Problem B. Painting the Roads

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 mebibytes

You are the king of the Pigeon Kingdom. The Pigeon Kingdom consists of n cities and $n-1$ two-way roads, each connecting a pair of cities. It is guaranteed that it is possible to traverse between any two cities through the roads.

Each road has a color, black or white, and a length ℓ_i. Initially, each road is white. However, you think that it is too boring this way. So you have decided to assign m robots to m cities to paint the roads to your favorite color pattern. Different robots **can** be assigned to the same city. Robot i starts at city p_i, travels through some roads (possibly none), and then stops. A robot **cannot** travel through one road multiple times. When a robot travels through a road, it flips the color of the road (if it was white, it turns black, and vice versa). The robots are independent, which means that they will not interfere with each other in the travel. We assume that different robots don't paint any road simultaneously. Also, different robots **can** stop in the same city. The cost of a robot's travel is defined as the sum of lengths of all the roads on its path.

As the king of the Pigeon Kingdom, you want to minimize the total cost of all the travels. If it is impossible to paint the roads to the desired pattern with the m robots, print -1 instead.

Input

The first line contains an integer t, the number of test cases ($1 \le t \le 5000$). The test cases follow.

The first line of each test case contains two integers n and m ($2 \le n \le 5000$ and $1 \le m \le 5000$), denoting the number of cities and the number of robots, respectively.

Each of the next $n-1$ lines contains four integers u_i, v_i, ℓ_i, c_i ($1 \le u_i < v_i \le n$; $1 \le \ell_i \le 10$; $c_i = 0$ or $c_i = 1$), denoting a road of length ℓ_i connecting cities u_i and v_i. If $c_i = 0$, you should paint it white in the desired pattern; otherwise, you should paint it black. It is guaranteed that it is possible to traverse between any pair of cities through the given roads.

Then a single line contains m integers p_j ($1 \le p_j \le n$), denoting the starting city for each robot.

It is guaranteed that the of sum of n over all test cases will not exceed 5000, and the sum of m over all test cases will not exceed 5000.

Output

For each test case, print one line containing a single integer: the minimal total cost to paint all the roads to the desired pattern. If it is impossible to do so, print -1 instead.

Example

standard input	standard output
5	3
3 2	9
1 2 1 1	21
2 3 2 1	-1
1 3	42
4 2	
1 2 3 1	
2 3 1 0	
3 4 4 1	
1 2	
5 4	
1 2 3 0	
2 3 1 1	
3 4 2 0	
4 5 2 1	
1 1 1 1	
5 2	
1 2 2 1	
1 3 3 0	
1 5 2 1	
3 4 1 1	
1 2	
10 5	
1 2 10 1	
2 3 3 1	
3 4 4 0	
4 5 4 1	
5 6 2 1	
2 7 8 0	
2 8 9 1	
4 9 1 0	
1 10 4 0	
10 10 2 1 8	