

System of Equations with XOR

Input file: standard input
Output file: standard output
Time limit: 1 second
Memory limit: 512 megabytes

Alice and Bob love problems involving random numbers. One day they came up with the following problem:

- First, Alice chooses a random integer x from the range of 1 to $2^{31} - 1$, all numbers are equally likely.
- Then, Bob chooses a random integer y from the range of 1 to $2^{31} - 1$, all numbers are equally likely.
- They calculate the product of these numbers $a = x \cdot y$ and their bitwise XOR $b = x \oplus y$.

You are given two resulting integers a and b . Find any pair of natural numbers x and y such that:

$$xy = a \quad \text{and} \quad x \oplus y = b,$$

where \oplus denotes the bitwise XOR operation.

Recall that the bitwise "exclusive or" (\oplus , xor) of two non-negative integers is defined as follows: write both numbers in binary representation; the i -th binary digit of the result is 1 if exactly one of the arguments has it equal to 1. For example, $(14 \text{ xor } 7) = (1110_2 \oplus 0111_2) = 1001_2 = 9$. This operation is implemented in all modern programming languages; in C++, Java, and Python, it is written as `^`, and in Pascal as `«xor»`.

Input

The first line of the input contains a single integer t ($1 \leq t \leq 200\,000$) — the number of test cases.

In the following t lines of input, there are two integers a and b ($1 \leq a < 2^{62}$, $0 \leq b < 2^{31}$) — the description of the next test case.

Output

For each test case, output in a separate line two natural numbers x and y , separated by a space, such that $xy = a$ and $x \oplus y = b$.

If there are multiple valid answers, you may output any of them.

Example

standard input	standard output
2	7 3
21 4	3 3
9 0	

Note

In this problem, there are 100 tests, including the example from the statement. It is guaranteed that in all tests, except for the example from the statement, $t = 200\,000$, and the numbers a and b for each test case were generated by choosing random numbers x and y by Alice and Bob.