There is a robot who lives on a cartesian plane and likes to walk around it. One day he planned a very interesting journey around the plane. To make that journey he developed a program which he is going to follow. The program consists of n functions: $f_1, f_2, \ldots, f_n$. The i-th function f_i is a sequence of c_i commands. Each command is of one of the following types:

- GO: Move forward one meter;

- LEFT: Turn 90 degrees to the left;

- RIGHT: Turn 90 degrees to the right;

- Fk: Follow the instructions of the function f_k, then continue following the instructions of the current function.

The robot starts the journey at his home located at the point with coordinates (0, 0) following the instructions of the function f_1.

For example, consider the following set of functions:

f_1 : GO F2 GO F2 GO F2
f_2 : F3 F3 F3 F3
f_3 : GO LEFT

$(0,0)$
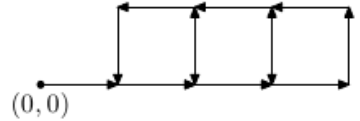
The robot's journey for that case is shown on the picture.

In some cases the journey of the robot might never end. Consider for example the set of instructions consisting of one function f_1 that has the following commands: GO F1. In that case the robot keeps going forward and never stops.

The question that puzzles the robot now is how far from the home will he get during his journey. That is, consider the set of all points which the robot will visit. Find the maximum value of $|x| + |y|$ among all those points. If there are points on the path of the robot with arbitrarily large values of $|x| + |y|$, output 'Infinity'.

Input

The input file contains several test cases, each of them as described below.

The first line of each case consists of an integer number n ($1 \leq n \leq 100$). The following n lines contain a description of the functions. The i-th line describes function f_i. It consists of the number c_i ($1 \leq c_i \leq 100$) — the number of commands for function f_i, followed by a description of each command.

Output

For each test case, output the maximum value of $|x| + |y|$ among all points visited during the journey or 'Infinity'.

Sample Input

```
3
6 GO F2 GO F2 GO F2
4 F3 F3 F3 F3
2 GO LEFT
1
2 GO F1
4
2 GO F2
7 LEFT GO GO GO F3 LEFT F4
5 GO F4 RIGHT F2 RIGHT
7 GO GO LEFT LEFT GO LEFT GO
```

Sample Output

```
5
Infinity
13
```