IOITC 2019
Team Selection Test 3

Breaking Trees

Parth has a graph of N nodes which are numbered from 1 to N. It has $N-1$ directed edges such that it is guaranteed that for all nodes i except 1, there is exactly one simple path from node 1 to node i. Further, for each node i, Parth defines 2 values: the type parameter A_i and the taste parameter B_i. Besides the graph, Parth also has a preference parameter, K.

Consider a simple path $S_1, S_2, \ldots, S_m$ (for some m). The happiness that this path brings to Parth is the sum of happiness of each node in it.
For $p \leq m-K$, the happiness of the p-th node, S_p, is B_{S_p} if $A_{S_p} = A_{S_{p+K}}$. If not, then the happiness of S_p is 0.
For $p > m-K$, happiness of S_p is 0.

You need to decompose the graph into paths such that each node belongs to exactly one path, and the total happiness Parth obtains from all the paths is maximized. Output this maximum happiness possible.

Input

- The first line of each test case contains two integers, N and K.
- Each of the next $N-1$ lines contains two space-separated integers u and v denoting a directed edge from node u to v.
- The following line contains N space-separated integers $A_1, A_2, \ldots, A_N$.
- The last line contains N space-separated integers $B_1, B_2, \ldots, B_N$.

Output

Output a single integer in a new line, the maximum happiness that Parth can obtain.

Constraints

- $1 \leq N \leq 2 \cdot 10^5$
- $1 \leq K \leq N$
- $1 \leq u, v \leq N$
- $1 \leq A_i \leq N$
- $-10^9 \leq B_i \leq 10^9$

Subtasks

- Subtask 1: 8%: $N \leq 500$
- Subtask 2: 20%: $N \leq 2 \cdot 10^5$, but the tree is a chain (i.e. ith edge goes from i to $(i+1)^{th}$ node)
- Subtask 3: 24%: $N \leq 5000$
- Subtask 4: 48%: Original Constraints

Sample Input 1

```
8 2
1 8
4 2
1 5
5 3
1 6
8 7
7 4
4 4 4 4 6 3 4 8
2 3 -4 -7 3 4 2 -3
```

Sample Output 1

```
4
```

Sample Input 2

```
6 3
1 2
2 3
3 4
4 5
5 6
5 6 1 5 4 1
8 -6 -4 2 -9 -4
```

Sample Output 2

```
8
```

Explanation 2

Consider the paths $1 \to 2 \to 3 \to 4$ and $5 \to 6$. In the first path, $A_1 = A_4$, and therefore its happiness is $B_1 = 8$. The second path has happiness 0.
Therefore the total happiness is $8 + 0 = 8$.