Gear

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

A gear system functions normally only if for any adjacent pair of gears (a, b), their products of radius and angular velocity sum to zero, i.e., $r_a\omega_a + r_b\omega_b = 0$.

Now Zag has a gear system, and he tells you the adjacency relations and radiuses of gears, along with the angular velocities of some gears. He wants you to find out the angular velocity of each gear.

Input

The first line contains three integers $n, m, k (1 \leq n, m \leq 10^5, k \leq n)$, the number of gears, the number of adjacency relations, and the number of known angular velocities.

Then a line of n integers $r_1, r_2, ..., r_n (1 \leq r_i \leq 10^9)$ follows, giving you the radius of each gear.

Then m lines of two integers $u, v (1 \leq u, v \leq n)$ follow, each of which describes a pair of adjacent gears.

Then k lines of two integers $p, v (1 \leq p \leq n, |v| \leq 10^9)$ follow, each of which tells you $\omega_p = v$.

Output

If there is a unique solution, output n real numbers in a line describing the angular velocity of each gear in order.

If there is no solution, output `0`.

If there are multiple solutions, output `-1`.

Your answer will be considered correct if the absolute or relative error doesn't exceed 10^{-4}.

Examples

standard input	standard output
5 5 1 2 3 4 5 6 1 2 2 3 1 4 3 4 4 5 1 6	6.00000000 -4.00000000 3.00000000 -2.40000000 2.00000000
3 2 0 2 3 3 1 2 1 3	-1
4 4 2 1 3 7 4 1 2 2 3 3 4 4 1 1 666 2 -222	666.00000000 -222.00000000 95.14285714 -166.50000000