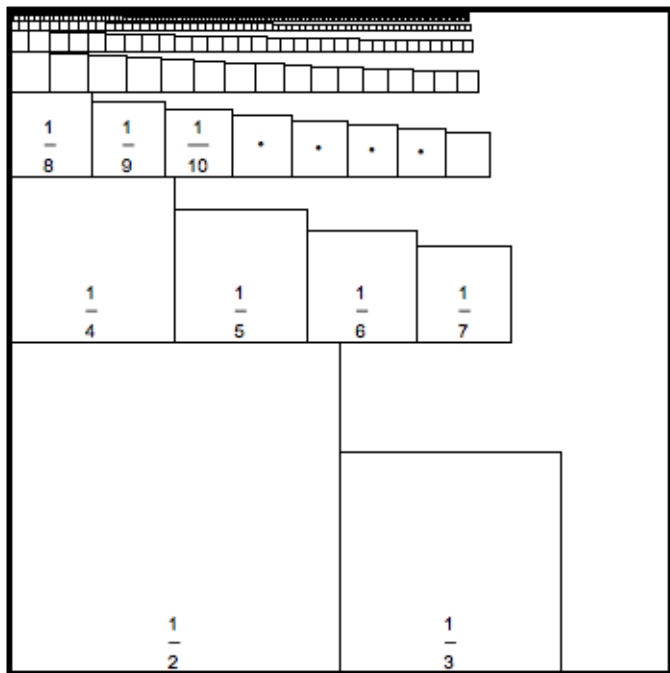


Billiken Challenge

This is a temporary page while our new website is under construction

July 2018

Harmonic Squares



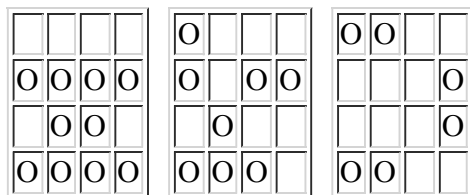
One approach is to put the squares into rows, as shown in the picture. Here, the k^{th} row has squares $1/2^k \dots 1/(2^{k-1}-1)$. Each row has length less than 1 since there are 2^k squares in it each with length less than $1/2^k$. There is room for the rows since the geometric series $1/2 + 1/4 + 1/8 + 1/16 + \dots$ has sum 1.

Odd Checkers

There are 16 possible ways.

First, there are at most 16 ways, since there are 16 possible arrangements for the top row, and given rows 1..k, the k+1 row is completely determined by the requirement that the row above have the correct parity.

Next, we demonstrate three arrangements that via rotation and reflection create all 16 possibilities:



See these slides by Erick Knight and David Wolfe for a complete discussion of the problem for general $m \times n$ boards. [Parity Party with Picture Proofs](#). This problem comes from P05 from Halici's 2006 puzzleup.com where $n = 4$, and P192 from Vaderlind, Guy, Larson, The Inquisitive Problem Solver.