

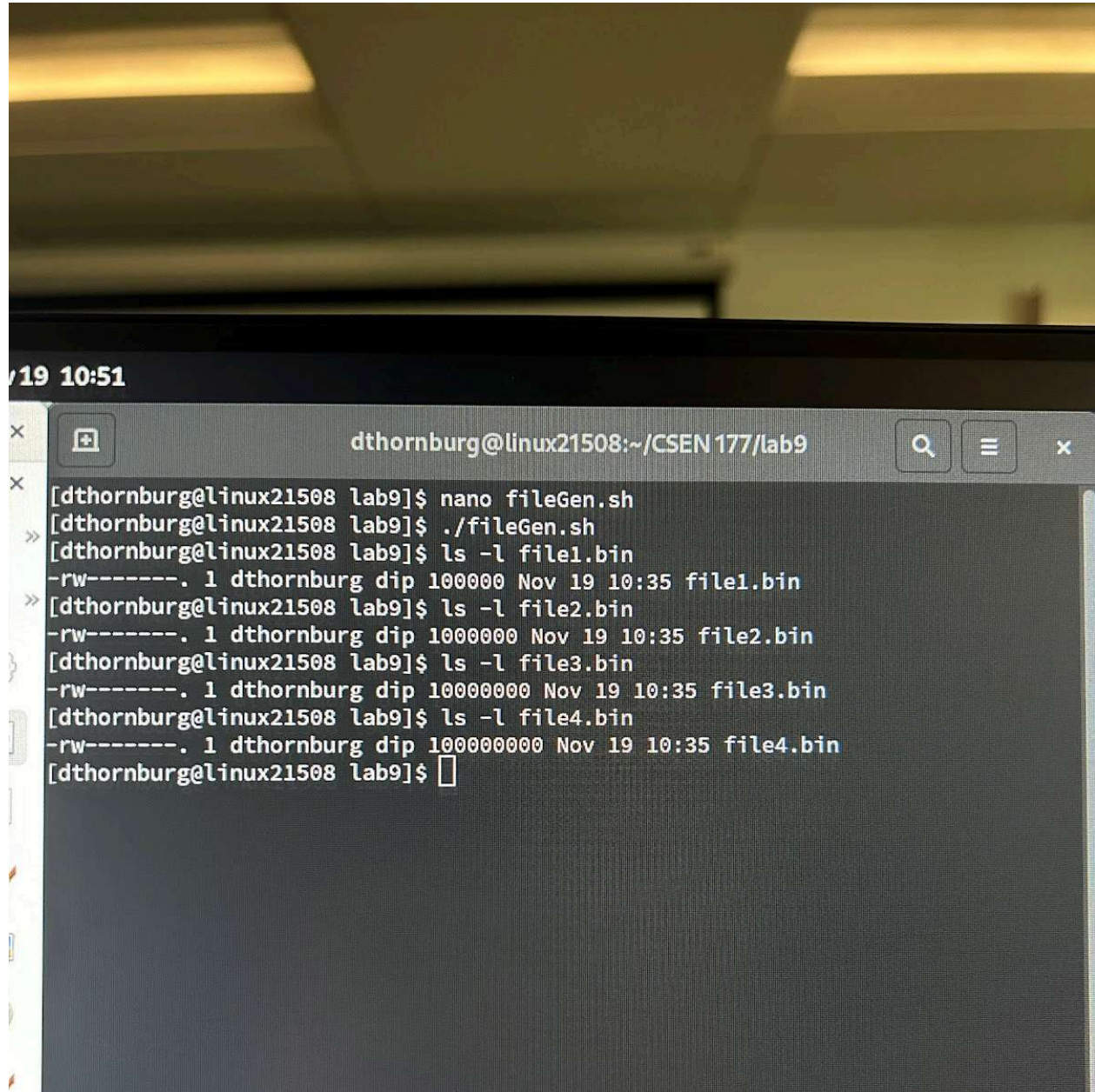
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Date: 11/19/2024

Lab 9 - File Performance Measurement

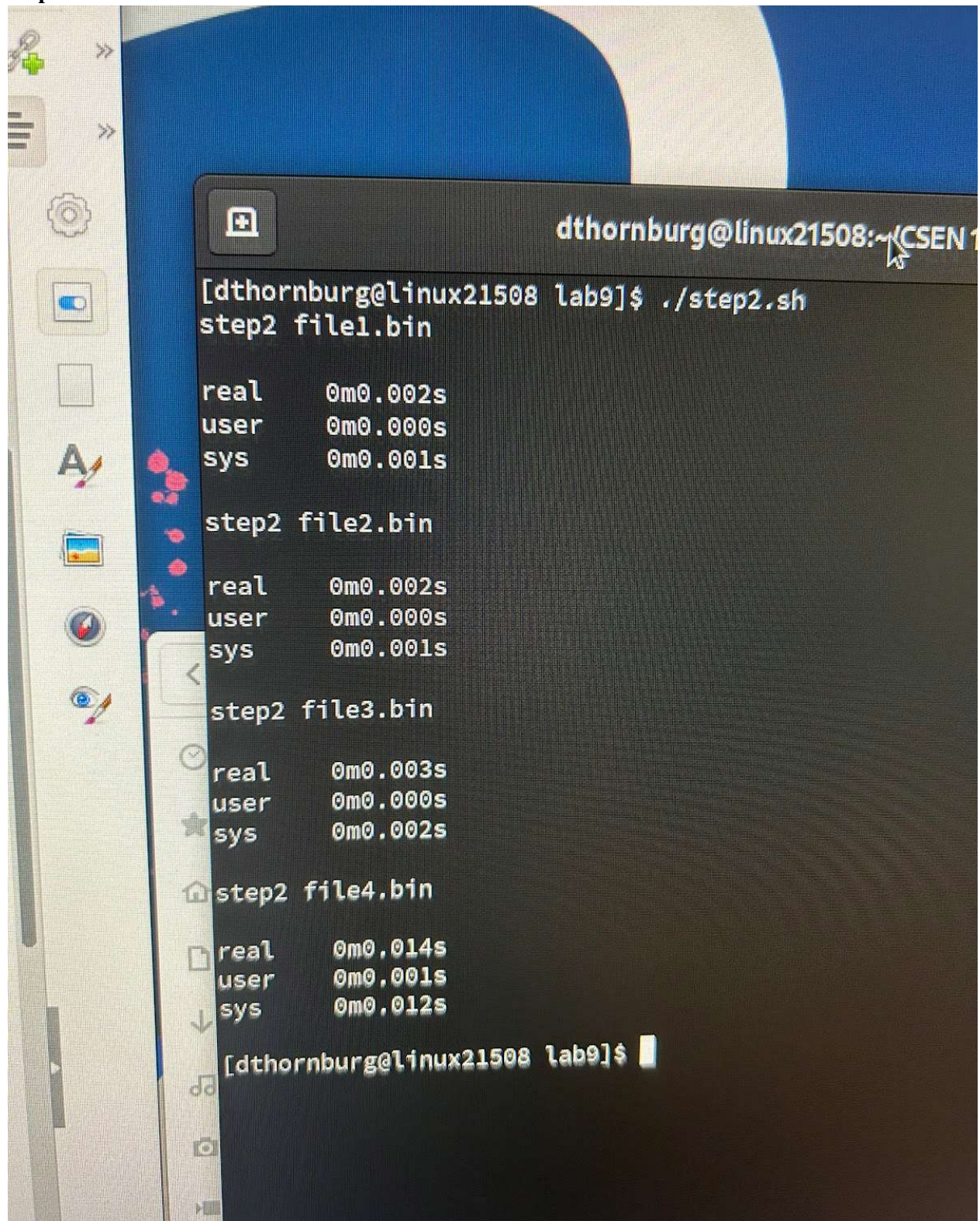
Description: We will see how long it takes for files of various sizes to be read, copied, and written.

Step 1:



```
Nov 19 10:51
dthornburg@linux21508:~/CSEN 177/lab9
[dthornburg@linux21508 lab9]$ nano fileGen.sh
[dthornburg@linux21508 lab9]$ ./fileGen.sh
[dthornburg@linux21508 lab9]$ ls -l file1.bin
-rw-----. 1 dthornburg dip 100000 Nov 19 10:35 file1.bin
[dthornburg@linux21508 lab9]$ ls -l file2.bin
-rw-----. 1 dthornburg dip 1000000 Nov 19 10:35 file2.bin
[dthornburg@linux21508 lab9]$ ls -l file3.bin
-rw-----. 1 dthornburg dip 10000000 Nov 19 10:35 file3.bin
[dthornburg@linux21508 lab9]$ ls -l file4.bin
-rw-----. 1 dthornburg dip 100000000 Nov 19 10:35 file4.bin
[dthornburg@linux21508 lab9]$
```


Step 2:



A terminal window titled 'dthornburg@linux21508:~[CSEN 1' is shown. The user has executed the command `./step2.sh` in the directory `lab9`. The script processes four files: `file1.bin`, `file2.bin`, `file3.bin`, and `file4.bin`. For each file, it reports three timing metrics: `real`, `user`, and `sys` time in seconds. The timing for `file3.bin` is slightly longer than the others, and `file4.bin` shows a more significant delay in the `real` time.

```
dthornburg@linux21508 lab9]$ ./step2.sh
step2 file1.bin

real    0m0.002s
user    0m0.000s
sys     0m0.001s

step2 file2.bin

real    0m0.002s
user    0m0.000s
sys     0m0.001s

step2 file3.bin

real    0m0.003s
user    0m0.000s
sys     0m0.002s

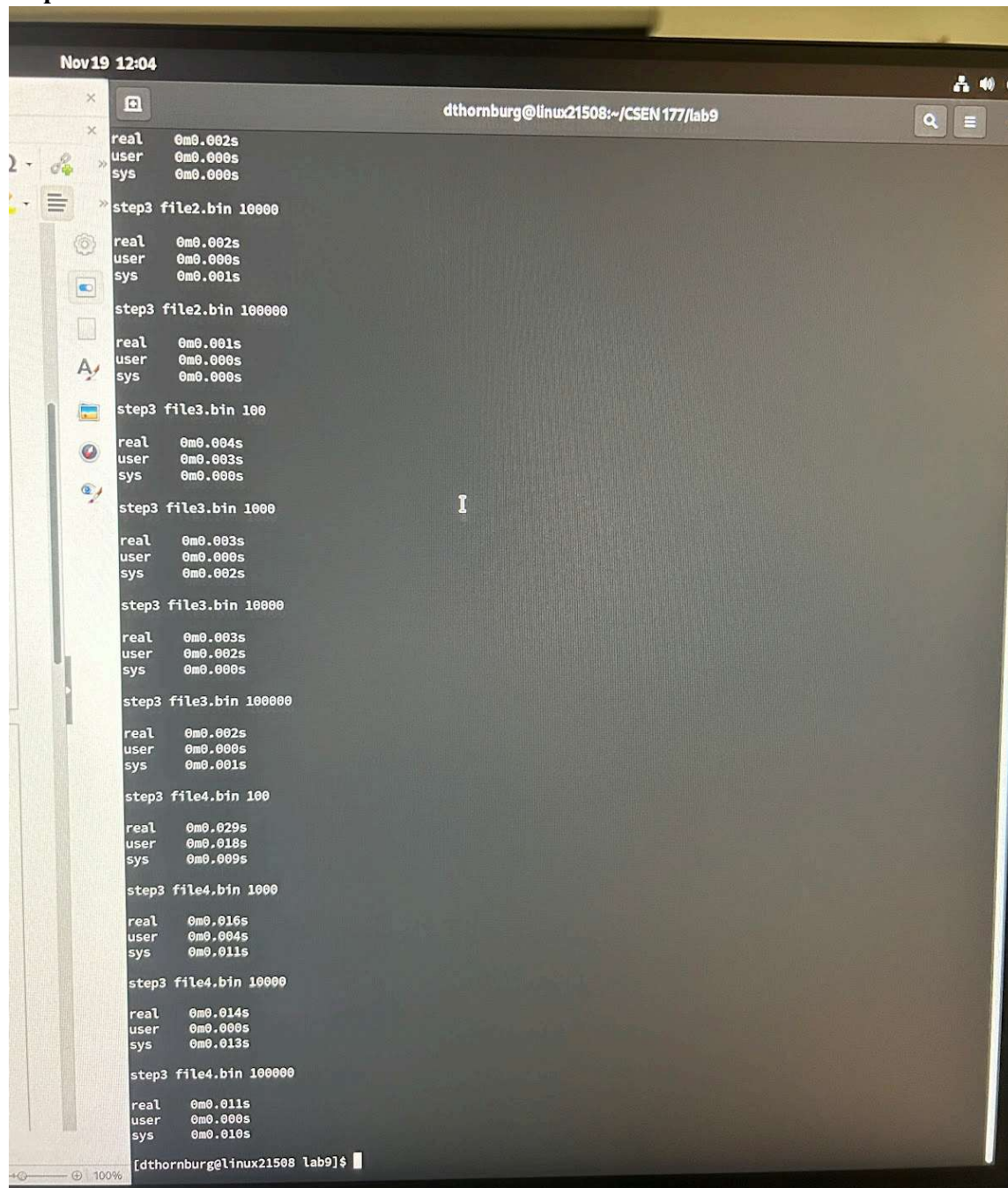
step2 file4.bin

real    0m0.014s
user    0m0.001s
sys     0m0.012s

[dthornburg@linux21508 lab9]$
```

The time it takes to finish the file is slightly longer for the third file but still negligible. The last file with size 100000000 is where we finally see the delay in reading the whole thing.

Step 3:



The image shows a terminal window titled "dthornburg@linux21508:~/CSEN 177/lab9" with a timestamp of "Nov19 12:04". The terminal displays benchmark results for various file sizes and steps. The results are organized into groups, each starting with a step number and file name, followed by real, user, and sys time measurements.

```
Nov19 12:04
dthornburg@linux21508:~/CSEN 177/lab9

real    0m0.002s
user    0m0.000s
sys     0m0.000s

step3 file2.bin 10000
real    0m0.002s
user    0m0.000s
sys     0m0.001s

step3 file2.bin 100000
real    0m0.001s
user    0m0.000s
sys     0m0.000s

step3 file3.bin 100
real    0m0.004s
user    0m0.003s
sys     0m0.000s

step3 file3.bin 1000
real    0m0.003s
user    0m0.000s
sys     0m0.002s

step3 file3.bin 10000
real    0m0.003s
user    0m0.002s
sys     0m0.000s

step3 file3.bin 100000
real    0m0.002s
user    0m0.000s
sys     0m0.001s

step3 file4.bin 100
real    0m0.029s
user    0m0.018s
sys     0m0.009s

step3 file4.bin 1000
real    0m0.016s
user    0m0.004s
sys     0m0.011s

step3 file4.bin 10000
real    0m0.014s
user    0m0.000s
sys     0m0.013s

step3 file4.bin 100000
real    0m0.011s
user    0m0.000s
sys     0m0.010s

[dthornburg@linux21508 lab9]$
```

```
Nov 19 12:04
dthornburg@linux21508:~/CSEN177/lab9
[dthornburg@linux21508 lab9]$ ./step3.sh
step3 file1.bin 100
real    0m0.003s
user    0m0.001s
sys     0m0.000s

step3 file1.bin 1000
real    0m0.002s
user    0m0.001s
sys     0m0.000s

step3 file1.bin 10000
real    0m0.001s
user    0m0.000s
sys     0m0.000s

step3 file1.bin 100000
real    0m0.001s
user    0m0.000s
sys     0m0.000s

step3 file2.bin 100
real    0m0.002s
user    0m0.001s
sys     0m0.000s

step3 file2.bin 1000
real    0m0.002s
user    0m0.000s
sys     0m0.000s

step3 file2.bin 10000
real    0m0.002s
user    0m0.000s
sys     0m0.001s

step3 file2.bin 100000
real    0m0.001s
user    0m0.000s
sys     0m0.000s

step3 file3.bin 100
real    0m0.004s
user    0m0.003s
sys     0m0.000s

step3 file3.bin 1000
real    0m0.003s
user    0m0.000s
sys     0m0.002s

step3 file3.bin 10000
real    0m0.003s
user    0m0.002s
sys     0m0.000s
```

As the buffer size gets larger or the file length gets smaller, the time it takes to go through the file decreases.

Step 4:

```
Nov 19 12:20
dthornburg@linux21508:~/CSEN 177/lab9

real    0m0.027s
user    0m0.000s
sys     0m0.002s

>> step4 file2.bin 10000

real    0m0.026s
user    0m0.001s
sys     0m0.000s

step4 file2.bin 100000

real    0m0.027s
user    0m0.000s
sys     0m0.002s

step4 file3.bin 100

real    0m0.136s
user    0m0.003s
sys     0m0.006s

step4 file3.bin 1000

real    0m0.137s
user    0m0.001s
sys     0m0.021s

step4 file3.bin 10000

real    0m0.131s
user    0m0.001s
sys     0m0.009s

step4 file3.bin 100000

real    0m0.141s
user    0m0.001s
sys     0m0.017s

step4 file4.bin 100

real    0m1.083s
user    0m0.032s
sys     0m0.058s

step4 file4.bin 1000

real    0m1.138s
user    0m0.014s
sys     0m0.043s

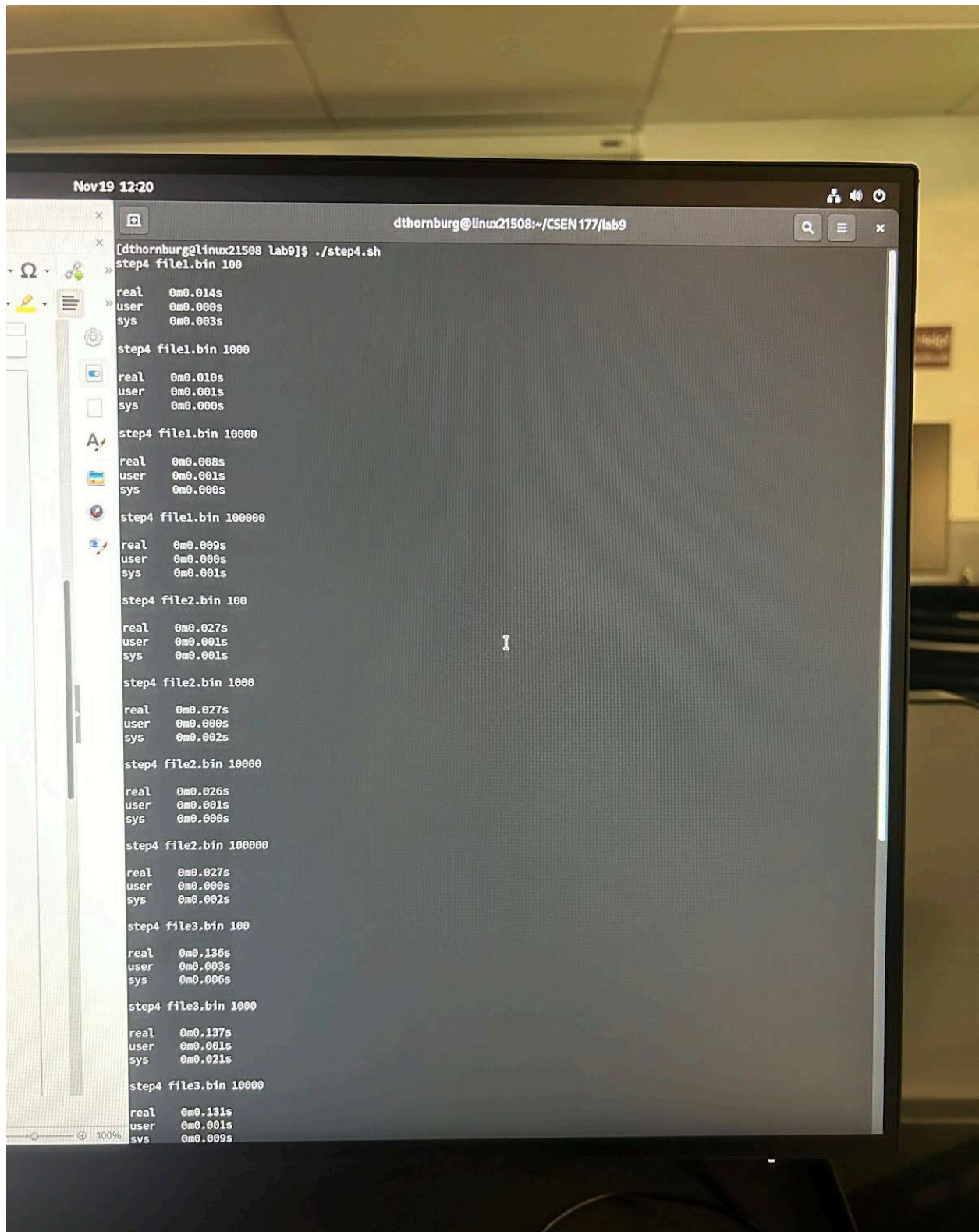
step4 file4.bin 10000

real    0m1.112s
user    0m0.006s
sys     0m0.053s

step4 file4.bin 100000

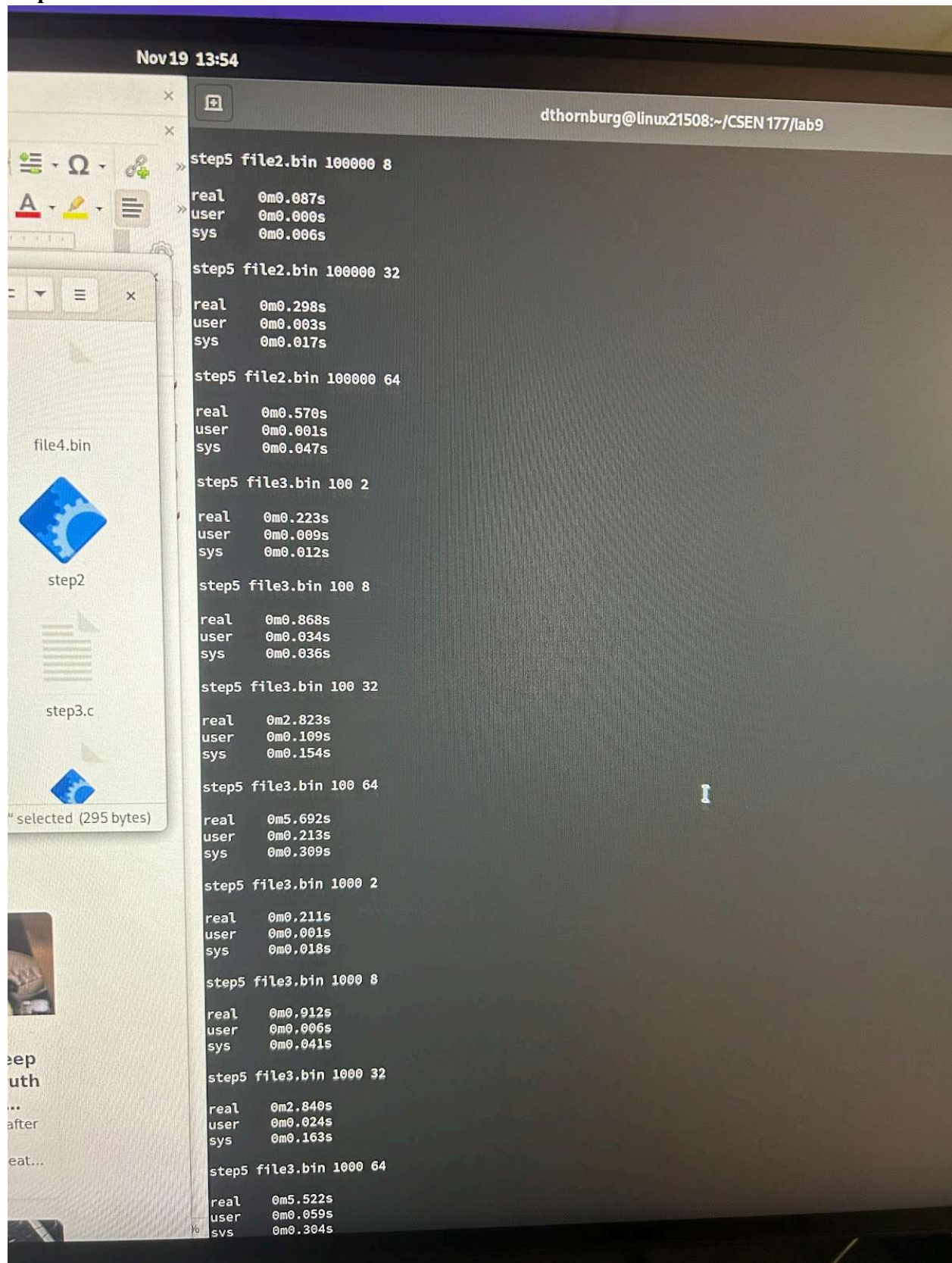
real    0m1.109s
user    0m0.001s
sys     0m0.059s

[dthornburg@linux21508 lab9]$
```

The speed benefits we once saw from bigger buffer sizes now aren't really present due to the writes. Having a smaller overall file still increases speed though.

Step 5:



```
Nov 19 13:54
dthornburg@linux21508:~/CSEN 177/lab9

step5 file2.bin 100000 8
real    0m0.087s
user    0m0.000s
sys     0m0.006s

step5 file2.bin 100000 32
real    0m0.298s
user    0m0.003s
sys     0m0.017s

step5 file2.bin 100000 64
real    0m0.570s
user    0m0.001s
sys     0m0.047s

step5 file3.bin 100 2
real    0m0.223s
user    0m0.009s
sys     0m0.012s

step5 file3.bin 100 8
real    0m0.868s
user    0m0.034s
sys     0m0.036s

step5 file3.bin 100 32
real    0m2.823s
user    0m0.109s
sys     0m0.154s

step5 file3.bin 100 64
real    0m5.692s
user    0m0.213s
sys     0m0.309s

step5 file3.bin 1000 2
real    0m0.211s
user    0m0.001s
sys     0m0.018s

step5 file3.bin 1000 8
real    0m0.912s
user    0m0.006s
sys     0m0.041s

step5 file3.bin 1000 32
real    0m2.840s
user    0m0.024s
sys     0m0.163s

step5 file3.bin 1000 64
real    0m5.522s
user    0m0.059s
sys     0m0.304s
```


Nov19 13:54

dthornburg@linux21508:~/CSEN 177/lab9

step5 file1.bin 10000 8

real 0m0.041s
user 0m0.000s
sys 0m0.003s

step5 file1.bin 10000 32

real 0m0.142s
user 0m0.001s
sys 0m0.014s

step5 file1.bin 10000 64

real 0m0.278s
user 0m0.003s
sys 0m0.018s

step5 file1.bin 100000 2

real 0m0.015s
user 0m0.000s
sys 0m0.003s

step5 file1.bin 100000 8

real 0m0.035s
user 0m0.000s
sys 0m0.003s

step5 file1.bin 100000 32

real 0m0.138s
user 0m0.000s
sys 0m0.010s

step5 file1.bin 100000 64

real 0m0.300s
user 0m0.006s
sys 0m0.025s

step5 file2.bin 100 2

real 0m0.038s
user 0m0.002s
sys 0m0.003s

step5 file2.bin 100 8

real 0m0.087s
user 0m0.007s
sys 0m0.002s

step5 file2.bin 100 32

real 0m0.297s
user 0m0.012s
sys 0m0.020s

step5 file2.bin 100 64

real 0m0.570s
user 0m0.022s
sys 0m0.042s

file4.bin



step2



step3.c



selected (295 bytes)

ep

uth

..

after

eat...

Nov19 13:54

dthornburg@linux21508:~/CSEN 177/lab9

```
real 0m2.840s
user 0m0.024s
sys 0m0.163s
```

```
step5 file3.bin 1000 64
```

```
real 0m5.522s
user 0m0.059s
sys 0m0.304s
```

```
step5 file3.bin 10000 2
```

```
real 0m0.207s
user 0m0.004s
sys 0m0.017s
```

```
step5 file3.bin 10000 8
```

```
real 0m0.737s
user 0m0.003s
sys 0m0.041s
```

```
step5 file3.bin 10000 32
```

```
real 0m2.789s
user 0m0.020s
sys 0m0.159s
```

```
step5 file3.bin 10000 64
```

```
real 0m5.523s
user 0m0.025s
sys 0m0.315s
```

```
step5 file3.bin 100000 2
```

```
real 0m0.218s
user 0m0.001s
sys 0m0.017s
```

```
step5 file3.bin 100000 8
```

```
real 0m0.944s
user 0m0.001s
sys 0m0.036s
```

```
step5 file3.bin 100000 32
```

```
real 0m2.940s
user 0m0.005s
sys 0m0.139s
```

```
step5 file3.bin 100000 64
```

```
real 0m5.516s
user 0m0.008s
sys 0m0.273s
```

```
step5 file4.bin 100 2
```

```
real 0m2.068s
user 0m0.071s
sys 0m0.096s
```

```
step5 file4.bin 100 8
```

file4.bin



step2



step3.c



h" selected (295 bytes)



leep
ruth
l...
after
eat...

Nov 19 13:54

dthornburg@linux21508:~/CSEN 177/lab9

```
sys      0m0.270s
> [dthornburg@linux21508 lab9]$ ./step5.sh
step5 file1.bin 100 2
```

```
> real    0m0.015s
user      0m0.001s
sys       0m0.001s
```

```
step5 file1.bin 100 8
```

```
real      0m0.040s
user      0m0.002s
sys       0m0.002s
```

```
step5 file1.bin 100 32
```

```
real      0m0.144s
user      0m0.003s
sys       0m0.013s
```

```
step5 file1.bin 100 64
```

```
real      0m0.280s
user      0m0.007s
sys       0m0.011s
```

```
step5 file1.bin 1000 2
```

```
real      0m0.012s
user      0m0.001s
sys       0m0.000s
```

```
step5 file1.bin 1000 8
```

```
real      0m0.039s
user      0m0.001s
sys       0m0.002s
```

```
step5 file1.bin 1000 32
```

```
real      0m0.149s
user      0m0.001s
sys       0m0.008s
```

```
step5 file1.bin 1000 64
```

```
real      0m0.278s
user      0m0.001s
sys       0m0.015s
```

```
step5 file1.bin 10000 2
```

```
real      0m0.014s
user      0m0.003s
sys       0m0.000s
```

```
step5 file1.bin 10000 8
```

```
real      0m0.041s
user      0m0.000s
sys       0m0.003s
```

```
step5 file1.bin 10000 32
```

```
real      0m0.142s
user      0m0.001s
```

file4.bin



step2



step3.c



selected (295 bytes)

step

uth

after

eat...

Nov19 13:55

dthornburg@linux21508:~/CSEN177/lab9

```
user 0m0.008s
sys 0m0.273s

step5 file4.bin 100 2
real 0m2.068s
user 0m0.071s
sys 0m0.096s

step5 file4.bin 100 8
real 0m7.324s
user 0m0.262s
sys 0m0.383s

step5 file4.bin 100 32
real 0m30.904s
user 0m1.013s
sys 0m1.416s

step5 file4.bin 100 64
real 0m55.877s
user 0m2.007s
sys 0m2.819s

step5 file4.bin 1000 2
real 0m2.134s
user 0m0.017s
sys 0m0.094s

step5 file4.bin 1000 8
real 0m7.260s
user 0m0.056s
sys 0m0.380s

step5 file4.bin 1000 32
real 0m30.265s
user 0m0.204s
sys 0m1.438s

step5 file4.bin 1000 64
real 0m57.613s
user 0m0.429s
sys 0m2.788s

step5 file4.bin 10000 2
real 0m2.149s
user 0m0.009s
sys 0m0.091s

step5 file4.bin 10000 8
real 0m7.466s
user 0m0.045s
sys 0m0.381s

step5 file4.bin 10000 32
real 0m33.909s
```



Nov19 13:55

dthornburg@linux21508:~/CSEN 177/lab9

```
real    0m7.260s
user    0m0.056s
sys     0m0.380s
```

```
» step5 file4.bin 1000 32
```

```
real    0m30.265s
user    0m0.204s
sys     0m1.438s
```

```
step5 file4.bin 1000 64
```

```
real    0m57.613s
user    0m0.429s
sys     0m2.788s
```

```
step5 file4.bin 10000 2
```

```
real    0m2.149s
user    0m0.009s
sys     0m0.091s
```

```
step5 file4.bin 10000 8
```

```
real    0m7.466s
user    0m0.045s
sys     0m0.381s
```

```
step5 file4.bin 10000 32
```

```
real    0m33.909s
user    0m0.123s
sys     0m1.442s
```

```
step5 file4.bin 10000 64
```

```
real    0m55.095s
user    0m0.254s
sys     0m2.804s
```

```
step5 file4.bin 100000 2
```

```
real    0m2.092s
user    0m0.001s
sys     0m0.098s
```

```
step5 file4.bin 100000 8
```

```
real    0m7.151s
user    0m0.007s
sys     0m0.349s
```

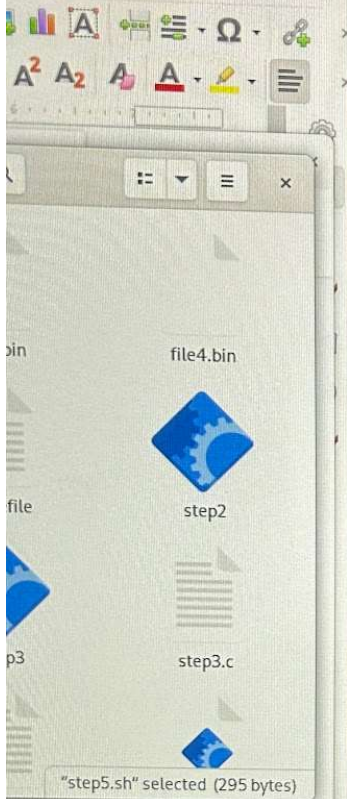
```
step5 file4.bin 100000 32
```

```
real    0m30.078s
user    0m0.030s
sys     0m1.235s
```

```
step5 file4.bin 100000 64
```

```
real    0m55.094s
user    0m0.049s
sys     0m2.363s
```

```
[dthornburg@linux21508 lab9]$
```



ardian
eye and Sleep
ene: The Truth
it Why You...

chew caffeine after
have stopped
ng alcohol and eat...

Nov 19 13:54

dthornburg@linux21508:~/CSEN 177/lab9

```
real    0m0.297s
user    0m0.012s
sys     0m0.020s
>> step5 file2.bin 100 64
```

```
real    0m0.570s
user    0m0.022s
sys     0m0.042s
step5 file2.bin 1000 2
```

```
real    0m0.039s
user    0m0.000s
sys     0m0.007s
step5 file2.bin 1000 8
```

```
real    0m0.087s
user    0m0.001s
sys     0m0.006s
step5 file2.bin 1000 32
```

```
real    0m0.292s
user    0m0.002s
sys     0m0.021s
step5 file2.bin 1000 64
```

```
real    0m0.570s
user    0m0.004s
sys     0m0.049s
step5 file2.bin 10000 2
```

```
real    0m0.041s
user    0m0.001s
sys     0m0.007s
step5 file2.bin 10000 8
```

```
real    0m0.091s
user    0m0.000s
sys     0m0.007s
step5 file2.bin 10000 32
```

```
real    0m0.293s
user    0m0.001s
sys     0m0.023s
step5 file2.bin 10000 64
```

```
real    0m0.570s
user    0m0.005s
sys     0m0.048s
step5 file2.bin 100000 2
```

```
real    0m0.038s
user    0m0.000s
sys     0m0.005s
step5 file2.bin 100000 8
```

file4.bin



step2



step3.c



" selected (295 bytes)

deep
uth
...
after
eat...

The threads made it take longer across the board, but faster than it would have been if I had repeated step 4 each thread-amount of times (64 threads is faster than copying into 64 copy.bins sequentially). The buffer size continues to not make a difference.