

Even Numbers

Marina is a college girl who likes to play with all kinds of numbers. One day she was very bored and decided to play around with even numbers.

She writes N numbers on the board (odd and even numbers) and then, she modifies only even numbers (for some reason she likes the odd numbers) and reversed its binary representation (from the left to the right) and replaces each even number. But soon she gets bored and ask you help in order to automate the conversion process.

Input

In the first line contains the value of N . This integer is followed by N lines, every one with a positive integer a_i ($1 \leq a_i \leq 10^7$).

Output

The output will contain N lines, the numbers that are on the blackboard after the conversion process.

Example

Input:

```
5
10
8
3
5
2
```

Output:

```
5
1
3
5
1
```