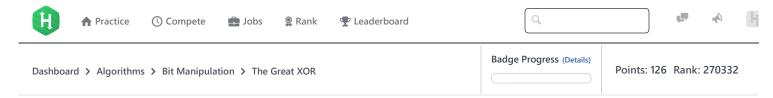
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# The Great XOR **■**



Problem Submissions Leaderboard Discussions Editorial A

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

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

where  $\boldsymbol{a}$  and  $\boldsymbol{x}$  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**

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

# Subtasks

For 50% of the maximum score:

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

# **Output Format**

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

#### Sample Input 0

2

10

### Sample Output 0

1

#### 5

## **Explanation 0**

We perform the following q = 2 queries:

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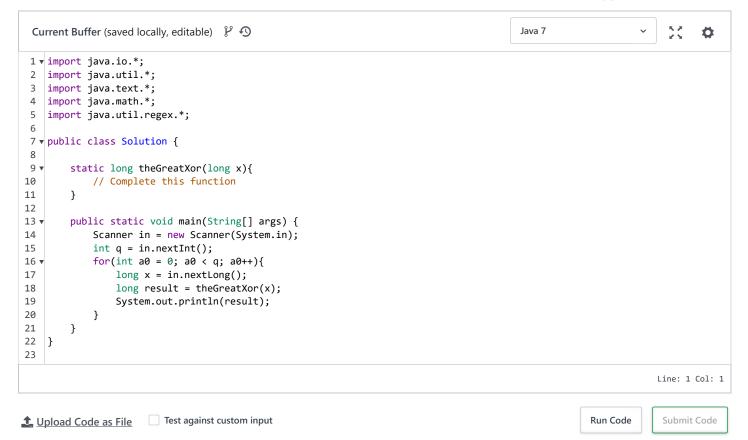
1. For x=2 the only value of a satisfying 0 < a < x is 1. This also satisfies our other condition, as  $1 \oplus 2 = 3$  and 3 > x. Because we have one valid a and there are no more values to check, we print 1 on a new line.

2. For  $\pmb{x}=\pmb{10}$ , the following values of  $\pmb{a}$  satisfy our conditions:

```
1 \oplus 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  $a_i$ , we print 5 on a new line.

f y in Submissions:2917 Max Score:25 Difficulty: Medium Rate This Challenge: ☆☆☆☆☆



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