Problem G. Fatemeh and Sepahan Keshvar's Capital

As you might know, Sepahan Keshvar consists of n states which are connected by $n-1$ bidirectional roads. Independency is very crucial in S.K., so each state has it's own budget. This year, the budget of state i is A_i. For the sake of fairness, each year the capital of S.K. will change to a random sate (not necessarily different).

Fatemeh is a tourist in S.K., and she figured out that each year the budget of states will change interestingly. Specifically, when state j becomes the new capital, the new budget for state i will be sum of the budgets of all states along the path from state i to j, inclusive. Please note when a new state becomes the new capital, all states update their budgets at the same time.

Given these details, help Fatemeh to find out the Expected Value of sum of the budgets of all states after exactly k years.

Input

In the first line of the input n and k are given. $(1 \leq n, k \leq 5000)$

The next line contains n numbers, the initial budget of states.

In the next $n-1$ lines the S.K.'s roads are given. In each line two space-separated integers are given, which are two adjacent states.

Output

In one line print the answer to the problem module 1000000007.

Examples

test	answer
4 1 1 1 1 1 1 2 1 3 1 4	500000012