Problem 1

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# Environment

* **Processor**: Intel(R) Core(TM) i7-1065G7 CPU @ 1.30GHz 1.50 GHz
* **Number of cores**: 4
* **RAM**: 16.0GB
* **OS**: Window 11 (64 bit)

# Tables and graphs

## Execution time

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| exec time | chunk size | 1 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
| static | default | 8.161215 | 6.313102 | 4.489625 | 3.37138 | 2.82432 | 2.566279 | 2.452443 | 2.451247 | 2.266 |
| dynamic | default | 8.280857 | 4.654672 | 2.903793 | 2.379482 | 2.042366 | 2.034973 | 2.02814 | 1.977186 | 1.967277 |
| static | 10 | 7.938462 | 4.757136 | 2.980703 | 2.950029 | 2.349023 | 2.203987 | 2.125187 | 2.119345 | 2.076638 |
| dynamic | 10 | 8.392224 | 4.652983 | 2.998122 | 2.400914 | 2.148778 | 2.082325 | 2.080283 | 1.997079 | 1.948382 |

## Performance

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| performance | chunk size | 1 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
| static | default | 0.122531 | 0.158401 | 0.222736 | 0.296614 | 0.354068 | 0.389669 | 0.407757 | 0.407956 | 0.441306 |
| dynamic | default | 0.12076 | 0.214838 | 0.344377 | 0.42026 | 0.489628 | 0.491407 | 0.493063 | 0.505769 | 0.508317 |
| static | 10 | 0.125969 | 0.210211 | 0.335491 | 0.33898 | 0.425709 | 0.453723 | 0.470547 | 0.471844 | 0.481548 |
| dynamic | 10 | 0.119158 | 0.214916 | 0.333542 | 0.416508 | 0.465381 | 0.480232 | 0.480704 | 0.500731 | 0.513246 |

## Static(default)

## Dynamic(default)

## Static(chunk size: 10)

## Dynamic(chunk size: 10)

# Explanation / Analysis

When the chunk size was set to default, static scheduling’s performance increased from 0.12 to 0.44, as the number of threads increased. In the case of dynamic scheduling, it showed similar performance to static, but when the performance increased more rapidly and the number of threads exceeded 10, adding threads did not improve significantly.

텍스트, 폰트, 스크린샷이(가) 표시된 사진

자동 생성된 설명텍스트, 폰트, 스크린샷, 화이트이(가) 표시된 사진

자동 생성된 설명

When the chunk size is set to 10, static scheduling performs slightly better than the value given as default. In the case of the default value, the chunk size is designated as ‘loop\_count/thread\_count’, resulting in a performance difference between threads. This is because the larger the number, it is difficult to calculate whether it is a prime number or not. Therefore, threads with high numbers take longer than other threads.

텍스트, 폰트, 스크린샷, 블랙이(가) 표시된 사진

자동 생성된 설명 텍스트, 폰트, 스크린샷, 화이트이(가) 표시된 사진

자동 생성된 설명

In dynamic scheduling, it can also be seen that setting the chunk size to 10 is a litter better than giving default for the same reason as static.