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CS3224  
HW2

Written Portion:

1) What are the system call names for getting the process' userID, opening a file, closing a file, reading a file and writing a file?

Getting userID: `getuid/geteuid`. Opening a file: `open/openat/creat`. Closing a file: `close`. Reading a file: `read/pread/preadv/readv`. Writing to a file: `write/pwrite/prwritev/writev`.

2) How many system calls are (i.e. the count) involved with opening a file, closing a file, reading a file and writing a file? (count each individually. You may either use strace options to aid you in doing so, or you may use grep).

4 syscalls for opening a file.

4 syscalls for closing a file.

3 syscalls for reading a file.

2 for writing to a file.

But, strace showed that our code only made 2 opening, 2 closing, 2 reading, and 2 writing syscalls. The other syscalls were made before the mycopy program was executed.

(My strace output screenshots are below)

[illegible]

```

jefferson@jefferson-VMware-Virtual-Platform:~/Desktop/hw1/hw2$ strace -c ./mycopy input.txt output.txt
% time    seconds  usecs/call   calls   errors syscall
-----
34.95    0.000332      332      1      0   execve
18.63    0.000177       44      4      0   close
16.84    0.000160       20      8      0   mmap
12.00    0.000114       28      4      0   openat
 7.68    0.000073       36      2      0   write
 2.42    0.000023        7      3      0   mprotect
 1.68    0.000016        5      3      0   read
 1.26    0.000012       12      1      0   munmap
 1.05    0.000010        5      2      0   fstat
 0.84    0.000008        4      2      0   pread64
 0.63    0.000006        6      1      0   1 access
 0.32    0.000003        3      1      0   brk
 0.32    0.000003        3      1      0   getuid
 0.32    0.000003        3      1      0   arch_prctl
 0.32    0.000003        3      1      0   set_robust_list
 0.32    0.000003        3      1      0   prlimit64
 0.21    0.000002        2      1      0   set_tid_address
 0.21    0.000002        2      1      0   rseq
-----
100.00    0.000950       25      38      1 total
jefferson@jefferson-VMware-Virtual-Platform:~/Desktop/hw1/hw2$

```

3) What was the value of the file descriptor of your read file? Should we expect it to change if you change the order of opening the input and output files?

The value of the file descriptor of my read file, input.txt, was 3, as shown below in my strace output.

```

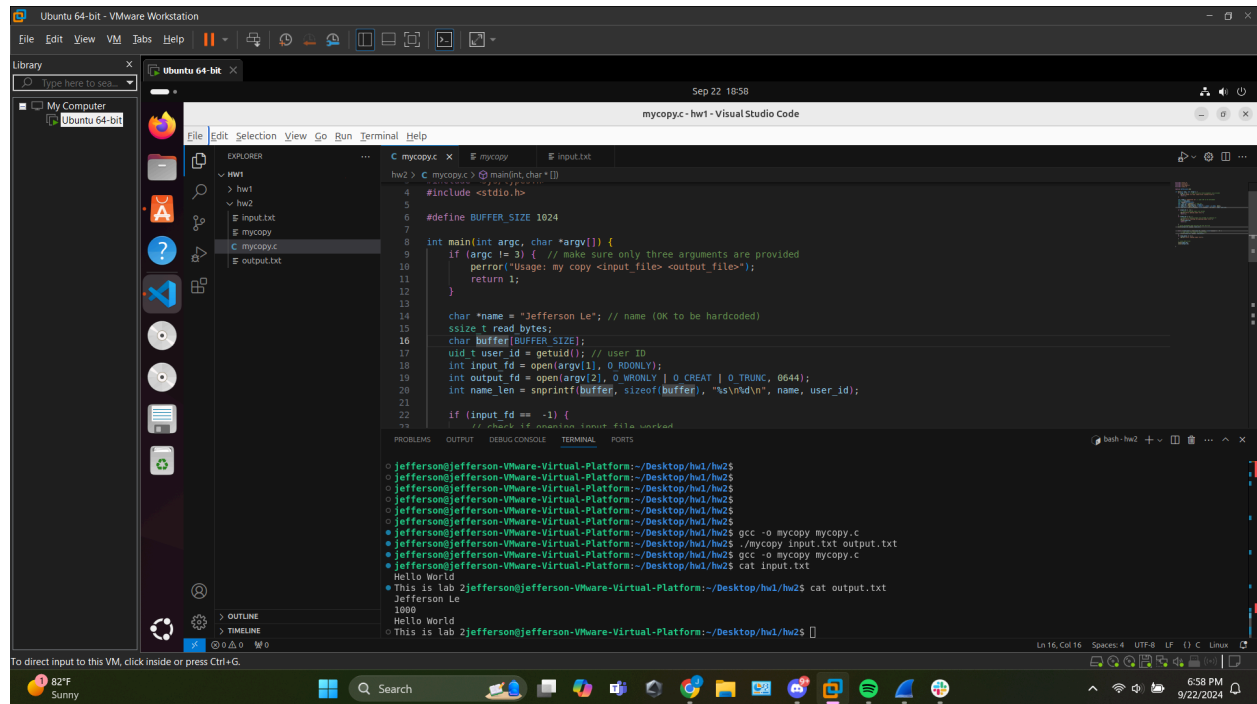
openat(AT_FDCWD, "input.txt", 0_RDONLY) = 3
openat(AT_FDCWD, "output.txt", 0_WRONLY|0_CREAT|0_TRUNC, 0644) = 4

```

If we change the order of opening the input and output files, it would change. You can also see in the strace output that output.txt's file descriptor is 4. If we were to switch the order of opening the input and output files, input.txt would have a descriptor of 4, and output.txt would have a descriptor of 3.

4) What was the value of the file descriptor of your write file? Should we expect it to change if you change the order of opening the input and output files?

4, using the same strace output in question 3. Yes, it would change in the way described in question 3, but reversed. So, if we were to switch the order of opening the input and output files, input.txt would have a descriptor of 4, and output.txt would have a descriptor of 3.



Here is a screenshot of my directory, code, and the program being run with output.