

CSO-102 : Data Structures – Task 7.

Peter learned about priority queues recently and asked his teacher for a problem. So his teacher came up with an interesting problem. He now has an integer array **A**. For each index **i**, he wants to find the product of the largest, second largest and the third largest integer in the range **[1,i]**. As you are a good friend of him, he wants you to solve the problem. Write a program for this problem in C/C++.

Note: You have to implement priority queue using binary heap. Do not import it from library.

Input:

The first line contains an integer **N**, denoting the number of elements in the array **A**.

The next line contains **N** space separated integers, each denoting the **ith** integer of the array **A**.

Output:

Print the answer for each index in each line. If there is no second largest or third largest number in the array **A** upto that index, then print "-1", without the quotes.

Constraints:

$1 \leq N \leq 100000$

$0 \leq A[i] \leq 1000000$

Sample Input:

5

1 2 3 4 5

Sample Output:

-1

-1

6

24

60

Explanation:

There are 5 integers 1,2,3,4 and 5.

For the first two indexes, since the number of elements is less than 3, so -1 is printed.

For the third index, the top 3 numbers are 3,2 and 1 whose product is 6.

For the fourth index, the top 3 numbers are 4,3, and 2 whose product is 24.

For the fifth index, the top 3 numbers are 5,4 and 3 whose product is 60.