CS 475/575 -- Spring Quarter 2017

Project #2

OpenMP: Static vs Dynamic and Small vs. Large Chunksize

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I. Runtime environment

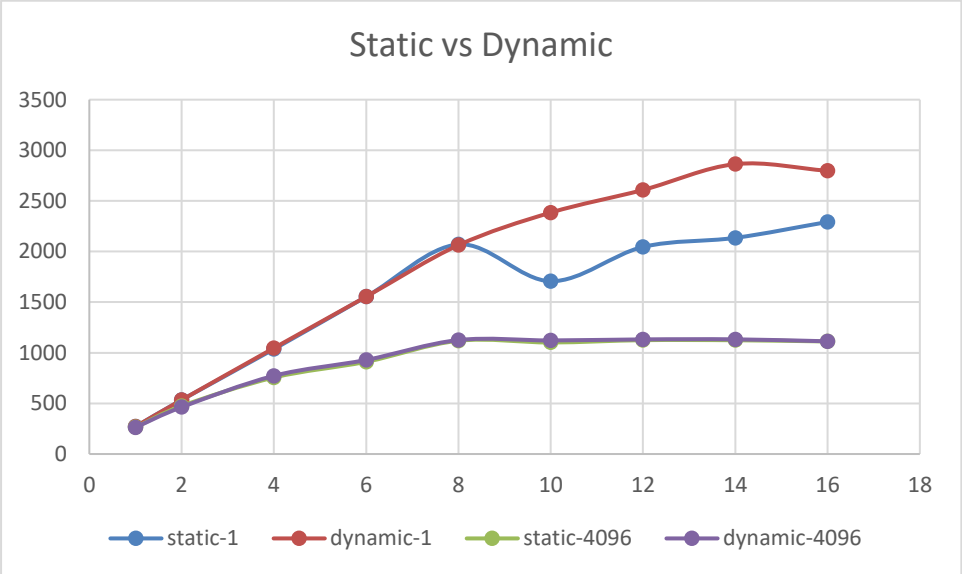
In this project, I ran my program on OSU's server(filp.engr.oregonstate.edu).

II. Table and graph of results

After executing my program under my script, I got the following results, which are the peak performance of each condition after 10 times tries.

	static-1	dynamic-1	static-4096	dynamic-4096
1	270.24	270.86	263.96	263.15
2	534.32	534.09	474.23	462.88
4	1036	1046.56	755.86	772.56
6	1553.64	1554.2	911.07	929.23
8	2070.1	2062.86	1118.95	1125.57
10	1706.97	2384.56	1101.68	1122.02
12	2045.55	2608.3	1124.69	1132.31
14	2135.21	2863.41	1123.77	1132.93
s16	2292.2	2797.78	1111.71	1113.33

In the meantime, I drew a graph based on this table.



III. Pattern analysis

According to this graph I created, Static-4096 and dynamic-4096 are almost overlapped, and after 8, they got no rise anymore, because our ARRAYSIZE is set 32*1024, it is 8*4096, so that, when threads increase to 8, the program would only

use 8 threads in the same time, no matter how many threads I added, it wouldn't affect performance.
Then, I also can see when chunk size is 1, static and dynamic are still increasing when thread 16, however, they got some different when thread 8. As we known, dynamic will put assignments in a pool, when thread becomes idle, it will be assigned new assignments, it will increase performance. However, it still increases overhead, so that we can see static and dynamic seems no differences, until adding to 8 threads. When some threads may be finished early, static won't have any advantage in this case, but dynamic will get a fast-increasing performance. Moreover, because chunk size is 1, every thread will be taken full advantage of, so dynamic and static are still rising.

IV. Question

During this program, because I need to compare static and dynamic schedule, I need to set #pragma static and dynamic, and I didn't want to duplicate my code, so I found I can set schedule runtime, and use omp_set_schedule() function to set static and dynamic, however, I always got some weird results, so I change schedule to fixed static and dynamic, then weird results gone. I don't understand why it happened. I presume it is unstable to use runtime schedule.