Multicore Computing Project3

- Problem 2 -

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목 차

1. Environment

Model: MacBook Air(M1, 2020)

Chip: Apple M1

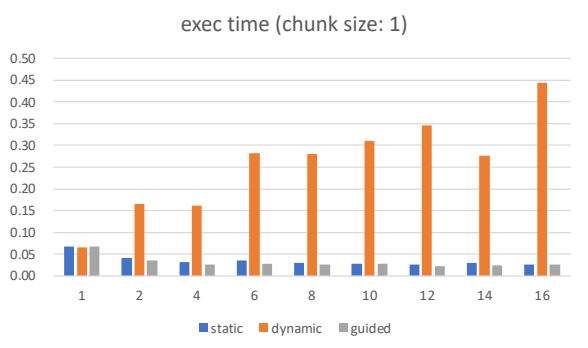
Cores: 4+4 (P: 4 / E: 4)

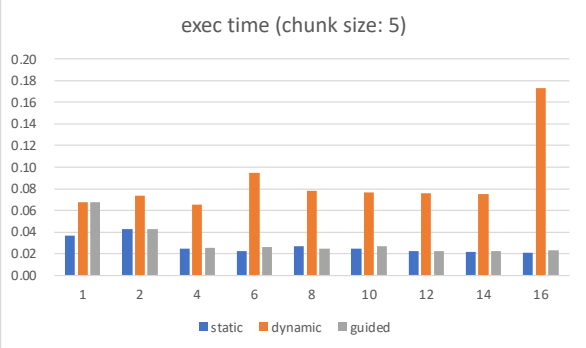
RAM: 16 GB

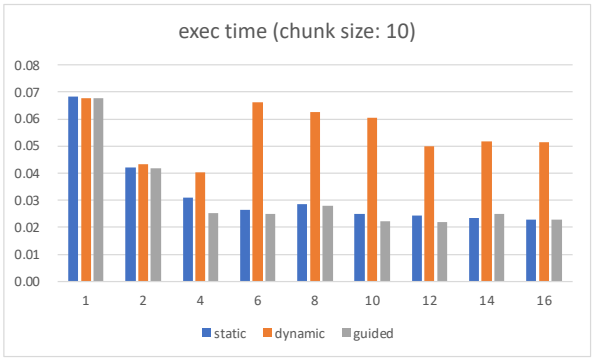
2. Result

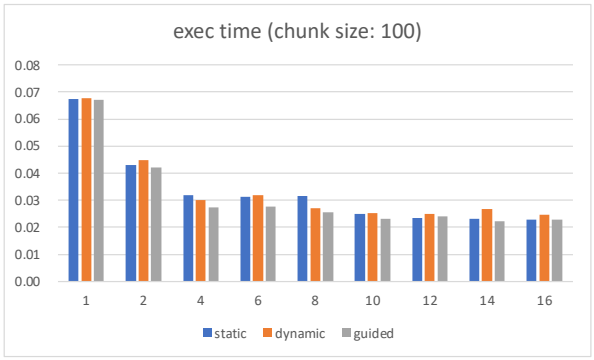
exec time (unit:ms)	chunk size	1	2	4	6	8	10	12	14	16
static	1	0.07	0.04	0.03	0.04	0.03	0.03	0.03	0.03	0.03
dynamic		0.07	0.17	0.16	0.28	0.28	0.31	0.35	0.28	0.44
guided		0.07	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.03
static	5	0.04	0.04	0.02	0.02	0.03	0.02	0.02	0.02	0.02
dynamic		0.07	0.07	0.07	0.09	0.08	0.08	0.08	0.07	0.17
guided		0.07	0.04	0.03	0.03	0.02	0.03	0.02	0.02	0.02
static	10	0.07	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02
dynamic		0.07	0.04	0.04	0.07	0.06	0.06	0.05	0.05	0.05
guided		0.07	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02
static	100	0.07	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.02
dynamic		0.07	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.02
guided		0.07	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02

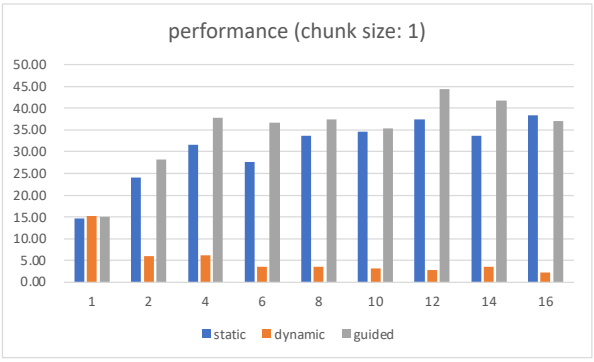
performance (1/exec time)	chunk size	1	2	4	6	8	10	12	14	16
static	1	14.69	24.10	31.50	27.62	33.67	34.60	37.35	33.74	38.30
dynamic		15.22	6.06	6.18	3.54	3.58	3.22	2.88	3.62	2.25
guided		14.97	28.22	37.79	36.76	37.35	35.44	44.40	41.78	37.02
static	5	27.24	23.25	40.05	44.15	36.58	40.40	44.79	45.31	47.86
dynamic		14.85	13.63	15.24	10.57	12.78	13.07	13.22	13.36	5.77
guided		14.77	23.54	39.22	37.64	40.45	36.79	44.07	44.91	43.69
static	10	14.63	23.69	32.37	37.72	35.14	40.29	40.91	42.63	43.86
dynamic		14.78	23.08	24.85	15.08	15.97	16.52	19.96	19.29	19.39
guided		14.78	23.99	39.37	39.90	35.66	45.22	45.42	40.12	43.76
static	100	14.81	23.18	31.48	31.92	31.76	40.00	42.69	43.36	43.95
dynamic		14.77	22.25	33.26	31.28	37.08	39.60	39.91	37.21	40.71
guided		14.89	23.75	36.56	35.96	39.13	43.04	41.46	45.05	43.94

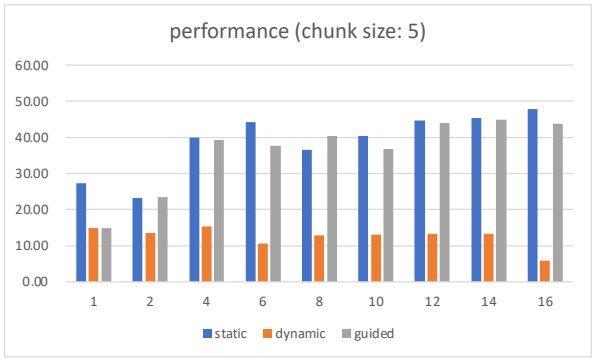


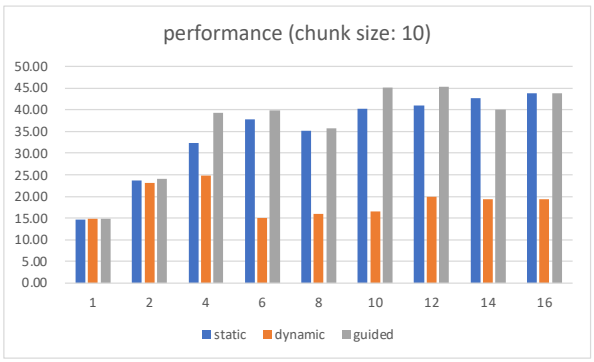


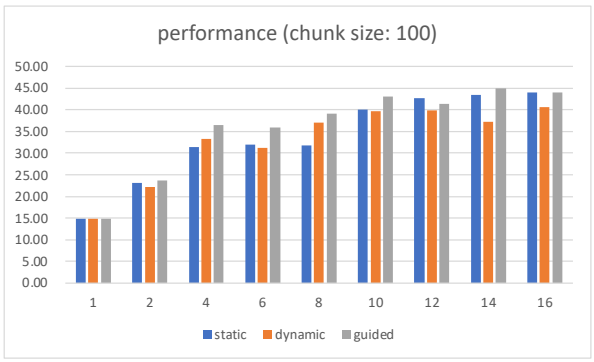












3. Explanation

If we look at the result, when chunk size is set to 1, 5 or 10, static and guided methods' execution time showed decreasing trend while dynamic showed the opposite. When chunk size is set to 100, all methods showed decreasing trend. This is because when dynamic method has overhead to fetch workload, which can lead to decreasing performance when having many threads and small chunk size. Guided method on the other hand, works like dynamic but it reduces chunk size during the process. By this way, it can take advantage of both static and dynamic way.