2025.1 Multicore Computing Project #3

-C OpenMP program-

20223961 김수아

1. environment
    A. CPU
        i. 13th Gen Intel Core i7-1355U
        ii. 10 cores(12 logical processors)
        iii. 1.70GHz base clock speed
    B. Memory : 15.7GB
   C. OS : Windows 11

2. result
    A. tables
        i. exec time

exectime (unit : ms)	chunck size	1	2	4	6	8	10	12	14	16
static	default	2452	1861	1247	922	771	657	644	629	560
dynamic	default	2351	1292	862	605	536	471	427	451	432
static	10	2344	1329	972	895	633	520	570	534	489
dynamic	10	2362	1209	812	673	609	562	470	456	460

        ii. performance

profomance (1/exectime)	chunck size	1	2	4	6	8	10	12	14	16
static	default	0.0004	0.0005	0.0008	0.001	0.0012	0.0015	0.0015	0.0016	0.0017
dynamic	default	0.0004	0.0007	0.0012	0..0017	0.0019	0.0021	0.0023	0.0022	0.0023
static	10	0.0004	0.0007	0.001	0.0011	0.0016	0.0019	0.0018	0.0019	0.0020
dynamic	10	0.0004	0.0008	0.0012	0.0015	0.0016	0.0018	0.0021	0.0022	0.002

B. graphs
  i. exec time

execution time
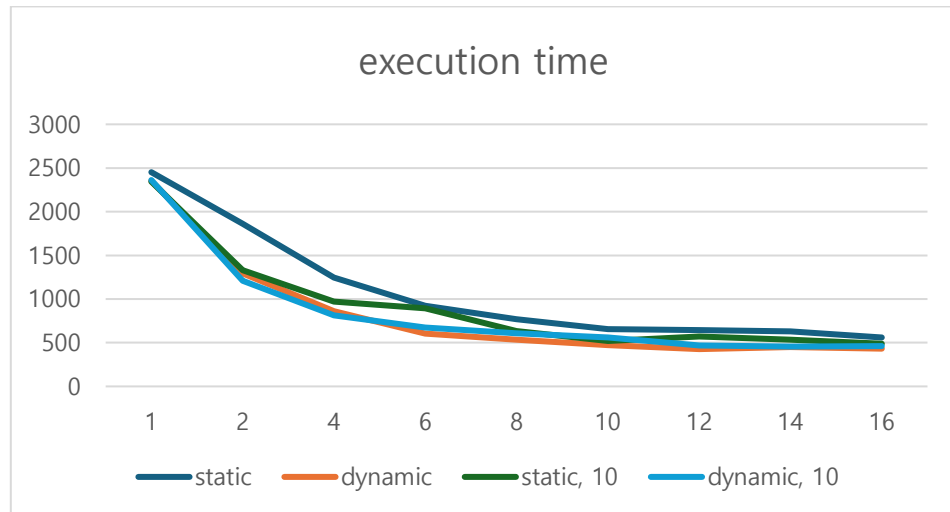
  ii. performance
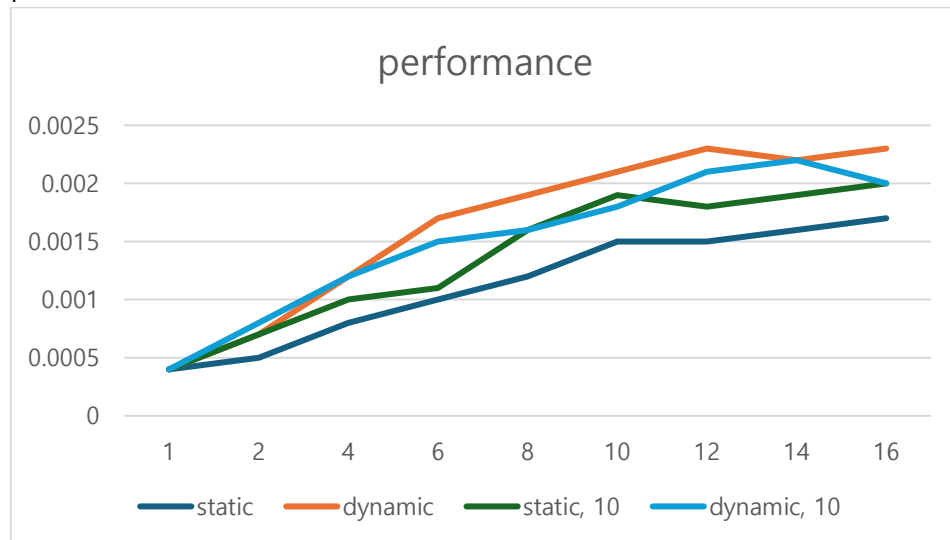
performance

C. explanation
  i. Relationship between performance and the number of threads
     1. Generally performance graph draws an upward-sloping curve.(Execution time graph is opposite because exec time = 1/performance). It is not linear but rather more gradual. Some cases, after a certain point performance is decreases or plateaus. This can be explained by Amdahl's Law. Also as the number of threads increases, overhead is increased too. It make the graph non linear.
  ii. static vs dynamic
     Dynamic approach performed best. In static(default) case, it may be load unbalanced problem between thread that calculates

easy(small) number and calculates difficult(big) number because it divides the data in order. On the other hand, the dynamic approch was better because it dynamically allocates work directly as soon as the task is finished in a thread.

iii. chunk size : default vs 10

For Static scheduling, chunk size 10 is relatively performed better than default. Because smaller chunks provide better load balancing by distributing work more evenly.

For dynamic, default chunk size is little better than chunk size 10. Because, dynamic scheduling already satisfies load balancing, so the smaller chunk size causes additional scheduling overhead.

It shows that load balancing and scheduling have relationship of thade-off.