

D. Gellyfish and Camellia Japonica

time limit per test: 2 seconds
 memory limit per test: 512 megabytes

Gellyfish has an array of n integers c_1, c_2, \dots, c_n . In the beginning, $c = [a_1, a_2, \dots, a_n]$.

Gellyfish will make q modifications to c .

For $i = 1, 2, \dots, q$, Gellyfish is given three integers x_i, y_i , and z_i between 1 and n . Then Gellyfish will set $c_{z_i} := \min(c_{x_i}, c_{y_i})$.

After the q modifications, $c = [b_1, b_2, \dots, b_n]$.

Now Flower knows the value of b and the value of the integers x_i, y_i , and z_i for all $1 \leq i \leq q$, but she doesn't know the value of a .

Flower wants to find any possible value of the array a or report that no such a exists.

If there are multiple possible values of the array a , you may output any of them.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 10^4$). The description of the test cases follows.

The first line of each test case contains two integers n and q ($1 \leq n, q \leq 3 \cdot 10^5$) — the size of the array and the number of modifications.

The second line of each test case contains n integers b_1, b_2, \dots, b_n ($1 \leq b_i \leq 10^9$) — the value of the array c after the q modifications.

The following q lines each contain three integers x_i, y_i , and z_i ($1 \leq x_i, y_i, z_i \leq n$) — describing the i -th modification.

It is guaranteed that the sum of n and the sum of q over all test cases does not exceed $3 \cdot 10^5$.

Output

For each test case, if a exists, output n integers a_1, a_2, \dots, a_n ($0 \leq a_i \leq 10^9$) in a single line. Otherwise, output "-1" in a single line.

If there are multiple solutions, print any of them.

Example

input	Copy
<pre>3 2 1 1 2 2 1 2 3 2 1 2 3 2 3 2 1 2 1 6 4 1 2 2 3 4 5 5 6 6 4 5 5 3 4 4 2 3 3</pre>	
output	Copy
<pre>-1 1 2 3 1 2 3 4 5 5</pre>	

Note

In the first test case, based on the given sequence of modifications, we know that $b_1 = a_1$ and $b_2 = \min(a_1, a_2)$. Therefore, it is necessary that $b_2 \leq b_1$. However, for the given b , we have

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Practice



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Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms) ▼

Choose file: No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
322832186	Jun/04/2025 12:21	Accepted
322831574	Jun/04/2025 12:17	Wrong answer on test 3

→ Problem tags

constructive algorithms dfs and similar graphs greedy trees

No tag edit access

→ Contest materials

- Announcement (en)

$b_1 < b_2$. Therefore, there is no solution.

In the second test case, we can see that the given c becomes b from a after the given modifications, and c is not changed at each modification.

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