Problem D. Kth Excluded

Time limit 3000 ms
Mem limit 1048576 kB

Problem Statement

You are given a sequence of N positive integers: $A = (A_1, A_2, \ldots, A_N)$, and Q queries.

In the i-th query $(1 \leq i \leq Q)$, given a positive integer K_i, find the K_i-th smallest integer among the positive integers that differ from all of $A_1, A_2, \ldots, A_N$.

Constraints

- $1 \leq N, Q \leq 10^5$
- $1 \leq A_1 < A_2 < \cdots < A_N \leq 10^{18}$
- $1 \leq K_i \leq 10^{18}$
- All values in input are integers.

Input

Input is given from Standard Input in the following format:

$$
\begin{aligned}
&N\ Q \\
&A_1\ A_2\ \ldots\ A_N \\
&K_1 \\
&K_2 \\
&\vdots \\
&K_Q
\end{aligned}
$$

Output

Print Q lines. The i-th line should contain the response to the i-th query.

Sample 1

Input	Output
4 3 3 5 6 7 2 5 3	2 9 4

The positive integers that differ from all of $A_1, A_2, \ldots, A_N$ are $1, 2, 4, 8, 9, 10, 11, \ldots$ in ascending order. The second, fifth, and third smallest of them are 2, 9, and 4, respectively.

Sample 2

Input	Output
5 2 1 2 3 4 5 1 10	6 15