

Multicore Computing Project 1

Hardware and Software Information

Hardware Model	Lenovo ThinkPad T470s
Memory	7.5 GiB
Processor	Intel® Core™ i5-7300U CPU @ 2.60GHz × 4
Graphics	Mesa Intel® HD Graphics 620 (KBL GT2)
Disk Capacity	128.0 GB

OS Name	Fedora Linux 35 (Workstation Edition)
OS Type	64-bit
GNOME Version	41.5
Windowing System	X11
Software Updates	>

Hyperthreading: ON

Core **Count**: 2
Thread **Count**: 4

Problem 1

Tables

Execution Times

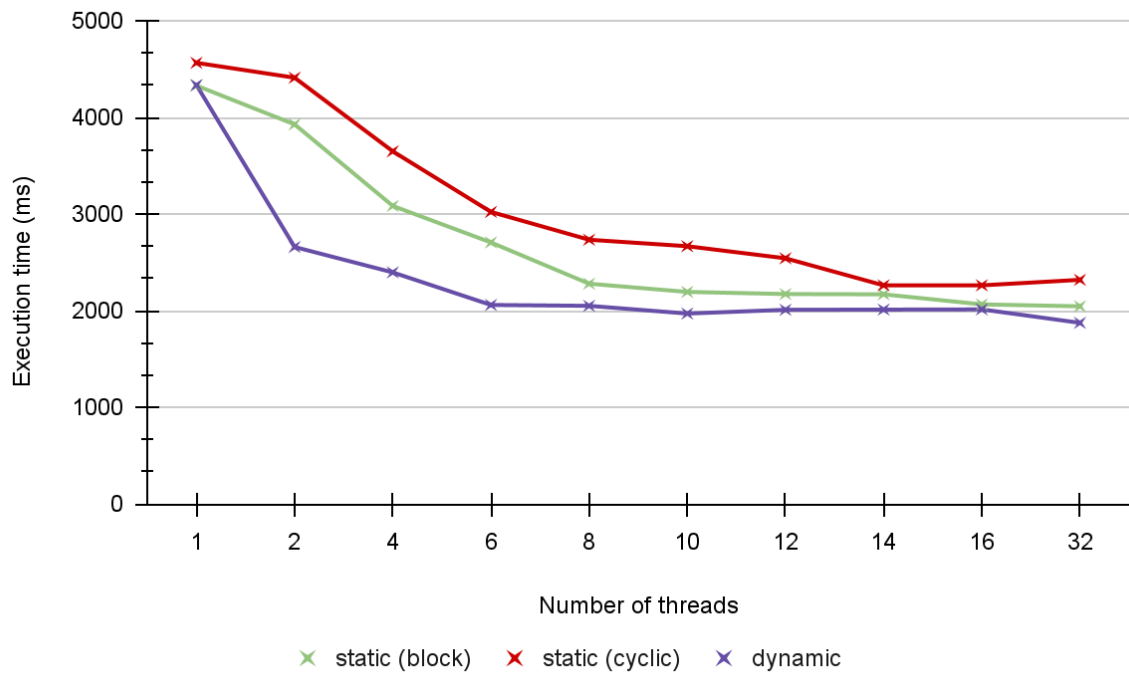
exec times in ms	1	2	4	6	8	10	12	14	16	32
static (block)	4330	3929	3085	2707	2280	2195	2173	2170	2066	2046
static (cyclic)	4566	4412	3650	3023	2735	2668	2543	2263	2263	2320
dynamic	4336	2660	2397	2060	2051	1971	2010	2012	2014	1875

Performance

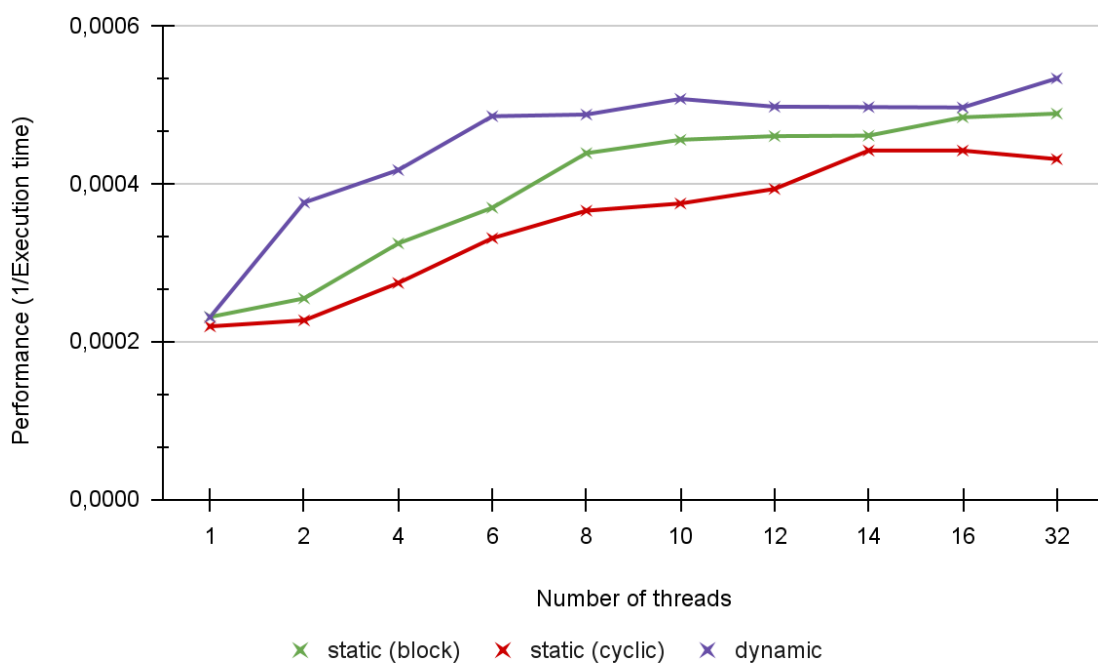
Perform ance 1/exec time	1	2	4	6	8	10	12	14	16	32
static (block)	0,00023 094688 22	0,00025 451768 9	0,00032 414910 86	0,00036 941263 39	0,00043 859649 12	0,00045 558086 56	0,00046 019328 12	0,00046 082949 31	0,00048 402710 55	0,00048 875855 33
static (cyclic)	0,00021 901007 45	0,00022 665457 84	0,00027 397260 27	0,00033 079722 13	0,00036 563071 3	0,00037 481259 37	0,00039 323633 5	0,00044 189129 47	0,00044 189129 47	0,00043 103448 28
dynamic	0,00023 062730 63	0,00037 593984 96	0,00041 718815 19	0,00048 543689 32	0,00048 756704 05	0,00050 735667 17	0,00049 751243 78	0,00049 701789 26	0,00049 652432 97	0,00053 333333 33

Graphs

Execution Times



Performance



Interpretation

My interpretation of these results is that increasing the number of threads, significantly reduces execution times and therefore increases performance. However, it reaches a point of what I would call “peak necessary performance” where execution times and performance do not vary much when adding more threads. As we can see, execution times with 16 threads are rather low and when doubling the number threads results are pretty much the same.

As for comparing the three methods, I think dynamic load balancing is definitely the best approach to a problem like this one, when the number of threads is low. However when increasing the number of threads the three methods seem to achieve pretty close or identical, sometimes even better execution times. So I think the best approach would then come to which one uses less memory.

Problem 2

Tables

Execution Times

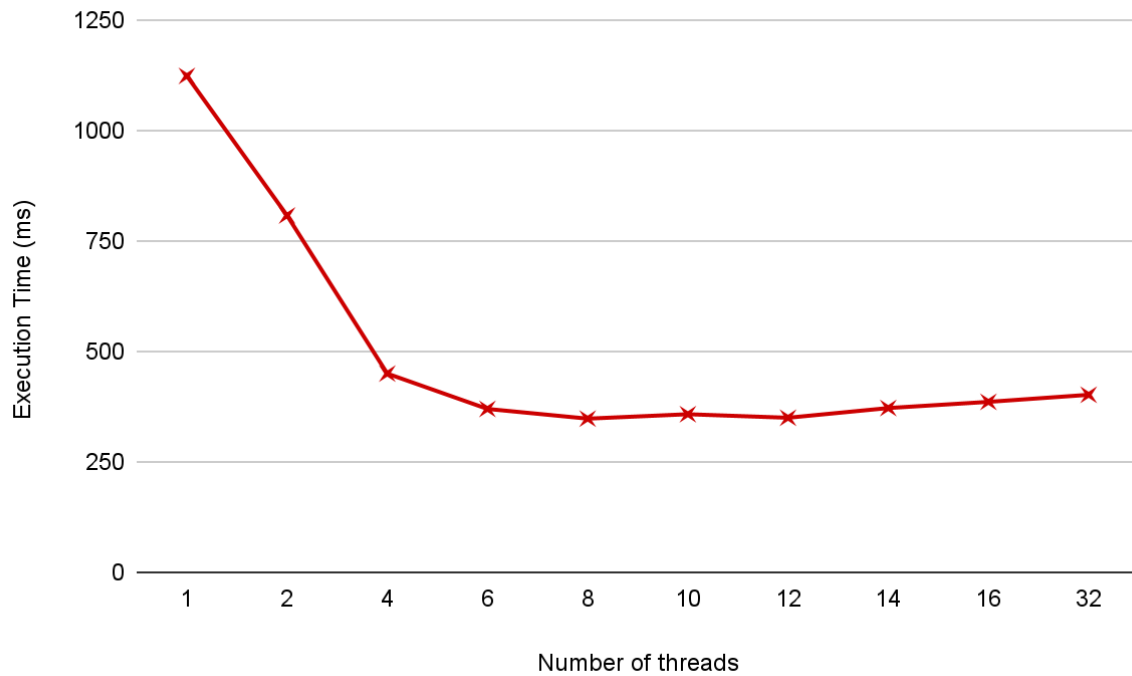
	1	2	4	6	8	10	12	14	16	32
exec times in ms	562	404	225	185	174	179	175	186	193	201

Performance

	1	2	4	6	8	10	12	14	16	32
		0,0024752	0,0044444	0,0054054	0,00574712	0,0059217	0,0058571	0,00537634	0,0051813	0,0049751
Performance 1/exec time	0,001779359431	47525	44444	05405	747126437	92179	85714	376344086	18134715	24378

Graphs

Execution Times



Performance

