## Problem 4 – We All Love Bits!

One of the things the programmers love the most is bitwise operations. The "bitwise guy" is a synonym for a programmer that loves bits more than everything else in programming. Mitko is a "bitwise guy". He invented a new bitwise algorithm. The algorithm takes one positive integer number **P**, makes magic with it and returns a new positive integer number. He also defined a new number **P̃** which represents the number **P** in binary numeral system with inverted bits. All zeros in **P** are ones in **P̃** and all ones in **P** are zeros in **P̃**. For example if we have P = 9 (which is 1001in binary numeral system) its inverted number P̃ will be equal to 6 (which is 110 in binary numeral system). But that’s not all! He invented another number **P̈**, which represents reversed number **P** in binary numeral system. For example if we have P = 11 (which is 1011 in binary numeral system) its reversed number P̈ is equal to 13 (which is 1101 in binary numeral system). The Mitko's magical algorithm takes a number **P** and transforms it to a new number **Pnew** using the following bitwise transformation: **Pnew = (P ^ P̃) & P̈**.

Your task is to write a program that transforms a sequence of **N** positive integer numbers using Mitko's algorithm.

### Input

The input data should be read from the console.

At the first input line there will be one positive integer – the number **N**.

At each of the next **N** lines there will be one positive integer – the consequent number that must be converted using Mitko's algorithm.

The input data will always be valid and in the format described. There is no need to check it explicitly.

### Output

The output data should be printed on the console.

The output must consist of **N** lines, containing the transformed numbers for each number from the input.

### Constraints

* The number **N** will be positive integer number between 1 and 20 000, inclusive.
* Each of the **N** numbers will be positive integer numbers between 1 and 2 147 483 647, inclusive.
* Allowed working time for your program: 0.20 seconds.
* Allowed memory: 16 MB.

### Examples

|  |  |
| --- | --- |
| **Input example** | **Output example** |
| 1  2 | 1 |
| 2  19  248 | 25  31 |