Project 3

CS 475

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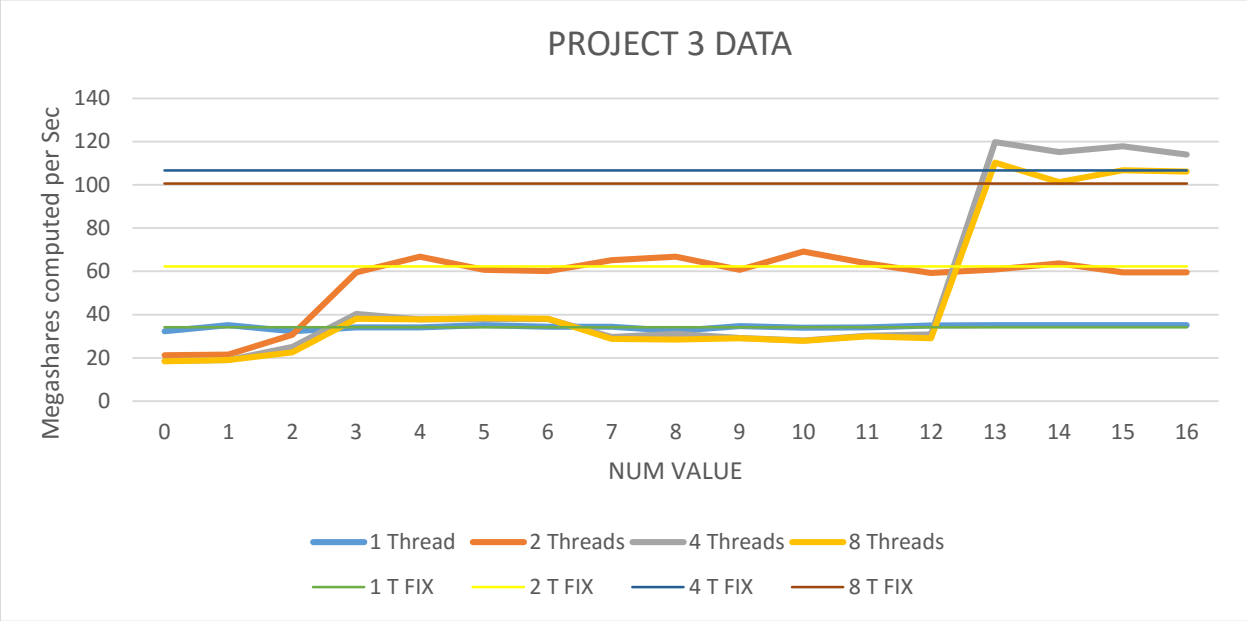
Write Up

I ran this this project on my personal machine. First time using it for a project in this class. I used g++. I remember hearing about using the Xeon Phi but I'm not sure about it and I like the use of Pragma, so I decided not to use Xeon Phi, still need to study up on it. Used up to 8 threads and up to 16 NUM.

	FIX #1				FIX #2			
	Threads				Threads			
NUM	1	2	4	8	1	2	4	8
0	32.3884	21.2069	18.643	18.4491	34.3947	60.2753	103.685	95.0553
1	35.07	21.5146	18.9978	18.9462	31.4988	60.6648	91.8025	88.3615
2	32.3727	30.7336	25.0836	22.5273	35.0762	59.7313	101.258	102.719
3	34.0742	59.5413	40.2898	38.1387	35.0786	66.6845	103.1	102.557
4	34.0726	66.7354	37.7572	37.782	35.0789	63.5273	102.234	101.912
5	35.0725	60.7943	37.9033	38.392	33.0348	59.4386	101.976	102.063
6	34.4015	60.1138	37.9384	38.0468	34.0649	64.7578	103.385	84.0855
7	34.401	65.1904	29.7119	28.8034	33.61	65.1093	102.916	107.811
8	32.4631	66.7568	31.0881	28.4657	32.1739	63.9279	103.089	104.796
9	34.7607	60.7737	29.2485	29.1355	35.0788	63.5375	103.197	107.466
10	33.9478	69.1342	28.0729	27.8339	34.4016	66.7765	107.438	90.1571
11	34.0513	63.7171	30.1886	30.006	35.0792	61.2848	103.235	101.511
12	34.94	59.3136	30.8928	29.0607	35.0787	63.084	107.463	102.968
13	35.0815	60.8943	119.824	110.353	35.0808	60.0052	124.427	102.28
14	35.0714	63.647	115.119	101.234	34.401	60.7519	107.747	103.273
15	35.0785	59.5327	117.79	106.736	34.3965	59.6553	125.768	106.845
16	35.0736	59.6032	113.938	106.101	34.0274	60.3798	119.878	106.548

This is the table of values I got after running through the project.

The following is the graph made from the data of the table above.



From looking at the graph above, the main thing you can see performance wise is the great shift from NUM 12 to NUM 13 when using 4 and 8 threads. The performance goes up by at least x5 for both thread lines. It seems most likely this is where the false sharing has stopped and the threads start reaching peak performance.

I also see that when using 2 threads the performance starts growing much sooner but never gets to the peak performance as much as 4 and 8 threads. So it must have optimized using all the cache lines it can around NUM 3.

Then with using only 1 thread it's noticeable that with any number of padding it never truly optimizing. This is because with one thread it can't take advantage of any parallelizable.

The nice thing I realized it that you can get a nice performance with just 4 threads so you if you really wanted you shouldn't need to use anything more than 4 threads.