

Given a binary tree of height H , the variables V and S are defined as follows:

- V is the root value **modulo** H
- S is the minimum value of the V th level **modulo** H , and if S is 0, set to 1 instead

S represents the step value between levels. In this problem, it is required to print the **concatenation of sums** of some selected levels of the tree. The selected levels start at level 0 (the root level) and continues down the tree by step of S every time. For example, for a tree with 9 levels, if $S=3$, the selected levels will be 0, 3, 6.

Input Format

- The first line contains the number of nodes in the tree N .
- The second line contains N numbers representing the data in each node.
- The next line contains the number of edges in the tree E .
- The following E lines will contain 3 values:
 -
 - L or R to represent if this is a left or right child
 -
 - Index of the parent.
 -
 - Index of the child.

Constraints

- N is between 1 and 10^6
- Node 0 is always the root
- Root is in level 0
- Node values are between 1 and 10^4

Output Format

- The concatenation of the sums in one line.

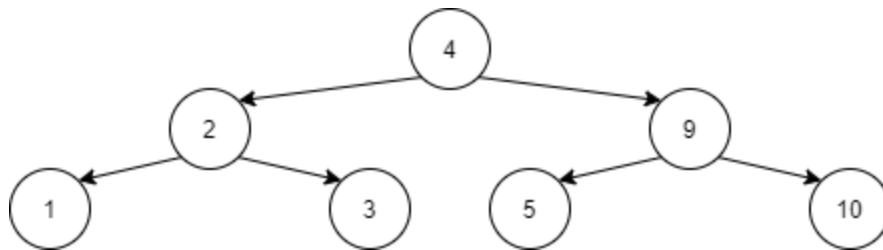
Sample Input 0

```
7
4 2 9 1 3 5 10
6
L 0 1
R 0 2
L 1 3
R 1 4
L 2 5
R 2 6
```

Sample Output 0

419

Explanation 0



- H is 3 (the tree height).
- V is equal to 4 modulo 3 which is 1.
- S is the minimum of the 1st level (Vth level) modulo tree height, which is 2 modulo 3, which is 2.
- The selected levels are level 0 (with sum 4) and level 2 with sum (19) --> concatenated = 419