



## INOI 30

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Tehran, Iran

Summer Camp Programming Finals - Day 2

LOSTIKS

en (US)

## LOSTIKS

Aryo the Brave has bought a new crawler dungeon named Keys. In fact, it's been days he's playing and his army is getting ready for battle without their commander.

Each dungeon of this game has  $N$  rooms connected with  $N - 1$  doors together so that their graph (with nodes equal to rooms and edges equal to doors) is a tree means both connected and acyclic.

At the start of a dungeon, Aryo is in room  $S$  and has to reach room  $T$ . The problem is that  $M$  of these doors are locked and their keys can be in some other rooms. And worst Aryo's character in the game can carry at most one key at a time means he can't drop a key till he hasn't opened a door with it.

Moving from a room to an adjacent room takes 1 second and taking a key or unlocking a door takes no time but pay attention that by unlocking a door he won't move to the other room and he will just unlock the door.

Aryo's army needs him but he is stuck in this game, so for each of the dungeons tell him the minimum time he needs to pass that dungeon so that he can fight alongside his brave soldiers as soon as possible.

### Input

At the first line of input, you get  $N$  number of rooms.

next line you get  $S$  and  $T$  the starting and finishing room.

at next  $N - 1$  lines each line consists of information about a door as  $u, v, w$ .  $u$  and  $v$  are two rooms connected by the door. if  $w = 0$  door is not locked and else  $w$  is the room where the door's key is there.

### Output

In the only line of the output print a minimum time that Aryo needs to go from  $S$  to  $T$ . If it's not possible to do so print  $-1$ .

### Constraints

- $1 \leq n \leq 10^6$
- $1 \leq s, t, u, v \leq n$

- $0 \leq w \leq n$
- $0 \leq m \leq 20$

## Subtasks

Subtasks	score	constraints
1	23	$n \leq 100\,000, m \leq 8$
2	36	$n \leq 7000$
3	41	No additional constraints.

## Examples

Standard input	Standard output
4 1 4 1 2 0 1 3 2 3 4 1	4
5 3 1 1 2 5 2 3 4 3 4 0 4 5 2	10