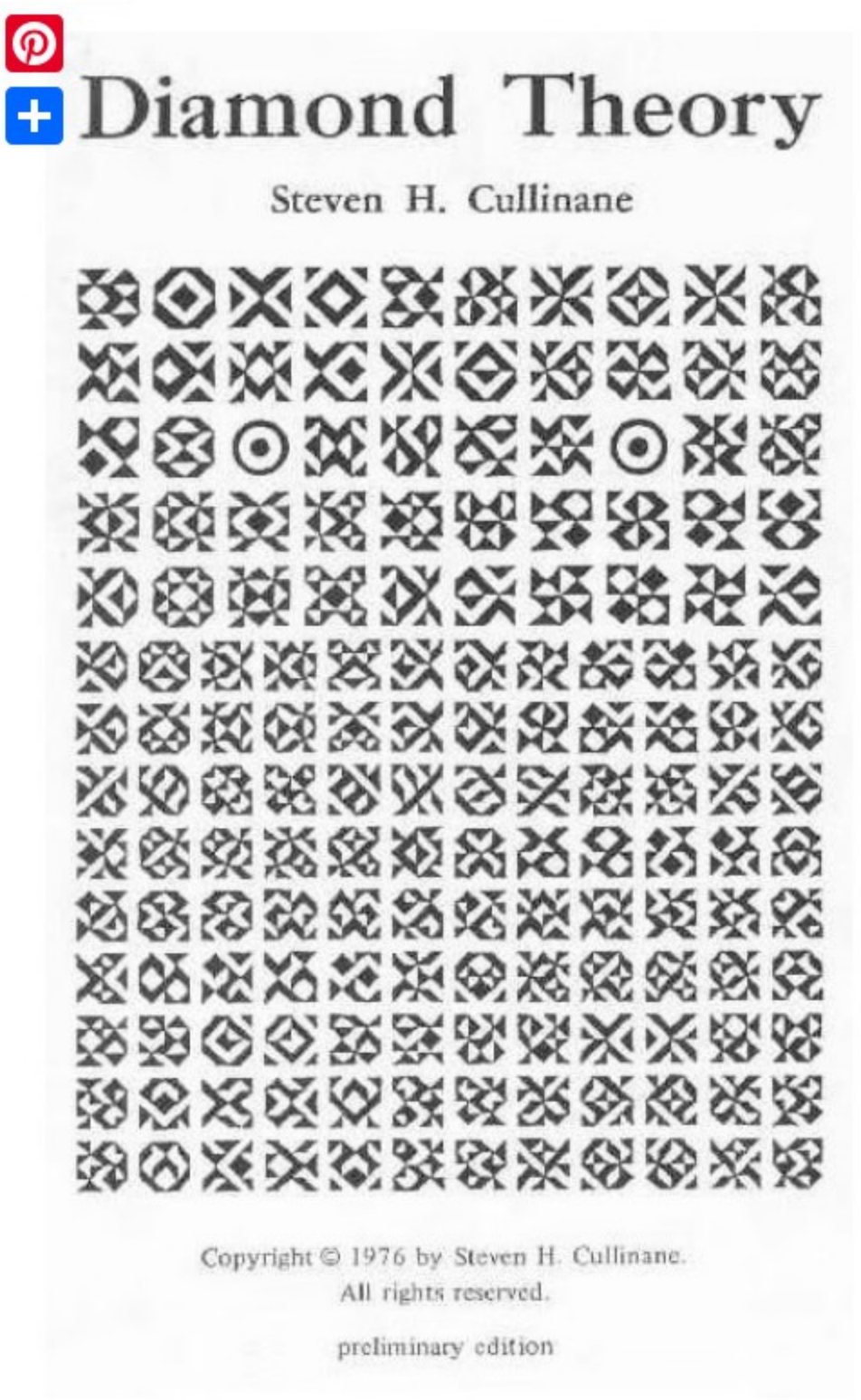
Log24

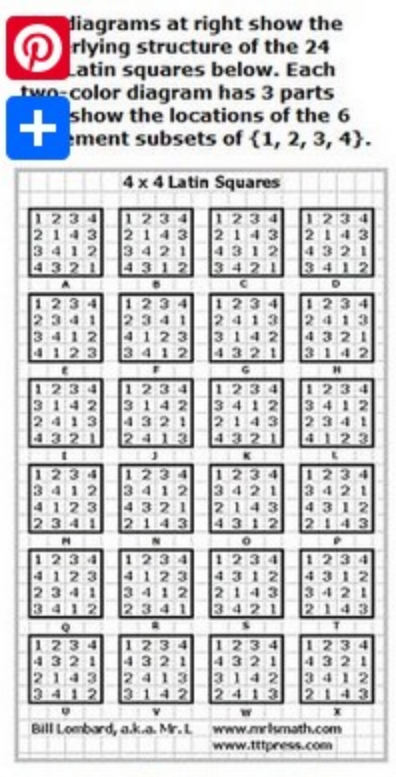
Thursday, September 18, 2025

Contrapuntal Structure in Latin Squares

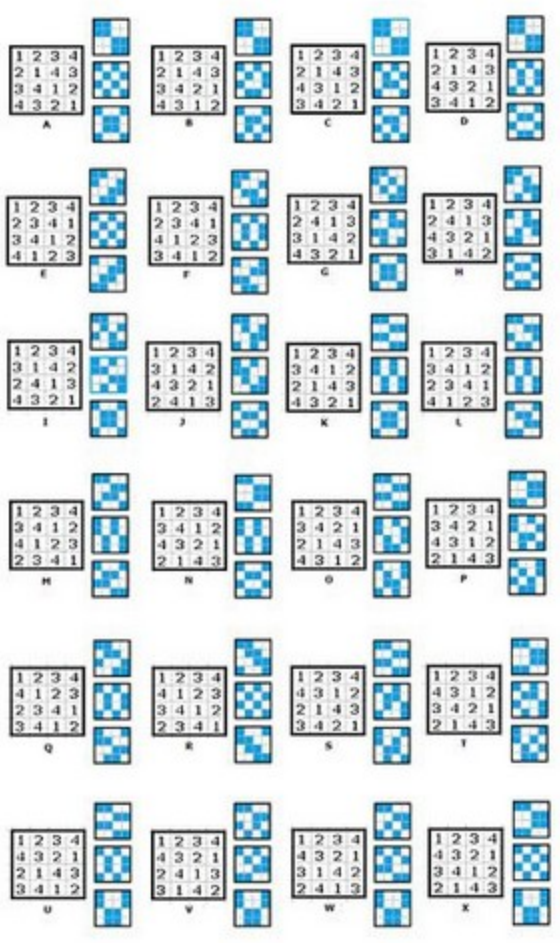
Filed under: General — m759 @ 4:24 pm Edit This

Images from https://shc7596.wixsite.com/website —



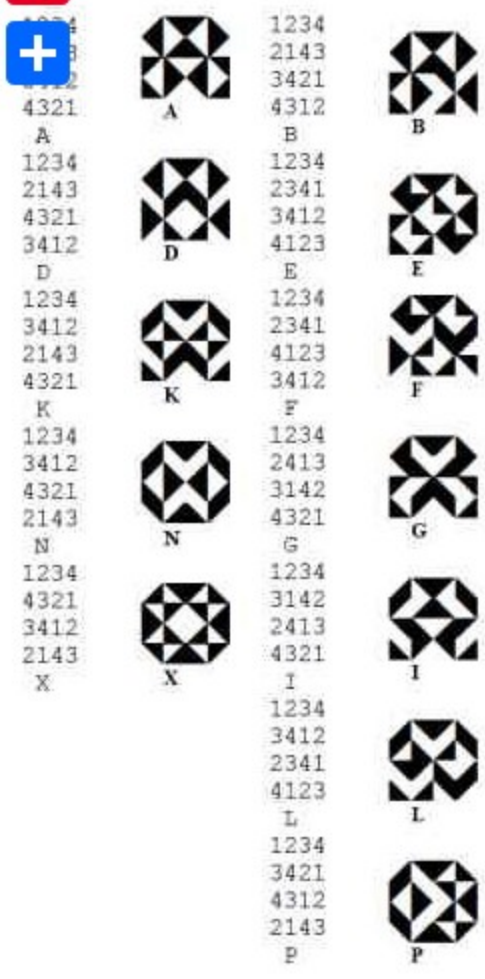


Diagrams at right show the underlying structure of the 24 Latin squares below. Each two-color diagram has 3 parts to show the locations of the 6 element subsets of {1, 2, 3, 4}.



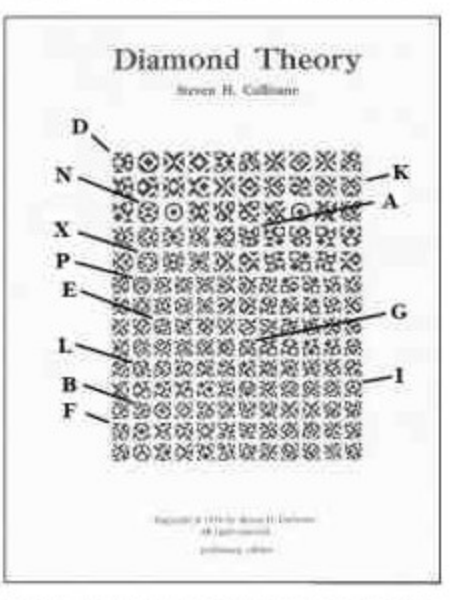
Such diagrams were devised to prove the diamond theorem of Steven H. Cullinane. See diamondtheorem.com and finitegeometry.org/sc for details.

Latin Squares of Triangles

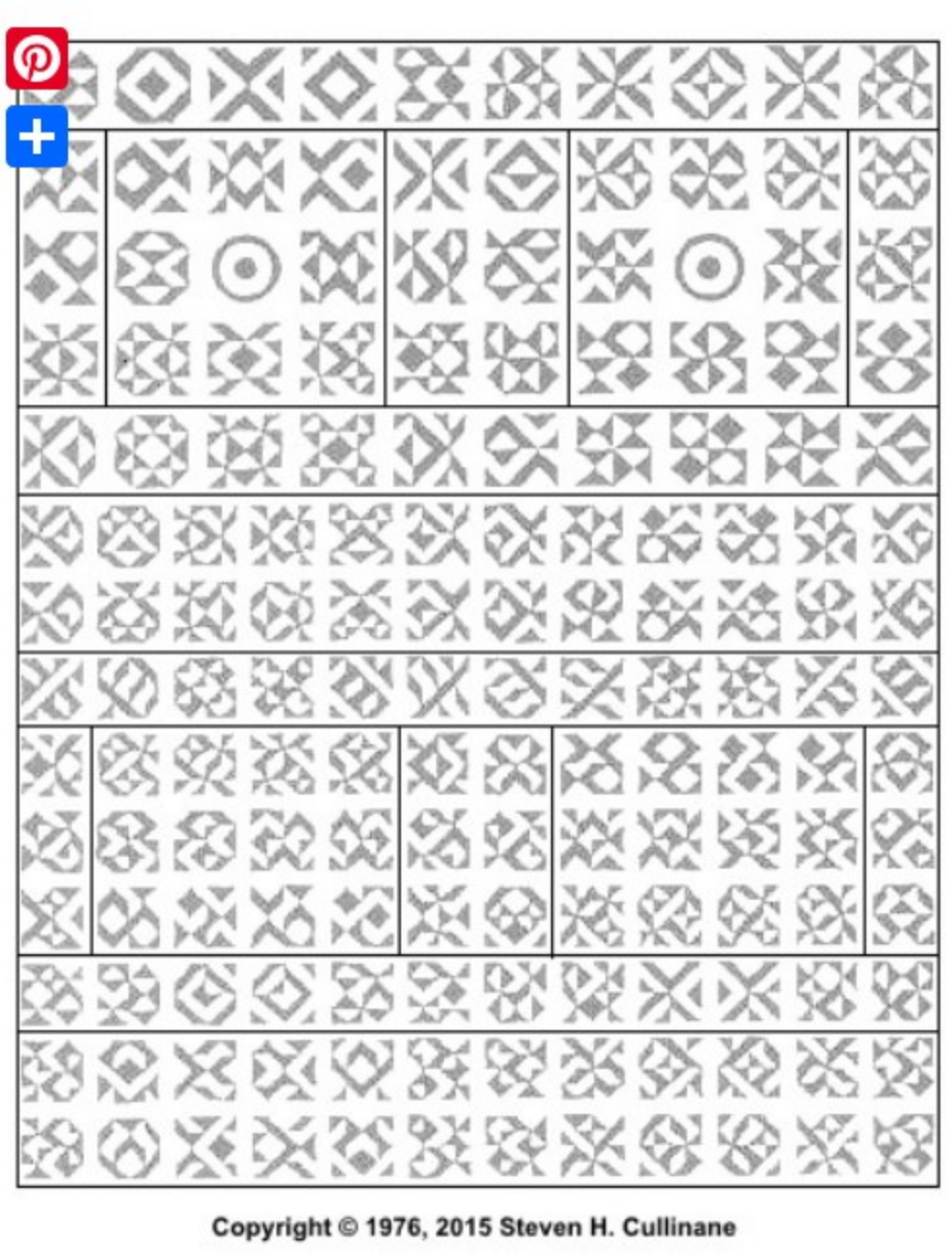


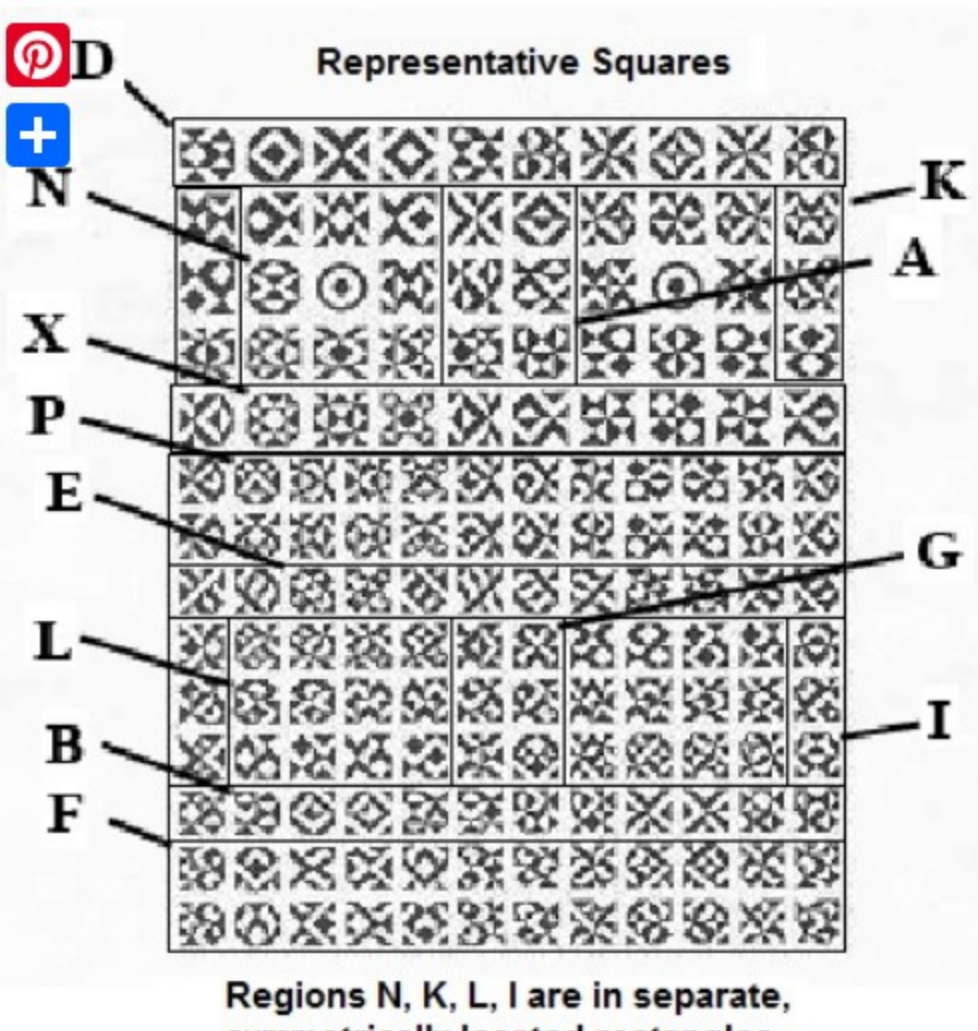
At left are the 12 Latin squares, with first row in standard 1234 order, that are structurally distinct modulo the group of 8 symmetries of the square.

Each Latin square can be converted to a graphic figure by mapping the digits 1234 to the four triangular half-squares in some order. (This can be done in 24 ways; one of the ways is shown at left.)



The image above shows all such graphic figures that are structurally distinct modulo the group of four rotations of the square in the square's own plane.





Regions N, K, L, I are in separate, symmetrically located rectangles.