

# Programming Assignment 3: Minima, Maxima, Quickselect, and Median of Medians

Course: CS212 Design and Analysis of Algorithms

September 6, 2024

## Objective

The objective of this assignment is to implement algorithms to find the minimum, maximum, k-th smallest element using Quickselect, and the median using the Median of Medians algorithm. You'll learn about efficient selection algorithms and their practical applications.

## Problem Statement

- **Problem Description**

- Minima and Maxima: Implement functions to find the minimum and maximum of an array in  $O(n)$  time.
- Quickselect: Implement the Quickselect algorithm to find the k-th smallest element in an array in expected  $O(n)$  time.
- Median of Medians: Implement the Median of Medians algorithm to find the median of an array in  $O(n)$  worst-case time.

## Note

- You are expected to work individually on this assignment.
- Plagiarism will not be tolerated. Any suspected plagiarism will result in penalties as per the course policy.