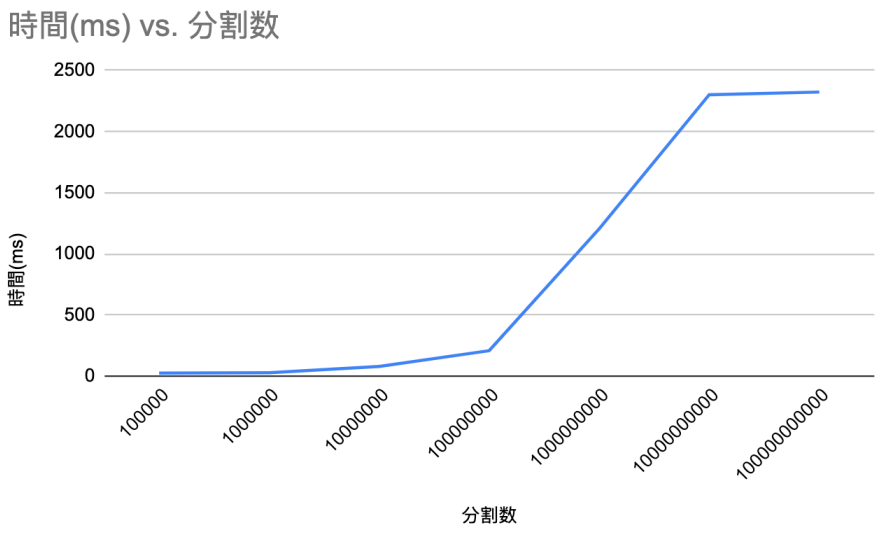
PCS_2021_Ex01J

s1270174

- CPU
  docker in M1 chip ( )
-
  0.6 GHz ~ 3.2 GHz
-
  8
-
  6GB
- OS
  arch linux(amd64) latest

1 (1)

A



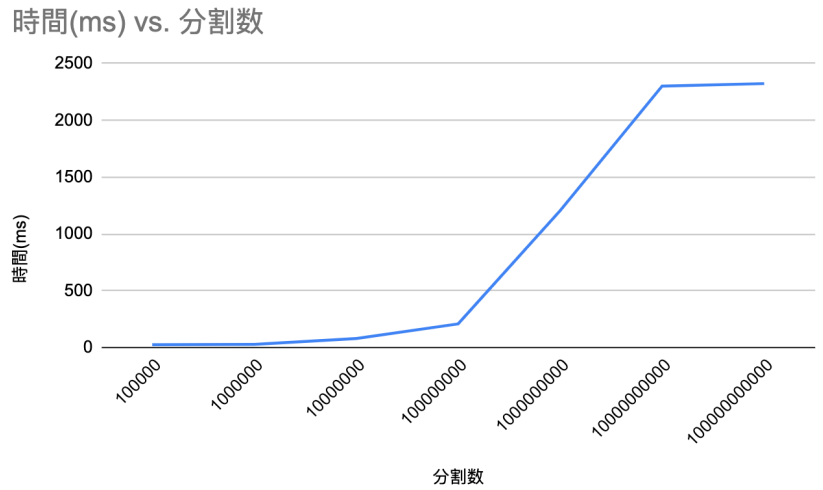
:

(p1.c):

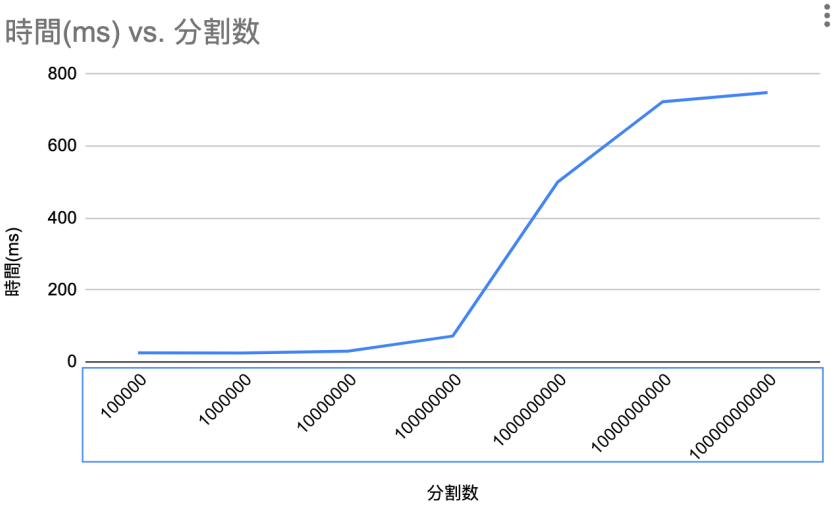
```c
#include <stdio.h>
#include <stdlib.h>
#include <math.h>

double f(double a){
    return (4.0 / (1.0 + a * a));
}

int main(int argc, char *argv[]){
    int n, id, np, i;
    double PI25DT = 3.14159265358979323846264 3;
    double h, sum, x, mypi;

    // error handling
    if (argc != 2) {
        printf("no enough arguments!");
        exit(0);
    }

    char* n_string = argv[1];

    n = atoi(n_string);

    h = 1.0 / (double)n;
    sum = 0.0;
    // main loop
    for (i = 0; i < n; i++){
        x = h * ((double)i - 0.5);
        sum += f(x);
    }
    mypi = h * sum;

    printf("pi is approximately %.16f, Error is %.16f\n", mypi, fabs(mypi - PI25DT));

    return 0;
}
```

B

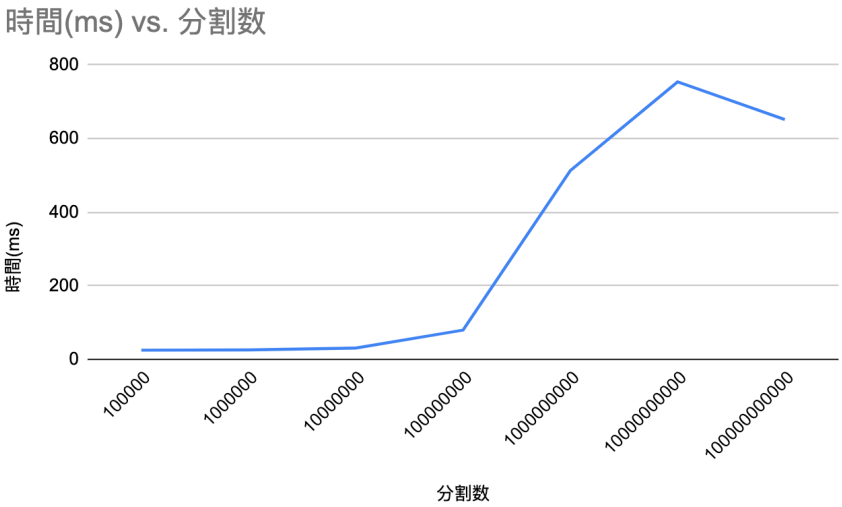
0->1


時間(ms) vs. 分割数
2500
2000
1500
1000
500
0
時間(ms)
100000
1000000
10000000
100000000
1000000000
10000000000
100000000000
分割数

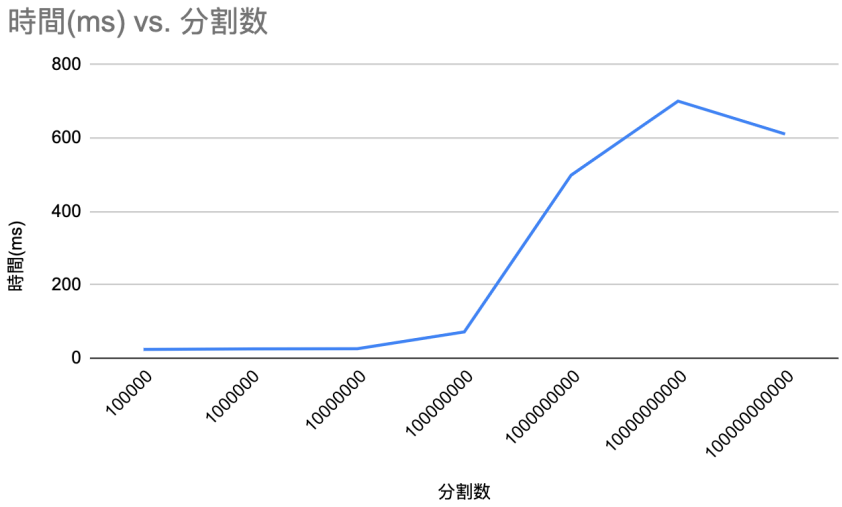
- -O0


時間(ms) vs. 分割数
800
600
400
200
0
時間(ms)
100000
1000000
10000000
100000000
1000000000
10000000000
100000000000
分割数

- -O1



- -O2



- -O3

2 (2)

```
schoolWorks/sy05/PCS_2021_Ex01J on  main [!?] took 4s
❯ gcc-11 p2.c e_time.c && time ./a.out 1000000000000
pi is approximately 3.1415926552348434, Error is 0.0000000016450503
en - st = 4.265404
________________________________________________________
Executed in    4.33 secs    fish           external
   usr time    4.25 secs   30.00 micros    4.25 secs
   sys time    0.01 secs  288.00 micros    0.01 secs
```

(e_time.c):

```c
#include <time.h>
#include <sys/time.h>
#include <sys/resource.h>

double e_time(void){
    static struct timeval now;
    gettimeofday(&now, NULL);
    return (double)(now.tv_sec + now.tv_usec / 1000000.0);
}
```

(p2.c):

```c
#include <stdio.h>
#include <stdlib.h>
#include <math.h>

double e_time(void);

double f(double a){
    return (4.0 / (1.0 + a * a));
}

int main(int argc, char *argv[]){
    int n, id, np, i;
    double PI25DT = 3.14159265358979323846264 3;
    double h, sum, x, mypi;
    double st, en;

    // error handling
    if (argc != 2) {
        printf("no enough arguments!");
        exit(0);
    }

    char* n_string = argv[1];

    n = atoi(n_string);

    st = e_time(); //

    h = 1.0 / (double)n;
    sum = 0.0;
    // main loop
    for (i = 0; i < n; i++){
        x = h * ((double)i - 0.5);
```

```
        sum += f(x);
    }
    mypi = h * sum;

    en = e_time(); //

    printf("pi is approximately %.16f, Error is %.16f\n", mypi, fabs(mypi - PI25DT));

    printf("en - st = %f", en - st);

    return 0;
}
```