Robotic Class

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 262144/262144 K (Java/Others)
Total Submission(s): 0 Accepted Submission(s): 0

Problem Description

Baby volcano is now at a robotic class. In this class, babies are required to program a special control system of a robot. This control system has a real-valued control variable x, which captures the behavior of this robot. In addition, this control system could be abstracted as an acyclic directed graph, with n node, the nodes are indexed from 1 to n. In this graph, the node n has no output edge, termed as the output node. Moreover, for each vertex $t, 1 \le t < n$, there is a number k_t, a set of $integer\text{-}valued$ limits $a_{t,0} < a_{t,1} < a_{t,2} < \cdots < a_{t,k_t-1} < a_{t,k_t} := +\infty$, and a set of $integer\text{-}valued$ coefficients, bias and destinations $c_{t,0}, b_{t,0}, d_{t,0}, c_{t,1}, b_{t,1}, d_{t,1}, c_{t,2}, b_{t,2}, d_{t,2} \cdots, c_{t,k_t}, b_{t,k_t}, d_{t,k_t}$. For every t and $i, 0 \le i \le k_t$, $-1 \le c_{t,i} \le 1$.

To use this system to control the robot, the user follows the steps below:

1. Choose x_0 and initialize $x := x_0$, then choose some node s_0 and set the currect node $t := s_0$
2. If t is the output node$(t = n)$, then output $x_{out} := x$, else go to step 3.
3. The user finds the smallest i such that $a_{t,i} \ge x$(Note that i always exists), then transform $x := c_{t,i} \times x + b_{t,i}$, and set $t := d_{t,i}$, and go back to step 2.

Note that for every fixed s_0, the output value x_{out} is a function with respect to the initial value $x_0 \in \mathbb{R}$, we call this function $C_{s_0}(x_0)$.

To precisely control the robot, it is required that for every initial node s_0, $C_{s_0}(x_0)$ is continuous with respect to x_0.

A function $f(x), x \in \mathbb{R}$ is continuous with respect to x iff

$$\forall x \in \mathbb{R}, \forall \epsilon > 0, \exists \delta > 0, \forall x' \in \mathbb{R}, (|x - x'| \le \delta \implies |f(x) - f(x')| \le \epsilon)$$

You need to verify this requirement is satisfied or not. In other words, if for every initial node s_0, $C_{s_0}(x_0)$ is continuous with respect to x_0, you should output "YES". If there exists some node s^* such that $C_{s^*}(x_0)$ is not continuous, you should output "NO".

Input

In the first line there is one integer T, denotes the number of test cases.

The rest of input has T part, each part corresponds to a test case.

For each part, in the first line there is a number n, denotes the number of nodes.

In the next $n-1$ lines, the i-th line starts with k_i, follows with $4k_i + 3$ integers, they are $c_{i,0}, b_{i,0}, d_{i,0}, a_{i,0}, c_{i,1}, b_{i,1}, d_{i,1}, a_{i,1}, \cdots, a_{i,k_i-1}, c_{i,k_i}, b_{i,k_i}, d_{i,k_i}$.

It guarantees that $1 \le T \le 100$,
and in a single test cases,
$1 \le n \le 500$,
$1 \le \sum k_i \le 2000$,
$-1 \le c_{i,j} \le 1$,
$-10^6 \le b_{i,j} \le 10^6$,
$-10^9 \le a_{i,j} \le 10^9$,
$i + 1 \le d_{i,j} \le n$.
And it guarantees that $a_{i,j-1} < a_{i,j}$ for every $1 \le j < k_i$.

Output

For each test case, you should firstly output "Case #t: "(without quotes), where t is the index of this test case, then if for every initial node s_0, $C_{s_0}(x_0)$ is continuous with respect to x_0, you should output "YES". If there exists some node s^* such that $C_{s^*}(x_0)$ is not continuous, you should output "NO".

Sample Input

```
3
4
1 1 1 2 -4 -1 -7 3
0 -1 -2 4
0 1 4 4
4
1 1 1 2 -4 -1 -7 3
0 -1 -3 4
0 1 4 4
1
```

Sample Output

```
Case #1: YES
Case #2: NO
Case #3: YES
```

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Hangzhou Dianzi University Online Judge 3.0
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Designer & Developer : Wang Rongtao Lin Le GaoJie GanLu
Total 0.000000(s) query 0, Server time : 2020-09-20 12:06:11, Gzip enabled

Administration