Solution for "Symmetry" Bronze January 2011

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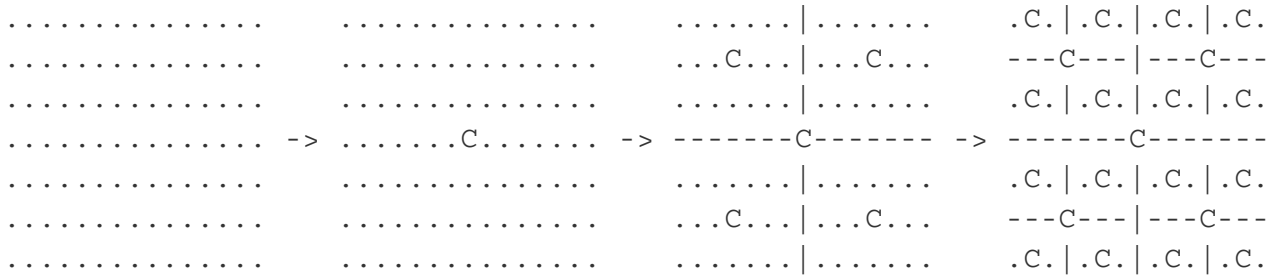
Initially, USACO presents the following sample example:



In this case, FJ places a cow at the center of the rectangle and creates 4 separate quadrants, treating each quadrant as a new rectangle. In total, he completes this process 3 times and places a total of 21 cows.

Now, we must extend this solution. We notice that, at any step, to get the size of the quadrants (which are the rectangles in the next step), we must divide the length and width of the rectangle at the current step by 2. We must stop when either the width or height of the quadrant is even because at this point we cannot place any more cows. We also realize that each time we complete this process, we add 4^{s-1} cows where s is the number of the step that we are currently on. For example, as we repeat this process, we have a total of 1 + 4 + 16 + … 4^{s-1} cows. This sum can be represented by the closed form equation $(4^s - 1)/(4-1)$.

```
read n,m
while n%2 = 1 and m%2 = 1:
      cows = 4*cows + 1
      n = n/2
      m = m/2
print cows
```