Data Structures & Algorithms Coursework

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Declaration

I confirm that the submitted coursework is my own work and that all material attributed to others (whether published or unpublished) has been clearly identified and fully acknowledged and referred to original sources. I agree that the College has the right to submit my work to the plagiarism detection service. TurnitinUK for originality checks.

Acknowledgements

I'd like to thank my partner Shannon for her continued support and challenges that help me grow, both professionally and personally. I would also like to thank all of you who also helped me get here.

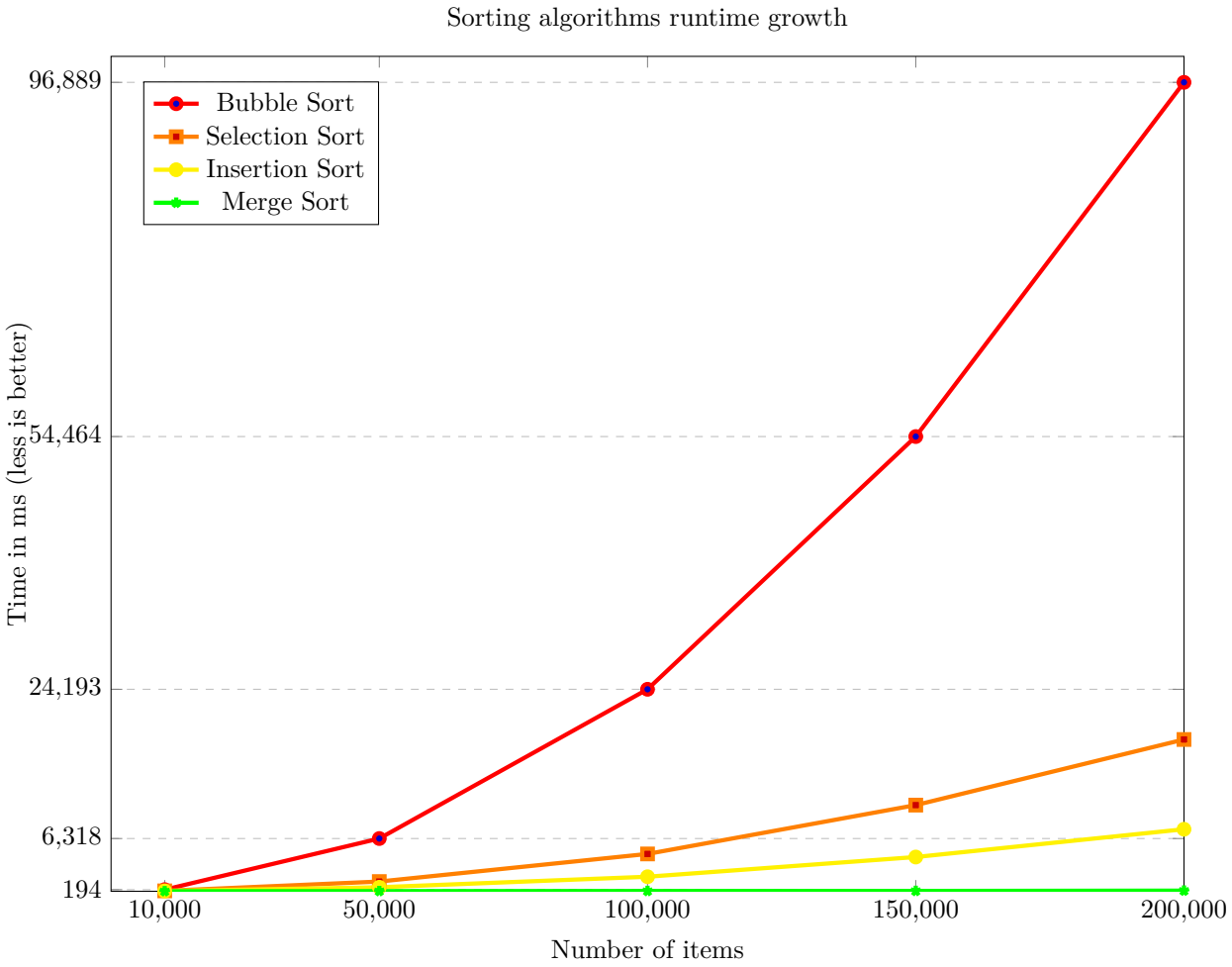
Contents

Chapter 1

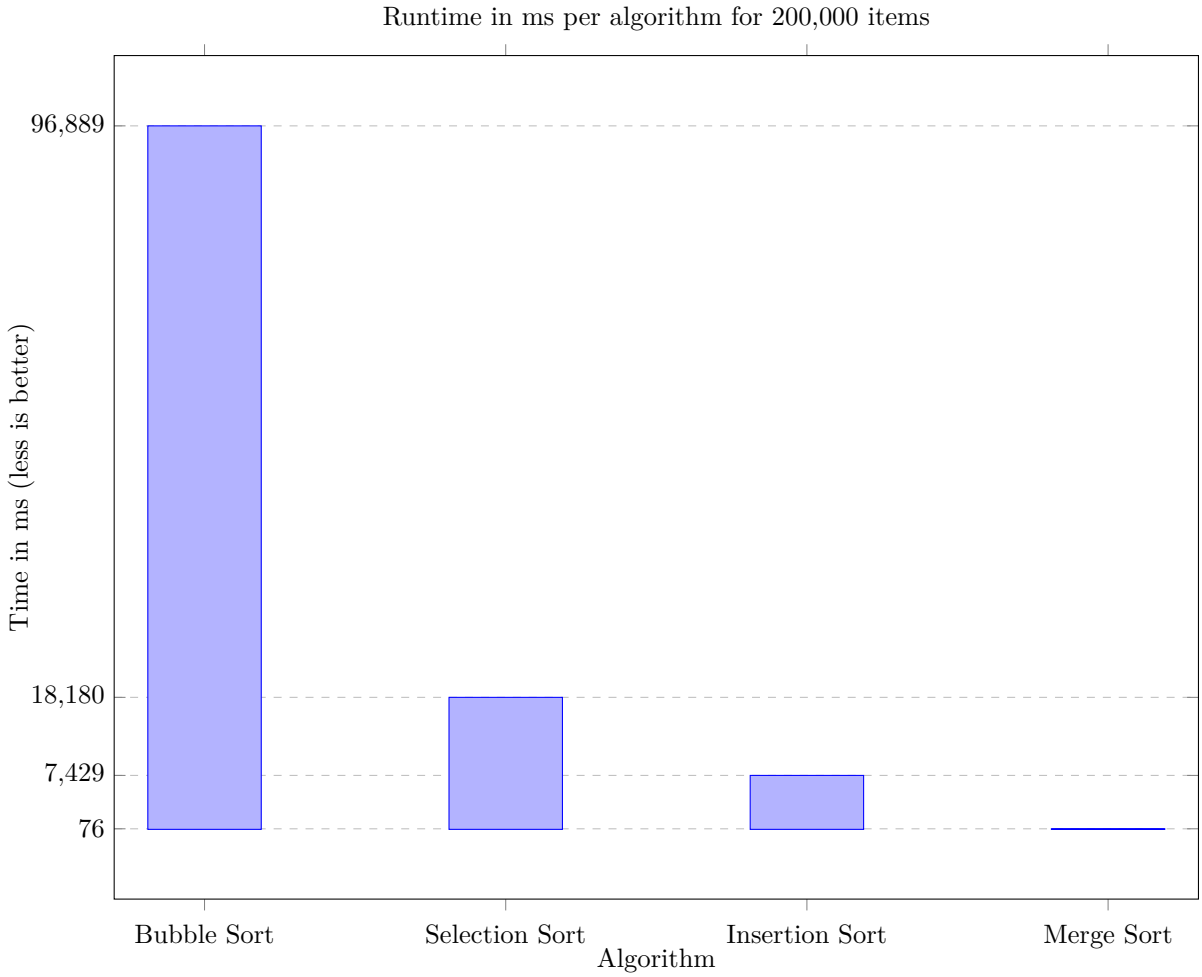
Analysis of Sorting Algorithms

Selection sort and benchmark utility code can be found Appendix A.

1.1 Sort time growth



1.2 Runtime Comparison



1.3 Reflection

Write a short reflection on the graphs, discussing the time complexity of the tested algorithm in terms of the Big (O) notation.

Chapter 2

Segregate Even and Odd numbers

2.1 Task

Given an array A[], write an algorithm in pseudocode that segregates even and odd numbers. The algorithm should put all even numbers first, and then odd numbers.

2.2 Implementation

Chapter 3

Recursion

3.1 Tasks

Design a recursive method for each of the following problems:

1. When you cut a pizza, you cut along a diameter of the pizza. Let pizza(n) be the number of slices of pizza that exist after you have made n cuts, where n 1. For example, pizza(2) = 4 because there are four slices after two diagonal cuts. Write a recursive method pizza(n) to return the number of slices and verify the correctness of your method when the pizza is cut 4 times *(3 points)*.
2. A bunch of motorcycles and cars want to parallel park on a street. The
street can fit n motorcycles, but one car take up three motorcycle spaces. Let a(n) be the number of arrangements of cars and motorcycles on a street that fits n motorcycles *(7points)*.