College of Engineering Trivandrum

Data Structures Lab Exam Report

Adithya Kurien Peter

S3 CSE Roll No:5

TVE19CS005

Department Of Computer Science

February 15, 2020

Contents

1 K-th Largest number

Given an array of n distinct integers, print the k-th largest element in that array

1.1 Algorithm

Algorithm

```
1
2  ALGORITHMS
3  Start of main function
4  input n                          //number of elements in the array
5  input k                          //for finding the kth largest element
6  input the array arr
7  sort(arr,n)                      //function call for sorting the elements    ←
                                    in descending order
8  print arr[k-1]                   //k th largest element in the array
9  End of main function
10 Start of function sort(arr,n)        //arr is the array n is the number←
      of                             elements
11 for i <-- 0 to n do
12     flag <-- 0                   //for checking if swapes occurred
13     for j <-- 0 to n-i-1 do
14         if arr[j] < arr[j+1] then        //sorting is descending order
15             temp <-- arr[j]         //swapping arr[j] and arr[j+1]
16             arr[j] <-- arr[j+1]
17             arr[j+1] <-- temp
18             flag <-- 1           //swap has occurred
19         Endif
20     Endfor
21     if(flag == 0) then
22         break;                   //if swap didn't occur, the array     ←
                                      is sorted
23     Endif
24 Endfor
25 End for sort function
```

1.2 Code

```
1
2  #include <math.h>
3  #include <stdio.h>
4  #include <string.h>
5  #include <stdlib.h>
```

```c
#include <assert.h>
#include <limits.h>
#include <stdbool.h>

void sort(int *arr,int n){
    int flag;
    for(int i=0;i<n;i++){
        flag = 0;
        for(int j=0;j<n-i-1;j++){
            if(arr[j] < arr[j+1]){
                int temp = arr[j];
                arr[j] = arr[j+1];
                arr[j+1] = temp;
                flag = 1;
            }
        }
        if(flag == 0){
            break;
        }
    }
}

int main() {
    /* Enter your code here. Read input from STDIN. Print output to STDOUT */
    int n;
    scanf("%d",&n);
    int k;
    scanf("%d",&k);
    int *arr = (int*)malloc(n*sizeof(int));
    for(int i=0;i<n;i++){
        scanf("%d",&arr[i]);
    }
    sort(arr,n);
    printf("%d\n",arr[k-1]);
    return 0;
}
```

1.3 Sample Input Output

1.4 Result

Program submitted and executed successfully in HackerRank Platform via user id adi137.