DMOPC '21 Contest 1 P6 - Tree Jumping

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

Unfortunately, it turns out that a lot of the shows you've been watching this season haven't really lived up to their hype. To vent your frustration, you've decided to spend the weekend jumping in a tree instead.

The tree you're jumping in is rooted at node 1 with N nodes connected by $N-1$ edges, the i-th edge connecting nodes u_i and v_i with a length of l_i. Each node i has 2 values r_i and c_i.

You may jump from node a to node b if b is a descendant of a and $r_a > c_b$, with a danger factor of $\frac{dist(a,b)}{r_a - c_b}$ where $dist(a,b)$ is the length of the shortest path from a to b.

For each node i from 2 to N, find the minimum danger factor of a **direct** jump from some node to node i or determine that it is impossible to jump to this node.

Constraints

$2 \leq N \leq 3 \times 10^5$

$1 \leq r_i, c_i, l_i \leq 10^9$

$1 \leq u_i, v_i \leq N$

Subtask 1 [30%]

$u_i = i$ and $v_i = i + 1$ for all i.

Subtask 2 [70%]

No additional constraints.

Input Specification

The first line contains an integer N.

The second line contains N integers r_i $(1 \leq i \leq N)$.

The third line contains N integers c_i $(1 \leq i \leq N)$.

The next $N-1$ lines each contain 3 integers u_i, v_i, and l_i.

Output Specification

Output $N-1$ lines, the i-th line containing the minimum danger factor of a direct jump from some node to node $i+1$ or `Unreachable` if it is impossible to jump to this node. Your output will be considered correct if the absolute or relative error of each numerical value does not exceed 10^{-9}.

Sample Input

```
7
11 8 7 2 6 3 9
2 1 1 5 4 3 13
2 4 3
1 2 3
7 1 4
3 6 6
2 3 2
5 3 1
```

Sample Output

```
0.300000000000
0.285714285714
1.000000000000
0.333333333333
1.375000000000
Unreachable
```

Explanation

For node 2, it is best to jump from node 1 to node 2 with a danger factor of $\frac{3}{11-1} = \frac{3}{10}$.

For node 3, it is best to jump from node 2 to node 3 with a danger factor of $\frac{2}{8-1} = \frac{2}{7}$.

For node 4, it is best to jump from node 1 to node 4 with a danger factor of $\frac{6}{11-5} = 1$.

For node 5, it is best to jump from node 3 to node 5 with a danger factor of $\frac{1}{7-4} = \frac{1}{3}$.

For node 6, it is best to jump from node 1 to node 6 with a danger factor of $\frac{11}{11-3} = \frac{11}{8}$.

For node 7, it is impossible to jump to this node.