Problem K
K Paths

In graph theory, a tree is a connected undirected graph which does not have any cycles. A tree containing n vertices has exactly $n - 1$ edges. For every pair of vertices (u, v) in the tree, there is exactly one simple path between u and v. A simple path is a path which passes through each vertex at most once.

You are given a tree containing n vertices. These vertices are numbered from 1 to n, inclusive. Let a_i be the label of the i-th vertex.

You need to select k disjoint simple paths, so that the starting vertex of every path differs from its ending one, and the maximum sum of the labels of the starting and ending vertices of a path is minimized.

Formally, you need to select k pairs of vertices (s_1, e_1), (s_2, e_2), ..., (s_k, e_k) satisfying all below conditions:

- For every i such that $1 \le i \le k$, $s_i \ne e_i$.
- Let's consider k simple paths on the tree: The simple path between s_1 and e_1, the simple path between s_2 and e_2, ..., the simple path between s_k and e_k. These k paths must be pairwise disjoint. In other words, every vertex in the tree belongs to at most one of these k paths.
- The value $\max(a_{s_1} + a_{e_1}, a_{s_2} + a_{e_2}, \ldots, a_{s_k} + a_{e_k})$ is as small as possible.

Input

The first line of the input contains two integers n and k ($2 \le n \le 10^5, 1 \le k \le \frac{n}{2}$).

The second line contains n integers: $a_1, a_2, \ldots, a_n$ ($0 \le a_i \le 10^9$).

In the last $n - 1$ lines, each contains two integers u and v ($1 \le u, v \le n$) indicating that two vertices u and v is directly connected by an edge.

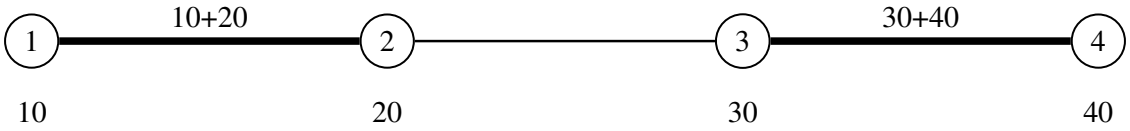
It is guaranteed that the given edges form a tree.

Output

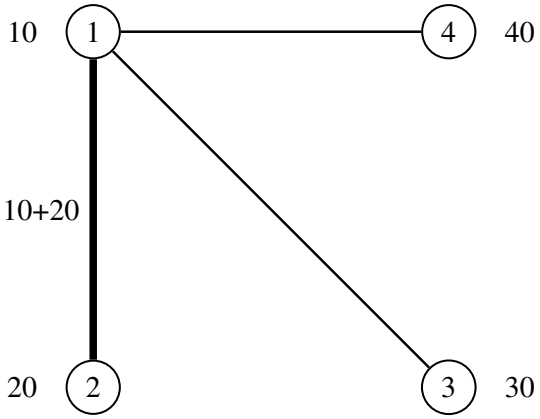
Print a single integer denoting the minimum possible value of the above expression. If it is impossible to select k pairs of vertices satisfying all the above conditions, print -1 instead.

Explanation to samples

In the first sample:



In the second sample:



Sample Input 1	Sample Output 1
4 2 10 20 30 40 1 2 2 3 3 4	70

Sample Input 2	Sample Output 2
4 1 10 20 30 40 1 2 1 3 1 4	30

Sample Input 3	Sample Output 3
4 2 10 20 30 40 1 2 1 3 1 4	-1