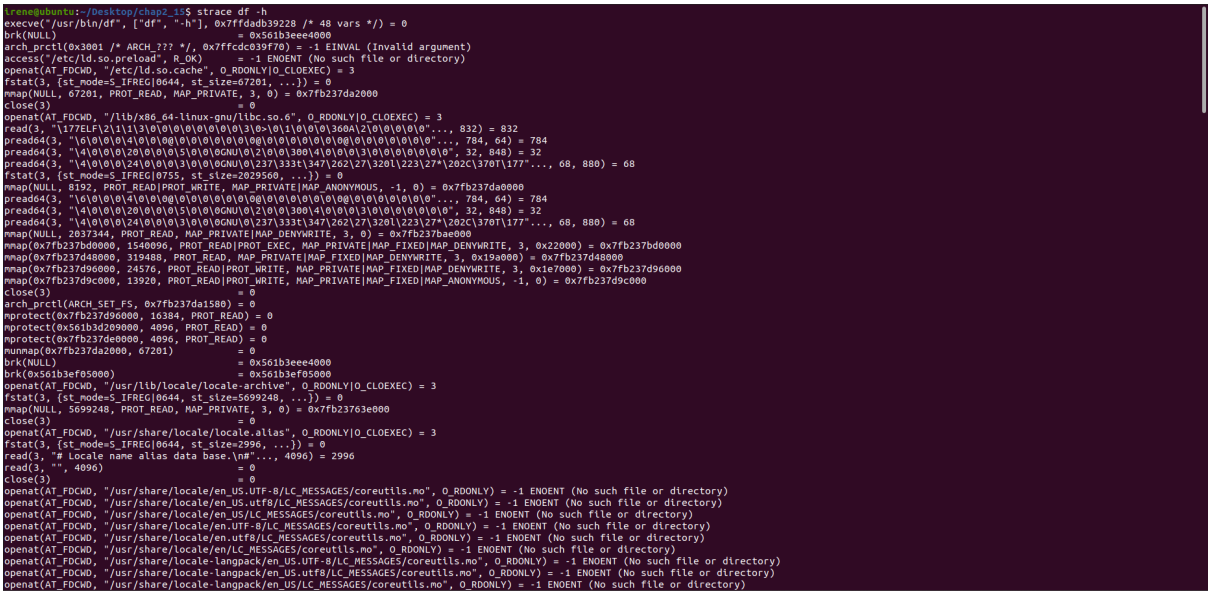
Result:



If the files source file didn't exist:

```
irene@ubuntu:~/Desktop/chap2_15$ ./copyCopy.exe
Enter the name of the input file (ex: input.txt)
a.c
Enter the name of the output file (ex: output.txt)
fl.txt
Error while opening Input File: No such file or directory
```

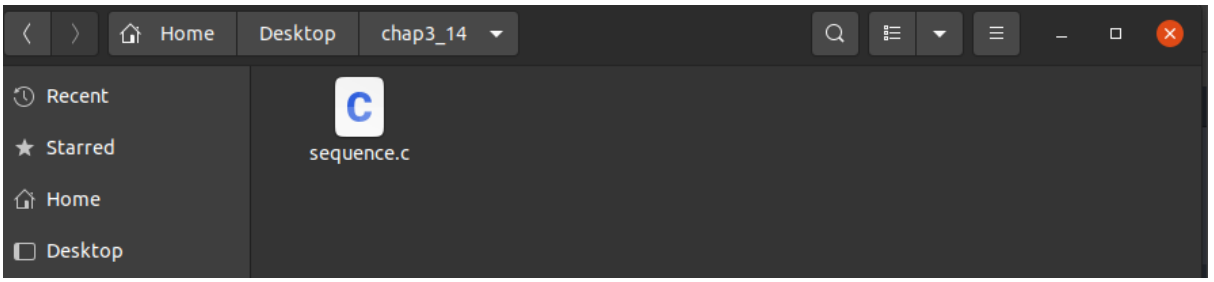
4. Trace result: (Command: `strace df -h`)



```
irene@ubuntu:~/Desktop/chap2_15$ strace df -h
execve("/usr/bin/df", ["df", "-h"], 0x7ffdadb39228 /* 48 vars */) = 0
brk(NULL)                               = 0x561b3eee4000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffcdc039f70) = -1 EINVAL (Invalid argument)
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=67201, ...}) = 0
mmap(NULL, 67201, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fb237da2000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360A\2\0\0\0\0\0"..., 832) = 832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\237\333t\347\262\27\320l\223\27*\202C\370T\177"..., 68, 880) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=2029560, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fb237da0000
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\237\333t\347\262\27\320l\223\27*\202C\370T\177"..., 68, 880) = 68
mmap(NULL, 2037344, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fb237bae000
mmap(0x7fb237bd0000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x22000) = 0x7fb237bd0000
mmap(0x7fb237d48000, 319488, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x19a000) = 0x7fb237d48000
mmap(0x7fb237d96000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7fb237d96000
mmap(0x7fb237d9c000, 13920, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7fb237d9c000
close(3)                                = 0
arch_prctl(ARCH_SET_FS, 0x7fb237da1580) = 0
mprotect(0x7fb237d96000, 16384, PROT_READ) = 0
mprotect(0x561b3d209000, 4096, PROT_READ) = 0
mprotect(0x7fb237de0000, 4096, PROT_READ) = 0
munmap(0x7fb237da2000, 67201)           = 0
brk(NULL)                               = 0x561b3eee4000
brk(0x561b3ef05000)                     = 0x561b3ef05000
openat(AT_FDCWD, "/usr/lib/locale/locale-archive", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=5699248, ...}) = 0
mmap(NULL, 5699248, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fb23763e000
close(3)                                = 0
openat(AT_FDCWD, "/usr/share/locale/locale.alias", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=2996, ...}) = 0
read(3, "# Locale name alias data base.\n#"..., 4096) = 2996
read(3, "", 4096)                       = 0
close(3)                                = 0
openat(AT_FDCWD, "/usr/share/locale/en_US.UTF-8/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/usr/share/locale/en_US.utf8/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/usr/share/locale/en_US/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/usr/share/locale/en.UTF-8/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/usr/share/locale/en.utf8/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/usr/share/locale/en/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/usr/share/locale-langpack/en_US.UTF-8/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/usr/share/locale-langpack/en_US.utf8/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/usr/share/locale-langpack/en_US/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
```

III. Chapter 3.14

1. Go to the Chap3_14 folder and open the terminal on the folder or open the sequence.c file using Atom and open the terminal there.



2. Enter `g++ -g sequence.c -o sequence.exe` to generate an .exe file if it doesn't exist in the folder. If an .exe exists, enter `./sequence.exe 35` to run the program.

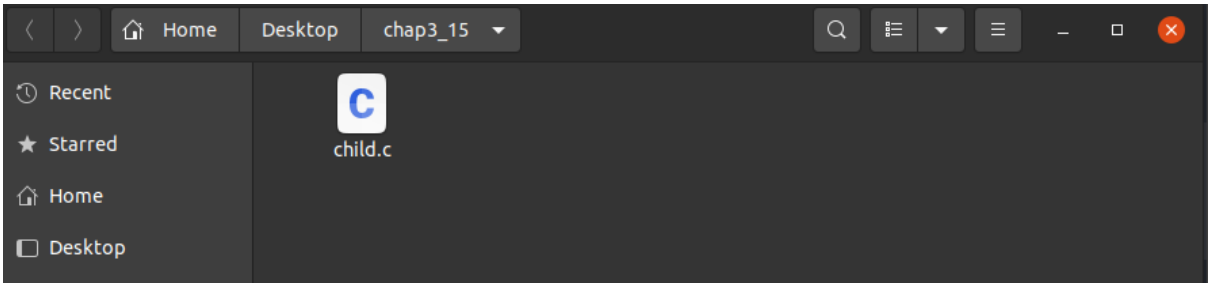
```
irene@ubuntu:~/Desktop/chap3_14$ g++ -g sequence.c -o sequence.exe
irene@ubuntu:~/Desktop/chap3_14$ ./sequence.exe 35
```

3. Result:

```
irene@ubuntu:~/Desktop/chap3_14$ ./sequence.exe 35
35, 106, 53, 160, 80, 40, 20, 10, 5, 16, 8, 4, 2, 1
```

IV. Chapter 3.15

1. Go to the Chap3_15 folder and open the terminal on the folder or open the sequence.c file using Atom and open the terminal there.



2. Enter `gcc -o child.o child.c -lrt` to generate an .o file if it doesn't exist in the folder. If an .o exists, enter `./child.o 24` to run the program.

```
irene@ubuntu:~/Desktop/chap3_15$ gcc -o child.o child.c -lrt
irene@ubuntu:~/Desktop/chap3_15$ ./child.o 24
```

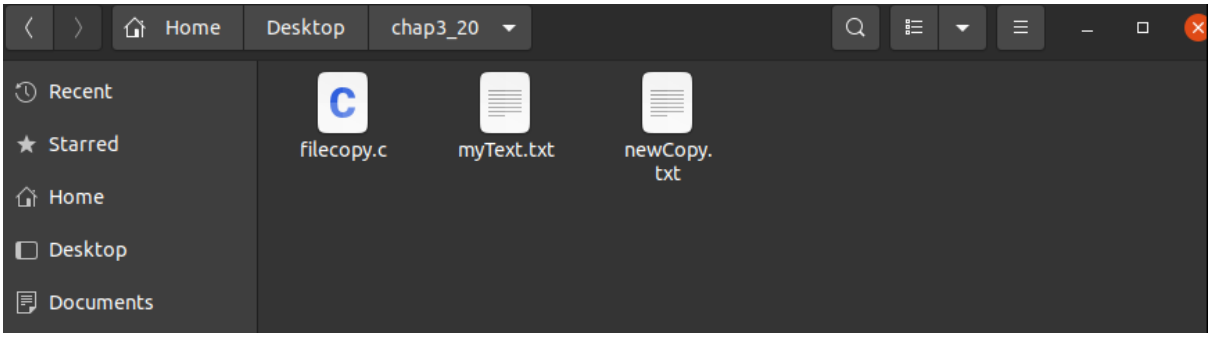
3. Result:

```
irene@ubuntu:~/Desktop/chap3_15$ ./child.o 24
The data to shared memory has been written.
Reading the shared memory
24,12,6,3,10,5,16,8,4,2,1
```

```
irene@ubuntu:~/Desktop/chap3_15$ strace df -h
execve("/usr/bin/df", ["df", "-h"], 0x7ffdae8e3da8 /* 48 vars */) = 0
brk(NULL)                               = 0x556b2026f000
arch_prctl(0x3001 /* ARCH_??? */, 0x7fffa6bea360) = -1 EINVAL (Invalid argument)
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=67201, ...}) = 0
mmap(NULL, 67201, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7faf75b5f000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360A\2\0\0\0\0"..., 832) = 832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\237\333t\347\262\27\320l\223\27*\202C\370T\177"..., 68,
880) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=2029560, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7faf75b5d000
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\237\333t\347\262\27\320l\223\27*\202C\370T\177"..., 68,
880) = 68
mmap(NULL, 2037344, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7faf7596b000
mmap(0x7faf7598d000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x22000)
 = 0x7faf7598d000
mmap(0x7faf75b05000, 319488, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x19a000) = 0x7faf7
5b05000
mmap(0x7faf75b53000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000)
 = 0x7faf75b53000
mmap(0x7faf75b59000, 13920, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7
faf75b59000
close(3)                                = 0
arch_prctl(ARCH_SET_FS, 0x7faf75b5e580) = 0
mprotect(0x7faf75b53000, 16384, PROT_READ) = 0
mprotect(0x556b1e575000, 4096, PROT_READ) = 0
mprotect(0x7faf75b9d000, 4096, PROT_READ) = 0
munmap(0x7faf75b5f000, 67201)           = 0
brk(NULL)                               = 0x556b2026f000
brk(0x556b20290000)                     = 0x556b20290000
openat(AT_FDCWD, "/usr/lib/locale/locale-archive", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=5699248, ...}) = 0
mmap(NULL, 5699248, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7faf753fb000
close(3)                                = 0
openat(AT_FDCWD, "/usr/share/locale/locale.alias", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=2996, ...}) = 0
read(3, "# Locale name alias data base.\n#"..., 4096) = 2996
read(3, "", 4096)                       = 0
close(3)                                = 0
openat(AT_FDCWD, "/usr/share/locale/en_US.UTF-8/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (N
o such file or directory)
```

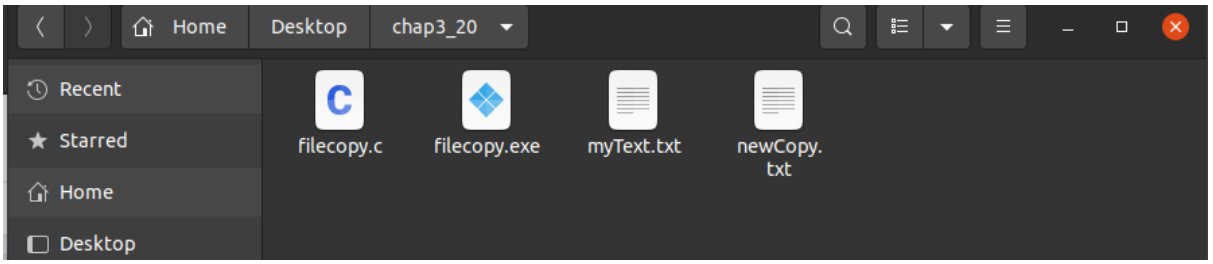
V. Chapter 3.20

1. Go to the Chap3_20 folder and open the terminal on the folder or open the openfile.c file using Atom and open the terminal there.
2. Please generate a source file and a destination .txt before running the program.



3. Enter `gcc -o filecopy.exe filecopy.c` to generate an .exe file if it doesn't exist in the folder. If an .exe exists, enter `ls -l` to run the program.

```
irene@ubuntu:~/Desktop/chap3_20$ gcc -o filecopy.exe filecopy.c
irene@ubuntu:~/Desktop/chap3_20$ ls -l
total 28
-rw-rw-r-- 1 irene irene  1243 Mar 26 06:41 filecopy.c
-rwxrwxr-x 1 irene irene 17192 Mar 26 07:05 filecopy.exe
-rw-rw-r-- 1 irene irene    45 Mar 26 06:47 myText.txt
-rw-rw-r-- 1 irene irene     0 Mar 26 07:05 newCopy.txt
```



4. Then enter `cat myText.txt` to choose the source file.

```
irene@ubuntu:~/Desktop/chap3_20$ cat myText.txt
This is a test file. I want it to be copied.
```

5. Then enter `./filecopy.exe myText.txt newCopy.txt` and `cat newCopy.txt` to paste the content of the source file to the destination file.

```
irene@ubuntu:~/Desktop/chap3_20$ ./filecopy.exe myText.txt newCopy.txt
irene@ubuntu:~/Desktop/chap3_20$ cat newCopy.txt
This is a test file. I want it to be copied.
```