7148 LRIP

There is a tree with N nodes, and every node has a weighted value. A RIP (restricted increasing path) is a directed path with all nodes' weighted values not decreasing and the difference between the max weighted value and the min weighted value is not larger than D. Find the length of longest restricted increasing path (LRIP).

A path in a tree is a finite or in finite sequence of edges which connect a sequence of vertices which are all distinct from one another. A directed path is again a sequence of edges which connect a sequence of vertices, but with the added restriction that the edges all be directed in the same direction.

Input

The first line of the input gives the number of test cases, T. T test cases follow. Each test case starts with two integers N and D, which indicates the number of nodes in the tree and the restricted value. The following line contains N integers, a_1, a_2, ..., a_i, ..., a_N, which indicates the i-th node's weighted value. Then $N-1$ lines follow, every line contains two integers u, v ($1 \leq u, v \leq N$), which means there is a path between u-th node and v-th node.

Output

For each test case, output one line containing '`Case #`x`:` y', where x is the test case number (starting from 1) and y is the length of LRIP of this tree.

Unofficial clarification: The last $N-1$ lines for each testcase describe edges, not paths. These edges are undirected (i.e. you can make it a directed edge in either direction), and the length of a path is the number of nodes on it.

Limits:
$1 \leq T \leq 10$
$1 \leq a_i \leq 10^5$, $1 \leq i \leq N$
$1 \leq N, D \leq 10^5$

Sample Input

```
3
3 1
1 2 3
1 2
2 3
3 2
1 2 3
1 2
2 3
7 4
1 3 4 5 7 8 3
1 3
1 4
2 3
3 5
```

```
5 7
6 3
```

Sample Output

```
Case #1: 2
Case #2: 3
Case #3: 3
```