

# **CPSC457 - PRINCIPLES OF OPERATING SYSTEMS**

University of Calgary  
Assignment 2

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Q4 - Run "strace -c" and "time" on your bash script from Q1 and your C/C++ program from Q3 and compare the results. Include the output of the above commands in your report, and explain why the results are different.

```
soquresh@csx:~/457/assignments/as2 (ssh)
soquresh@csx:~/457/assignments/as2$ time ./scan.sh jpeg 5
./face.jpeg 3864876
./a/b/school.jpeg 355915
./a/tree.jpeg 242402
./a/b/house.jpeg 168025
./a/b/jpeg.jpeg 75713
Total size: 4706931

real    0m0.035s
user    0m0.019s
sys     0m0.019s
soquresh@csx:~/457/assignments/as2$
```

```
soquresh@csx:~/457/assignments/as2 (ssh)
soquresh@csx:~/457/assignments/as2$ time ./scan jpeg 5
./face.jpeg 3864876
./a/tree.jpeg 242402
./a/b/school.jpeg 355915
./a/b/house.jpeg 168025
./a/b/jpeg.jpeg 75713
Total size: 4706931

real    0m0.009s
user    0m0.002s
sys     0m0.005s
soquresh@csx:~/457/assignments/as2$
```

```
soquresh@csx:~/457/assignments/as2 (ssh)
soquresh@csx:~/457/assignments/as2$ strace -c ./scan jpeg 5
./face.jpeg 3864876
./a/tree.jpeg 242402
./a/b/school.jpeg 355915
./a/b/house.jpeg 168025
./a/b/jpeg.jpeg 75713
Total size: 4706931
% time    seconds  usecs/call   calls   errors syscall
-----
71.62    0.001731    1731         1        wait4
8.19     0.000198     39         5        stat
5.17     0.000125      8        14        mmap
3.19     0.000077      7        10        mprotect
2.52     0.000061     10         6        write
2.03     0.000049      9         5        openat
1.94     0.000047     47         1        clone
1.41     0.000034      5         6        read
1.24     0.000030      4         7        fstat
1.20     0.000029      4         7        close
0.41     0.000010     10         1        1 access
0.29     0.000007      7         1        execve
0.25     0.000006      2         3        brk
0.25     0.000006      6         1        pipe2
0.17     0.000004      4         1        arch_prctl
0.12     0.000003      3         1        fcntl
0.00     0.000000      0         1        munmap
-----
100.00    0.002417         71        1 total
soquresh@csx:~/457/assignments/as2$
```

Note: I tried to do 'strace -c ./scan.sh jpeg 5' very hard but I could not figure out how to strace shell scripts.

We can see from the outputs of time that the c++ program is much faster than the shell script. This is essentially due to the shell script requiring the use of 4 different processes, such as find, sort, head and awk. They all need to have their own separate memory allocations and due to this there is latency accessing data across, which gives more time for the shell script. In comparison, the c++ program is simply 1 program and does not require as many resources.