# MKTHNUM - K-th Number

#sorting (/problems/tag/sorting) #tree (/problems/tag/tree)

English (/problems/MKTHNUM/en/) Vietnamese (/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 ... 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 ... 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 ... 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 ≤ n ≤ 100000, 1 ≤ m ≤ 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 ≤ i ≤ j ≤ n, 1 ≤ k ≤ 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 ... j] segment.

SAMPLE OUTPUT
5
6
3
```

**Note : naive solution will not work!!!**

Submit solution! (/submit/MKTHNUM/)

---

hide comments

< | 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/v9UzfI
I used merge sort with O(N*2 (logn)*2 ) sol

devarshi09 (/users/devarshi09): 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^2N) 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!!

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

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

Leave a Comment

Publish

Notes:
1. Don't post any source code here.
2. Please be careful, leave short comments only. Don't spam here.
3. For more discussion (hints, ideas, solutions) please visit our forum (/forum).
4. Authors of the problems are allowed to delete the post and use html code here (e.g. to provide some useful links).

Submit solution! (/submit/MKTHNUM/)

| | |
|---|---|
| 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 |

Evaluate this problem

**Nobody has rated this problem yet,**

**maybe you'll be the first?**

Concept difficulty

easy normal hard extreme

Implementation difficulty

easy normal hard extreme

Recommend!

Own tags

#sqrt-decomp-2 # # # # # # #
# # # # # # # # # # # #
# # # # # # # # # # # #
# # # #

Tag name Add

About (/info) | Tutorial (/tutorials) | Tools (/tools) | Clusters (/clusters) | Credits (/credits) | API (/sphereengine) | Widgets (/sphereengine-widget)

Legal: Terms of Service (/legal-tos/) | Privacy Policy (/legal-pp/) | GDPR Info (/legal-gdpr/)

RSS (/rss/)