

Mingle

Input file: **standard input**
Output file: **standard output**
Time limit: 4 seconds
Memory limit: 512 megabytes



The next season of *Squid Game* is about to begin! The Frontman put you in charge of the third game of the season, *Mingle*.

Mingle is defined by an initial number of players p , the number of safe rooms m , and a sequence of k positive integers b_1, \dots, b_k .

The game consists of k rounds. In the i -th round, the remaining players need to form teams of size *exactly* b_i , and each team must hide in one of the m safe rooms. Each safe room admits at most one team. If a player doesn't join a team of size b_i , or their team doesn't hide in a safe room, they are eliminated.

All players who survive the i -th round advance to the next, $i + 1$ -th round. Teams may change arbitrarily between rounds. Players who have made it past round k are declared the winners of *Mingle*.

The Frontman is interested in computing the maximum possible number of winners in the game. However, since neither the initial number of players nor the sequence itself has been determined yet, you need to answer multiple queries about the game.

At the start, you are given a sequence a of size n and the number of safe rooms m , fixed for all queries. Then, q queries follow. Each query is one of two types:

- $1\ i\ x$ ($1 \leq i \leq n$, $1 \leq x \leq 10^9$) — update $a_i := x$.
- $2\ l\ r\ p$ ($1 \leq l \leq r \leq n$, $1 \leq p \leq 10^9$) — what is the maximum number of winners in *Mingle* played on the sequence a_l, a_{l+1}, \dots, a_r with m safe rooms and p initial players?

For each query of type 2, output the maximum possible number of winners. Note that queries of type 2 are independent from each other.

Input

The first line contains two integers n, m ($1 \leq n \leq 2 \cdot 10^5$, $1 \leq m \leq 100$) — the size of a , and the number of safe rooms.

The second line contains n space-separated integers a_1, \dots, a_n ($1 \leq a_i \leq 10^9$) — the initial sequence.

The third line contains a single integer q ($1 \leq q \leq 2 \cdot 10^5$) — the number of queries.

The next q lines describe the queries, one per line, in the format specified above.

Output

Output the answers to the queries of type 2, one per line, in the order that they appear in the input.

Examples

standard input	standard output
5 50 10 4 3 6 2 5 2 1 5 255 1 3 13 2 1 4 456 1 5 7 2 3 5 150	100 192 133
6 30 18 55 19 30 87 10 6 2 2 4 540 1 4 41 2 1 6 350 1 1 49 2 1 5 666 2 3 6 210	480 260 522 170
3 100 40 50 60 4 2 1 3 4000 1 1 30 1 3 45 2 1 3 4000	3960 2970

Note

In the first query of the first test case, no more than 100 players can survive the 5-th round due to the limited number of safe rooms.

In the third query of the first test case, no more than 200 players can survive the 2-nd round. Then, in the 3-rd round, these 200 players can form up to 15 teams of size 13, leaving 5 players behind. In the 4-th round, the remaining 195 players can form up to 32 teams of size 6, resulting in 192 winners.