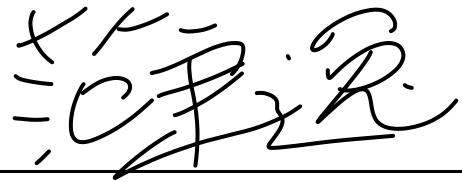


# SP\_HW4 report

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```
gcc -Wall -O3 pserver.o lib.o -o pserver -pthread -lm
b10902117@linux11 [~/HW/SP/hw4_simple-movies-recommendation-system-Soul52913] time ./tserver < testcases/input0.txt

real    0m17.177s
user    0m16.206s
sys     0m0.407s
b10902117@linux11 [~/HW/SP/hw4_simple-movies-recommendation-system-Soul52913] time ./tserver < testcases/input0.txt

real    0m16.168s
user    0m15.848s
sys     0m0.082s
```

## 1 layer

```
gcc -Wall -O3 tserver.o lib.o -o tserver -pthread -lm
gcc -Wall -O3 pserver.o lib.o -o pserver -pthread -lm
b10902117@linux11 [~/HW/SP/hw4_simple-movies-recommendation-system-Soul52913] time ./tserver < testcases/input0.txt

real    0m3.566s
user    0m6.351s
sys     0m0.090s
b10902117@linux11 [~/HW/SP/hw4_simple-movies-recommendation-system-Soul52913] time ./pserver < testcases/input0.txt
0 3109431095 62188
real    0m4.745s
user    0m6.524s
sys     0m1.114s
```

## 2 layer

```
gcc -Wall -O3 tserver.o lib.o -o tserver -pthread -lm
gcc -Wall -O3 pserver.o lib.o -o pserver -pthread -lm
b10902117@linux11 [~/HW/SP/hw4_simple-movies-recommendation-system-Soul52913] time ./tserver < testcases/input0.txt

real    0m1.250s
user    0m3.260s
sys     0m0.070s
b10902117@linux11 [~/HW/SP/hw4_simple-movies-recommendation-system-Soul52913] time ./pserver < testcases/input0.txt
0 310940 1554731095 621880 777331095 4664115548 3109446642 62188
real    0m2.558s
user    0m3.410s
sys     0m0.000s
```

## 3 layer

```
gcc -Wall -O3 tserver.o lib.o -o tserver -pthread -lm
gcc -Wall -O3 pserver.o lib.o -o pserver -pthread -lm
b10902117@linux11 [~/HW/SP/hw4_simple-movies-recommendation-system-Soul52913] time ./tserver < testcases/input0.txt

real    0m0.679s
user    0m1.829s
sys     0m0.056s
b10902117@linux11 [~/HW/SP/hw4_simple-movies-recommendation-system-Soul52913] time ./pserver < testcases/input0.txt
0 310940 1554731095 621880 777331095 4664115548 3109446642 621887774 1554715548 2332131095 3886823322 3109446642 5441
538869 4664154416 62188
real    0m2.084s
user    0m1.864s
sys     0m0.000s
```

## 4 layer

```
gcc -Wall -O3 tserver.o lib.o -o tserver -pthread -lm
gcc -Wall -O3 pserver.o lib.o -o pserver -pthread -lm
b10902117@linux11 [~/HW/SP/hw4_simple-movies-recommendation-system-Soul52913] time ./tserver < testcases/input0.txt

real    0m0.477s
user    0m1.439s
sys     0m0.080s
b10902117@linux11 [~/HW/SP/hw4_simple-movies-recommendation-system-Soul52913] time ./pserver < testcases/input0.txt
0 310940 1554731095 6218831095 4664115548 310940 777346642 6218831095 388687774 155470 388615548 2332138869 466413109
5 3498146642 5441515548 194343887 777323322 310947774 1166054416 6218834982 3886838869 4275546642 5052819435 23321116
61 1554723322 2720854416 5830250529 5441542756 4664127209 3109458303 62188
real    0m2.125s
user    0m1.236s
sys     0m4.503s
```

## 5 layer

I process them on linux11.csie.mtu.edu.tw

By the picture, we find out that with more layer, the time it consumed will take shorter. From layer 1 to layer 2, the time they consumed decline significantly from 17 to 3 (t) and 16 to 4 (p). But it won't decline more

significantly if the layer is bigger. Instead, it will gradually approach to a certain value. For tserver, it will decline to about 0.6 sec, and for pserver, it will decline to about 2 sec. At smaller layer, pserver run almost same as tserver. But when layer is bigger, tserver is faster tha pserver.

The reason for bigger layer take shorter time is multithreads and multiprocesses will run the progress at the same time, which cause the time it takes get shorter.