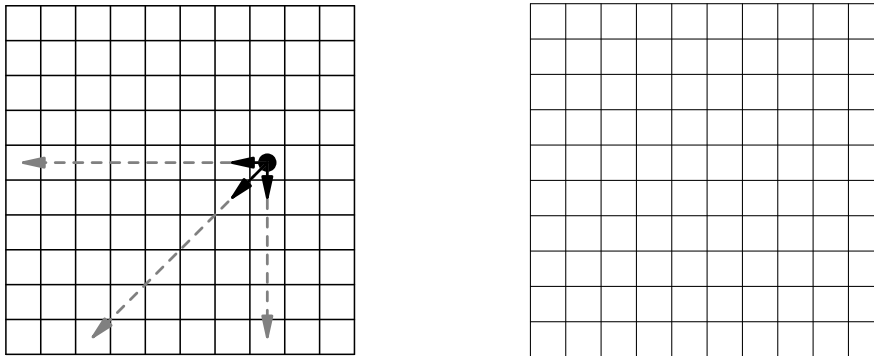


Problem G. Grundy

Input file: `grundy.in`
 Output file: `grundy.out`
 Time limit: 7 seconds
 Memory limit: 512 mebibytes

Grundy or Sprague-Grundy values are a strong tool in combinatorial games analysis. In this problem you will have to find Sprague-Grundy values for Wythoff's Nim.

Consider an infinite quarter-plane chessboard with cells indexed by pairs of non-negative integers. A chess queen is standing at the point (x, y) and can move to any cell other with coordinates (x', y') if $x = x'$ or $y = y'$ or $x - y = x' - y'$ and both $x' \leq x$ and $y' \leq y$.



Grundy value of a cell (x, y) is defined recursively and is equal to the smallest number g that does not appear among Grundy values of cells that can be reached from (x, y) in one move. The table above shows Grundy values for cells with coordinates up to 9.

You are given g and k . Consider all cells with Grundy values g . Let us order them all lexicographically: first by x -coordinate, then by y -coordinate. You have to find the k -th among them.

Input

The input file contains several test cases. Each test case consists of one line that contains two integers g and k ($0 \leq g \leq 10$, $1 \leq k \leq 500\,000$). There are at most 1000 tests. The last test case is followed by a line that contains two zeroes, it must not be processed.

Output

For each test case print two integers: x and y — the coordinates of the k -th lexicographically cell with Grundy value equal to g .

Examples

<code>grundy.in</code>	<code>grundy.out</code>
0 1	0 0
0 2	1 2
0 3	2 1
0 4	3 5
1 1	0 1
1 4	3 6
2 1	0 2
2 4	3 4
0 0	