

Problem D. Tea

Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 256 mebibytes

Bytemommy whole-heartedly loves her Bytekids. However she is kinda forgetful, so instead of giving their proper names, she numbered them with consecutive integers from 1 to n . Everyday she prepares a tea for each of her Bytekids in their favourite cups. One peculiar property of all tea cups in their home is that they have infinite capacity, even though they take finite space only. However, this is for our simplicity only. Bytekid number i prefers to drink exactly l_i bitres of tea everyday. However, amount of tea is not their only requirement — its temperature has to be properly adjusted as well. Bytekid number i would like its tea to have exactly b_i Bytesius degrees.

Unfortunately, one day scatterbrained Bytemommy messed up teas temperatures and temperature of tea in i -th cup was exactly a_i Bytesius degrees, instead of b_i (however i -th kid still got l_i bitres in its cup). Nothing is lost yet — Bytekids are very clever and using some auxiliary cups started to mix up their teas trying to get cups with appropriate amounts and temperatures of teas. You need to determine whether it is possible for Bytekids to reach their goal, that is to get n teas so that i -th tea has exactly l_i bitres and b_i Bytesius degrees.

Formally, Bytekids are allowed to perform following steps arbitrarily many times:

- *Partitioning the tea.* Given a cup with a bitres of tea with temperature t , create two cups of tea with x and $a - x$ bitres of tea with temperature t for some arbitrary real value of x such that $0 < x < a$ (initial cup of tea will no longer exist, obviously).
- *Mixing the tea.* Given two cups of tea with a and b bitres of tea with temperatures t_a and t_b , respectively, create one cup of tea with $a + b$ bitres of tea with temperature

$$\frac{a \cdot t_a + b \cdot t_b}{a + b},$$

that is, the weighted mean of initial temperatures (again, initial two cups of tea will no longer exist).

Input

The first line of input contains one integer t ($1 \leq t \leq 100\,000$) denoting number of testcases.

Description of each testcase starts with a line containing one integer n ($1 \leq n \leq 100\,000$) denoting number of Bytekids. Following n lines describe Bytekids: i -th of them contains three integers l_i , a_i and b_i ($1 \leq l_i, a_i, b_i \leq 1\,000\,000$) denoting amount of tea in i -th cup in bitres (both initial and required final one) and initial and required temperature of that tea, respectively.

Sum of values of n over all testcases will not exceed 1 000 000.

Output

You need to print t lines, i -th of them should contain a word **TAK** if it is possible for Bytekids to reach their goal in i -th testcase, or **NIE** otherwise.

Example

standard input	standard output
5	TAK
2	NIE
2 1 4	TAK
2 5 2	NIE
2	TAK
1 4 3	
1 5 4	
2	
1 5 7	
1 7 5	
2	
1 4 1	
1 2 5	
3	
2 6 4	
1 2 3	
3 4 5	

Explanation to the sample test: Denote cups of tea as pair of numbers. Pair (l, t) denotes cup with l litres of tea with temperature t Bytesius degrees.

In the first testcase Bytekids have cups $(2, 1)$ and $(2, 5)$. Using operation of partitioning the tea they can get cups $(\frac{1}{2}, 1)$, $(\frac{3}{2}, 1)$, $(\frac{1}{2}, 5)$ and $(\frac{3}{2}, 5)$. Then, by mixing up cups $(\frac{1}{2}, 1)$ and $(\frac{3}{2}, 5)$, they get $\frac{1}{2} + \frac{3}{2} = 2$ with temperature

$$\frac{\frac{1}{2} \cdot 1 + \frac{3}{2} \cdot 5}{\frac{1}{2} + \frac{3}{2}} = 4,$$

that is — cup $(2, 4)$. Similarly, by mixing cup $(\frac{3}{2}, 1)$ with $(\frac{1}{2}, 5)$, they get $(2, 2)$. In the end, Bytekids will have two cups with appropriate amounts and temperatures of tea.

In the second testcase both teas are too hot. We can't do much here.

However, in the third testcase it is sufficient for Bytekids to swap their cups.