Weird Sorting

Problem Statement

There are a large number of number theory, algorithms and cryptography enthusiasts working at HackerRank. They love logic and code. Much of this, helps them with their work in cryptography and security as well.

Dan, a member of this team, is very famous among his colleagues for new experiments. Today he got an array containing 2^n numbers. It contains all numbers of the range $[0, 2^n - 1]$.

Dan has a different criteria for sorting the numbers. He wants to sort the array in increasing order. a is smaller than b if number of setbits in binary representation of a is lesser than number of setbits in binary representation of b. If number of set bits in both of the numbers are equal then the number having a smaller value will be considered smaller.

Dan is interesting in knowing what will be then k^{th} smallest number, if he sorts the array in the given manner.

Input Format

First line will contain and integer T i.e. number of test cases.
Next T will contain two numbers n and k.

Constraints:

$1 \leq T \leq 1000$
$1 \leq n \leq 60$
$1 \leq k \leq 2^n$

Output Format

T lines each containg output to a test case.

Sample Input

```
4
2 1
2 2
2 3
2 4
```

Sample Output

```
0
1
2
3
```

Explanation

Binary representation of first 4 numbers are $00, 01, 10$ and 11.