

Lab Assignment: Quick Sort

Problem Statement

Write a program to implement the Quick Sort algorithm to sort an array of integers in ascending order. The implementation should use the divide-and-conquer strategy by selecting a pivot and partitioning the array around the pivot.

Example

Input: arr = [9, 3, 4, 2, 1, 8, 5]

Output: Sorted Array = [1, 2, 3, 4, 5, 8, 9]

Logic: Quick Sort (Divide and Conquer)

Quick Sort works by:

1. Choosing a Pivot element from the array.
2. Partitioning the array so that:
 - All elements smaller than the pivot go to the left.
 - All elements greater than the pivot go to the right.
3. Recursively applying the same logic to the left and right sub-arrays.

Time Complexity:

- Best and Average Case: $O(n \log n)$
- Worst Case: $O(n^2)$ (when pivot choice is poor)

Function Signature (C Language)

```
void quickSort(int arr[], int low, int high);
```

```
int partition(int arr[], int low, int high);
```

- arr[]: The array to sort.
- low: The starting index.
- high: The ending index.

Task

- Implement quickSort function using recursion.
- Use the partition function to find the pivot and split the array.
- Test your function with different inputs.

Submission Checklist

- [] Write and test the program.
- [] Submit the source code file (.c).
- [] Include input/output screenshots or results as needed.