The Greatest Integer

You are given a set, S, of N distinct integers. Perform the operation below on the set until such a point as the size of the set ($|S|$) no longer changes when the operation is performed. The operation is as follows:

Choose any 2 distinct numbers, x and y, in set S. Calculate their absolute difference ($|x - y|$), and insert the result into the set. Recall that a set is a collection of distinct objects, so $|S|$ will not change if you attempt to insert a value it already contains.

Perform the above operation on S until until $|S|$ no longer changes. Then print the M^{th} greatest number present in the final set.

Note: It is guaranteed that $|S| \geq M$.

Input Format

The first line contains an integer, N, denoting the size of the initial set.
The second line contains N space-separated integers denoting the elements present in the initial set, S.
The third line contains an integer, M (our output is the M^{th} greatest integer in the final set).

Constraints

- $2 \le N \le 10^5$
- $1 \le M \le10^5$
- All integers in initial set S are $\le10^5$

Output Format

Print the M^{th} greatest integer in the final set on a new line.

Sample Input

```
3
2 6 10
2
```

Sample Output

```
8
```

Explanation

Our initial set $S = [2, 6, 10]$, and we will refer to the set resulting from an operation as S'.

1. $S = [2, 6, 10]$. We choose $x=2$ and $y=6$. We insert $|2-6|=4$ into the set, resulting in $S'=[2, 4, 6, 10]$.
2. $S=[2, 4, 6, 8]$. We choose $x=2$ and $y=10$. We insert $|2-10|=8$ into the set, resulting in $S'=[2, 4, 6, 8, 10]$.

At this point, no operation using any possible x and y combination will result in any new numbers being added to the set. Thus, our final set of integers is $[2, 4, 6, 8, 10]$.

$M=2$, and our M^{th} (2^{nd}) greatest integer in $[2, 4, 6, 8, 10]$ is 8, so we print 8 on a new line.