Friendship

I live for a world full of chaos, mayhem is my dream. Sadly, friendship bonds keep the world together. \textbf{This has to end}. Initially, there are **N** people living in the world, and I know the strength of each one and the friendship bonds between them. A group of connected people will sum up their strengths if attacked (the power of friendship... *disgusting*, right?), so I'm interested in the strength of full groups of connected people, specially in the maximum strength of a group.

I have already set a plan of action, the order in which I will destroy friendships! But, turns out, that when one destroys friendships, people may react and increase or decrease their strength. I need your help to find out how successful my plan is.

I'll give you the initial information (strengths and bonds) and a list of **Q** events, each event will be either a destruction event, or a strength change event.

I need to know the maximum strength of a group after each event.

Input

The first line of input consists of two integers **N** and **M**, the number of people and the initial number of bonds respectively.

Next line will contain **N** integers s_1, s_2,... s_N separated with exactly one white space, being s_i the initial strength of the i-th person.

Next **M** lines will contain two integers a_i and b_i, representing a friendship bond between those two people.

The next line will contain a single integer **Q**, the number of events.

The following Q lines will be either:
• 1 k: Indicating the destruction of bond number k (in the input order)
• 2 p x: Indicates that the person p changed her strength to x

Output

Print Q lines, the maximum strength of a group after each event.

Example

Input:
5 6
3 3 3 3 3
1 2
1 3
2 3
2 5
3 4

4 5
5
2 1 2
1 5
1 4
2 4 8
2 3 7

Output:
14
14
8
11
12

Constraints

- $1 \le N, M, Q \le 10^5$

- $1 \le s_i, x^i \le 10^5$

- $1 \le a_i, b_i \le N$

- $1 \le k_i \le M$

- $1 \le p_i \le N$

- every bond will be deleted at most once.

- between two people there is at most one bond.