

Programming Assignment 3

CSCE 313-503

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Khanh Nguyen

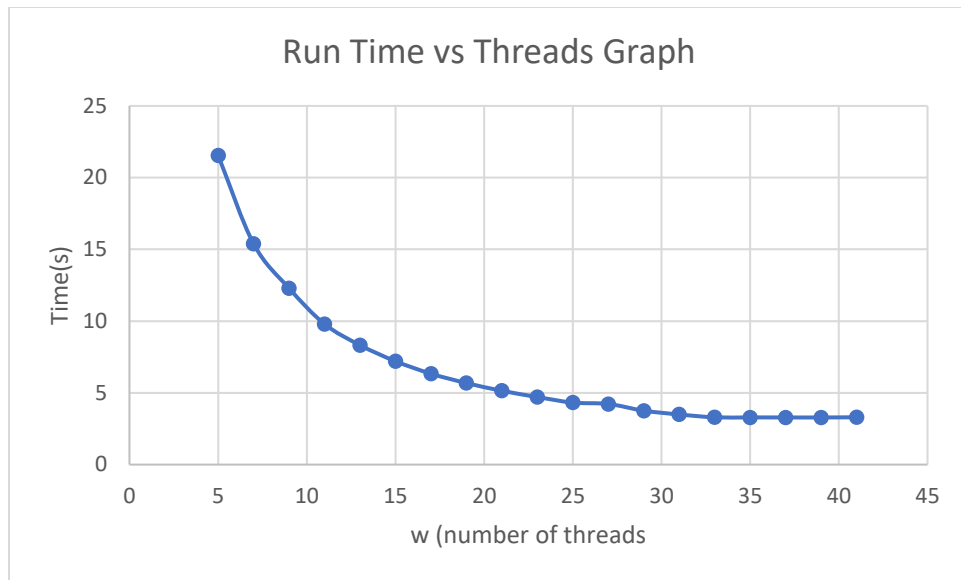
UIN# 525000335

Prof. Tanzir Ahmed

I have implemented the SafeBuffer class with all the functions needed to create multiple worker threads. That allows the program can run faster with large number of n requests. All the functions SafeBuffer::pop(), SafeBuffer::push_back(), SafeBuffer::size() and frequency_count vectors are guarded with pthread_mutex_lock and pthread_mutex_unlock to avoid race condition. I also created a timer to observe the efficiency of having more threads in the program.

Result table collected when I ran the program on unix.cse.tamu.edu server. The server only allowed me to run it up to 47 threads.

w (number of threads)	Time(s)
5	21.54874
7	15.388716
9	12.29127
11	9.794712
13	8.325531
15	7.205072
17	6.336332
19	5.682988
21	5.144861
23	4.709214
25	4.319872
27	4.22587
29	3.757309
31	3.492765
33	3.295093
35	3.288575
37	3.28482
39	3.283577
41	3.298902
43	3.29277



The performance of the program is greatly increased with more threads running. When the number of threads increases from 5 to 33, the runtime is greatly reduced, performance is significantly improved. After I increased w more than 33, the runtime pretty much stayed the same. The graph behaved as I have expected.

When I go beyond 47 number of threads on the host server (unix.cse.tamu.edu), I received the message "SERVER:cread: broken/closed pipe detected, exiting thread...:". It's because the number of File Descriptors is limited on the server.

When I tried to create more threads than the limit range (40-50), the server just gave me an segmentation fault message.