

## Problem D. Fire

Input file: *standard input*  
Output file: *standard output*  
Time limit: 1 second  
Memory limit: 256 mebibytes

*Pang* lives on a tree with  $n$  vertices. The vertices are labelled as  $1, 2, \dots, n$  and *Pang* is in vertex 1. Each vertex has a temperature. On the morning of each day after day 0, the temperature of each vertex decreases by 1. The temperature doesn't decrease on day 0. On the afternoon of each day, *Pang* can travel to an adjacent vertex, provided that he is at a vertex with positive temperature and his destination vertex has a non-negative temperature. On the evening of each day, if the temperature is higher than or equal to 0, *Pang* can cast magic which increases the temperature of the vertex he is in by  $k$ . For each pair of adjacent vertices  $a$  and  $b$ , *Pang* can travel from vertex  $a$  to vertex  $b$  at most once (and from  $b$  to  $a$  at most once). He can choose not to travel and stay in the current vertex.

*Pang* wants to cast his magic on each vertex exactly once. He also tries to stay at vertex 1 as long as possible, before traveling to any other city. Given the temperature of each vertex right before the morning of the day 1, on which day must *Pang* prepare for departing? If *Pang* prepares on day  $i$ , he can cast his magic on that day and will make his first move on day  $i + 1$ . If he cannot cast his magic on each vertex exactly once even if he prepares for departing on the day 0, output  $-1$ .

### Input

The first line contains two integers  $n$  and  $k$  ( $2 \leq n \leq 100000, 0 \leq k \leq 1000000000$ ).

Each of the next  $n - 1$  lines contains two integers  $x$  and  $y$ , indicating an edge between vertices  $x$  and  $y$  ( $1 \leq x, y \leq n$ ).

The  $(n + 1)$ -th line contains  $n$  integers  $a_1, a_2, \dots, a_n$  — the temperature of vertex  $i$  right before the morning of day 1 ( $0 \leq a_i \leq 1000000000$ ).

It's guaranteed that the input is a tree structure.

### Output

If he cannot cast his magic on each vertex exactly once, output  $-1$ .

Otherwise, output a single integer  $x$  — he must prepare for departing from vertex 1 on day  $x$ . Day 1 is the day after day 0, and so on.

### Examples

standard input	standard output
3 1 1 2 1 3 4 3 5	1
3 1 1 2 1 3 2 10 10	-1