Team Name
164 for Life

Team Members
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Project Title
Sorting Algorithm Efficiency Comparison

Problem
We are aiming to compare and analyze the efficiency of both the Merge Sort and Quick Sort algorithms on large datasets in order to determine their performance in terms of execution speed and memory usage.

Motivation
Sorting is a fundamental and important operation in all of computer science, widely used for databases, search engine optimization, and real-time data processing. By determining the best algorithm, the performance can significantly improve in both speed and memory so by understanding the strengths and weaknesses, we will be able to have the best approach.

Features
We will know we have solved the problem when we have implemented the algorithm, tested on a dataset of at least 100,000 entries, analyzed performance metrics such as time and space complexity and execution speed, and a detailed graph to illustrate the differences.

Data
We will find the publicly available datasets with at least 100,000 numerical values from an open source (https://www.kaggle.com/), from film rating details to stock price data.

Tools
We will use Python for our programming language, NumPy, Pandas, and Matplotlib for our libraries, and Jupyter Notebook for visualization.

Visuals/Wireframes
We will create graphs to display sorting times for the different dataset sizes, as well as tables to compare algorithm execution times and memory usage.

Strategy
We will implement Merge Sort and Quick Sort algorithms. We will store the dataset inside an array and then iteratively apply the sorting on different dataset styles to compare performances.

Roles
- **ZhiJie Yuan:** Data collection, preprocessing
- **Kyle Wostbrock:** Algorithm implementation
- **Thorin Groth:** Performance analysis, visualization