DMPG '19 G5 - Hunting the White Whale

Time limit: 2.0s **Memory limit:** 256M

Subaru and Rem are hunting down the white whale. They currently have a list of N locations where the white whale has been rumoured to appear. There are $N-1$ roads that connect every location to every other location. The ith of these typically sees t_i travelers per day.

If the white whale travels along these roads, it continually travels along a single path that sees a total of K travelers per day, picked uniformly at random from all such paths. Doing so means that it will pass all locations that are on this path. Thus Rem asks Subaru N questions: if we wait at node $1, 2, \ldots, N$, what is the probability we will encounter the whale?

Constraints

For all subtasks:

$0 \leq t_i \leq 1\,000\,000$

Subtask 1 [9%]

$1 \leq N \leq 100$

$1 \leq K \leq 100$

The network of roads forms the simplest possible line: For $1 \leq i < N$, road i connects locations i and $i+1$.

Subtask 2 [12%]

$1 \leq N \leq 1\,000$

$1 \leq K \leq 1\,000\,000$

Subtask 3 [22%]

$1 \leq N \leq 200\,000$

$1 \leq K \leq 100$

Subtask 4 [57%]

$1 \leq N \leq 200\,000$

$1 \leq K \leq 1\,000\,000$

Input Specification

The first line of input will contain two space-separated integers, N and K.
The next $N-1$ lines will each contain 3 integers: a_i, b_i, t_i, indicating there is a road between locations a_i and b_i, with t_i travelers per day.

Output Specification

You should output N lines, where each is the probability Rem and Subaru encounter the white whale, expressed as a fraction in lowest terms.

Sample Input

```
5 4
1 3 3
2 3 3
3 4 1
4 5 3
```

Sample Output

```
1 / 3
1 / 3
1 / 1
1 / 1
1 / 3
```

Explanation for Sample Output

The possible paths are:

- $2 \to 3 \to 4$
- $1 \to 3 \to 4$
- $5 \to 4 \to 3$

Locations 3 and 4 appear on all 3 paths, but locations 1, 2, and 5 only appear on a single path each.