

Round B APAC Test 2016

[A. Travel](#)

[B. gWheels](#)

**C. gNumbers**

[D. Albocede DNA](#)

[Questions asked](#)

#### Submissions

Travel	
6pt	Not attempted 503/1288 users correct (39%)
12pt	Not attempted 365/493 users correct (74%)
gWheels	
5pt	Not attempted 1062/1588 users correct (67%)
14pt	Not attempted 244/873 users correct (28%)
gNumbers	
8pt	Not attempted 259/1020 users correct (25%)
16pt	Not attempted 78/181 users correct (43%)
Albocede DNA	
16pt	Not attempted 31/139 users correct (22%)
23pt	Not attempted 18/23 users correct (78%)

#### Top Scores

kcm1700	100
LeeSin	100
johngs	100
Taradheesh	100
Eyelids	100
BrianKuo	100
huangxi	100
sgtlaugh	100
yaray	84
alecsyde	84

## Problem C. gNumbers

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 C-small

Large input  
16 points

Solve C-large

### gNumbers

Googlers are crazy about numbers and games, especially number games! Two Googlers, Laurence and Seymour, have invented a new two-player game based on "gNumbers". A number is a gNumber if and only if the sum of the number's digits has no positive divisors other than 1 and itself. (In particular, note that 1 is a gNumber.)

The game works as follows: First, someone who is not playing the game chooses a starting number **N**. Then, the two players take turns. On a player's turn, the player checks whether the current number **C** is a gNumber. If it is, the player loses the game immediately. Otherwise, the player chooses a prime factor **P** of **C**, and keeps dividing **C** by **P** until **P** is no longer a factor of **C**. (For example, if the current number were 72, the player could either choose 2 and repeatedly divide by 2 until reaching 9, or choose 3 and repeatedly divide by 3 until reaching 8.) Then the result of the division becomes the new current number, and the other player's turn begins.

Laurence always gets to go first, and he hates to lose. Given a number **N**, he wants you to tell him which player is certain to win, assuming that both players play optimally.

### Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow; each consists of a starting number **N**.

### 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 winner's name: either Laurence or Seymour.

### Limits

$1 \leq T \leq 100$ .

### Small dataset

$1 < N \leq 1000$ .

### Large dataset

$1 < N \leq 10^{15}$ .

### Sample

Input	Output
9	Case #1: Seymour
2	Case #2: Seymour
3	Case #3: Laurence
4	Case #4: Laurence
6	Case #5: Laurence
8	Case #6: Laurence
9	Case #7: Seymour
30	Case #8: Laurence
36300	Case #9: Seymour
1000000000000000	

In Case #1, 2 is already a gNumber, since the sum of its digits is 2, which has no positive divisors other than 1 and itself. So Laurence immediately loses, which means Seymour wins. The same is true for Case #2.

In Case #3, 4 is not a gNumber, since the sum of its digits is 4, which has a positive divisor other than 1 and itself (namely, 2). 4 has one prime factor (2), so Laurence must choose this factor and repeatedly divide 4 by it, which leaves him with 1. Then, Seymour begins his turn with 1, which is a gNumber. So he

loses and Laurence wins.

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