

2023-1 Multicore Computing, Project #3

Problem 2

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CAU SW 20184286

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Environment

CPU type_ Intel Core i5-8265U 1.60GHz, Hyper Threading ON

of core_ 4

Memory size_ 8GB

OS type_ Window 11 Pro

Result

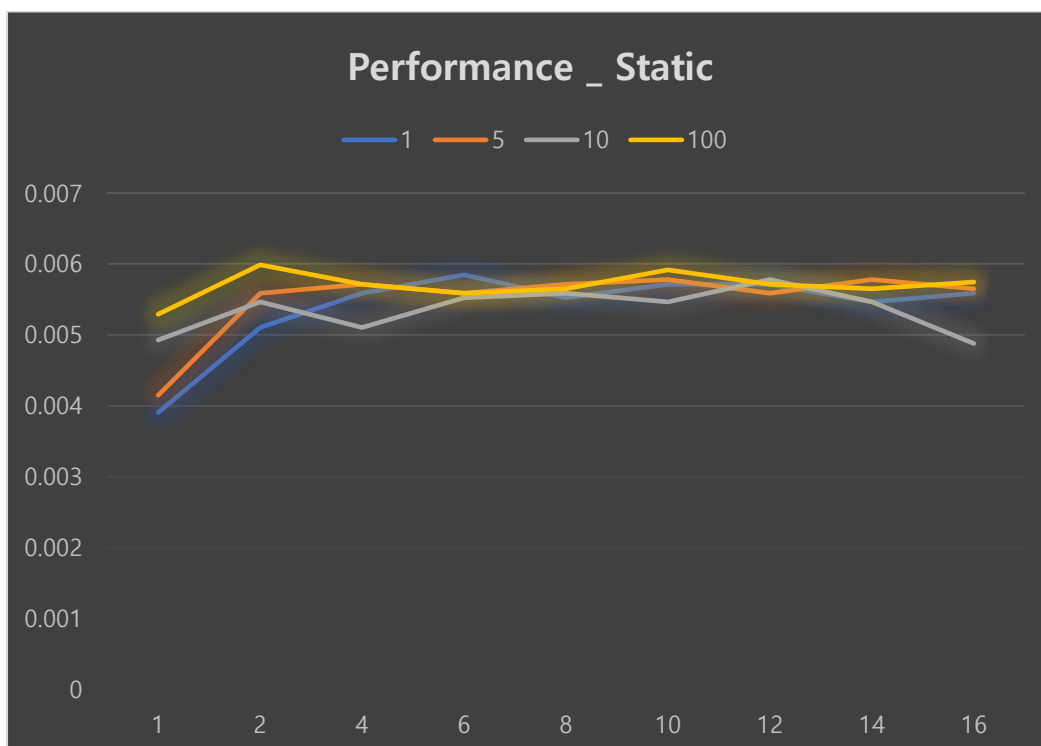
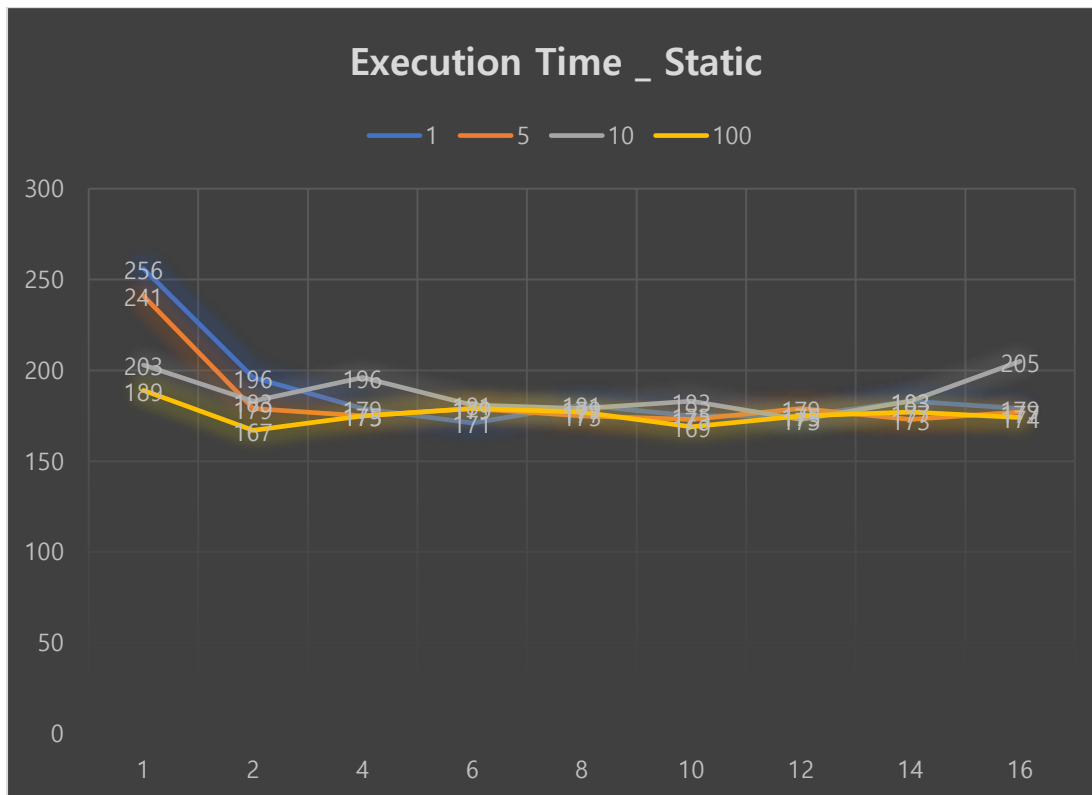
Tables_ (unit : ms)

Exec time	Chunk size	1	2	4	6	8	10	12	14	16
Static	1	256	196	179	171	181	175	175	183	179
Dynamic		224	229	177	173	185	182	179	176	200
Guided		232	178	183	183	190	185	175	171	189
Static	5	241	179	175	179	175	173	179	173	177
Dynamic		216	231	179	177	179	171	177	183	188
Guided		205	181	177	173	175	173	171	177	175
Static	10	203	183	196	181	179	183	173	183	205
Dynamic		191	175	181	179	177	176	175	181	179
Guided		214	192	183	177	177	177	179	173	196
Static	100	189	167	175	179	177	169	175	177	174
Dynamic		202	168	177	177	170	181	175	173	175
Guided		192	176	169	165	173	173	179	177	181

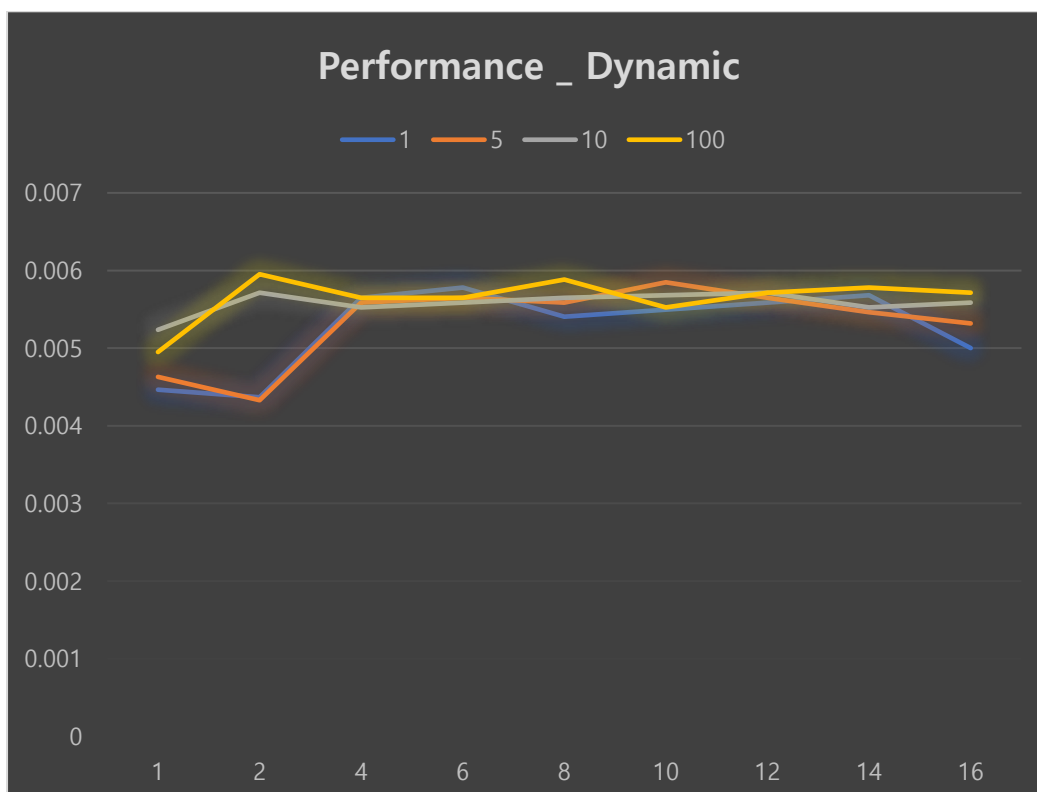
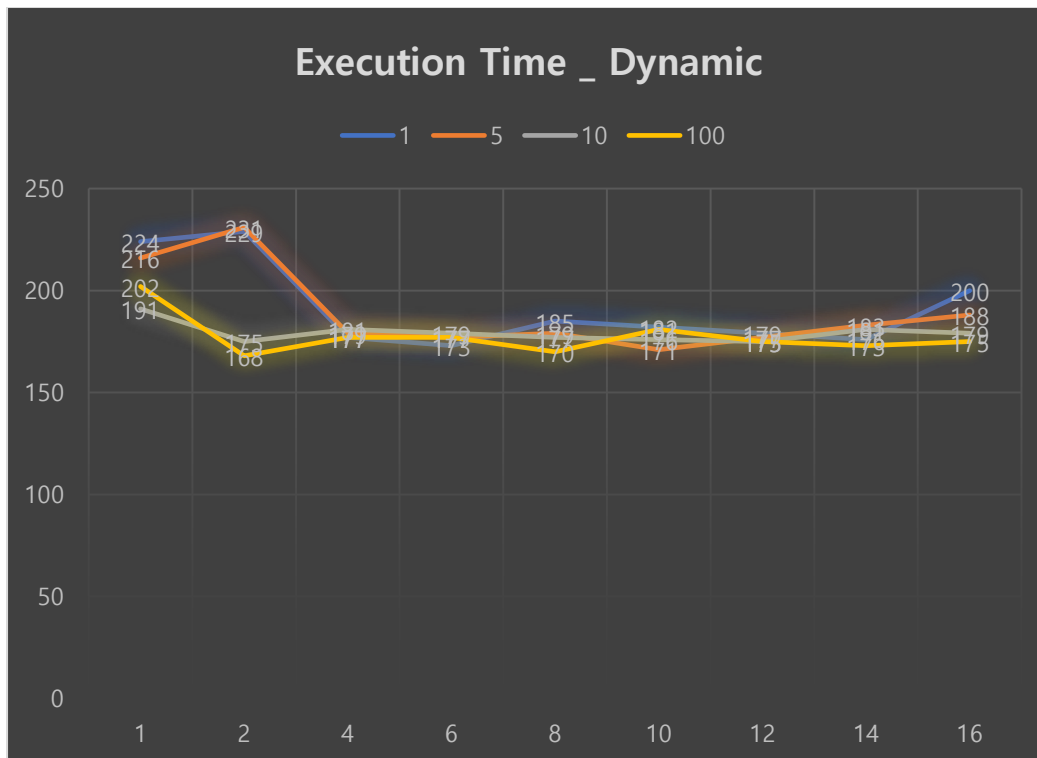
Performance	Chunk size	1	2	4	6	8	10	12	14	16
Static	1	0.003906	0.005102	0.005587	0.005848	0.005525	0.005714	0.005714	0.005464	0.005587
Dynamic		0.004464	0.004367	0.00565	0.00578	0.005405	0.005495	0.005587	0.005682	0.005
Guided		0.00431	0.005618	0.005464	0.005464	0.005263	0.005405	0.005714	0.005848	0.005291
Static	5	0.004149	0.005587	0.005714	0.005587	0.005714	0.00578	0.005587	0.00578	0.00565
Dynamic		0.00463	0.004329	0.005587	0.00565	0.005587	0.005848	0.00565	0.005464	0.005319
Guided		0.004878	0.005525	0.00565	0.00578	0.005714	0.00578	0.005848	0.00565	0.005714
Static	10	0.004926	0.005464	0.005102	0.005525	0.005587	0.005464	0.00578	0.005464	0.004878
Dynamic		0.005236	0.005714	0.005525	0.005587	0.00565	0.005682	0.005714	0.005525	0.005587
Guided		0.004673	0.005208	0.005464	0.00565	0.00565	0.00565	0.005587	0.00578	0.005102
Static	100	0.005291	0.005988	0.005714	0.005587	0.00565	0.005917	0.005714	0.00565	0.005747
Dynamic		0.00495	0.005952	0.00565	0.00565	0.005882	0.005525	0.005714	0.00578	0.005714
Guided		0.005208	0.005682	0.005917	0.006061	0.00578	0.00578	0.005587	0.00565	0.005525

Graphs_

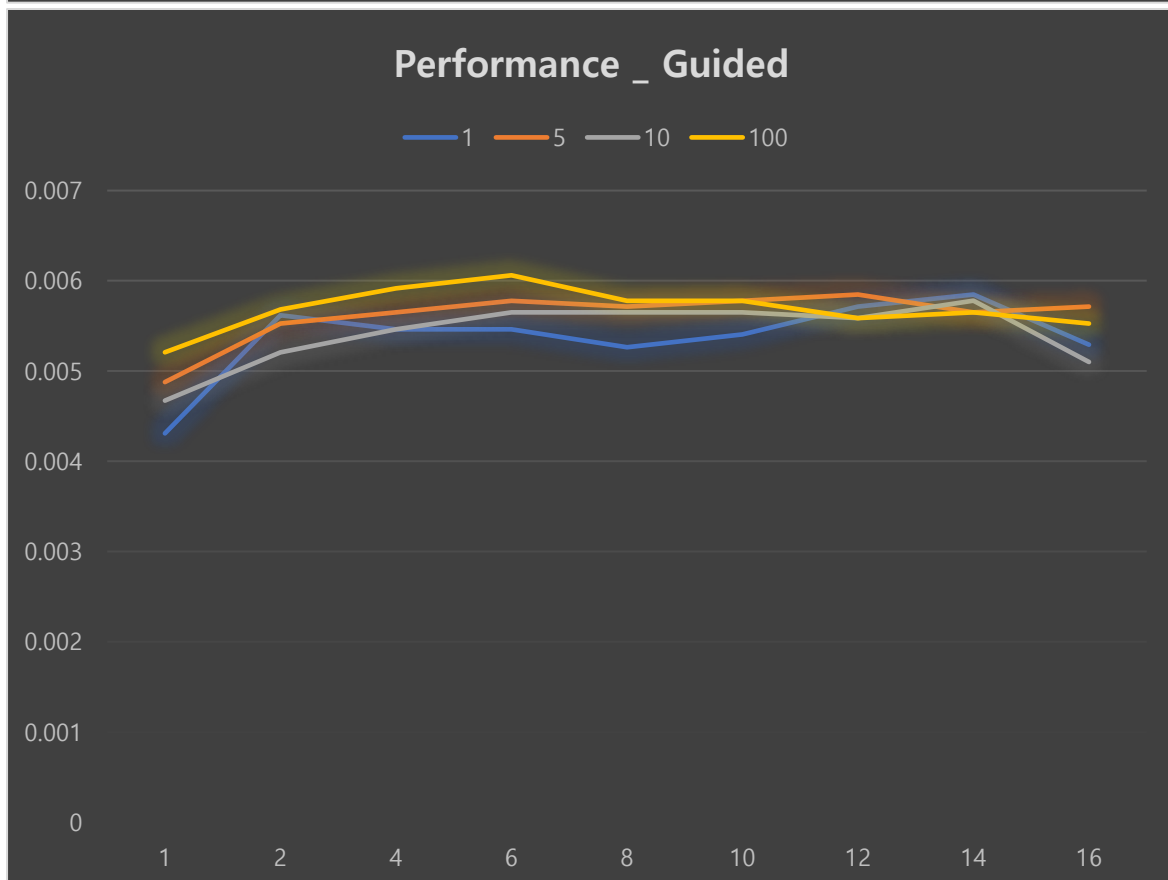
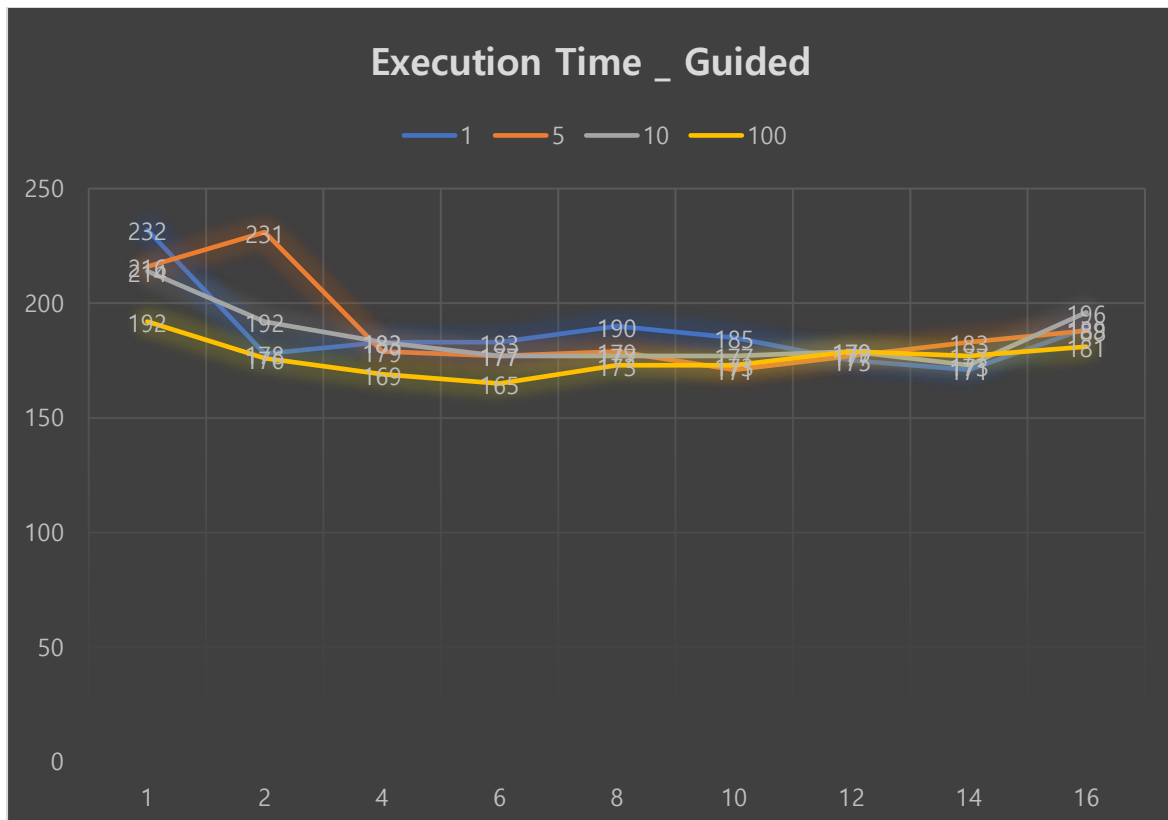
Static



Dynamic



Guided



Explanation / Analysis_

First, when comparing chunk sizes, we can see the more chunk sizes, the higher performance. It is because chunk size helps more parallel programming. It works all types of scheduling.

Also, as the number of threads increased, performance increased in all cases. Particularly noteworthy is that when one thread became two, there was a very high increase in performance, with almost a 2x decrease in execution time for 1-4 threads. However, as the number of threads increased to 4-16, the efficiency of the increase was not as significant. This may be due to Amdahl's law, which states that a computer program is composed of parallelizable and non-parallelizable parts, so there is a limit to the improvement in performance unless further parallelization is possible.