

Counter game



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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.

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

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

Update If they set counter to **1**, Richard wins, because its Louise' turn and she cannot make a move.

Input Format

The first line contains an integer \boldsymbol{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

1

Sample Output

Richard

Explanation

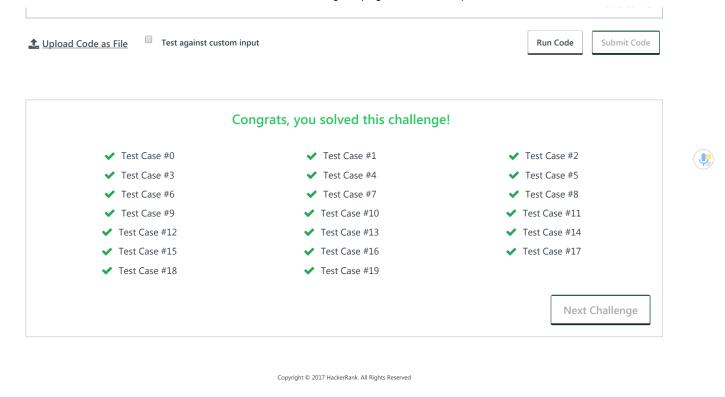
- As 6 is not a power of 2, Louise reduces the largest power of 2 less than 6 i.e., 4, and hence the counter reduces to 2.
- As **2** is a power of **2**, Richard reduces the counter by half of **2** i.e., **1**. Hence the counter reduces to **1**.

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



```
C#
  Current Buffer (saved locally, editable) & 5
                                                                                                                                                             *
     using System;
     using System.Collections.Generic;
 2
 3
     using System.Linq;
 4
     using System.Text;
 5
     using System.Numerics;
    ▼ class Solution {
 7
 8
           static void Main(String[] args) {
 9
                 /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be
10
                  int t = int.Parse(Console.ReadLine());
11
12
13
                        //6703734870638684097
                        //7597026128958891522
14
15
                        //13174607262084689114
                        //6959712971461184279
16
17
                        //12572864054437627553
18
19
                       while (t-- > 0)
20
21
22
                             BigInteger n = BigInteger.Parse(Console.ReadLine());
23
                            // BigInteger n = BigInteger.Parse("6703734870638684097");
24
                              string[] spot2 = { "18446744073709551616", "9223372036854775808"
25
      "4611686018427387904", "2305843009213693952", "1152921504606846976", "576460752303423488", "288230376151711744", "144115188075855872", "72057594037927936", "36028797018963968", "18014398509481984", "9007199254740992", "4503599627370496", "2251799813685248", "1125899906842624",
      "562949953421312", "281474976710656", "140737488355328", "70368744177664", "35184372088832", "17592186044416", "8796093022208", "4398046511104", "2199023255552", "1099511627776", "549755813888", "274877906944", "137438953472", "68719476736", "34359738368", "17179869184", "8589934592",
      2/46/7906944 , 15/458955472 , 66/19476/56 , 54559/36568 , 171/9869164 , 6589954592 , "4294967296", "2147483648", "1073741824", "536870912", "268435456", "134217728", "67108864", "33554432", "16777216", "8388608", "4194304", "2097152", "1048576", "524288", "262144", "131072", "65536", "32768", "16384", "8192", "4096", "2048", "1024", "512", "256", "128", "64", "32", "16", "8", "4", "2", "1" };
26
                              BigInteger[] pot2 = Array.ConvertAll(spot2, e => BigInteger.Parse(e));
27
28
                              string winner = "Richard";
29
                             while (true)
30
31
                                   if (n == 1)
32
33
34
                                         break:
35
36
                                   winner = (winner == "Louise") ? "Richard" : "Louise";
                                   if (!pot2.Contains(n))
37
38
39
                                         BigInteger largest_power = pot2[0];
                                         for (int i = 0; i < pot2.Length; i++)</pre>
40
41
42
                                               if (pot2[i] < n)
43
44
                                                     largest_power = pot2[i];
45
                                                     break;
46
47
48
                                         n -= largest_power;
49
50
                                   else
51
                                         n /= 2;
52
53
54
55
                             }
56
57
58
                              //Console.WriteLine(n):
59
                              Console.WriteLine(winner);
60
61
62
63
64
65
           3
66
                                                                                                                                                 Line: 8 Col: 37
```





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