

College of Engineering Trivandrum

Data Structures Lab Exam Report



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Data Structures Lab Exam Report

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>
```



```

6  #include <assert.h>
7  #include <limits.h>
8  #include <stdbool.h>
9
10 void sort(int *arr, int n){
11     int flag;
12     for(int i=0; i<n; i++){
13         flag = 0;
14         for(int j=0; j<n-i-1; j++){
15             if(arr[j] < arr[j+1]){
16                 int temp = arr[j];
17                 arr[j] = arr[j+1];
18                 arr[j+1] = temp;
19                 flag = 1;
20             }
21         }
22         if(flag == 0){
23             break;
24         }
25     }
26 }
27
28 int main() {
29     /* Enter your code here. Read input from STDIN. Print output to STDOUT */
30     int n;
31     scanf("%d", &n);
32     int k;
33     scanf("%d", &k);
34     int *arr = (int*)malloc(n*sizeof(int));
35     for(int i=0; i<n; i++){
36         scanf("%d", &arr[i]);
37     }
38     sort(arr, n);
39     printf("%d\n", arr[k-1]);
40     return 0;
41 }

```



1.3 Sample Input Output

```
adi@Adithya-TVE19CS005:~/adi/CET/Lab-Exam$ gcc LabExam.c
adi@Adithya-TVE19CS005:~/adi/CET/Lab-Exam$ ./a.out
5
4
5 4 3 2 1
2
adi@Adithya-TVE19CS005:~/adi/CET/Lab-Exam$ gcc LabExam.c
adi@Adithya-TVE19CS005:~/adi/CET/Lab-Exam$ ./a.out
5
4
-5 -4 -3 -2 -1
-4
adi@Adithya-TVE19CS005:~/adi/CET/Lab-Exam$ gcc LabExam.c
adi@Adithya-TVE19CS005:~/adi/CET/Lab-Exam$ ./a.out
5
4
13 22 1 9 45
9
adi@Adithya-TVE19CS005:~/adi/CET/Lab-Exam$ gcc LabExam.c
adi@Adithya-TVE19CS005:~/adi/CET/Lab-Exam$ ./a.out
6
3
-1 23 43 7 21 9
21
adi@Adithya-TVE19CS005:~/adi/CET/Lab-Exam$
```

1.4 Result

1. K-th Largest Number

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

Input Format

- first line : an integer N, size of array
- second line : an integer K
- third line : N separated integers, elements of array

Constraints

- $1 \leq N \leq$
- $1 \leq K \leq N$
- \leq , represent -th element in array

Output Format

- k-th largest element in array

Language: C Autocomplete Ready

```
1 #include <math.h>
2 #include <stdio.h>
3 #include <string.h>
4 #include <stdlib.h>
5 #include <assert.h>
6 #include <limits.h>
7 #include <stdbool.h>
8
9
```

Line: 25 Col: 1

Test Results Custom Input Run Code Run Tests Submit

Compiled successfully. All available test cases passed

Test Case	Input (stdin)	Your Output (stdout)
Test case 0	5 4 13 22 1 9 45	
Test case 1		
Test case 2		
Test case 3		

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

