```
********************************************
* Last Name:   Iremadze
* First Name:  Luke
* Student ID:  10163614
* Course:      CPSC 457
* Tutorial:    T02
* Assignment:  2
* Question:    Q4
*
* File name: Q4-strace.pdf
********************************************
```

## Discussion of Results

The results were surprisingly unexpected.

I though that the bash script would have ran at a faster speed but from my examination the result showed an 89.19% better runtime, nearly double!

Most of the time was spent in wait4 section of the system call, which could be caused by the pipes we have integrated with the script commands. (Zimmer)

On one hand this saved us a lot of coding time, but on the other it seems to be less efficient. We should choose to use the scripting method unless we have a mission critical situation which requires every drop of performance.

Source:

Zimmer, O. (2017, June 13). How to get a process out of a wait4() system call - Quora. Retrieved from https://www.quora.com/How-do-I-get-a-process-out-of-a-wait4-system-call

## Strace from own program

```
bash-4.4$ strace -c time ./scan c 2
Found 8 files:
         : 32764
        ./scan.c : 2596
Total size: 3933 bytes.
0.00user 0.00system 0:00.00elapsed 60%CPU (0avgtext+0avgdata 3004maxresident)k
0inputs+0outputs (0major+343minor)pagefaults 0swaps
% time     seconds  usecs/call     calls    errors syscall
------ ----------- ----------- --------- --------- ----------------
 70.38    0.002214        2214         1           wait4
 21.90    0.000689           6       112           write
  2.16    0.000068           3        18        16 openat
  1.24    0.000039          39         1           clone
  1.05    0.000033           4         8         7 stat
  0.99    0.000031           6         5           mmap
  0.83    0.000026           6         4           mprotect
  0.41    0.000013           3         4           rt_sigaction
  0.38    0.000012          12         1           munmap
  0.22    0.000007           3         2           close
  0.22    0.000007           3         2           fstat
  0.13    0.000004           4         1           read
  0.10    0.000003           3         1           arch_prctl
  0.00    0.000000           0         1           brk
  0.00    0.000000           0         1         1 access
  0.00    0.000000           0         1           execve
------ ----------- ----------- --------- --------- ----------------
100.00    0.003146                   163        24 total
```

## Strace from bash script

```
bash-4.4$ strace -c time sh scan.sh c 2
./scan.c 2596
./myFind.c 1337
Total size: 3933
0.00user 0.00system 0:00.00elapsed 116%CPU (0avgtext+0avgdata 3684maxresident)k
0inputs+0outputs (0major+908minor)pagefaults 0swaps
% time     seconds  usecs/call     calls    errors syscall
------ ----------- ----------- --------- --------- ----------------
 81.28    0.004838        4838         1           wait4
  7.04    0.000419           3       112           write
  3.14    0.000187          10        18        16 openat
  1.78    0.000106         106         1           clone
  1.56    0.000093          11         8         7 stat
  1.44    0.000086          17         5           mmap
  1.44    0.000086          21         4           mprotect
  0.64    0.000038          38         1           munmap
  0.64    0.000038           9         4           rt_sigaction
  0.34    0.000020          10         2           fstat
  0.30    0.000018           9         2           close
  0.22    0.000013          13         1           read
  0.17    0.000010          10         1           arch_prctl
  0.00    0.000000           0         1           brk
  0.00    0.000000           0         1         1 access
  0.00    0.000000           0         1           execve
------ ----------- ----------- --------- --------- ----------------
100.00    0.005952                   163        24 total
```