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Kth Minimum

locked



by anveshi

Problem

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Editorial

Jen likes playing with lists of nonzero integers. She has many such lists in her almirah. To kill her boredom, she would take some list and look for the k^{th} smallest number in it.

However, she soon lost interest in doing so because it was too easy, so she decided to create a new list L using this procedure:

```
-- lists are 1-indexed --

procedure generate_list(A, B, x):
    let n = length of A
    let m = length of B
    let L = an empty list

    for i from 1 to min(n, m - x), inclusive:
        for j from (i + x) to m, inclusive:
            Append (A[i]*B[j]) to the end of L

    return L
```

To create L , she takes two lists A and B and an integer x and calls `generate_list(A, B, x)`. She was surprised to see such a big list and got stuck on finding the k^{th} smallest number in it. Can you help her?

Note: The k^{th} smallest number in a list L is the k^{th} element of L when it is sorted. For example, the 4^{th} smallest number in $[7, 2, 7, 2, 11]$ is 7.

Input Format

The first line contains four space-separated integers n , m , x and k . n and m are the respective sizes of A and B .

The second line contains n space-separated integers A_1, A_2, \dots, A_n .

The third line contains m space separated integers B_1, B_2, \dots, B_m .

Constraints

- $2 \leq n, m \leq 2 \times 10^5$
- $1 \leq x < m$
- $1 \leq |A_i| \leq 2 \times 10^5$
- $1 \leq |B_i| \leq 2 \times 10^5$
- $1 \leq k \leq \text{length}(L)$

Subtasks

- $1 \leq n, m \leq 2 \times 10^3$ for $\sim 20\%$ of the maximum score.

Output Format

Print a single line containing a single integer denoting the answer: the k^{th} smallest number in the list L .

Sample Input 0

```
3 4 1 5
2 -3 1
```

3 1 -2 -1

Sample Output 0

3

Explanation 0

L is obtained from `generate_list([2, -3, 1], [3, 1, -2, -1], 1)`. We find that $L = [2, -4, -2, 6, 3, -1]$. Therefore, the 5th smallest number in L is 3.

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Max Score: 65

Difficulty: Hard

Rate This Challenge:

☆☆☆☆☆

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Current Buffer (saved locally, editable)  

C++14  

```
1 #include <cmath>
2 #include <cstdio>
3 #include <vector>
4 #include <iostream>
5 #include <algorithm>
6 using namespace std;
7
8
9 int main() {
10     /* Enter your code here. Read input from STDIN. Print output to STDOUT */
11     return 0;
12 }
13
```

Line: 1 Col: 1

 [Upload Code as File](#)☐ Test against custom input

Run Code

Submit Code