CSE 5441 SP2021 (8386)

Lab 2 Pthreads Producer/Consumer Report

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1 Final runtimes

Run all data files using the serial program and parallel program. Table 1 shows the "real" time from time(1). The paraller program uses 5 producers and 15 consumers.

Table 1: Final runtimes of serial vs parallel programs

Data File	Serial Program	Parallel Program
PC_data_x1	0m03.506s	0m02.602s
PC_data_t00100	0m22.443s	0m13.406s
PC_data_t01000	3m26.711s	1m45.199s
PC_data_t05000	17m35.247s	8m57.969s
PC_data_t10000	34m51.188s	18m45.125s
PC_data_t50000	246m38.747s	124m40.433s

2 Scalability of parallel program

Run the parallel program with data file "PC_data_t50000" with different number of threads. To easy to compare, the number of producers and consumers are the same. The results shows in Table 2 and Figure 1

Table 2: Runtimes of parallel program with different number of threads

# of prod/cons	# of total	time
2	4	132m33.693s
3	6	125m03.226s
4	8	125m17.684s
5	10	125m26.291s
8	16	124m55.845s
10	20	125m12.747s
20	40	125m10.165s
30	60	124m56.490s
40	80	128m10.586s
50	100	128m25.360s

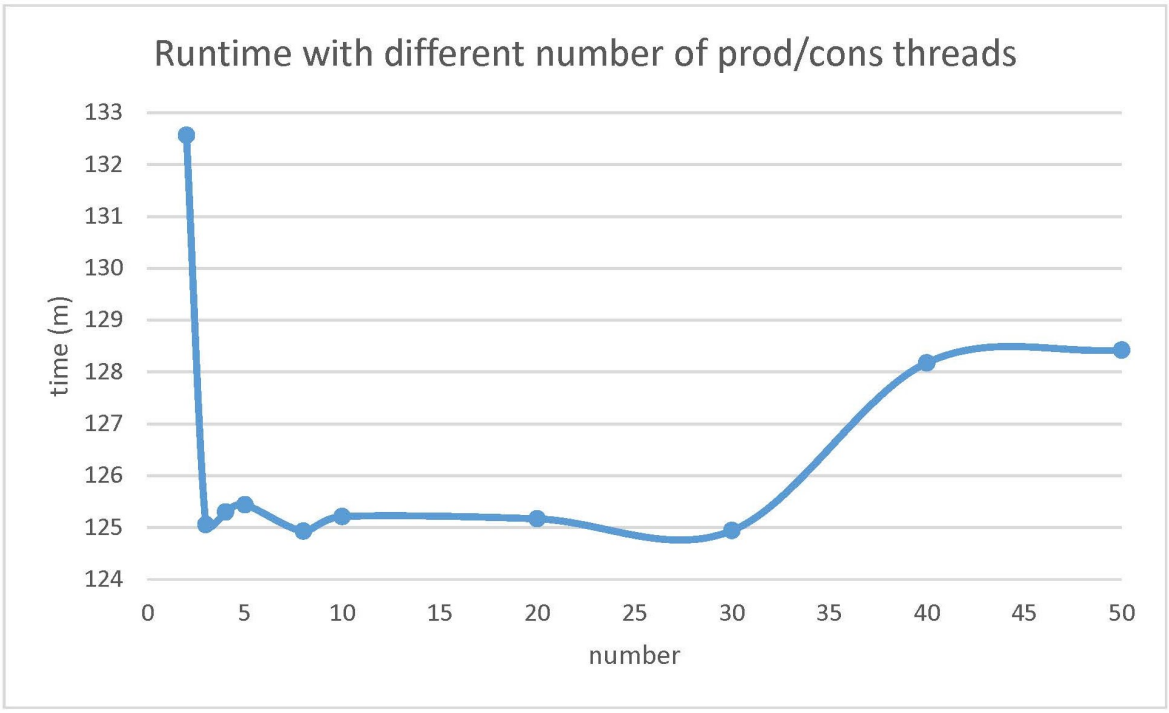

Figure 1: Runtimes of parallel program with different number of threads

3 Results summary

3.1 Compare serial program vs parallel program

From Table 1, the parallel version completes the task faster than the serial version. That shows, using Pthreads to do parallel programming can improve the performance for the producer/consumer task.

3.2 Scalability of parallel program

From Figure 1, as the the number of producers and consumers increases, the runtime first goes down and then becomes stable, and finally goes up. That is the same with part of my intuition, in a reasonable range, more threads can reduce the runtime, but if there are too many threads, that will increase the runtime. However, it seems in a certain range, the change of number of threads won't influence much on the time.