

Card Power Prediction

Input file: **standard input**
Output file: **standard output**
Time limit: 0.25 seconds
Memory limit: 4 megabytes

John Pwn the literal duck parallelogram who is also a fast snail is playing Valorant!

Unfortunately, all his teammates instalocked and now he is forced to fill sentinel on lotus. He already knows he will be sitting on C site the whole game, so he has brewed coffee and invited some friends to play a card game.

The card game is called Card Power Prediction. In Card Power Prediction, there are N players numbered 1 to N and a scoring table of M integers, $A_1, A_2 \dots A_M$. On each turn, a player i may draw a card from the draw pile, discard the card on top of his deck, or predict that his deck has a higher power than player j 's deck. The rules for comparing power are as follows:

For a deck of K cards, $C_1, C_2 \dots C_K$, the power P is defined by

$$P = \sum_{i=1}^K A_i C_i$$

If player i 's deck has a higher power than player j 's deck or the powers are equal, he wins and player j has to pay up, otherwise player i has to pay.

Note that the players will not draw a card if their deck already has M cards, and will not discard a card if their deck is empty.

Lastly, since John Pwn loves going gambling, instead of having turns in a set order, whose turn it is is decided by a random number generator.

As John Pwn and his friends are lazy, write a program to help them keep track of who wins which round.

Input

The first line contains 2 integers N, M , the number of players and size of the scoring table.

The next line contains M space-separated integers $A_1, A_2 \dots A_M$ representing the scoring table

The next line contains Q , the number of rounds played.

The next Q lines will be in the format of one of the following:

- 1 x y : Player x takes a turn and draws y from the draw pile
- 2 x : Player x takes a turn and discards the card at the top of his deck (his most recently drawn card)
- 3 x y : Player x predicts he can beat player y 's deck

Output

For type 3 queries, output 1 if player x beats player y or if their powers are equal, otherwise output 0

Scoring

For all testcases, it is guaranteed that

- $1 \leq N, M \leq 10^2$
- $1 \leq Q \leq 10^9$
- $-10^9 \leq A_i, C_i, P \leq 10^9$

Subtask	Score	Additional constraints
1	69	$Q = 0$
2	31	No additional constraints
3	0	Sample test cases

Example

standard input	standard output
3 5 -1 0 1 2 -2 5 1 1 0 3 2 1 1 1 -10 1 1 5 3 2 1	1 0

Note

Player 1 draws 0 into his deck, for a total power of $-1 \cdot 0 = 0$.

Player 2 challenges player 1. Since both their powers are 0, player 2 wins.

Player 1 draws -10 into his deck for a power of $-1 \cdot 0 + 0 \cdot -10 = 0$

Player 1 draws 5 into his deck for a power of $-1 \cdot 0 + 0 \cdot -10 + 1 \cdot 5 = 5$

Player 3 challenges player 1. Since player 1 has power 5 and player 2 has power 0, player 1 wins.