
Quick Assignment 4

Total: 100

CS 2500: Algorithms

Due Date: September 18, 2024 at 11.59 PM

Instructions

- Submit your solutions by the deadline specified above.
- Ensure that your work is your own.
- Write your answers clearly and show all your work.
- If you have any questions, ask during recitations or office hours.

Problems

You are tasked with writing a recursive algorithm that computes the mode of a given list of integers. The mode is the element that appears most frequently in the list. If there are multiple modes, the algorithm should return one of them.

1. **Recursive Algorithm.** Implement a recursive algorithm in Python that finds the mode of the list. [30 points]
2. **Recurrence Relation.** Analyze the time complexity of your recursive algorithm by deriving the recurrence relation. [30 points]
3. **Proof of correctness.** Prove the correctness of your algorithm using mathematical induction. [40 points]