B. SUMdamental Decomposition

time limit per test: 1 second
memory limit per test: 256 megabytes

On a recent birthday, your best friend Maurice gave you a pair of numbers n and x, and asked you to construct an array of **positive** numbers a of length n such that $a_1 \oplus a_2 \oplus \cdots \oplus a_n = x$ *.

This task seemed too simple to you, and therefore you decided to give Maurice a return gift by constructing an array among all such arrays that has the smallest sum of its elements. You immediately thought of a suitable array; however, since writing it down turned out to be too time-consuming, Maurice will have to settle for just the sum of its elements.

* $\oplus$ denotes the bitwise XOR operation.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \le t \le 10^4$). The description of the test cases follows.

Each test case consists of a single line containing a pair of numbers n and x ($1 \le n \le 10^9,\ 0 \le x \le 10^9$) — the numbers given to you by Maurice.

Output

For each test case, output your gift to Maurice — the sum of the elements of the array that satisfies all the described properties. If a suitable array does not exist, output -1.

Example

input

```
8
2 1
3 6
1 0
2 0
5 0
2 27
15 43
12345678 9101112
```

output

```
5
8
-1
2
8
27
55
21446778
```

Note

In the first test case, one of the suitable arrays is $[2, 3]$. It can be shown that it is impossible to achieve a smaller sum of array elements.

In the second case, one of the suitable arrays is $[1, 3, 4]$. It can also be shown that this is the optimal amount.

Codeforces Round 1022 (Div. 2)
Finished
Practice

→ Virtual participation

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Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
321852423	May/29/2025 05:13	Accepted
317995000	May/01/2025 18:49	Wrong answer on pretest 1
317974414	May/01/2025 18:04	Wrong answer on pretest 1

→ Problem tags

bitmasks constructive algorithms greedy implementation math *1300

No tag edit access

→ Contest materials

- Announcement
- Tutorial

Server time: May/29/2025 09:17:25^{UTC+7} (l1).
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