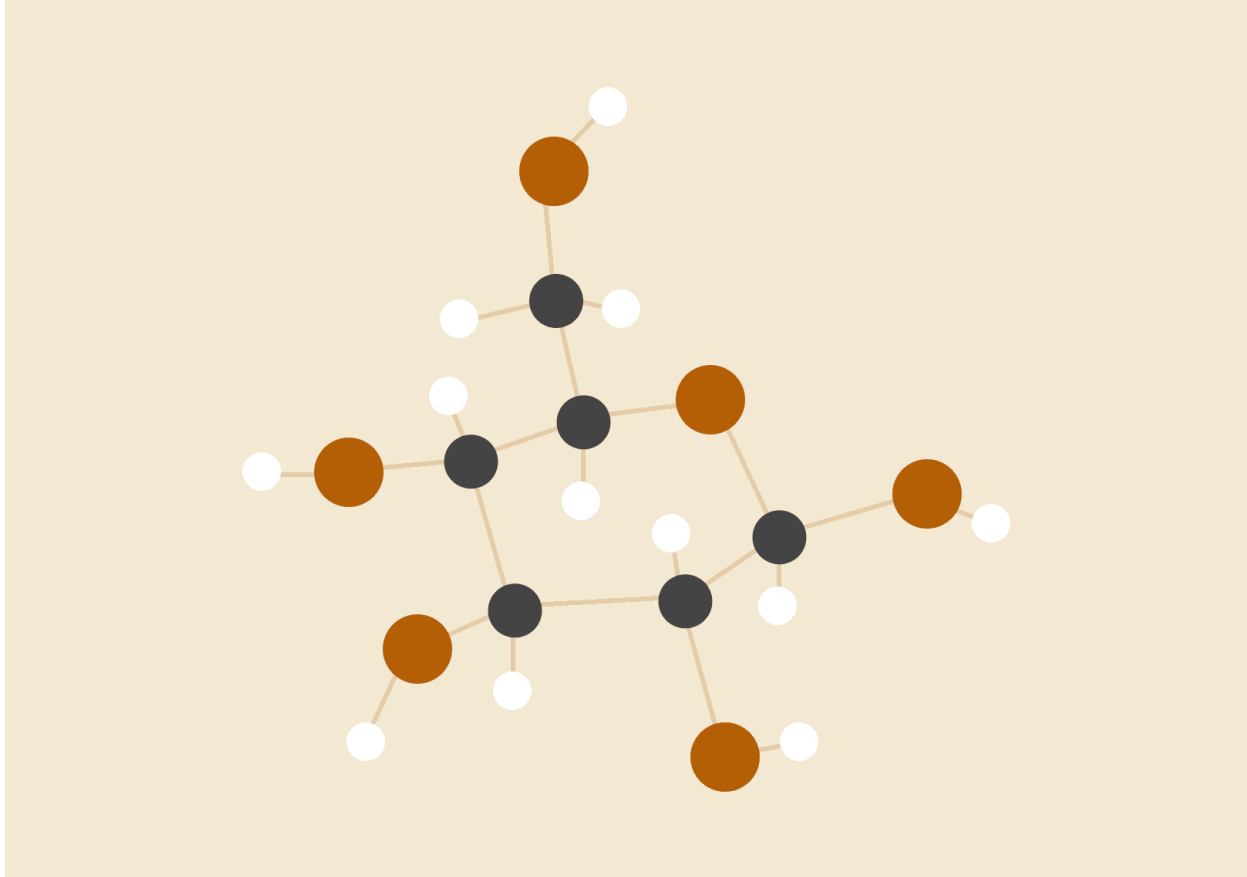


FINAL PROJECT REPORT

Comparison of sorting algorithms through Serial, Pthread and OpenMP



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17.05.2021

CS220 - Operating Systems

BCS 4H

INTRODUCTION

The target of our project is to find out which of these 3 (SERIAL vs PTHREAD vs OPENMP) ways yields the most efficient outcome. In this, 3 sorting algorithms will be compiled using the above-mentioned ways of processing to find out the time complexity.

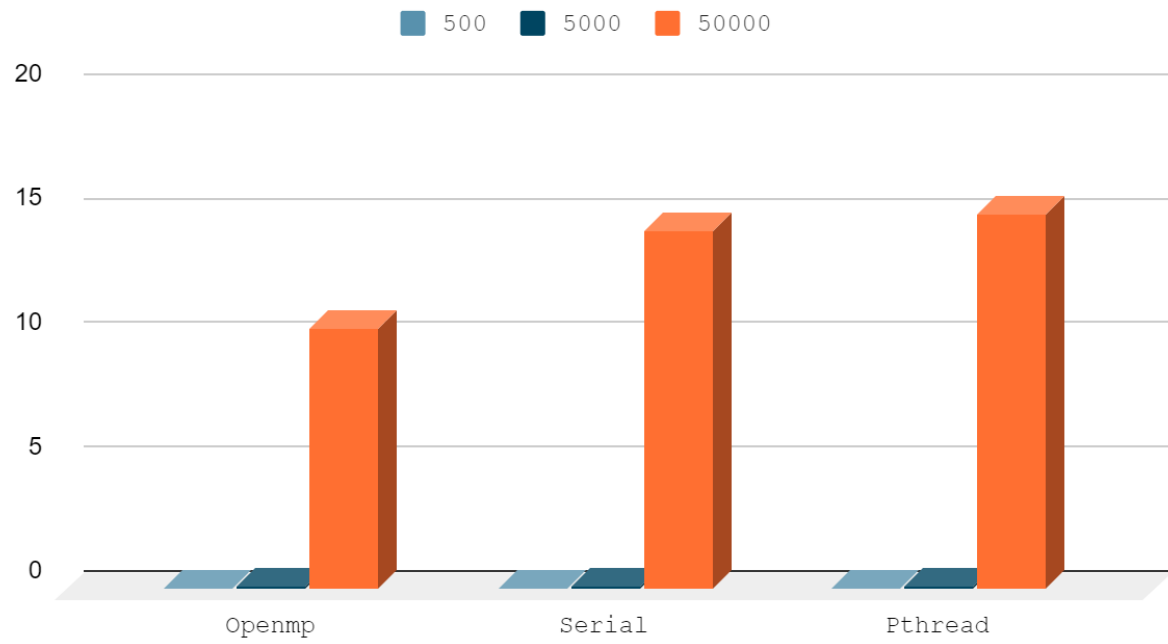
PROCEDURE

1. 3 sorting algorithms were be compiled:
 - a. Count Sort
 - b. Quick Sort
 - c. Selection Sort
2. Algorithms used the following ways of processing
 - a. Serial
 - b. Pthread
 - c. Openmp
3. The timestamp was put on all these methods and reading was noted.
4. The program outputs the execution time of the way of processing used and also with how many elements it was used with

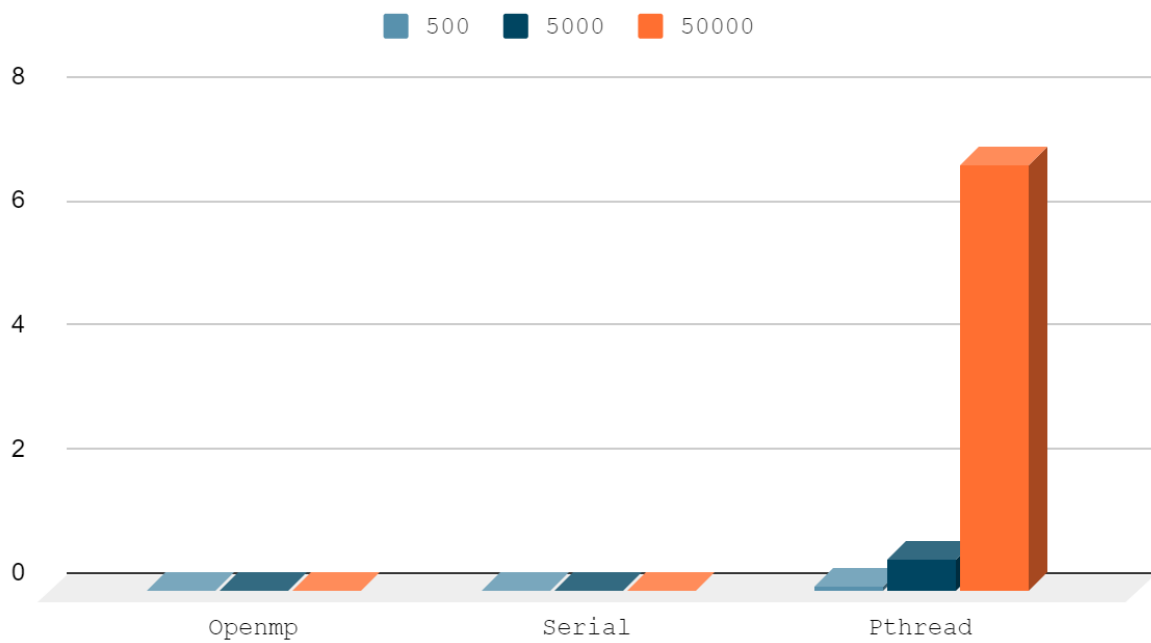
RESULTS

According to the data, we can assume that OpenMP is efficient when it comes to a large amount of data while serial processing is better when a low amount of data is used.

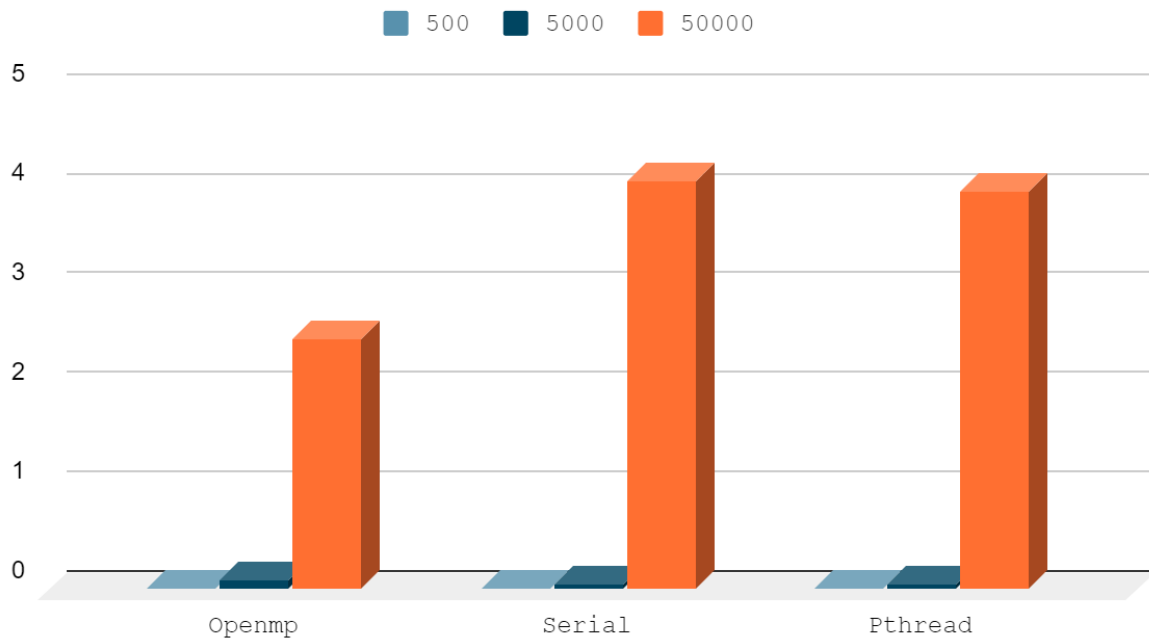
Count Sort



Quick Sort



Selection Sort



Count Sort:

```
subhan@tedd: ~/FAST
subhan@tedd:~/FAST$ ./count
---500 elements---
OMP Execution time was 0.001803 seconds
Serial Execution time was 0.001536 seconds
Pthread Execution time was 0.003593 seconds

---5000 elements---
OMP Execution time was 0.130902 seconds
Serial Execution time was 0.152194 seconds
Pthread Execution time was 0.143344 seconds

---50000 elements---
OMP Execution time was 10.480730 seconds
Serial Execution time was 14.380019 seconds
```

```
subhan@tedd: ~/FAST
OMP Execution time was 0.001803 seconds
Serial Execution time was 0.001536 seconds
Pthread Execution time was 0.003593 seconds

---5000 elements---
OMP Execution time was 0.130902 seconds
Serial Execution time was 0.152194 seconds
Pthread Execution time was 0.143344 seconds

---50000 elements---
OMP Execution time was 10.480730 seconds
Serial Execution time was 14.380019 seconds
Pthread Execution time was 15.086850 seconds
subhan@tedd:~/FAST$
```

Quick Sort:

```
subhan@tedd: ~/FAST
subhan@tedd:~/FAST$ ./quick
---500 elements---
OMP Execution time was 0.000497 seconds
Serial Execution time was 0.000059 seconds
Pthread Execution time was 0.067791 seconds

---5000 elements---
OMP Execution time was 0.001441 seconds
Serial Execution time was 0.000978 seconds
Pthread Execution time was 0.508687 seconds

---50000 elements---
OMP Execution time was 0.019759 seconds
Serial Execution time was 0.027208 seconds
```

```
subhan@tedd: ~/FAST
OMP Execution time was 0.000497 seconds
Serial Execution time was 0.000059 seconds
Pthread Execution time was 0.067791 seconds

---5000 elements---
OMP Execution time was 0.001441 seconds
Serial Execution time was 0.000978 seconds
Pthread Execution time was 0.508687 seconds

---50000 elements---
OMP Execution time was 0.019759 seconds
Serial Execution time was 0.027208 seconds
Pthread Execution time was 6.857865 seconds
subhan@tedd:~/FAST$
```

Selection Sort:

```
subhan@tedd: ~/FAST
subhan@tedd:~/FAST$ gcc -o selection selection.c -lpthread -fopenmp
subhan@tedd:~/FAST$ ./selection
---500 elements---
OMP Execution time was 0.001550 seconds
Serial Execution time was 0.000430 seconds
Pthread Execution time was 0.000713 seconds

---5000 elements---
OMP Execution time was 0.085518 seconds
Serial Execution time was 0.045417 seconds
Pthread Execution time was 0.042316 seconds

---50000 elements---
OMP Execution time was 2.519986 seconds
```

```
subhan@tedd: ~/FAST
OMP Execution time was 0.001550 seconds
Serial Execution time was 0.000430 seconds
Pthread Execution time was 0.000713 seconds

---5000 elements---
OMP Execution time was 0.085518 seconds
Serial Execution time was 0.045417 seconds
Pthread Execution time was 0.042316 seconds

---50000 elements---
OMP Execution time was 2.519986 seconds
Serial Execution time was 4.111187 seconds
Pthread Execution time was 4.005982 seconds
subhan@tedd:~/FAST$
```