C - Grey Codes

Source file name: `codes.c`, `codes.cpp`, *or* `codes.java`

We are going to generate a sequence of integers in binary. Start with the sequence:

```
0
1
```

Reflect it in the horizontal line, prepend a zero to the numbers in the top half and a one to the numbers on the bottom and you will get:

```
00
01
11
10
```

Repeat this again, and you will have 8 numbers:

```
000   0
001   1
011   3
010   2
110   6
111   7
101   5
100   4
```

The corresponding decimal values are shown on the right.

These sequences are called *reflected Gray codes* for 1, 2, and 3 bits, respectively. A Gray code for n bits is a sequence of 2^n different n-bit integers with the property that every two neighbouring integers differ in exactly one bit. A reflected Gray code is a Gray code constructed in the way shown above.

Input

The first line of input gives the number of cases, N. Then N test cases follow, each one is a line with 2 integers: n ($1 \leq n \leq 30$) and k ($0 \leq k < 2^n$).

The input must be read from standard input.

Output

For each test case, output the integer that appears in position k of the n-bit reflected Gray code.

The output must be written to standard output.

Sample Input	**Sample Output**
14 1 0 1 1 2 0 2 1 2 2 2 3 3 0 3 1 3 2 3 3 3 4 3 5 3 6 3 7	0 1 0 1 3 2 0 1 3 2 6 7 5 4