CS3345.004 Programing Assignment 2 (10%)

Due 11:59pm, April 13, 2023

Sorting algorithm

A. (**100%**) Experimental studies of sorting algorithm.

a. Implement mergesort algorithm.
b. Implement quicksort with median-of-three partitioning and a cutoff of 15
c. Perform a series of benchmarking tests to see which algorithm is faster.
d. In addition to various sizes of data sequence, your test shall include sequences that are "random" as well as "almost" sorted.
e. Analyze the measuring results and provide your conclusion.

B. **(Extra 20%)** Design an algorithm that reads N points in a plane and outputs any group of four or more colinear points (i.e., points on the same line). The obvious brute-force algorithm requires $O(N^4)$ time. However, there is a better algorithm that makes use of sorting and runs in $O(N^2 \log N)$ time.

Programming assignments grading:

Code Development 30% (compile w/o error)
Program Execution 20% (run successfully)
Program Design 25% (conform to spec)
Documentation 15% (program, comments)
Coding Style 10% (clear, efficient)

SUBMISSION:

1. A copy of the final working source code with comments and documentation.
2. A screenshot showing benchmarking tests results, and your analysis report.
3. Submit your answers, clearly marked with your name, through eLearning by the due date.
4. Plagiarizing assignment answers obtained from the internet or AI chatbots is not permitted.
5. **No late homework or assignment will be accepted!**

Yi Zhao