Star Catalog Multithreading Assignment Report

Summary/Overview:

This assignment involved performing calculations on data from the Tycho Star Catalogue to determine average angular distance between 30,000 stars. I used 1, 2, 4, 10, 25, 100, 1000 threads and checked the time taken with each thread on GitHub Codespaces. The program prints the minimum, maximum and mean angular distance along with the time taken after running. I used mutex to prevent data inconsistencies due to race conditions. To record the time I used the clock () function.

Included libraries:

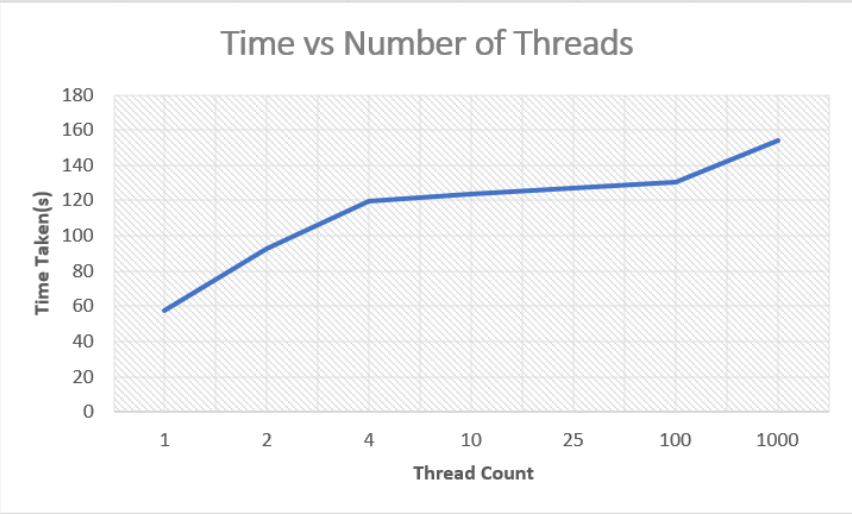
I included time.h and pthread.h libraries to determine the time taken for the calculations based on the number of threads used along with using the optimal number of threads.

Anomalies found:

The time kept increasing with the thread count.

Results:

Thread Count	Time Taken(s)
1	57.270729
2	92.441421
4	119.690465
10	123.521338
25	126.915074
100	130.720517
1000	153.707178



Conclusion:

After recording the results, I came to the conclusion that the optimal number of thread count is two threads and provides a better result on the local machine rather than GitHub codespaces. The results vary for everyone based on the number of cores in the processor of that machine, but a low thread count would give optimal result. This is because the machine will not be extremely worked up and the tasks will be divided properly.