NCTU OS HW2 report 2018

Name: 施威綸

Student ID: 0516076

Q1.

Briefly describe about your design for the problem "Sum Checker" and total num of threads you used in your code.

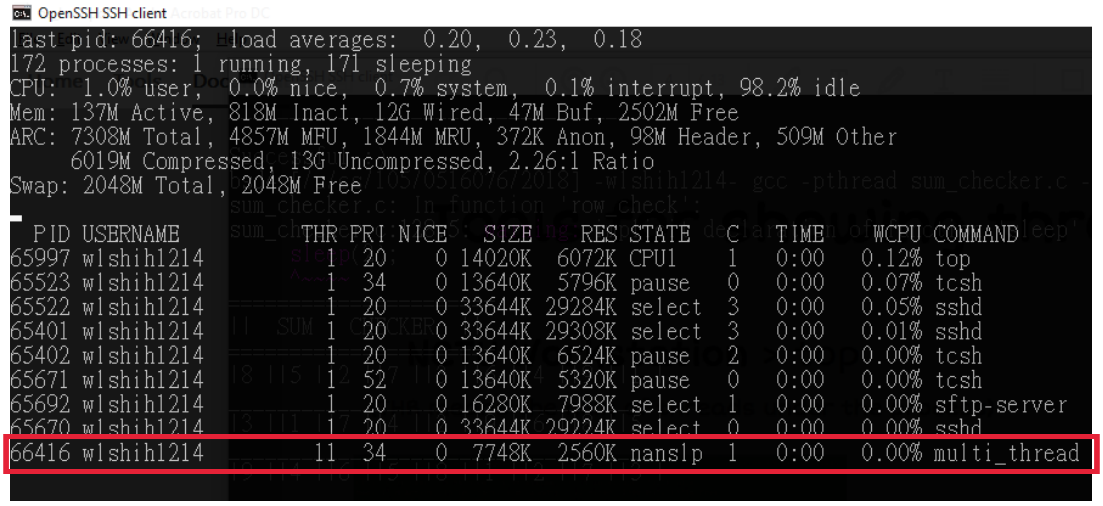
A1.

In this problem, 11 threads were used. One for row checking, one for row checking, and 9 for each sub-gird. Each thread compute the sum and compare with a checker, which is a global variable and the value can be updated when the first sum is computed.

Q2.

Show your thread info screenshots while "Sum Checker" code running.

A2.



```
last pid: 66416;  load averages:  0.20,  0.23,  0.18
172 processes: 1 running, 171 sleeping
CPU:  1.0% user,  0.0% nice,  0.7% system,  0.1% interrupt, 98.2% idle
Mem: 137M Active, 818M Inact, 12G Wired, 47M Buf, 2502M Free
ARC: 7308M Total, 4857M MFU, 1844M MRU, 372K Anon, 98M Header, 509M Other
     6019M Compressed, 13G Uncompressed, 2.26:1 Ratio
Swap: 2048M Total, 2048M Free

  PID USERNAME      THR PRI NICE  SIZE    RES STATE   C   TIME    WCPU COMMAND
65997 wlshih1214      1  20    0 14020K  6072K CPU1    1   0:00   0.12% top
65523 wlshih1214      1  34    0 13640K  5796K pause   0   0:00   0.07% tcsh
65522 wlshih1214      1  20    0 33644K 29284K select  3   0:00   0.05% sshd
65401 wlshih1214      1  20    0 33644K 29308K select  3   0:00   0.01% sshd
65402 wlshih1214      1  20    0 13640K  6524K pause   2   0:00   0.00% tcsh
65671 wlshih1214      1  52    0 13640K  5320K pause   0   0:00   0.00% tcsh
65692 wlshih1214      1  20    0 16280K  7988K select  1   0:00   0.00% sftp-server
65670 wlshih1214      1  20    0 33644K 29224K select  0   0:00   0.00% sshd
66416 wlshih1214     11  34    0  7748K  2560K nanslp  1   0:00   0.00% multi_thread
```

The process name is "multi_thread", using 11 threads.

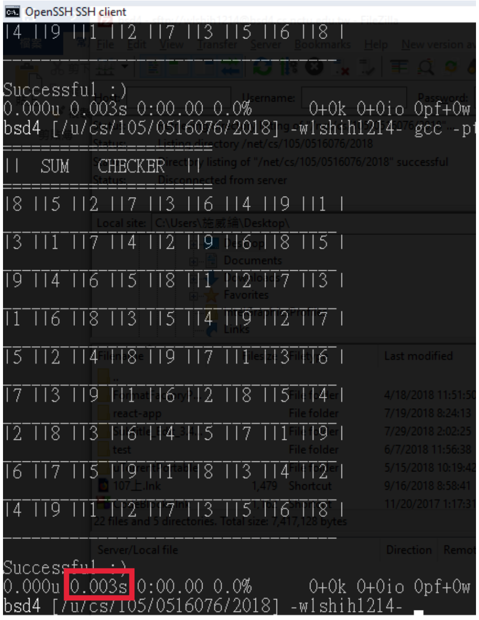
Q3.

Compare the time between Single-thread and Multi-thread.

A3.

Single-thread: 0.003s
Multi-thread: 0.004s

The result is not as expected. Multi-threaded sum checker used 11 threads, but the time wasn't 11 times faster. Maybe the algorithm was fast enough compare to the time to create and join threads.

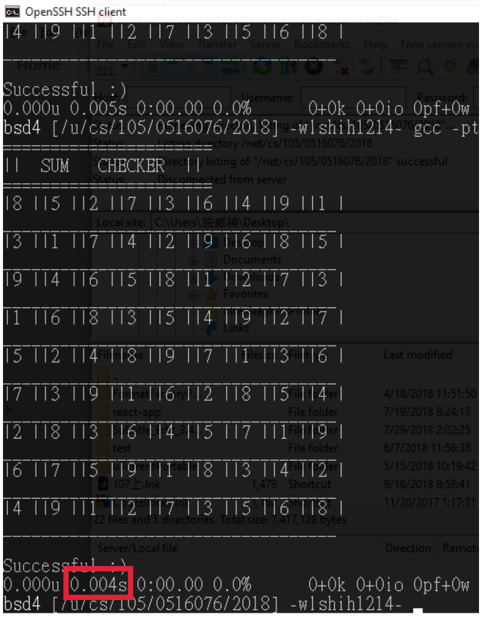


```
|4 ||9 ||1 ||2 ||7 ||3 ||5 ||6 ||8 |
-------------------------------------

Successful :)
0.000u 0.003s 0:00.00 0.0%      0+0k 0+0io 0pf+0w
bsd4 [/u/cs/105/0516076/2018] -wlshih1214- gcc -pt
=======================
||   SUM   CHECKER   ||
=======================
|8 ||5 ||2 ||7 ||3 ||6 ||4 ||9 ||1 |
-------------------------------------
|3 ||1 ||7 ||4 ||2 ||9 ||6 ||8 ||5 |
-------------------------------------
|9 ||4 ||6 ||5 ||8 ||1 ||2 ||7 ||3 |
-------------------------------------
|1 ||6 ||8 ||3 ||5 ||4 ||9 ||2 ||7 |
-------------------------------------
|5 ||2 ||4 ||8 ||9 ||7 ||1 ||3 ||6 |
-------------------------------------
|7 ||3 ||9 ||1 ||6 ||2 ||8 ||5 ||4 |
-------------------------------------
|2 ||8 ||3 ||6 ||4 ||5 ||7 ||1 ||9 |
-------------------------------------
|6 ||7 ||5 ||9 ||1 ||8 ||3 ||4 ||2 |
-------------------------------------
|4 ||9 ||1 ||2 ||7 ||3 ||5 ||6 ||8 |
-------------------------------------

Successful :)
0.000u 0.003s 0:00.00 0.0%      0+0k 0+0io 0pf+0w
bsd4 [/u/cs/105/0516076/2018] -wlshih1214-
```

Single



```
|4 ||9 ||1 ||2 ||7 ||3 ||5 ||6 ||8 |
-------------------------------------

Successful :)
0.000u 0.005s 0:00.00 0.0%      0+0k 0+0io 0pf+0w
bsd4 [/u/cs/105/0516076/2018] -wlshih1214- gcc -pt
=======================
||   SUM   CHECKER   ||
=======================
|8 ||5 ||2 ||7 ||3 ||6 ||4 ||9 ||1 |
-------------------------------------
|3 ||1 ||7 ||4 ||2 ||9 ||6 ||8 ||5 |
-------------------------------------
|9 ||4 ||6 ||5 ||8 ||1 ||2 ||7 ||3 |
-------------------------------------
|1 ||6 ||8 ||3 ||5 ||4 ||9 ||2 ||7 |
-------------------------------------
|5 ||2 ||4 ||8 ||9 ||7 ||1 ||3 ||6 |
-------------------------------------
|7 ||3 ||9 ||1 ||6 ||2 ||8 ||5 ||4 |
-------------------------------------
|2 ||8 ||3 ||6 ||4 ||5 ||7 ||1 ||9 |
-------------------------------------
|6 ||7 ||5 ||9 ||1 ||8 ||3 ||4 ||2 |
-------------------------------------
|4 ||9 ||1 ||2 ||7 ||3 ||5 ||6 ||8 |
-------------------------------------

Successful :)
0.000u 0.004s 0:00.00 0.0%      0+0k 0+0io 0pf+0w
bsd4 [/u/cs/105/0516076/2018] -wlshih1214-
```

multi

Q4.

What you learned from doing OS hw2 or some improvements you want to say to TAs.

A4.

After this assignment, I have a better understanding of how multi-threaded process work. But actually, we are only using the APIs provided by other developers. What I've really learnt is to use pointers and types in the right way in C.