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CSE 3320

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Executive Summary:

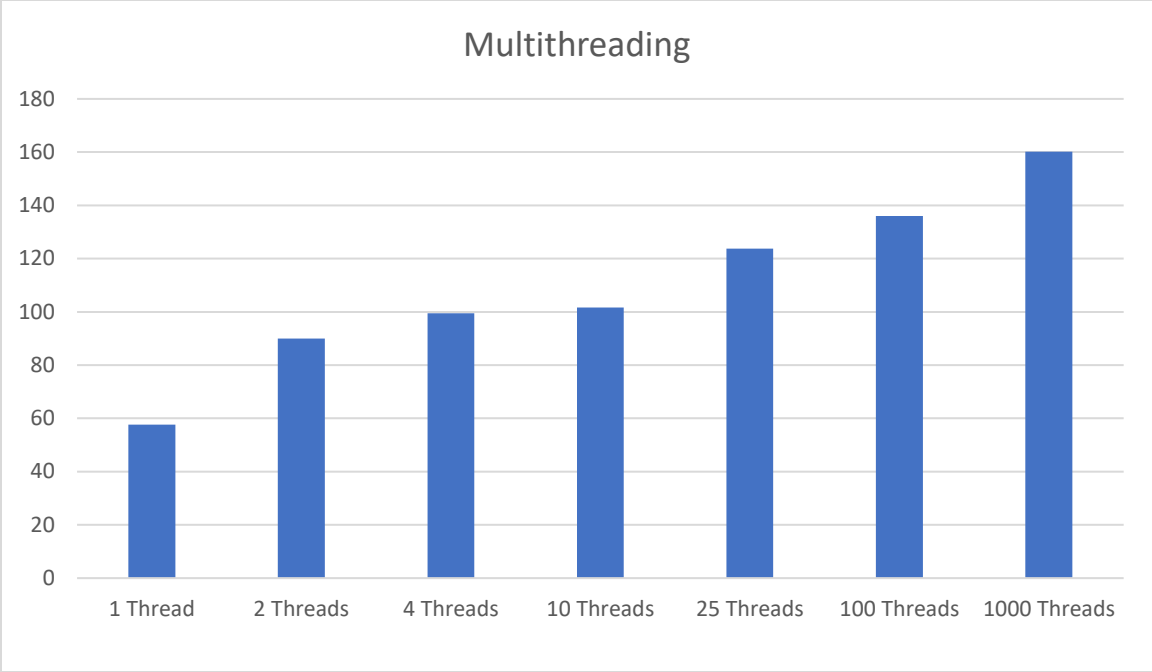
In this assignment, we were tasked with making a program more efficient by multi-threading it. As it will be shown, multi-threading does show an improvement of performance but did not get better as the number of threads increased to 1000. We were also tasked with timing the program which will also be discussed.

Used Libraries:

Besides the libraries that were given in the original code, I added #include <pthread.h> in order to multi-thread the application. As for the timing method, I used the time.h library and the clock() function that is included in that library. This function returns the number of clock ticks from when it is first used and then last. In order to get it in seconds, I used CLOCKS_PER_SEC to divide the given number from the clock() function. The reason why I used this method for timing was because it was introduced to me in CSE 3318 as a timing method I could use to see how sorts perform.

Graph and Table:

Number of Threads	Time
1	57.628529 seconds
2	89.995259 seconds
4	99.501287 seconds
10	101.662952 seconds
25	123.701292 seconds
100	136.058260 seconds
1000	160.174159 seconds



Anomalies in Data:

Due to me running the program in codespaces, there was very inconsistent timings that I received. There were also changes to the values of the minimum and maximum values. For the most part, threads 1-25 had similar results besides the average distance but after that, using more threads would either give the right number or not and it varied heavily. This can all come from the use of the cloud service since I do not the specifications of the system I am using or if I have been using the same one since I started working on this assignment.

Conclusion:

The optimal number of threads depends on the amount of CPUs a system has. Because I used git codespace, 2 threads (and sometimes 4) were the optimal number of threads since after that, the time increased to more than what it took for one thread. If I had a better machine, more threads would have been better but there may have also been other factors that may impact the performance.