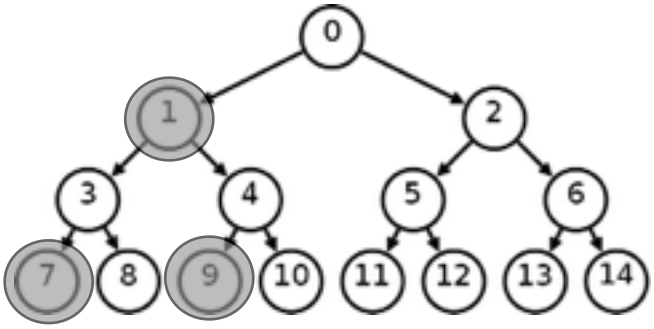
LCA.

A full binary tree is a rooted binary tree that has 0 as the root, and for each node i, the left child is 2i+1 and the right child is 2i+2.

Given a full binary tree, the *lowest common ancestor* (LCA) of two nodes u and v is the lowest node in the tree that has both u and v as descendants (where we allow a node to be a descendant of itself). The figure below shows an example that 1 is LCA of 7 and 9.



Think that you have a full binary tree with infinite number of nodes. Your task is to write a program that takes two nodes u and v as input, and shows the lowest common ancestor of u and v.

Input
Input will consist of multiple problem instances. Each instance will consist of two non-negative integers that are the number of node u and v (u,v <= 10,000). A final line of two zeroes will terminate input and should not be processed.

Output
For each problem instance, output a single line with a single integer indicating the number of LCA of u and v.

Sample Input/Output

Input	Output
9 7 8 16 105 432 0 0	1 3 12