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[PROBLEMS \(/problems\)](/problems/) ● [STATUS \(/status\)](/status/) 🏆 [RANKS \(/ranks\)](/ranks/)[DISCUSS \(http://spoj.com/forum\)](http://spoj.com/forum) [CONTESTS \(/contests\)](/contests/) ⚠ [\(/manageaccount/\)](/manageaccount/) **PROFILE** ▾[Problems \(/problems\)](/problems/) / [classical \(/problems/classical\)](/problems/classical/) / [K-th Number](#)[My status \(/status/MKTHNUM,nadim_mahmud/\)](/status/MKTHNUM,nadim_mahmud/) [Status \(/status/MKTHNUM/\)](/status/MKTHNUM/)[Ranking \(/ranks/MKTHNUM/\)](/ranks/MKTHNUM/)

MKTHNUM - K-th Number

#[sorting \(/problems/tag/sorting\)](/problems/tag/sorting/) #[tree \(/problems/tag/tree\)](/problems/tag/tree/)[English \(/problems/MKTHNUM/en/\)](/problems/MKTHNUM/en/)[Vietnamese \(/problems/MKTHNUM/vn/\)](/problems/MKTHNUM/vn/)

You are working for Macrohard company in data structures department. After failing your previous task about key insertion you were asked to write a new data structure that would be able to return quickly k-th order statistics in the array segment.

That is, given an array $a[1 \dots n]$ of different integer numbers, your program must answer a series of questions $Q(i, j, k)$ in the form: "What would be the k-th number in $a[i \dots j]$ segment, if this segment was sorted?"

For example, consider the array $a = (1, 5, 2, 6, 3, 7, 4)$. Let the question be $Q(2, 5, 3)$. The segment $a[2 \dots 5]$ is $(5, 2, 6, 3)$. If we sort this segment, we get $(2, 3, 5, 6)$, the third number is 5, and therefore the answer to the question is 5.

Input

The first line of the input contains n — the size of the array, and m — the number of questions to answer ($1 \leq n \leq 100000$, $1 \leq m \leq 5000$).

The second line contains n different integer numbers not exceeding 10^9 by their absolute values — the array for which the answers should be given.

The following m lines contain question descriptions, each description consists of three numbers: i, j , and k ($1 \leq i \leq j \leq n$, $1 \leq k \leq j - i + 1$) and represents the question $Q(i, j, k)$.

SAMPLE INPUT

```
7 3
1 5 2 6 3 7 4
2 5 3
4 4 1
1 7 3
```


Output

For each question output the answer to it – the k-th number in sorted $a[i \dots j]$ segment.

SAMPLE OUTPUT

5
6
3

Note : naive solution will not work!!!

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<	Previous	1	2 (/problems/MKTHNUM/cstart=10)
3 (/problems/MKTHNUM/cstart=20)	4 (/problems/MKTHNUM/cstart=30)		
Next (/problems/MKTHNUM/cstart=10)	> (/problems/MKTHNUM/cstart=30)		



rituraj2847 (/users/rituraj2847): 2018-09-05 14:14:33

Print '-1' if there's no kth number.



kkislay20 (/users/kkislay20): 2018-07-02 09:22:38

I am getting TLE..could someone help me out <https://ideone.com/v9Uzfl>
I used merge sort with $O(N*2 (\log n)^2)$ sol



devarshi09 (/users/devvarshi09): 2018-05-03 06:15:15

$O(\log N)^3$ works fine!
Solved with Merge Sort tree!



Jose Arias Perez [KIR@] (/users/joe_acm): 2018-03-05 02:17:42

Any tips on the MergeSort solution with $O(\lg^2 N)$ per query ??



siva2697 (/users/siva2697): 2018-03-03 08:53:34

size of seg tree = 2060964 AC :)



sarwar__05 (/users/sarwar__05): 2017-12-19 13:56:43

Solve KQUERYO first.

Last edit: 2017-12-19 13:57:07



newbie (/users/dpruthi): 2017-10-24 22:26:38

finally accepted,

A few tips:

1. numbers can be +ve, -ve and 0.
2. Use Fast I/O Got many tle because of that.

Thanks to @harsh_jain1 for giving the hint that it can be solved using trie also.



AAKASH TYAGI (/users/aakash_tyagi): 2017-08-13 21:29:57

$O(\log^3 n)$ per query works fine. Just remember to binary search on array elements rather than the entire range.



harsh_jain1 (/users/harsh_jain1): 2017-08-10 19:43:35

Solved using trie...wow!!



nikoltech (/users/nikoltech): 2017-06-24 12:52:52


Last edit: 2018-02-21 13:49:34

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Added by: ~!(*@*!@^& (/users/vdmedragon)
 Date: 2009-02-24
 Time limit: 0.115s-0.667s
 Source limit: 50000B
 Memory limit: 1536MB
 Cluster: Cube (Intel G860) (/clusters/)
 Languages: All except: ERL JS-RHINO
 Resource: Northeastern Europe 2004 Northern Subregion

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Concept difficulty

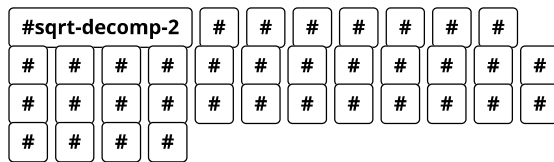
easy normal hard extreme

Implementation difficulty

easy normal hard extreme

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