Sequence of Zeroes and Ones

The sequence of zeroes and ones is generated in the following way. Zero is the first element of the sequence. During each following step the length of the sequence doubles: the sequence is inverted (zero becomes one and vice versa) and appended to the end of the sequence to get a new sequence.

This is illustrated below:

```
0
0 1
0 1 1 0
0 1 1 0 1 0 0 1
0 1 1 0 1 0 0 1 1 0 0 1 0 1 1 0
```

Task. Write an algorithm to find the n'th element of the sequence.

Examples.

Input	Output
3	1

Constraints. $1 \leq n \leq 30\ 000$.