PROBLEM OF THE MONTH, NOVEMBER 2016

For a given positive integer n, we define the *ghost of* n to be the positive integer obtained by listing the digits of n twice. For example, the ghost of 2016 is 20162016. Similarly, the ghost of 891325 is 891325891325. Find a positive integer n with the property that its ghost is a perfect square.

Submit your solutions to professor Dan Ismailescu, Mathematics Department via email at dan.p.ismailescu@hofstra.edu, or bring it in person at 103C Roosevelt Hall.

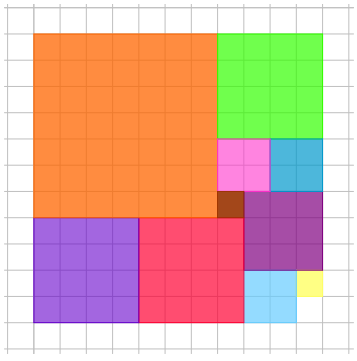
Solution - Problem of the Month, October 2016

Congratulations to Leonard Arkhanhelskyi for solving correctly the October Problem!

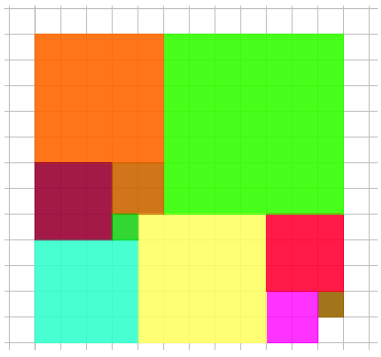
(a) You are given a 11×11 checkerboard with a missing corner. It can be partitioned into a collection of smaller square checkerboards in various ways. For example into 120 1×1 checkerboards or into a 10×10 and twenty 1×1 checkerboards etc. In the figure below a partition into eleven squares is shown. What is the minimum number of smaller square checkerboards that this 11×11 checkerboard with a missing corner can be partitioned into? Show how this can be done. Note we are not asking for a proof of minimality.

(b) Solve the same problem for a 12×12 checkerboard with a missing corner 1×1 square.

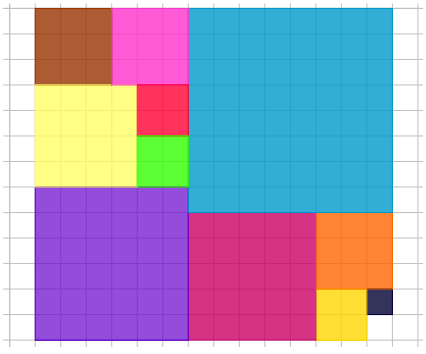
(c) Solve the same problem for a 13×13 checkerboard with a missing corner 1×1 square.



(a) 10 squares needed



(b) 10 squares needed



(c) 11 squares needed