A. Bits

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Let's denote as the number of bits set ('1' bits) in the binary representation of the non-negative integer x.

You are given multiple queries consisting of pairs of integers l and r. For each query, find the x, such that $l \le x \le r$, and is maximum possible. If there are multiple such numbers find the smallest of them.

Input

The first line contains integer n — the number of queries ($1 \le n \le 10000$).

Each of the following n lines contain two integers l_i, r_i — the arguments for the corresponding query ($0 \le l_i \le r_i \le 10^{18}$).

Output

For each query print the answer in a separate line.

Examples

input
3 1 2 2 4 1 10
output
1 3 7

Note

The binary representations of numbers from 1 to 10 are listed below:

$1_{10} = 1_2$

$2_{10} = 10_2$

$3_{10} = 11_2$

$4_{10} = 100_2$

$5_{10} = 101_2$

$6_{10} = 110_2$

$7_{10} = 111_2$

$8_{10} = 1000_2$

$9_{10} = 1001_2$

$10_{10} = 1010_2$