HW1b - Optional - Prime Contest

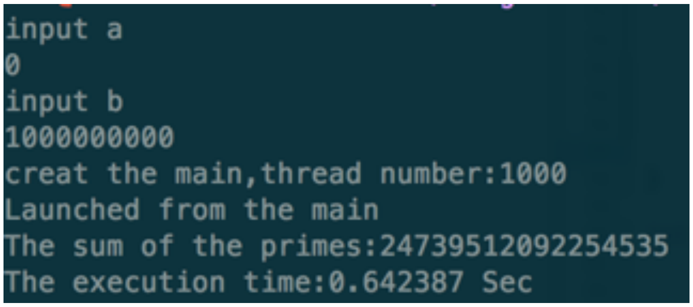
Algorithm

I have used the Sieve_of_Eratosthenes algorithm to delete the primes from the vector.

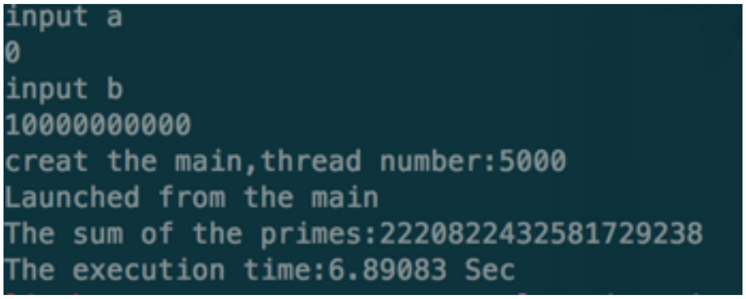
Multi-thread

I have used the multithread technology to speed up the program.I have test some data.You can change the thread number to check the answer and find the best thread number in this experiment.

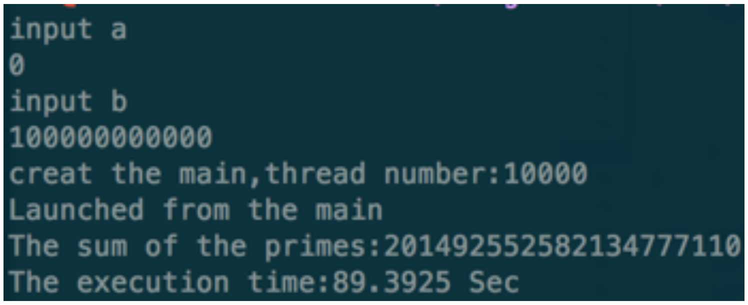
Data	Thread number	Execution time
1~10^9	1000	0.6 Sec
1~10^{10}	5000	6.8 Sec
1~10^{11}	10000	90 Sec



```
input a
0
input b
1000000000
creat the main,thread number:1000
Launched from the main
The sum of the primes:24739512092254535
The execution time:0.642387 Sec
```



```
input a
0
input b
10000000000
creat the main,thread number:5000
Launched from the main
The sum of the primes:2220822432581729238
The execution time:6.89083 Sec
```



```
input a
0
input b
100000000000
creat the main,thread number:10000
Launched from the main
The sum of the primes:201492552582134777110
The execution time:89.3925 Sec
```

Compiler optimize

```
clang++ -std=c++11  -02 main.cpp
```

I have use the `-02` to optimize the compiler and then

```
./a.out
```

This trick can Maximize Speed when compile the C++ code.

Analyze

I have research on on the internet

> *The bit complexity of the algorithm is O(n (log n) (log log n)) bit operations with a memory requirement of O(n).*

My result show above when I test the data 10^9,10^{10},10^{11} .Due to the algorithm complexity,I calculate the 10^{12} need to use 17 minute.

Final

If you have any question,be free to contact me.Thank you.

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