Play with a Tree

Hey, ACRush and Jelly are playing a game ! Let take a look at its rule:

You are given a tree. Two players take turns cutting edges on a tree. Some nodes is on the "ground". When a player cuts an edge, all the edges that are no longer connected to the ground disappear. The player who can not take a move loses.

ACRush plays first. Both of them are very good players. If you know state of the tree they are playing with, can you guess who will win?



Node 4 is on the ground.

Input

Input consists of multiple test-cases. The first line contains one integer *t* - number of cases (0 < *t* <= 20). For each case, the input format is following. The first line contains one integer N (1 <= N <= 100000). The next line N integers s[i] (1 or 0). If s[i] is 1, the *i*-th node is on the ground. If s[i] is 0, the *i*-th node is not on the ground. Each line of the following N - 1 lines contains two integers u, v. They denote there is an edge between node u and node v (1 <= u,v <= N). There is no blank line after each case.

Output

For each case, output who will win the game. If ACRush wins, output 1; otherwise, output 0 (Jelly wins).

There is no blank line after each case.

Example

Output: