

Qualification Round 2015

[A. Standing Ovation](#)[B. Infinite House of Pancakes](#)[C. Dijkstra](#)**D. Ominous Omino**[Contest Analysis](#)[Questions asked](#)

Submissions

Standing Ovation

7pt Not attempted
22964/26528 users
correct (87%)

10pt Not attempted
19346/22732 users
correct (85%)

Infinite House of Pancakes

9pt Not attempted
7805/17231 users
correct (45%)

12pt Not attempted
5442/6704 users
correct (81%)

Dijkstra

11pt Not attempted
6663/9721 users
correct (69%)

17pt Not attempted
2492/4819 users
correct (52%)

Ominous Omino

8pt Not attempted
7342/9200 users
correct (80%)

26pt Not attempted
686/4030 users
correct (17%)

Top Scores

kyc	100
ksun48	100
darnley	100
AntiForest	100
shik	100
Nicolas16	100
ProjectYoung	100
azariamuh	100
wo...	100
ctunoku	100

Problem D. Ominous Omino

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the [Quick-Start Guide](#) to get started.

Small input
8 points

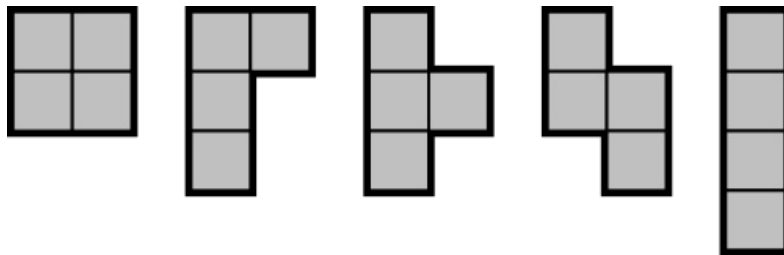
Solve D-small

Large input
26 points

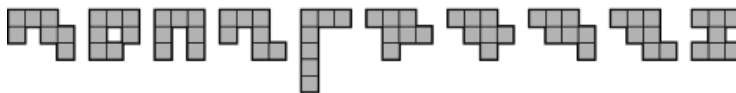
Solve D-large

Problem

An N -omino is a two-dimensional shape formed by joining N unit cells fully along their edges in some way. More formally, a 1-omino is a 1x1 unit square, and an N -omino is an $(N-1)$ -omino with one or more of its edges joined to an adjacent 1x1 unit square. For the purpose of this problem, we consider two N -ominoes to be the same if one can be transformed into the other via reflection and/or rotation. For example, these are the five possible 4-ominoes:



And here are some of the 108 possible 7-ominoes:



Richard and Gabriel are going to play a game with the following rules, for some predetermined values of X , R , and C :

1. Richard will choose any one of the possible X -ominoes.
2. Gabriel must use at least one copy of that X -omino, along with arbitrarily many copies of any X -ominoes (which can include the one Richard chose), to completely fill in an R -by- C grid, with no overlaps and no spillover. That is, every cell must be covered by exactly one of the X cells making up an X -omino, and no X -omino can extend outside the grid. Gabriel is allowed to rotate or reflect as many of the X -ominoes as he wants, including the one Richard chose. If Gabriel can completely fill in the grid, he wins; otherwise, Richard wins.

Given particular values X , R , and C , can Richard choose an X -omino that will ensure that he wins, or is Gabriel guaranteed to win no matter what Richard chooses?

Input

The first line of the input gives the number of test cases, T . T lines follow. Each contains three space-separated integers: X , R , and C .

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 either RICHARD (if there is at least one choice that ensures victory for Richard) or GABRIEL (if Gabriel will win no matter what Richard chooses).

Limits

Small dataset

$T = 64$.
 $1 \leq X, R, C \leq 4$.

Large dataset

$1 \leq T \leq 100$.
 $1 \leq X, R, C \leq 20$.

Sample

Input	Output
4	Case #1: GABRIEL
2 2 2	Case #2: RICHARD
2 1 3	Case #3: RICHARD
4 4 1	Case #4: GABRIEL
3 2 3	

In case #1, Richard only has one 2-omino available to choose -- the 1x2 block formed by joining two unit cells together. No matter how Gabriel places this block in the 2x2 grid, he will leave a hole that can be exactly filled with another 1x2 block. So Gabriel wins.

In case #2, Richard has to choose the 1x2 block, but no matter where Gabriel puts it, he will be left with a single 1x1 hole that he cannot fill using only 2-ominoes. So Richard wins.

In case #3, one winning strategy for Richard is to choose the 2x2 square 4-omino. There is no way for Gabriel to fit that square into the 4x1 grid such that it is completely contained within the grid, so Richard wins.

In case #4, Richard can either pick the straight 3-omino or the L-shaped 3-omino. In either case, Gabriel can fit it into the grid and then use another copy of the same 3-omino to fill in the remaining hole.

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