

Rajalakshmi Engineering College

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 6_COD_Question 4

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Kavya, a software developer, is analyzing data trends. She has a list of integers and wants to identify the n th largest number in the list after sorting the array using QuickSort.

To optimize performance, Kavya is required to use QuickSort to sort the list before finding the n th largest number.

Input Format

The first line of input consists of an integer n , representing the size of the array.

The second line consists of n space-separated integers, representing the elements of the array `nums`.

The third line consists of an integer k , representing the position of the largest

number you need to print after sorting the array.

Output Format

The output prints the k-th largest number in the sorted array (sorted in ascending order).

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 6

-1 0 1 2 -1 -4

3

Output: 0

Answer

```
#include <stdio.h>
```

```
#include <stdlib.h>
```

```
// You are using GCC
```

```
// Partition function for QuickSort (ascending order)
```

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

```
    int pivot = arr[high];
```

```
    int i = low - 1, temp;
```

```
    for (int j = low; j < high; j++) {
```

```
        if (arr[j] < pivot) {
```

```
            i++;
```

```
            // swap arr[i] and arr[j]
```

```
            temp = arr[i];
```

```
            arr[i] = arr[j];
```

```
            arr[j] = temp;
```

```
        }
```

```
    }
```

```
    // swap arr[i + 1] and pivot
```

```
    temp = arr[i + 1];
```

```
    arr[i + 1] = arr[high];
```

```
    arr[high] = temp;
```

```
    return i + 1;
```

```
}
```

```
// QuickSort algorithm
```

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

```
    if (low < high) {
```

```
        int pi = partition(arr, low, high);
```

```
        quickSort(arr, low, pi - 1);
```

```
        quickSort(arr, pi + 1, high);
```

```
    }
```

```
}
```

```
// Find the k-th largest number in a sorted array
```

```
void findNthLargest(int* nums, int n, int k) {
```

```
    quickSort(nums, 0, n - 1);
```

```
    printf("%d\n", nums[n - k]);
```

```
}
```

```
int main() {
```

```
    int n, k;
```

```
    scanf("%d", &n);
```

```
    int* nums = (int*)malloc(n * sizeof(int));
```

```
    for (int i = 0; i < n; i++) {
```

```
        scanf("%d", &nums[i]);
```

```
    }
```

```
    scanf("%d", &k);
```

```
    findNthLargest(nums, n, k);
```

```
    free(nums);
```

```
    return 0;
```

```
}
```

Status : Correct

Marks : 10/10