

Louise and Richard play a game. They have a counter set to **N**. Louise gets the first turn and the turns alternate thereafter. In the game, they perform the following operations.

Editorial

Discussions

- If N is not a power of 2, reduce the counter by the largest power of 2 less than N.
- ullet If $oldsymbol{N}$ is a power of $oldsymbol{2}$, reduce the counter by half of $oldsymbol{N}$.

Submissions

ullet The resultant value is the new ${\it N}$ which is again used for subsequent operations.

The game ends when the counter reduces to 1, i.e., N == 1, and the last person to make a valid move wins.

Leaderboard

Given N, your task is to find the winner of the game.

 $\textbf{Update} \ \textbf{If they set counter to 1}, \textbf{Richard wins, because its Louise' turn and she cannot make a move.}$

Input Format

Problem

The first line contains an integer T, the number of testcases.

 $m{T}$ lines follow. Each line contains $m{N}$, the initial number set in the counter.

Constraints

- $1 \le T \le 10$
- $1 \le N \le 2^{64} 1$

Output Format

For each test case, print the winner's name in a new line. So if Louise wins the game, print "Louise". Otherwise, print "Richard". (Quotes are for clarity)

Sample Input

6

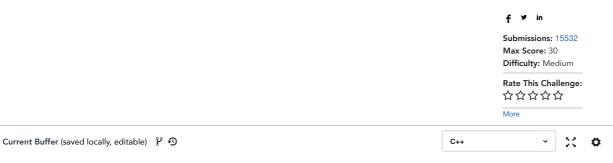
Sample Output

Richard

Explanation

- As 6 is not a power of 2, Louise reduces the largest power of 2 less than 6 i.e., 4, and hence the counter reduces to 2.
- As 2 is a power of 2, Richard reduces the counter by half of 2 i.e., 1. Hence the counter reduces to 1.

As we reach the terminating condition with N==1, Richard wins the game.



1 of 3 4/25/17, 2:55 PM

```
1 ▼#include <cmath>
 2 #include <cstdio>
 3 #include <vector>
 4 #include <iostream>
 5 #include <bitset>
 6 #include <algorithm>
   using namespace std;
 9 template<size_t N>
10 bitset<N> subtract(bitset<N> a, bitset<N> b) {
11 bitset<N> result;
        bool borrow = false;
12
13
       for (int i = 0; i < N; i++) {
14 ▼
15 ▼
            if (borrow && a[i]) {
   borrow = false;
16
                a[i] = 0;
17
19
            if (b[i] > a[i]) {
   borrow = true;
20 ▼
21
                result[i] = 1;
22
            } else {
24
               result[i] = a[i] - b[i];
            }
25
26
       }
27
28
        return result;
29 }
31 template<size_t N>
32 ▼bitset<N> shift_right(bitset<N> a) {
       bitset<N> result;
33
34
35 ▼
       for (int i = 0; i < N-1; i++) {
36
           result[i] = a[i+1];
37
38
39
        return result;
40 }
41
42 template<size_t N>
43 bool is_power_of_two(bitset <N> a) {
       int ones = 0;
44
       for (int i = 0; i < N; i++) {
46 ▼
47 ▼
           if (a[i]) {
48
                ones++;
49
            }
51 ▼
            if (ones > 1) {
52
                return false;
            }
5.3
54
       }
        return true;
57 }
58
59 template<size t N>
60 vbitset<N> largest_power_of_two(bitset <N> a) {
        bitset<N> result;
62
       int ones = 0;
63
        for (int i = N-1; i >= 0; i--) {
64 ▼
         if (a[i]) {
65 ▼
                result[i] = 1;
67
                break;
68
            }
       }
69
70
71
        return result;
72 }
73
74 template<size_t N>
75 ▼bool is_one(bitset <N> a) {
       for (int i = 1; i < N; i++) {
76 ▼
77 <del>-</del>
           if (a[i]) {
78
                return false;
79
            }
80
       }
81
        return a[0] ? true : false;
83 }
84
85 ★string get_winner(uint64_t i) {
86
       int player = 0;
88
        bitset<65> bs(i);
89
        while ( ! is_one(bs) ) {
90 ▼
```

2 of 3 4/25/17, 2:55 PM

3 of 3

1 Upload Code as File	Test against	custom input				Run Code	Submit Code
			Copyright © 2017 Hacker	Rank. All Rights Reserved			
		loin us on IF	C at #hackerrank	on freehode for h	uas or huas		

Contest Calendar | Interview Prep | Blog | Scoring | Environment | FAQ | About Us | Support | Careers | Terms Of Service | Privacy Policy | Request a Feature

4/25/17, 2:55 PM