Flooding

The Bitwise Ranges consist of N mountains, numbered 1 to N from left to right. The ith mountain is 1 kilometre wide and H_i kilometres tall. Atop each mountain is a village.

The government is planning for Q possible scenarios. In the ith scenario, W_i massive downpours of rain will land on the first mountain. Each downpour delivers enough water to submerge a single village in 1 kilometre of water. After the water lands on the first mountain, it will flow using the following rules:

- If the water can flow down, then it will.
- Otherwise, if the water can flow to the right, then it will.
- Finally, if the water cannot flow down or to the right, then it will not move.

If water flows rightwards off mountain N, then its future movements can be ignored.

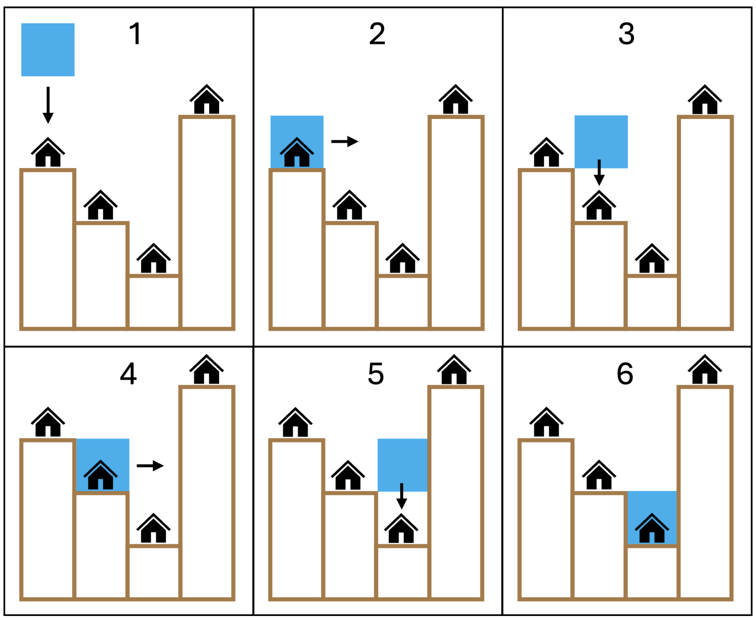

Figure 1: An example downpour. The rain initially lands on mountain 1 and eventually finishes atop mountain 3. Each pane shows one step of the process.

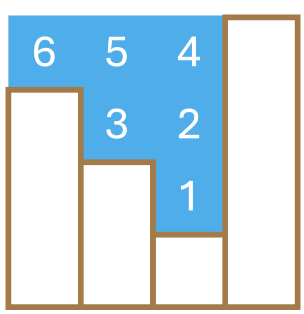

Figure 2: An example scenario with $W_i = 6$ downpours of rain. The final locations of the 6 downpours are labelled.

A village is said to be *flooded* if at least one downpour passes over it, **even if the downpour doesn't finish at this village**.

In each scenario, the government has a budget of K dollars. For one dollar, the government can raise the height of a single mountain by 1 kilometre. By wisely spending their K dollars, the government hopes to minimise the number of villages that are flooded. You have been asked to calculate the minimum number of villages that will be flooded if the government optimally spends its K dollars before the downpours begin.

Note that the Q scenarios are independent. That is, all heights return to their original values before future scenarios begin. However, the budget K is the same in all scenarios.

Subtasks and Constraints

For all subtasks:

- $2 \le N \le 200\,000$.
- $1 \le Q \le 200\,000$.
- $0 \le K \le 1\,000\,000\,000$.
- $1 \le H_i, W_i \le 1\,000\,000\,000$ for all i.

Additional constraints for each subtask are given below.

Subtask	Points	Additional constraints
1	17	$N, Q \le 50$ and $K = 0$.
2	20	$N, Q \le 50$.
3	18	$N \le 2000$.
4	21	$K = 0$.
5	24	No additional constraints.

Input

- The first line of input contains the integer N.
- The second line contains N integers $H_1, H_2, \ldots, H_N$.
- The third line contains the integers Q and K.
- The fourth line contains the Q integers $W_1, W_2, \ldots, W_Q$.

Output

Output Q integers on a single line: the answers to the Q scenarios.

Sample Input 1

```
4
3 2 1 4
4 0
1 6 7 1000
```

Sample Output 1

```
3 3 4 4
```

Sample Input 2

```
4
3 2 1 4
3 2
1 7 1000
```

Sample Output 2

```
1 3 4
```

Sample Input 3

```
7
2 1 1 3 1 2 1
4 1
10 9 8 1
```

Sample Output 3

```
7 5 3 2
```

Explanation

The first sample case is shown in Figure 1 and Figure 2 earlier in the statement. The government has a budget of $K = 0$ and so cannot raise any mountains:

- When $W_1 = 1$ and $W_2 = 6$, the first three villages are flooded.
- When $W_3 = 7$ and $W_4 = 1000$, all four villages are flooded.

The second sample case has the same mountains as the first case, but the budget is $K = 2$:

- When $W_1 = 1$, the government can raise the second mountain by 2 kilometres, so that it now has a height of 4 kilometres. Now, only the first village is flooded.
- When $W_2 = 7$, the goverment can raise the first and last mountains by 1 kilometre each. Then, only the first three villages are flooded.
- When $W_3 = 1000$, all four villages will be flooded regardless of how the budget is spent.

The third sample case is shown in Figure 3 below. The government has a budget of $K = 1$:

- When $W_1 = 10$, all seven villages will be flooded regardless of how the budget is spent.
- When $W_2 = 9$, the government can raise the fourth mountain by 1 kilometre, so that only five villages are flooded.
- When $W_3 = 8$, the government can raise the fourth mountain by 1 kilometre, so that only three villages are flooded.
- When $W_4 = 1$, the government can raise the third mountain by 1 kilometre, so that only two villages are flooded.

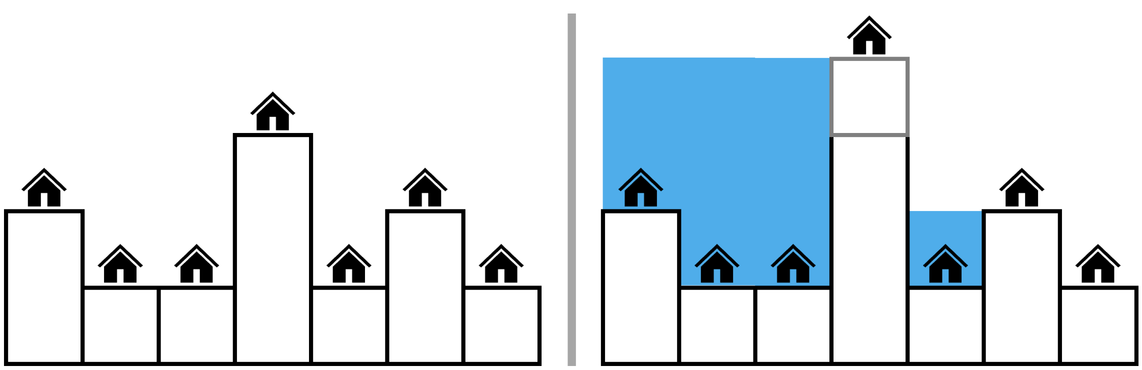

Figure 3: Sample input 3. On the left are the original mountains. On the right is the second scenario with $W_2 = 9$, where the fourth mountain has been raised by 1 kilometre. The first five villages are flooded.