Problem C. Puzzle: Kusabi

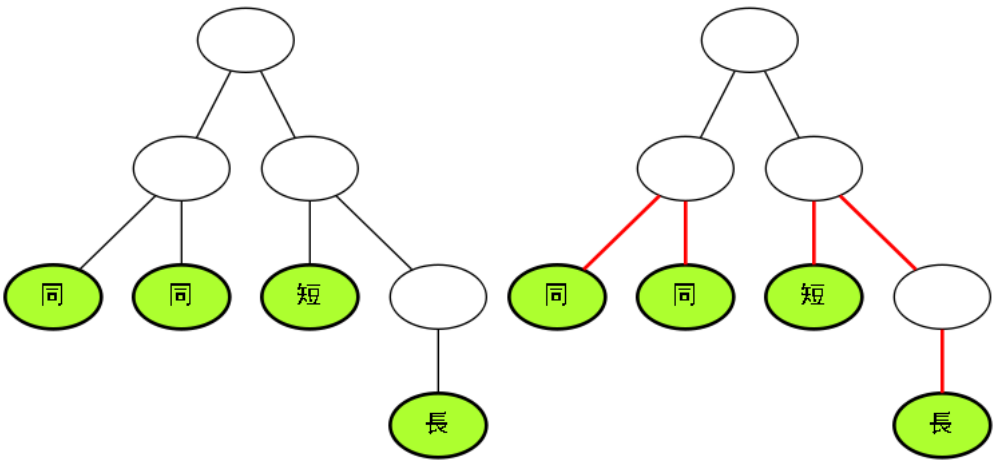
Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

Randomly guessing what each symbol corresponds to has only a 16.7% chance of success.

— Freddie Hand

Grammy is a puzzle master. Today, she is playing a variant of "Kusabi" puzzle. In this variant, there is a rooted tree with some Chinese characters on it. The root of the tree is vertex 1, which is not marked. The marked vertices can have a "Chang", "Duan", or "Tong" symbol on it. The goal is to connect all of the marked vertices into pairs such that:

- Each marked vertex is connected to exactly one other marked vertex by marking every edge on the shortest path between them.
- Vertices with character "Chang" must have a longer distance to the root than its counterpart.
- Vertices with character "Duan" must have a shorter distance to the root than its counterpart.
- Vertices with character "Tong" must have the same distance to the root with its counterpart.
- Each **edge** on the tree can be marked at most once.



The left picture illustrates a possible puzzle with only clues, and the right picture shows a possible way to solve the puzzle.

Grammy surely knows how to solve the puzzle, but she decided to give you a quiz. Please solve the puzzle.

Input

The first line contains a single integer n ($1 \le n \le 10^5$), denoting the number of vertices on the tree.

Each of the next $n-1$ lines contains two integers i, p_i ($1 \le p_i < i \le n$) and a string t_i ($t_i \in$ {"`Chang`", "`Duan`", "`Tong`", "`-`"}), denoting that there is an edge between p_i and i, and the type of vertex i is t_i ("`-`" means that vertex i is not marked). It is guaranteed that i is given in increasing order. It is also guaranteed that there is at least one marked vertex.

Output

If the solution does not exist, output "NO" on a single line.

Otherwise, output "YES" on the first line, then output several lines, each of which contains two integers u_i, v_i, denoting a pair of connected vertices in your solution. If there are multiple solutions, output any.

Examples

standard input	standard output
8 2 1 - 3 1 - 4 2 Tong 5 2 Tong 6 3 Duan 7 3 - 8 7 Chang	YES 6 8 5 4
10 2 1 Duan 3 2 Duan 4 2 - 5 4 Chang 6 2 Chang 7 1 Duan 8 6 Tong 9 6 Tong 10 3 Chang	YES 9 8 3 10 2 6 7 5