PROBLEM OF THE MONTH, MARCH 2017

Find a positive integer n such that the first seven digits of n^2 are all equal to 7.

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 Stephanie Nagel, Piotr Laskawiec, Leonard Arkhanhelskyi, and Kirnendra Sidhu for solving correctly the November Problem!

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.

A possible answer is $n = 13223140496$. Indeed, for this choice of n we have

$$ghost(n) = 1322314049613223140496 = (36363636364)^2.$$