

Phony

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 256 megabytes

You are given a sequence of length n and the number k , ask for support m operations or inquiries:

- C t : Let the largest number minus k (the far left one if there is more than one), executed t times.
- A x : Ask for the x -th largest number.

Input

The first line contains three integer n , m and k ($1 \leq n, m \leq 5 \times 10^5$).

The next line contains n integers representing the sequence a ($1 \leq a_i \leq 10^{18}$).

Each of the following m lines contains a character and an integer, indicating an operation or inquiry.

For all data guaranteed $1 \leq k, t \leq 10^{18}$, $1 \leq x \leq n$.

Ensure that the sequence after each operation for all a_i satisfies $-10^{18} \leq a_i \leq 10^{18}$

Output

For each inquiry, print a line for the answer.

Example

standard input	standard output
3 5 5	3
7 3 9	4
A 3	-1
C 1	
A 2	
C 2	
A 3	