
Problem A. Game

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 512 megabytes

Those guys are definitely teaming.

n players numbered from 0 to $n - 1$ are playing a game. There is a number x , which is initially equal to 0. There are n numbers a_i ($0 \leq i, a_i \leq n - 1$) that are subject to change between the rounds of the game. The game proceeds as follows:

1. Player 0 either skips his turn or makes x equal to $(x + a_0) \bmod n$.
2. Player 1 either skips his turn or makes x equal to $(x + a_1) \bmod n$.
3. ...
4. Player $n - 1$ either skips his turn or makes x equal to $(x + a_{n-1}) \bmod n$.

After this process, the player with the number x wins.

Each player makes a move (that is, changes x) if and only if he will win if he makes a move, but won't win if he doesn't. Players know that everyone plays according to this strategy.

You have to answer q queries: if we change a_x to y who will win the game? Note that the changes are **not** reverted after each query.

Input

The first line of input contains a single integer n ($1 \leq n \leq 10^5$) — the number of players.

The second line contains n integers — initial values of a_i ($0 \leq a_i \leq n - 1$).

The third line contains a single integer q ($0 \leq q \leq 10^5$) — the number of queries.

q lines follow. i -th of them contains two integers x_i and y_i ($0 \leq x_i, y_i \leq n - 1$) meaning that a_{x_i} is equal to y_i from this query onwards.

Output

Output $q + 1$ integers. i -th them should be the number of the winner of the game after $i - 1$ queries.

Examples

standard input	standard output
2 0 0 1 1 1	0 1
3 2 1 2 3 2 1 1 2 2 2	1 0 0 2
4 0 1 1 3 2 3 2 2 2	3 0 2