# Problem 5 – 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.
* Time limit: 0.20 seconds.
* Allowed memory: 16 MB.

## Examples

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |  | **Input** | **Output** |
| 1  2 | 1 | 2  19  248 | 25  31 | 4  6732654  255  36372344  60000 | 3894963  255  8125777  1623 |

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