

Beautiful Necklaces

Input file: **standard input**
Output file: **standard output**
Time limit: 3 seconds
Memory limit: 512 megabytes

Alice just got a new necklace for her birthday. The necklace consists of N beads numbered with IDs from 1 to N , where the bead with ID i and the bead with ID $i + 1$ (for each $i \in [1, N - 1]$) are connected by a thread and we say that they are neighbors. The bead with ID N and the bead with ID 1 are also connected, and they are neighbors as well. The color of the i -th bead is c_i . Colors are represented by positive integers.

Alice defines the beauty of a necklace as the length of the longest **contiguous** subsequence of beads that have the same color. For example, if Alice's necklace is $N = 8$ and $c = [4, 2, 2, 1, 2, 2, 4, 4]$, then the beauty of that necklace is equal to 3, since the beads with IDs 7, 8 and 1 have color 4, and form the longest contiguous subsequence with the same color.

During the next Q days, Alice will get a new bead. The ID of the new bead gotten in the i -th day will be $N + i$ and its color will be d_i . She can perform one of the two possible actions:

1. Given two IDs a_i and b_i of beads that are currently connected, she cuts a thread that connects them, inserts the new bead between the beads with ID a_i and b_i , and connects each of them to the new bead, so the beads a_i and b_i become the neighbors of the new bead.
2. Given one ID a_i , she removes the bead with ID a_i from its current necklace, connect its previous neighbors with a thread, and creates a new necklace consisting of just two beads: the bead with ID a_i and the new bead. Note that after this operation, Alice will have more than one necklace. It is guaranteed that after this operation, all of the necklaces have length greater or equal to 2.

After the daily operation, Alice wants to know what is the beauty of the necklace where the new bead was inserted, and the beauty of the most beautiful necklace that Alice has at the moment.

Input

The first line contains two integers N and Q ($2 \leq N \leq 10^5$ and $1 \leq Q \leq 10^5$).

The second line contains N integers $c_1, c_2, \dots, c_N$ ($1 \leq c_i \leq 2 * 10^5$).

The following Q lines contain the description of the operations that Alice will perform. The $(i + 2)$ -th line begins with two integers t_i and d_i ($t_i \in 1, 2$ and $1 \leq d_i \leq 2 * 10^5$), then some integers follow depending on the operation:

1. If $t_i = 1$, then Alice performs the first operation, and two distinct integers a_i and b_i follow ($1 \leq a_i, b_i < N + i$). It is guaranteed that the beads with ID a_i and b_i are neighbors right before the operation.
2. If $t_i = 2$, then Alice performs the second operation, and one integer a_i follows ($1 \leq a_i < N + i$).

Output

For each operation, print a line with two space-separated integers. The first integer is the beauty of the necklace where the new bead is inserted and the second integer is the beauty of the most beautiful necklace that Alice has at the moment.

Examples

standard input	standard output
8 3 4 2 2 1 2 2 4 4 1 3 1 2 2 4 4 1 2 9 2	3 3 1 4 5 5
7 5 1 1 2 2 3 3 1 2 4 4 2 5 2 2 6 6 1 5 2 9 1 5 2 9	1 3 1 2 1 2 2 2 3 3

Note

Note that, if a necklace has length equal to 2, the two beads are connected by two threads. For example, if we consider the color 1 as blue and the color 5 as orange, then the necklace formed by the beads with IDs 2 and 9 after the second operation looks like this:

