Problem D. Diameter of a Tree

Input file: `standard input`
Output file: `standard output`

Given a weighted tree T_0, we define its diameter as the length of the longest path between two vertices on it, where the length of a path is equal to the sum of weights of edges in the path.

If the tree stretches like a spider or a yawning tiger, its diameter will change. Let's use T_i to denote the state of the tree after i seconds, at which time the weight of each edge has been increased by exactly i units from T_0.

You will be presented with several different queries, and you should calculate the tree's diameter at some specified time for each query.

Input

The input contains several test cases, and the first line contains a positive integer T indicating the number of test cases which is up to 60.

For each test case, the first line contains two integers n and m indicating the number of vertices in the tree and the number of given queries respectively, where $2 \leq n \leq 2 \times 10^5$ and $1 \leq m \leq 2 \times 10^5$.

Each of the following $(n-1)$ lines contains three integers u, v and w which represent an edge in the original tree between the u-th vertex and the v-th one of weight w, where $1 \leq u, v \leq n$, $u \neq v$ and $1 \leq w \leq 10^8$.

Each of the following m lines describes a query containing only one integer k that asks you to calculate the diameter of the tree T_k, where $0 \leq k \leq 10^9$.

We guarantee that the sum of n in all test cases is no larger than 10^6, and the sum of m in all test cases is no larger than 10^6 as well.

Output

For each test case, output a line containing "`Case #x:`" (without quotes) at first, where `x` is the test case number starting from 1.

Then output m lines corresponding to all queries. The i-th line of them contains an integer indicating the answer to the i-th query.

Example

standard input	standard output
2 3 3 1 2 1 1 3 5 5 10 100 5 6 1 2 100 2 3 5 2 4 1 4 5 1 0 1 2 3 4 5	Case #1: 16 26 206 Case #2: 105 107 109 111 114 117

Note

In the second sample case:

- the diameter of T_0 is 105, which is the length of the path $1 - 2 - 3$; and
- the diameter of T_5 is 117, which is the length of the path $1 - 2 - 4 - 5$.