

Fake Walsh Transform

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

There is a set of integer $\{0, 1, 2, \dots, 2^m - 1\}$. Now you need to select k integers from the set. Each integer should be selected no more than once. Let's denote the integers you selected by a_1, a_2, \dots, a_k . You should make sure that $a_1 \oplus a_2 \oplus \dots \oplus a_k = n$, where \oplus indicates the bitwise exclusive OR operation.

You want to make k as large as possible. Please calculate the maximum k .

Input

The first line contains one integer T ($1 \leq T \leq 10^4$), indicating the number of test cases.

For each test case, the only line contains two integers m and n ($1 \leq m \leq 60, 0 \leq n < 2^m$).

Output

For each test case, output one integer in a single line, indicating the maximum k .

Example

standard input	standard output
1	3
2 2	

Note

For example, we can select $\{0, 1, 3\}$ from the set, since $0 \oplus 1 \oplus 3 = 2$.