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M24CSE033

Q. Given an array of n positive integers. Find the k-th largest element in the array and then find the maximum sum of a subsequence such that no two numbers in the subsequence are adjacent in the array, and the subsequence must include the k-th largest element.

For example: arr[] = {5, 5, 10, 100, 10, 5} and k = 2. Output is 25.

Here, the 2nd largest element is 10. The subsequence {5, 10,10} includes 10 and gives the maximum sum of 25, with no two elements being adjacent.

Another example for more clarification: arr[] = {4, 1, 3, 9, 2, 8} and k = 2. Output is 21.

The 2nd largest element is 8. The subsequence {4,9,8) includes 8 and max sum 21 and no two elements are adjacent.

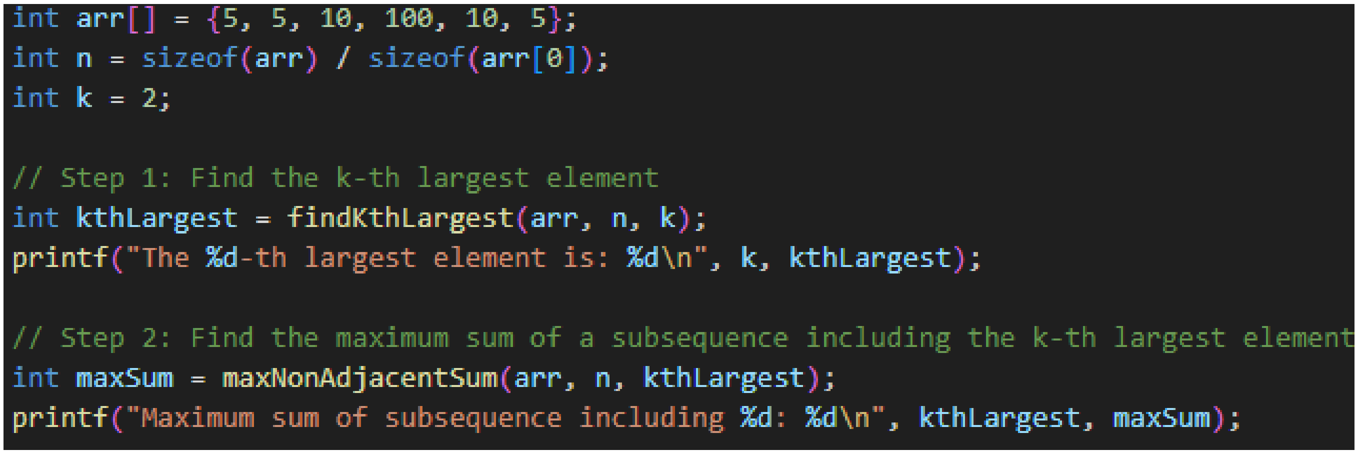
Explanation:

1. **findKthLargest**: It will return the k-th largest element after sorting the array in decreasing order.

2. **maxNonAdjacentSum**: This will return the maximum sum of a subsequence where no two elements are adjacent, and it will certainly include the k-th largest element.

3. **Main Function**: We have declared an array, arr[], and have found the k-th largest element using the function, findKthLargest. Then we recursively call the method maxNonAdjacentSum, which looks to find the maximum sum of a subsequence including the k-th largest element. Finally, print the result.

Example:



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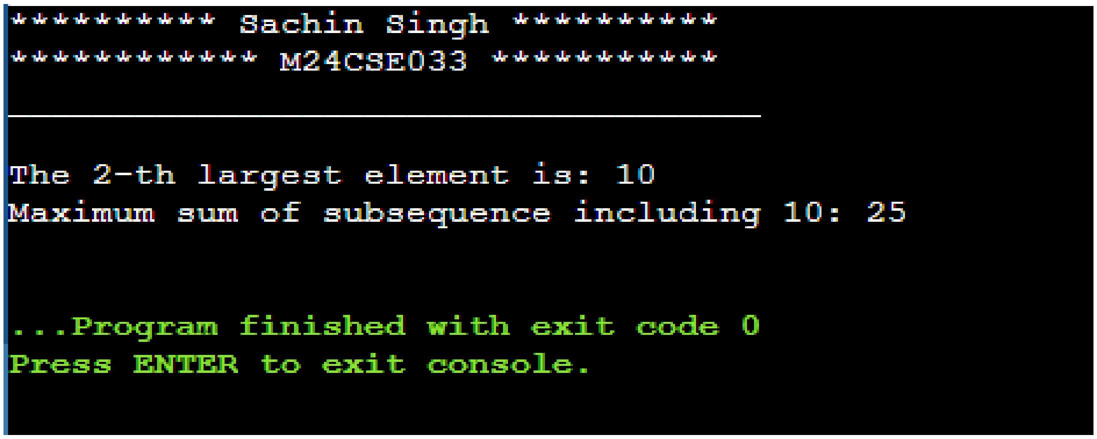
int arr[] = {5, 5, 10, 100, 10, 5};
int n = sizeof(arr) / sizeof(arr[0]);
int k = 2;

// Step 1: Find the k-th largest element
int kthLargest = findKthLargest(arr, n, k);
printf("The %d-th largest element is: %d\n", k, kthLargest);

// Step 2: Find the maximum sum of a subsequence including the k-th largest element
int maxSum = maxNonAdjacentSum(arr, n, kthLargest);
printf("Maximum sum of subsequence including %d: %d\n", kthLargest, maxSum);
```

Output:



```
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The 2-th largest element is: 10
Maximum sum of subsequence including 10: 25


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Press ENTER to exit console.
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