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# The Great XOR

by farziengineer

Problem

Submissions

Leaderboard

Discussions

Your submission will run against only preliminary test cases. Full test cases will run at the end of the day.

Given a long integer,  $x$ , count the number of values of  $a$  satisfying the following conditions:

- $a \oplus x > x$
- $0 < a < x$

where  $a$  and  $x$  are long integers and  $\oplus$  is the bitwise XOR operator.

You are given  $q$  queries, and each query is in the form of a long integer denoting  $x$ . For each query, print the total number of values of  $a$  satisfying the conditions above on a new line.

## Input Format

The first line contains an integer,  $q$ , denoting the number of queries.

Each of the  $q$  subsequent lines contains a long integer describing the value of  $x$  for a query.

## Constraints

- $1 \leq q \leq 10^5$
- $1 \leq x \leq 10^{10}$

## Subtasks

For 50% of the maximum score:

- $1 \leq q \leq 10^3$
- $1 \leq x \leq 10^4$

## Output Format

For each query, print the number of values of  $a$  satisfying the given conditions on a new line.

## Sample Input 0

```
2
2
10
```

## Sample Output 0

```
1
5
```

## Explanation 0

We perform the following  $q = 2$  queries:

1. For  $x = 2$  the only value of  $a$  satisfying  $0 < a < x$  is 1. This also satisfies our other condition, as  $1 \oplus 2 = 3$  and  $3 > x$ . Because we have one valid  $a$  and there are no more values to check, we print 1 on a new line.
2. For  $x = 10$ , the following values of  $a$  satisfy our conditions:

```
1 ⊕ 10 = 11
1 ⊕ 10 = 11
```

~~4~~  $\oplus$  10 = 14  
5  $\oplus$  10 = 15  
6  $\oplus$  10 = 12  
7  $\oplus$  10 = 13

Because there are five valid values of  $a$ , we print 5 on a new line.

[f](#) [t](#) [in](#)

Contest ends in 5 days

Submissions: 4880



Max Score: 25




Difficulty: Medium

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★★★★☆


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C#   

```
1 using System;
2 using System.Collections.Generic;
3 using System.IO;
4 using System.Linq;
5 class Solution {
6
7     static void Main(String[] args) {
8         int q = Convert.ToInt32(Console.ReadLine());
9         for(int a0 = 0; a0 < q; a0++){
10             long x = Convert.ToInt64(Console.ReadLine());
11             // your code goes here
12
13             int ans = 0;
14             for (long a = 1; a < x; a++){
15                 {
16                     if ( (a ^ x) > x)
17                     {
18                         ans++;
19                     }
20                 }
21             Console.WriteLine(ans);
22         }
23     }
24 }
25
```

Line: 19 Col: 18

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