

Rodolfo Kurchan's Square Puzzle #578

Complete list of maximal solutions for up to 11 squares,
computed by Hermann Jurksch and Hugo Pfoertner.
Illustrations by Rainer Rosenthal. (Autumn 2020)

Introduction

In 1997 R.KJ. wrote (<https://www.puzzlefuns.com/puzzle-fun-18>):

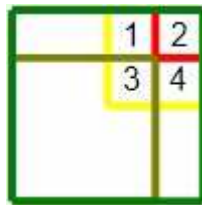
Using N different squares (from 1×1 to $N \times N$)
form the largest quantity of 1×1 squares.

577) The largest squares contains the smaller ones.

578) The smaller squares can be placed anywhere.

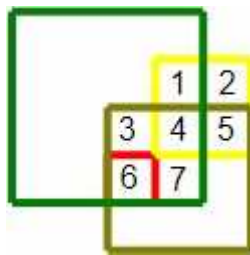
My best solutions for 577) are:

$1 \times 1 = 1$, $2 \times 2 = 1$, $3 \times 3 = 2$, $4 \times 4 = 4$, $5 \times 5 = 8$, $6 \times 6 = 10$, $7 \times 7 = 15$.



My best solutions for 578) are:

$1 \times 1 = 1$, $2 \times 2 = 1$, $3 \times 3 = 4$, $4 \times 4 = 7$, $5 \times 5 = 12$, $6 \times 6 = 17$, $7 \times 7 = 23$.



In 2020 R. K. added to the Online Encyclopedia of Integer sequences
(<https://oeis.org/OEIS>):

A336659: maximal number of 1×1 cells for N squares (puzzle #577)

A336660: maximal number of 1×1 cells for N squares (puzzle #578)

(We write "cell" instead of "square" to avoid confusion.)

New results

In the following we restrict ourselves to puzzle #578.

Sequence A336660 has entries for $N = 1$ to 11:

1, 1, 4, 7, 12, 17, 24, 31, 42, 50, 65

Sequence A337515 gives the number of best configurations:

1, 1, 1, 4, 1, 2, 1, 8, 4, 21, 29

Here is the list of illustrations for the best configurations.

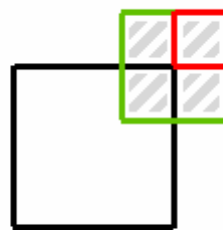
(See the catalogue of coordinates <https://oeis.org/A337515/a337515.txt>)



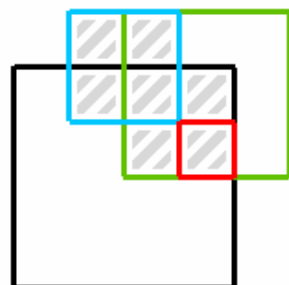
1 squares 1 cells
V1: unique



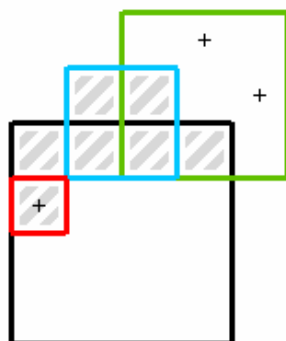
2 squares 1 cells
V1: unique



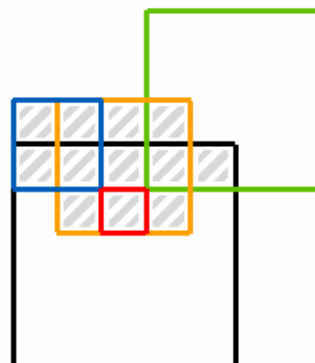
3 squares 4 cells
V1: unique



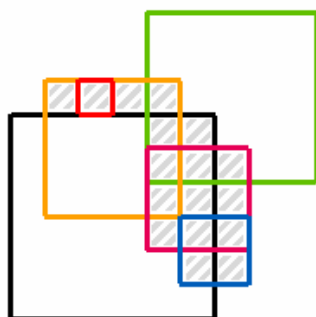
4 squares 7 cells
V1: unique



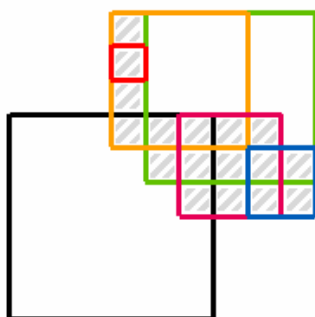
4 squares 7 cells
V2: 3 1-siblings



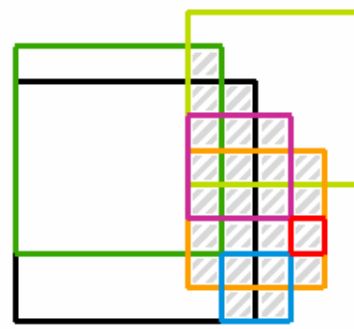
5 squares 12 cells
V1: unique



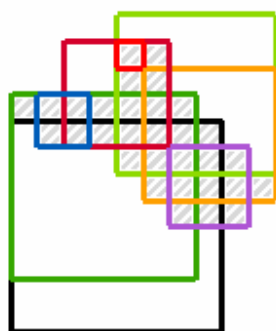
6 squares 17 cells
V1: unique



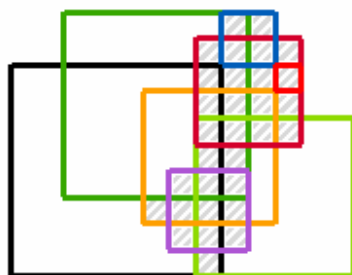
6 squares 17 cells
V2: unique



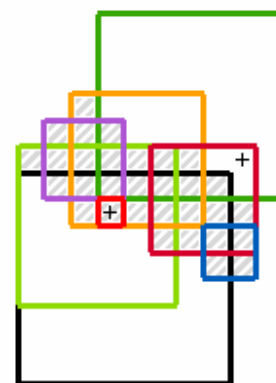
7 squares 24 cells
V1: unique



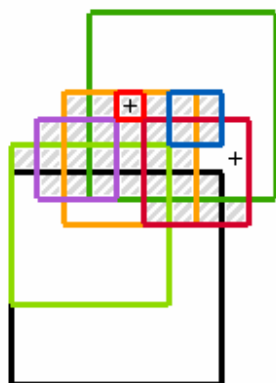
8 squares 31 cells
V1: unique



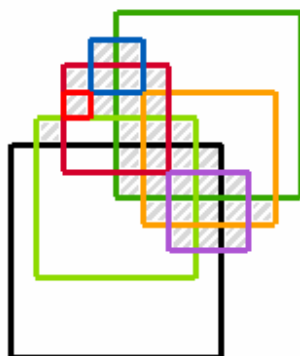
8 squares 31 cells
V2: unique



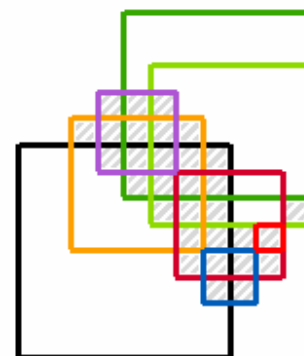
8 squares 31 cells
V3: 2 1-siblings



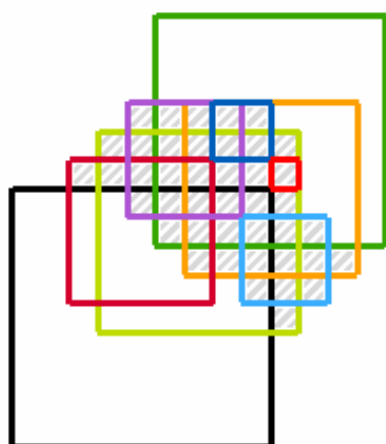
8 squares 31 cells
V4: 2 1-siblings



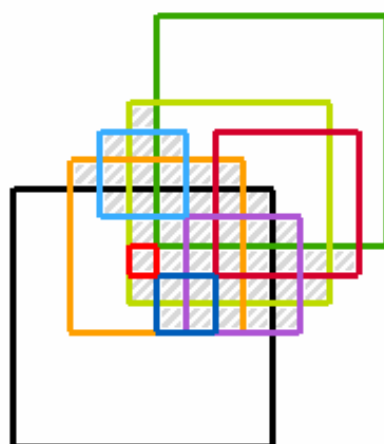
8 squares 31 cells
V5: unique



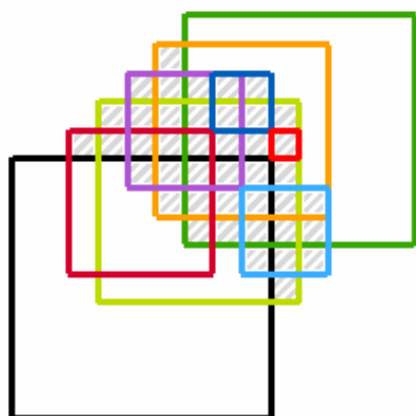
8 squares 31 cells
V6: unique



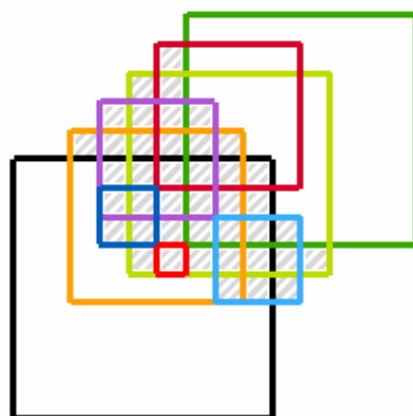
9 squares 42 cells
V1: unique



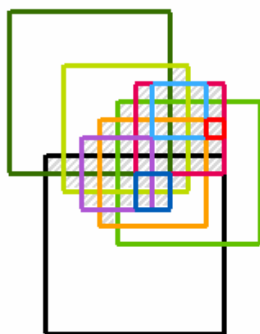
9 squares 42 cells
V2: unique



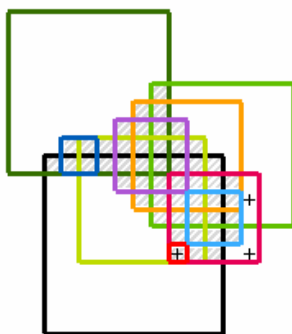
9 squares 42 cells
V3: unique



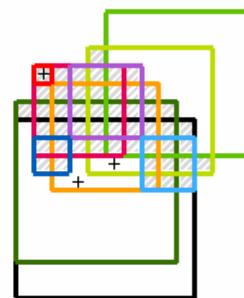
9 squares 42 cells
V4: unique



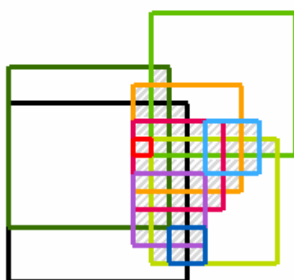
10 squares 50 cells
V1: unique



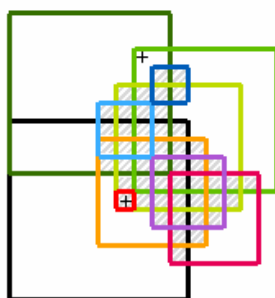
10 squares 50 cells
V2: 3 1-siblings



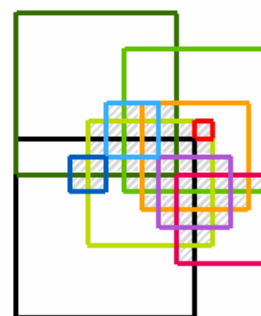
10 squares 50 cells
V3: 3 1-siblings



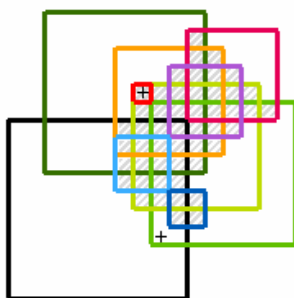
10 squares 50 cells
V4: unique



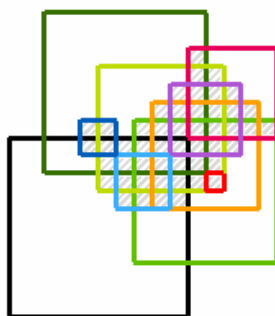
10 squares 50 cells
V5: 2 1-siblings



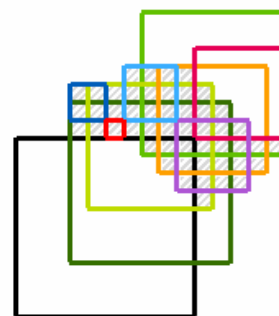
10 squares 50 cells
V6: unique



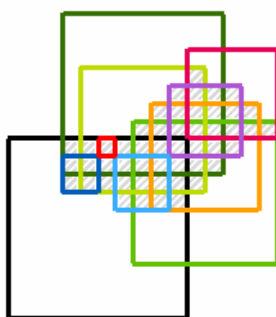
10 squares 50 cells
V7: 2 1-siblings



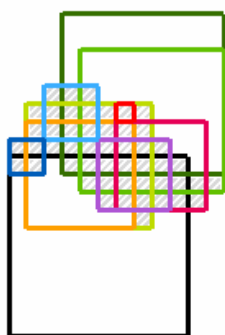
10 squares 50 cells
V8: unique



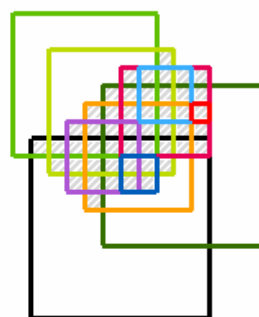
10 squares 50 cells
V9: unique



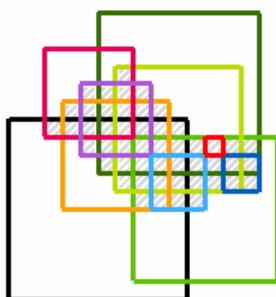
10 squares 50 cells
V10: unique



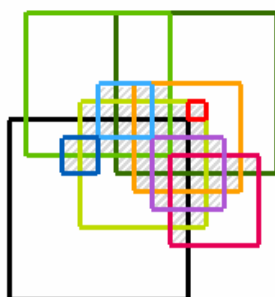
10 squares 50 cells
V11: unique



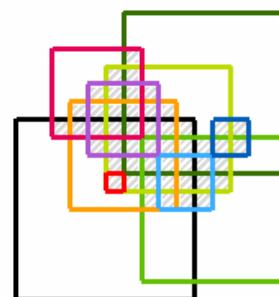
10 squares 50 cells
V12: unique



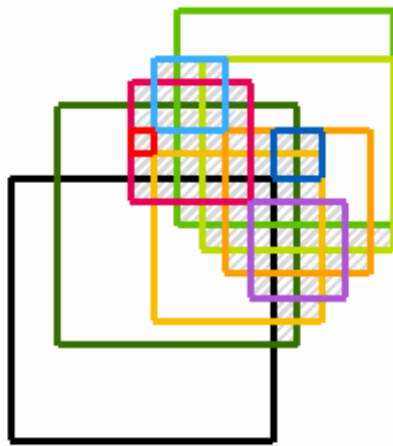
10 squares 50 cells
V13: unique



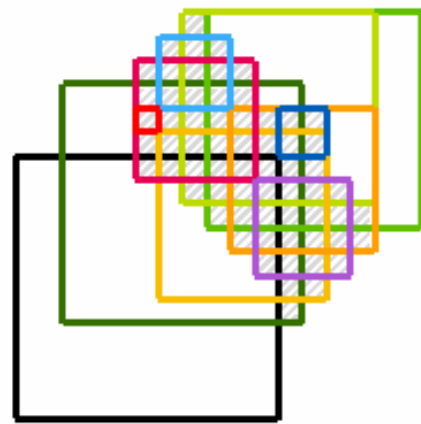
10 squares 50 cells
V14: unique



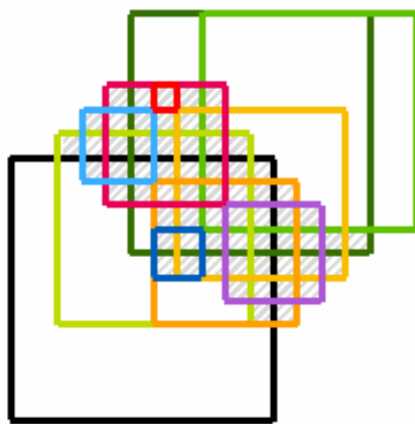
10 squares 50 cells
V15: unique



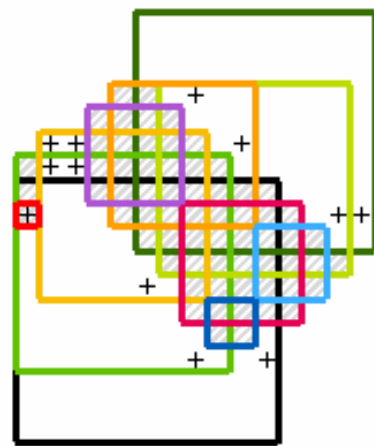
11 squares 65 cells
V1: unique



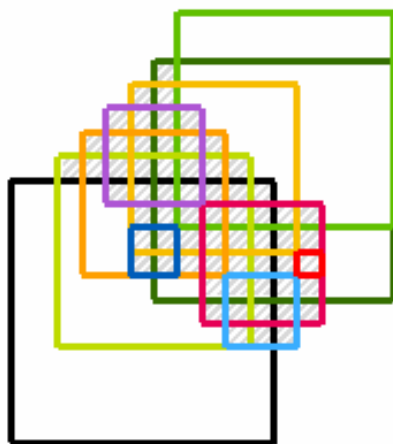
11 squares 65 cells
V2: unique



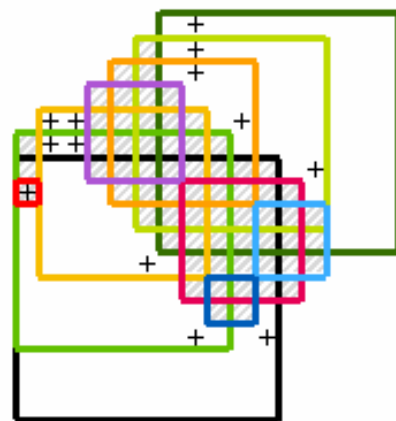
11 squares 65 cells
V3: unique



11 squares 65 cells
V4: 12 1-siblings



11 squares 65 cells
V5: unique



11 squares 65 cells
V6: 13 1-siblings