

Focşani

Input file: **standard input**
Output file: **standard output**
Time limit: **3 seconds**
Memory limit: **512 megabytes**



Little IR12660 doesn't know that much about Focşani, apart from the fact that it is the closest he will ever come to Transylvania. So he just remembers a problem he got as homework at school:

You are given a tree with N nodes, where each node i has an initial label a_i , an integer in the range $[1, k]$. A tree is an undirected and connected graph, with $N - 1$ edges.

Each label belongs to an alphabet of size K . Changing the label of the i -th node to x incurs a cost $C_{i,x}$.

A path in the tree is a set of nodes (x_1, x_2, \dots, x_m) such that x_i is connected to x_{i+1} for all $1 \leq i < m$. A path is **palindromic** if the sequence of labels along the path forms a palindrome.

Your task is to determine the minimum cost required to relabel the tree such that no path of length greater than 1 in the tree is palindromic.

Input

The first line contains two integers N and K ($2 \leq N \leq 1000$, $1 \leq K \leq 20$) — the number of nodes and the size of the alphabet.

The second line contains N integers a_1, a_2, \dots, a_N ($1 \leq a_i \leq K$) — the initial labels of the nodes.

The next $N - 1$ lines each contain two integers u and v ($1 \leq u, v \leq N$), representing an edge between nodes u and v .

The following N lines each contain K integers. The j -th integer in the i -th line represents $C_{i,j}$ ($0 \leq C_{i,j} \leq 10^9$) — the cost of changing node i to label j .

The input for this problem is generated uniformly at random! (except N and K)

Output

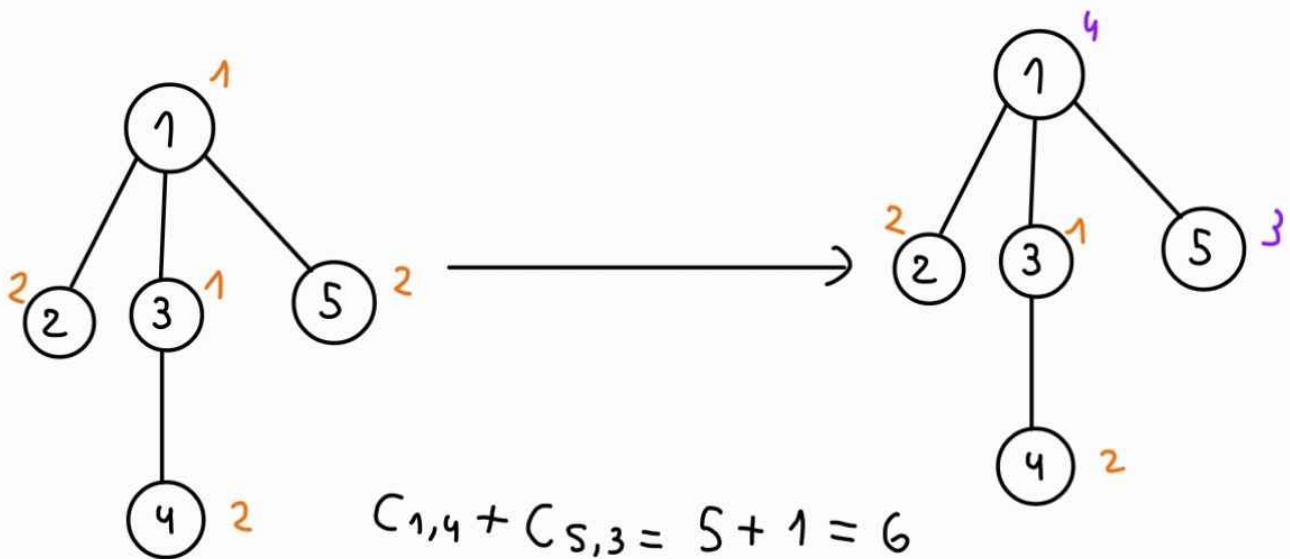
Output a single integer — the minimum cost required to relabel the tree such that no path of length greater than 1 is palindromic.

If there is no solution, output **-1**.

Examples

standard input	standard output
5 4 1 2 1 2 2 1 2 1 3 3 4 1 5 0 1 3 5 2 0 1 4 0 1 8 9 1 0 5 8 4 0 1 5	6
2 1 1 1 1 2 10 10	-1

Note



Analysis of the example.