ECE ŞEŞEN
22201637
CS101-01

Homework-2

1. Text output of the code

-> First run

	algorithm A	algorithm B
10	916	2125
100	1666	74792
1000	14250	2408417
10000	215083	26568041
100000	757125	2055021083

-> Second Run

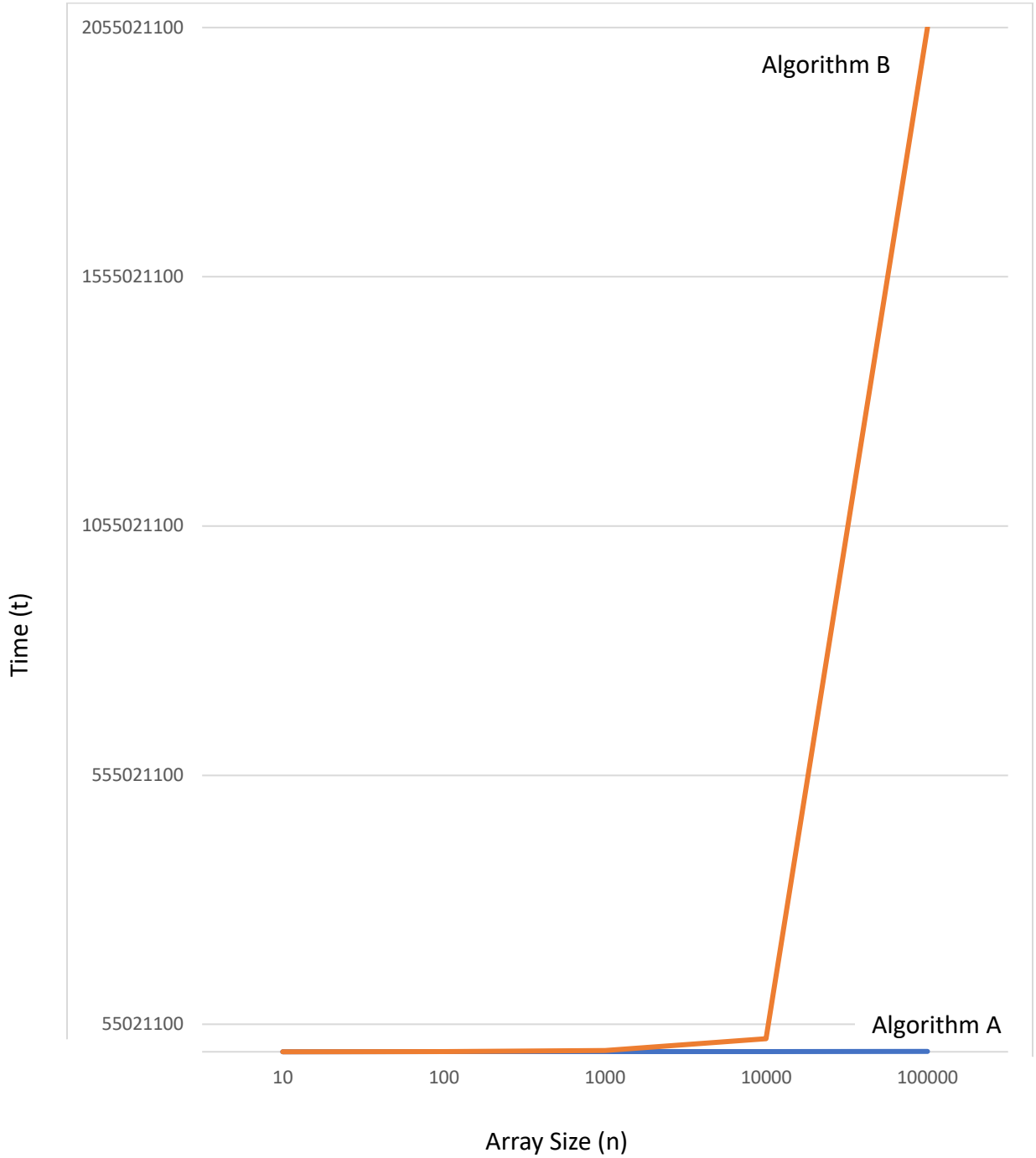
	algorithm A	algorithm B
10	875	2084
100	1667	74666
1000	14709	2380792
10000	106791	26358000
100000	799666	2055829542

-> Third Run

	algorithm A	algorithm B
10	1250	3000
100	1667	75000
1000	14750	2456083
10000	114500	27033583
100000	760459	2073138458

2. Plot for the output

Comparison of Two Algorithms



Accordign to graph, even if Algorithm A seems like it is nearly zero, it is not actually. Since Algorithm B is too slow, graph shows difference by putting time interval for Algorithm A near to zero. Therefore, computer needs sufficient time for calculating same logic by usign different algorithms.

3. Discussion

Firstly, analyzing the algorithms and the outputs, it is obvious that Algorithm A is much faster compared to Algorithm B. Time differs because of different implementation of same logic and various number of inputs. Moreover, inspecting the result, it is said that disregarding to algorithm style, run-time increases while input size increases.

Observing the results, we can realize that each iteration gives different outputs. During execution, I measured the required time by taking difference between end and start. Therefore, the difference does not stem from only the time intervals but also the process time of computer. *"This means that other processes may be executed in between of execution phases of your benchmarked program. Therefore. measuring the elapsed time is inaccurate (it likely also includes execution time from other processes)."* **[1]**

Algorithm A is faster because compared to Algorithm B, it does not contain any nested loop. Algorithm A follows the logic which is updating most repeated number when finding new number whose frequency is more than existing more repeated number's frequency. Therefore, while tracing all array elements, the algorithm just compares whether it is repeating number and its frequency overweight existing frequency.

However, Algorithm B contains nested loops which make the algorithm slower. It traces all elements one by one. Moreover, for each element, it traces all array again and count its frequency.

Works cited

[1]: https://softwareengineering.stackexchange.com/questions/222592/why-execution-time-is-different-each-time-in-java