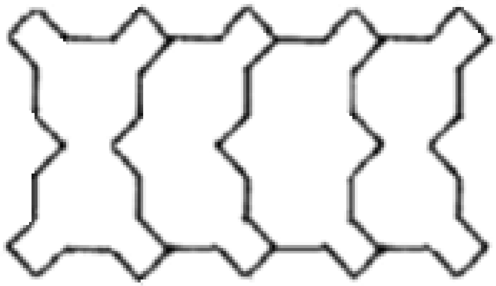
Ages 8 to adult
For 1 to 4 players

Dan Klarskov's

OCHOMINOES™

The 24 oct-dominoes and their wonders



Hundreds of puzzle shapes

Rules for two games

A product of
Kadon Enterprises, Inc.

OCHOMINOES *is a trademark of Kadon Enterprises, Inc., for its game and puzzle set of 24 di-octs, octagon dominoes with all combinations of 0 to 6 squares attached on their edges. Created and solved by Dan Klarskov and developed with Kate Jones. Made by Kadon under exclusive license.*

TABLE OF CONTENTS

Introduction **3**

Puzzle designs for solitaire

STEP BY STEP **4**

EIGHT HOLES DANCING **7**

POLYOMINOES LATTICES **11**

HEXOMINO TWINS **15**

SIAMESE TWINS **16**

MORE TWINS **17**

A HANDSOME ALPHABET **18**

STAIRS AND STEPS **19**

ARCHES **20**

FOUR-WAY SYMMETRY **21**

ROTATIONAL SYMMETRY **22**

VALENTINES **23**

FRAMES **23**

MIRROR SYMMETRY **24**

LACE AND LATTICES **25**

RINGS AND PIRATE FLAGS **26**

THE ANIMAL ZOO **27**

MOLECULES (2x2 patches) **29**

Games for two or more players

GAME 1, "Partners" **30**

GAME 2, "Molecules" **31**

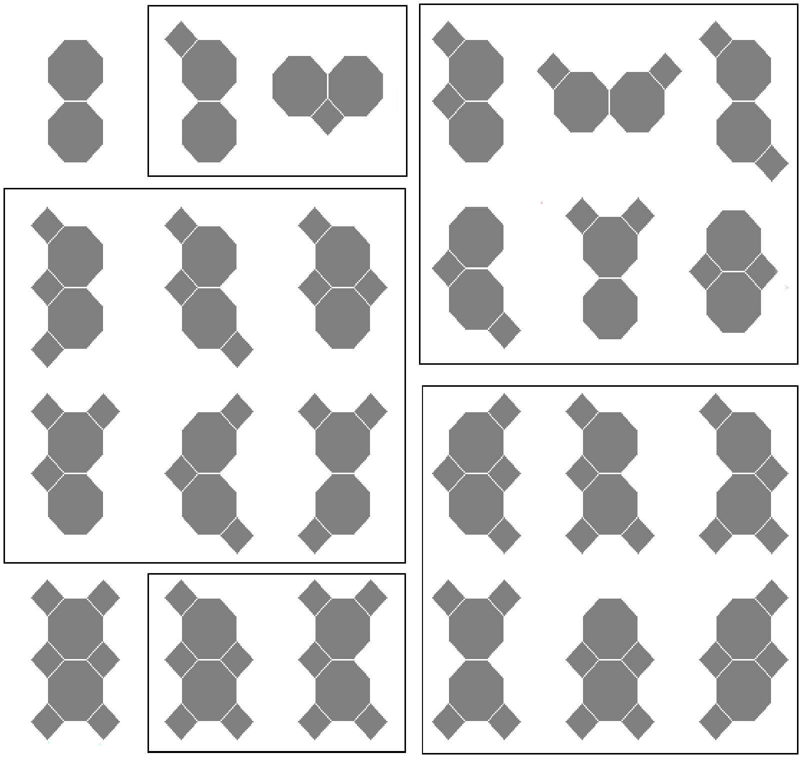
INTRODUCTION

The 24 tiles of this original polyform set of oct-dominoes (the *di-octs*) consist of all the ways that two octagons can be joined and then have little squares attached to them in every combination, from 0 to 6. They are shown below. Each group—the 1, 2, 3, 4, 5—has its own color, with the 0 and 6 sharing the sixth color. One of the classic challenges is to have no two of the same color touch.

The total area of the 24 pieces covers 48 cells. We package them as a 7x8 rectangle with two 4-unit "bars" and two 3-unit "bars" added. These can be inserted in different positions to vary how you can fill the rectangle or divide it into subsections. This booklet shows several attractive themes and permutations for the bars.

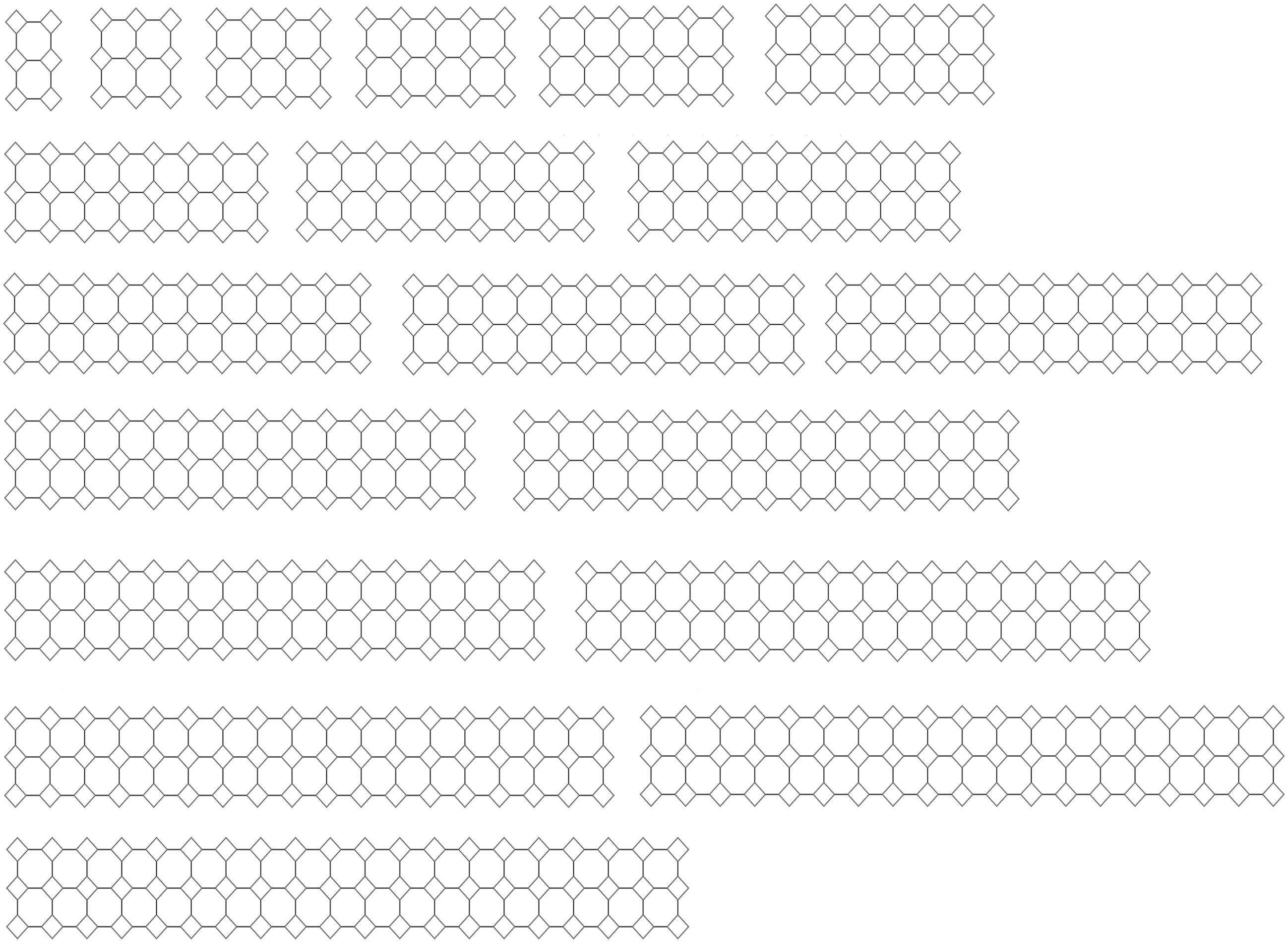
The Ochominoes tiles look like funny little cartoon figures. You are invited to invent your own names for them, using your imagination.

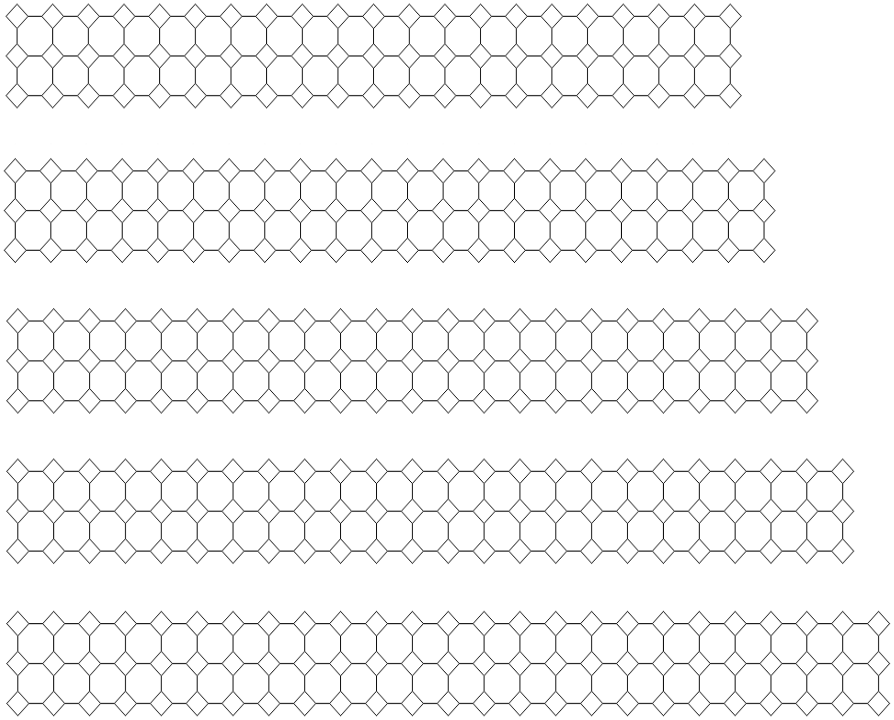
For example, the first one, without any squares attached, could be the number 8. The one with 6 squares looks like a teddy bear to us. Which one is a pussycat, a mouse, a heart, or eyeglasses? Send us your name suggestions for these characters and we'll publish them. If yours is the final name chosen, you'll win a prize. Email your idea to: kadon@gamepuzzles.com.



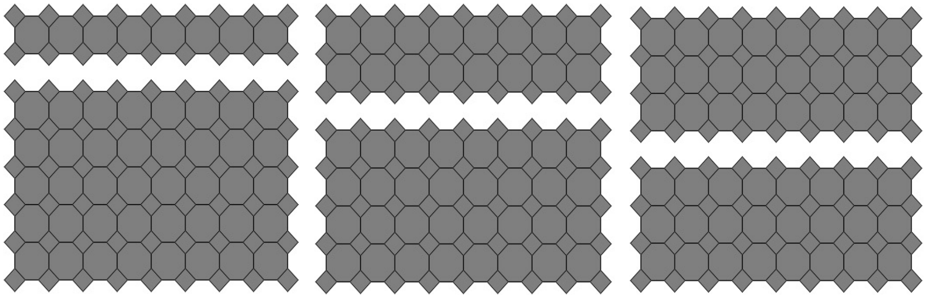
STEP BY STEP

Warm up by building these progressively lengthening rectangles. Be sure all the little squares poking out at the edges are filled, and don't leave any holes anywhere. Start with one piece (easy!) and add one piece at a time, all the way up to 24. The pieces can sit horizontally or vertically, or even mixed as needed.

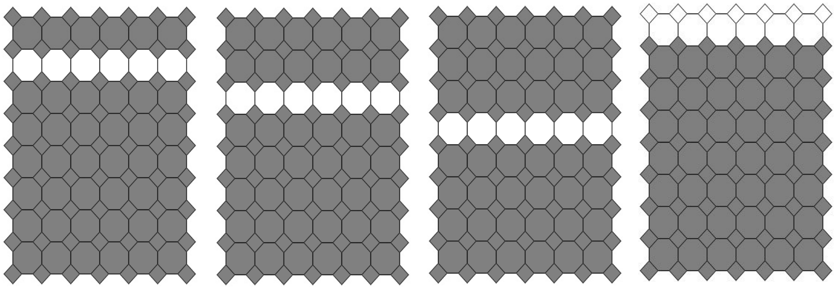




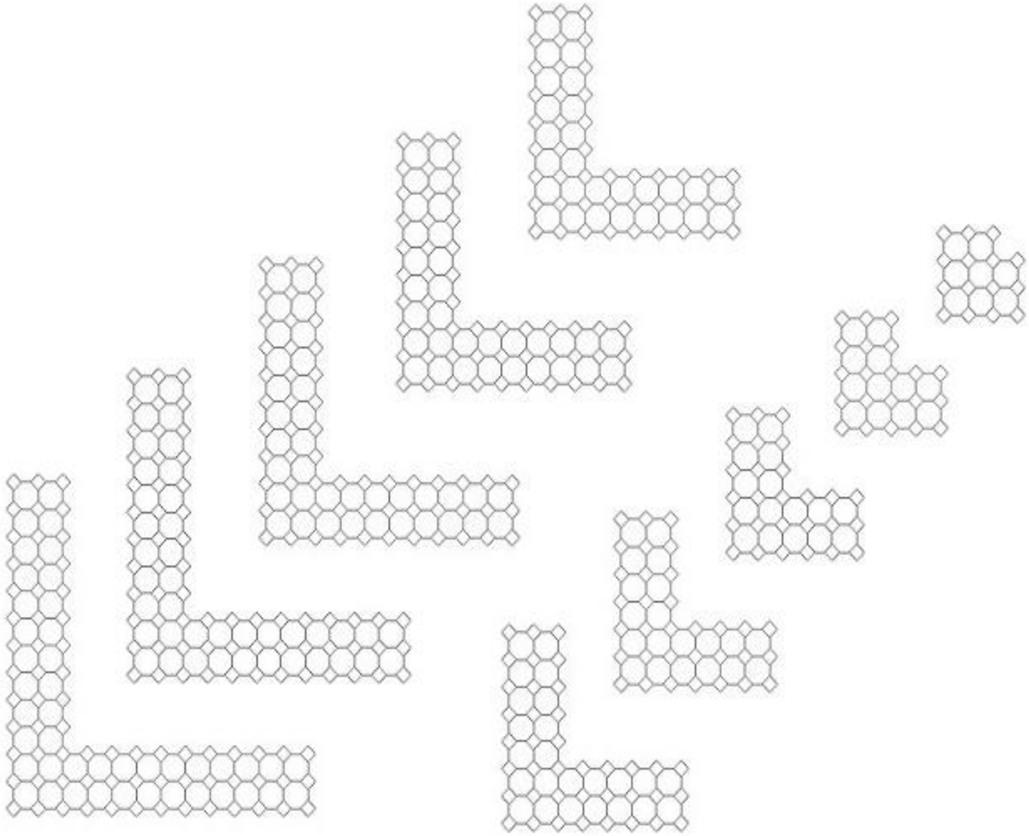
Now explore forming rectangles of these sizes, using as many tiles as needed: 3x2, 3x4, 3x6, 3x8, 3x10, 3x12, 3x14, 3x16 and then 4x2, 4x3, 4x4, 4x5, 4x6, 4x7, 4x8, 4x9, 4x10, 4x11, 4x12 and 5x2, 5x4, 5x6, 5x8, 6x1, 6x2, 6x3, 6x4, 6x5, 6x6, 6x7, 7x4, 7x6. Then fill the tray with the two 4-bars forming 1x8 lines across at each level. Why is it not possible to form a 6x8 rectangle without holes? (*Hint:* The set contains 48 octagons and 72 squares.)



Use the two 4-bars to fill a long edge row in the tray, then use the two 3-bars to lay out perpendicular fences in the tray, building one rectangle at a time, up to the largest of 6x7. (Use up to 21 tiles only.)

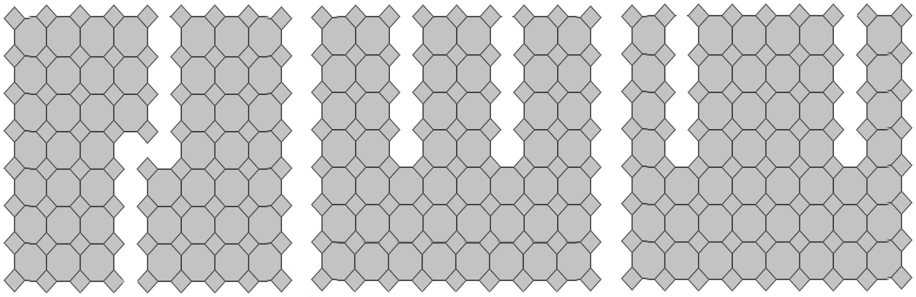


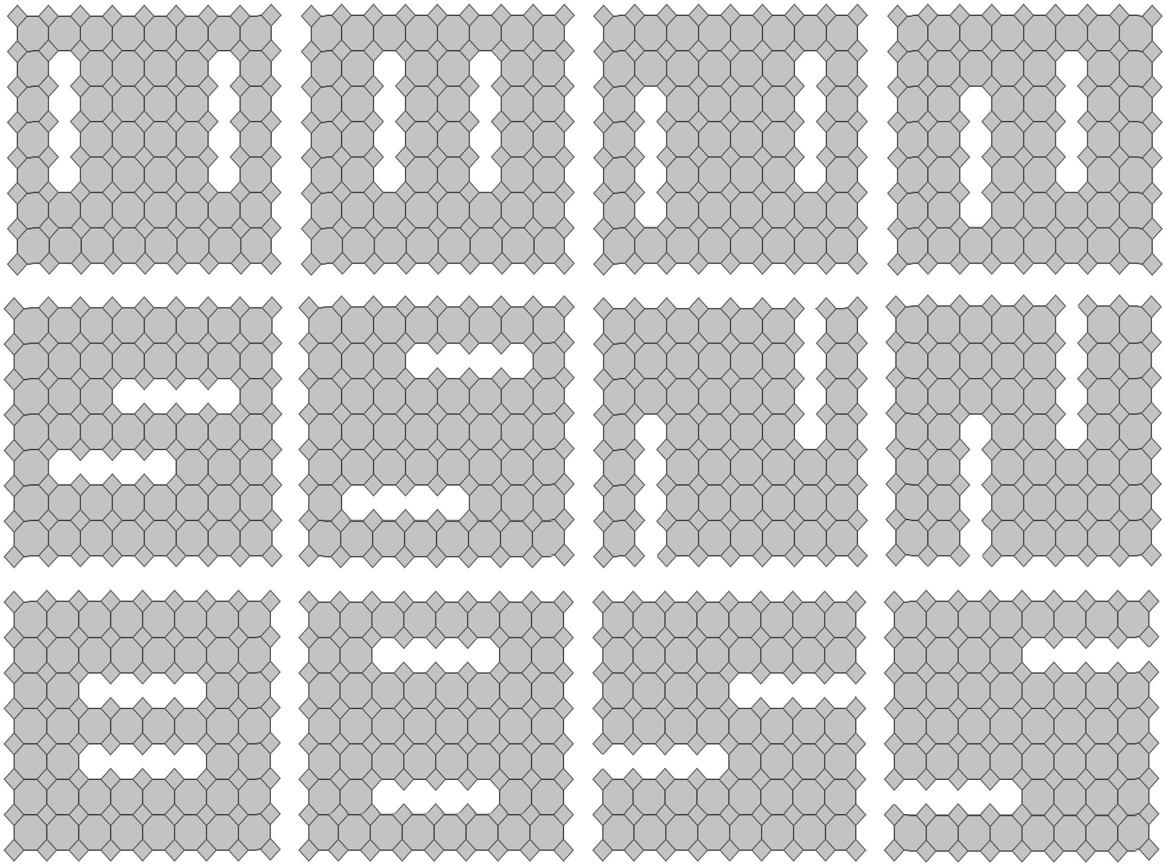
Step up to these ascending angle progressions, using from 4 to 24 tiles:



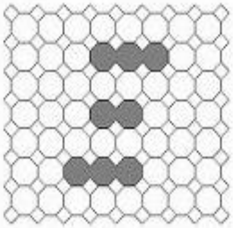
EIGHT HOLES DANCING

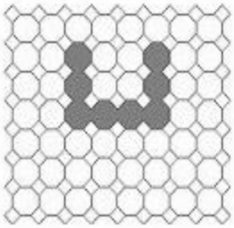
4x2: Fill the tray with all 24 tiles, marking the 8 free octagon spaces with the two 4-bars in the patterns shown.

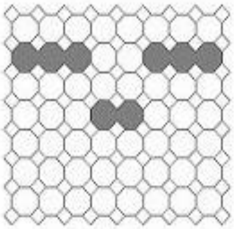


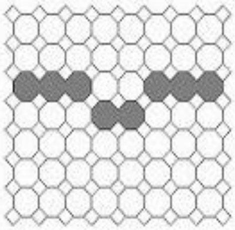


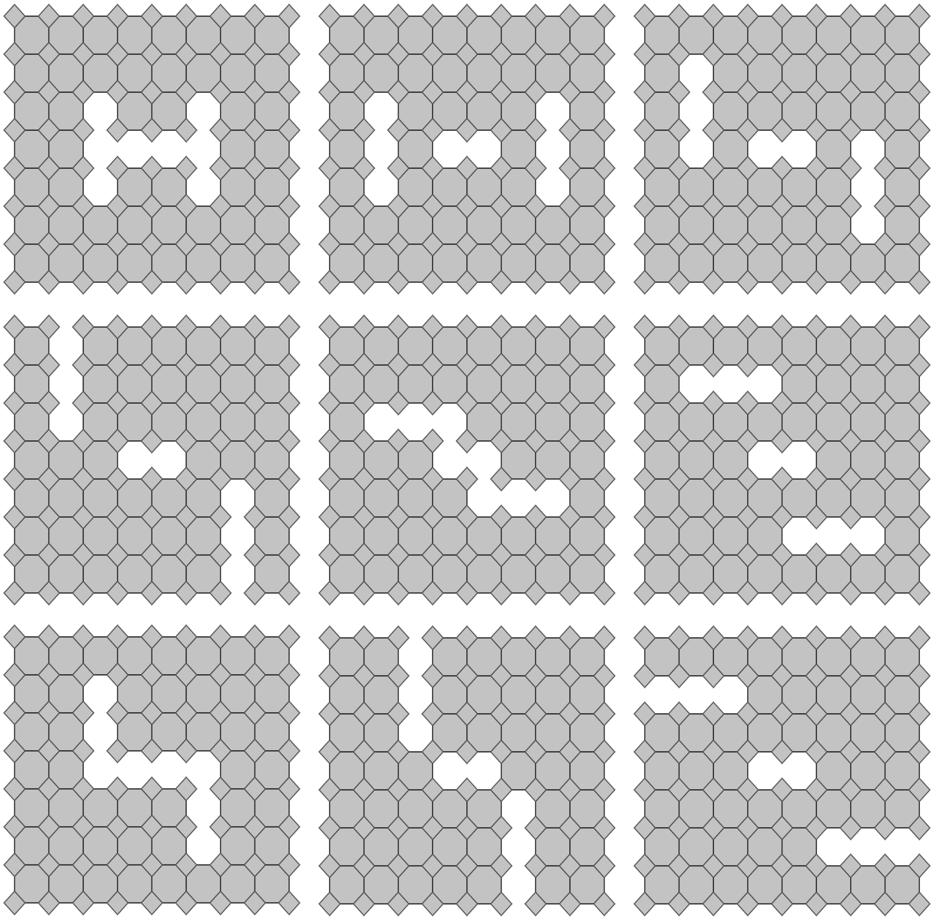
3-2-3: Fill the tray with all 24 tiles, leaving 8 free spaces in the patterns of 3-2-3 octagon rows as shown.

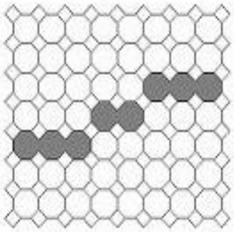


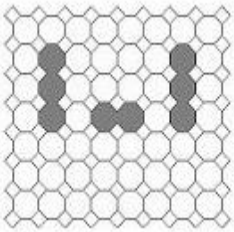


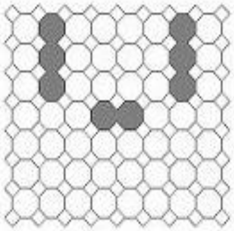


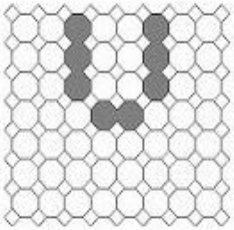




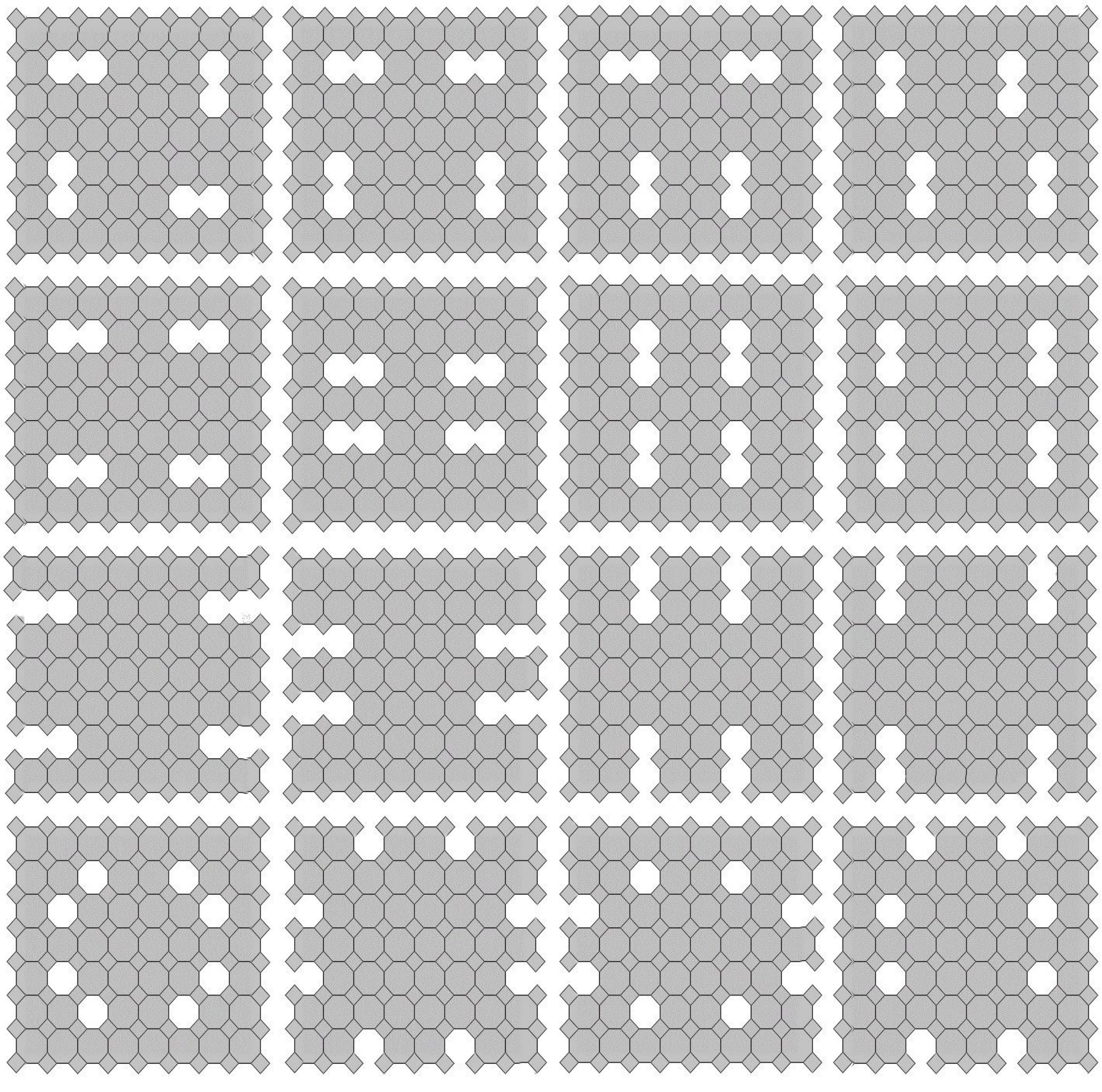






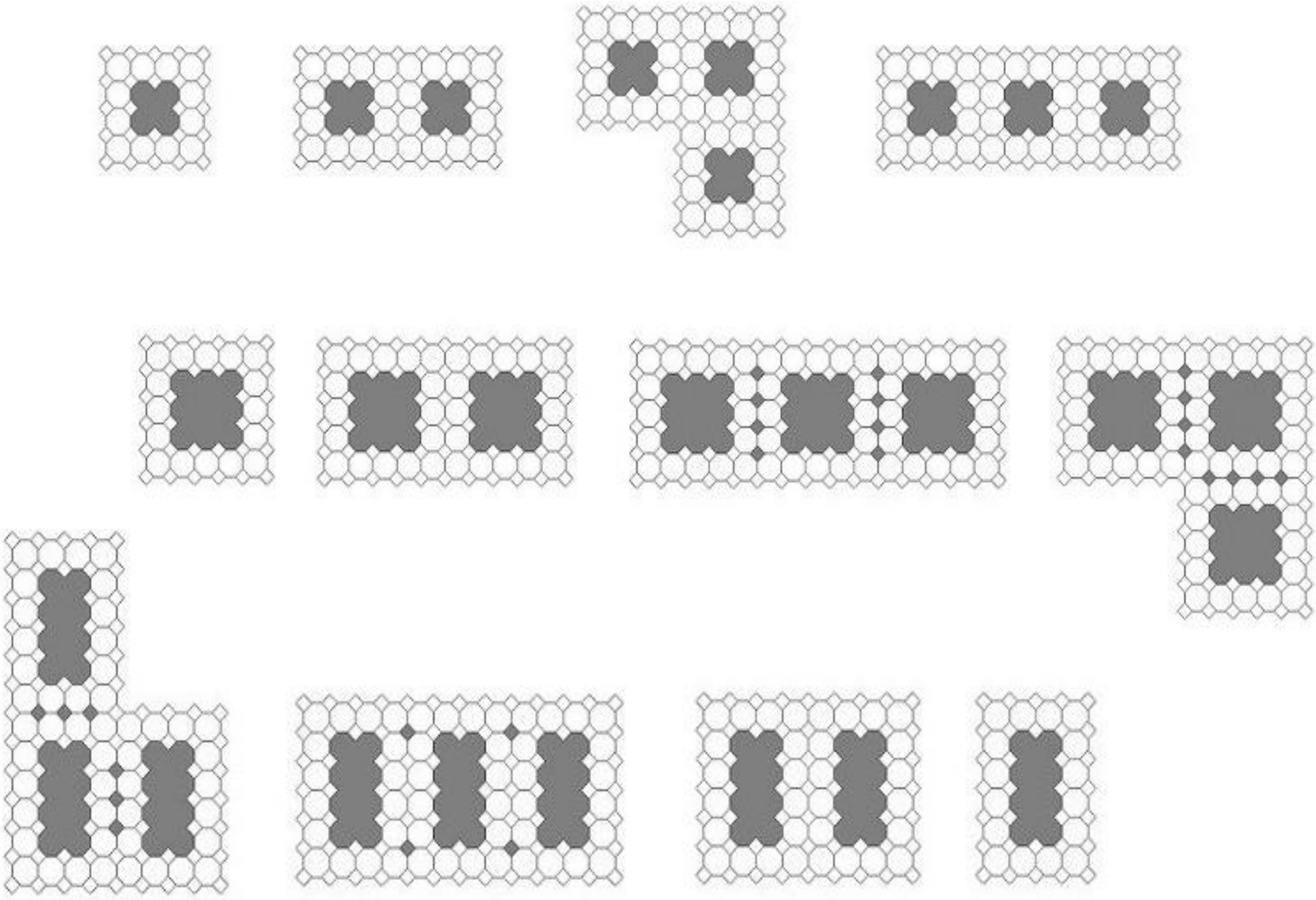


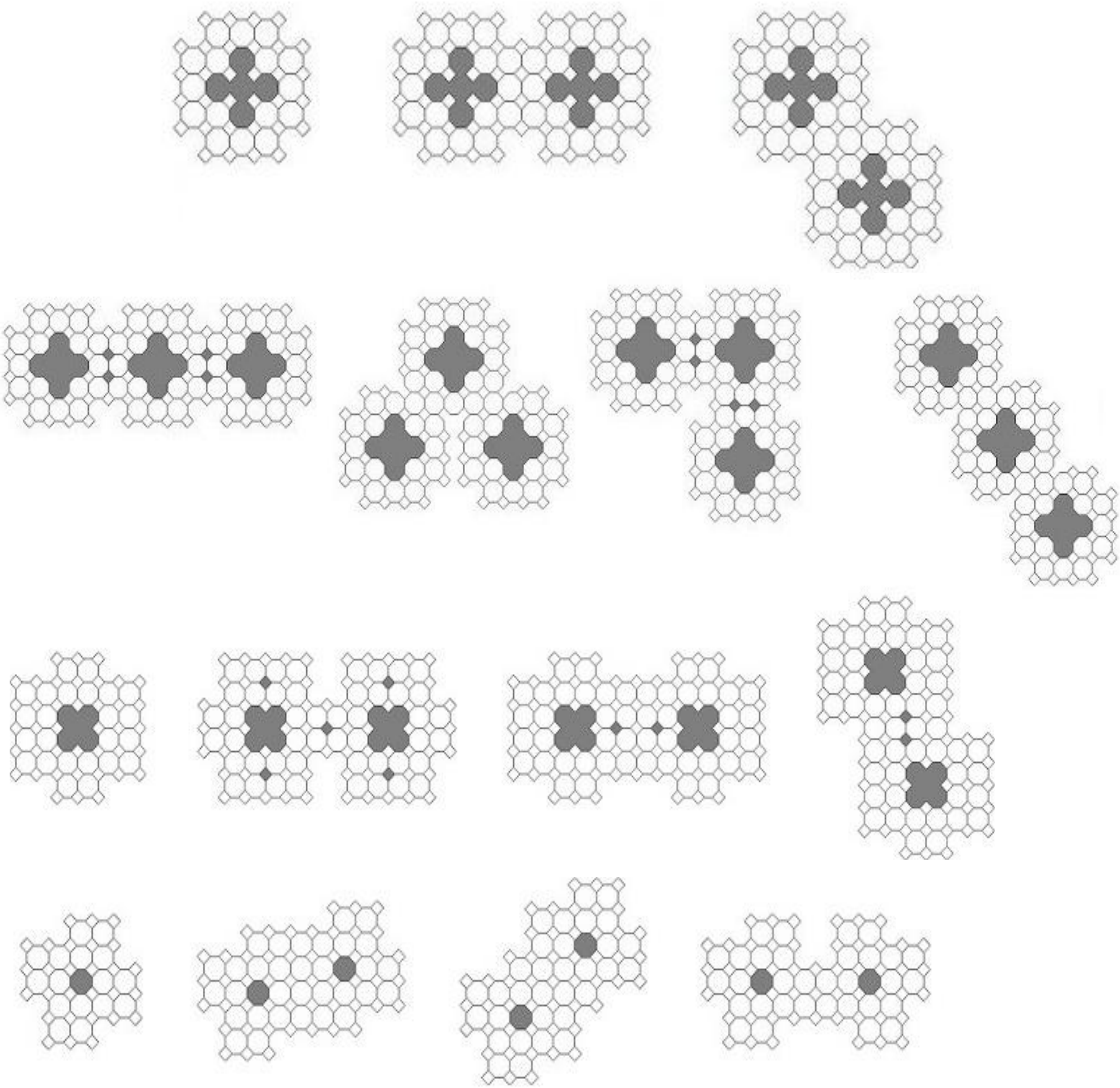
2x4: Fill the tray with all pieces, leaving 4 domino holes symmetrically arranged. And finally scatter 8 single holes pleasingly spaced as shown below.

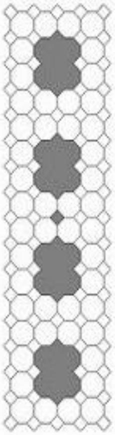
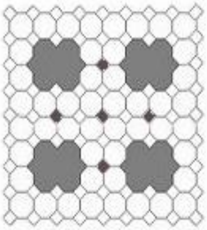
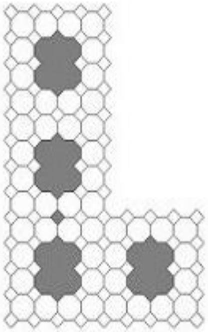
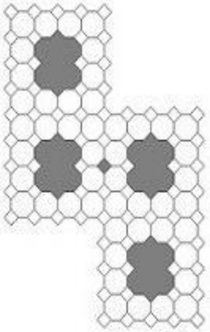
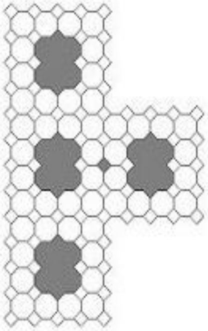


POLYOMINO LATTICES

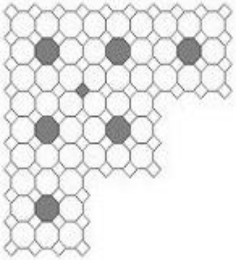
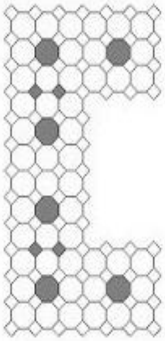
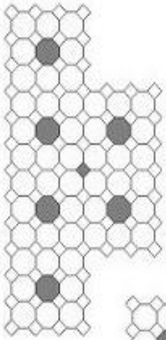
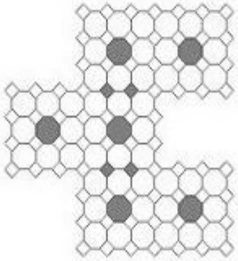
Polyominoes are shapes made by joining squares together. Here the squares have various decorative holes framed by the pieces. Start with the single square, then pairs, triplets, the 5 tetrominoes, and we'll top off with the 35 sixes (hexominoes). All dark areas, even the tiny diamonds, are holes.

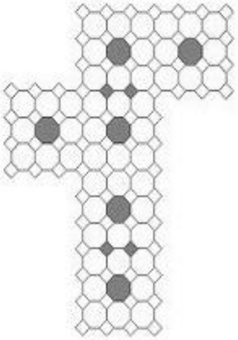
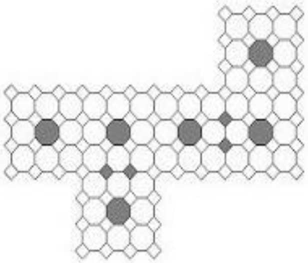
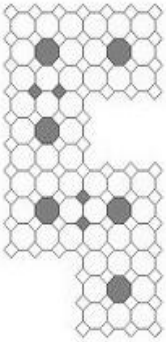
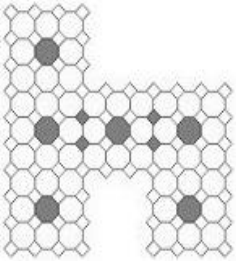


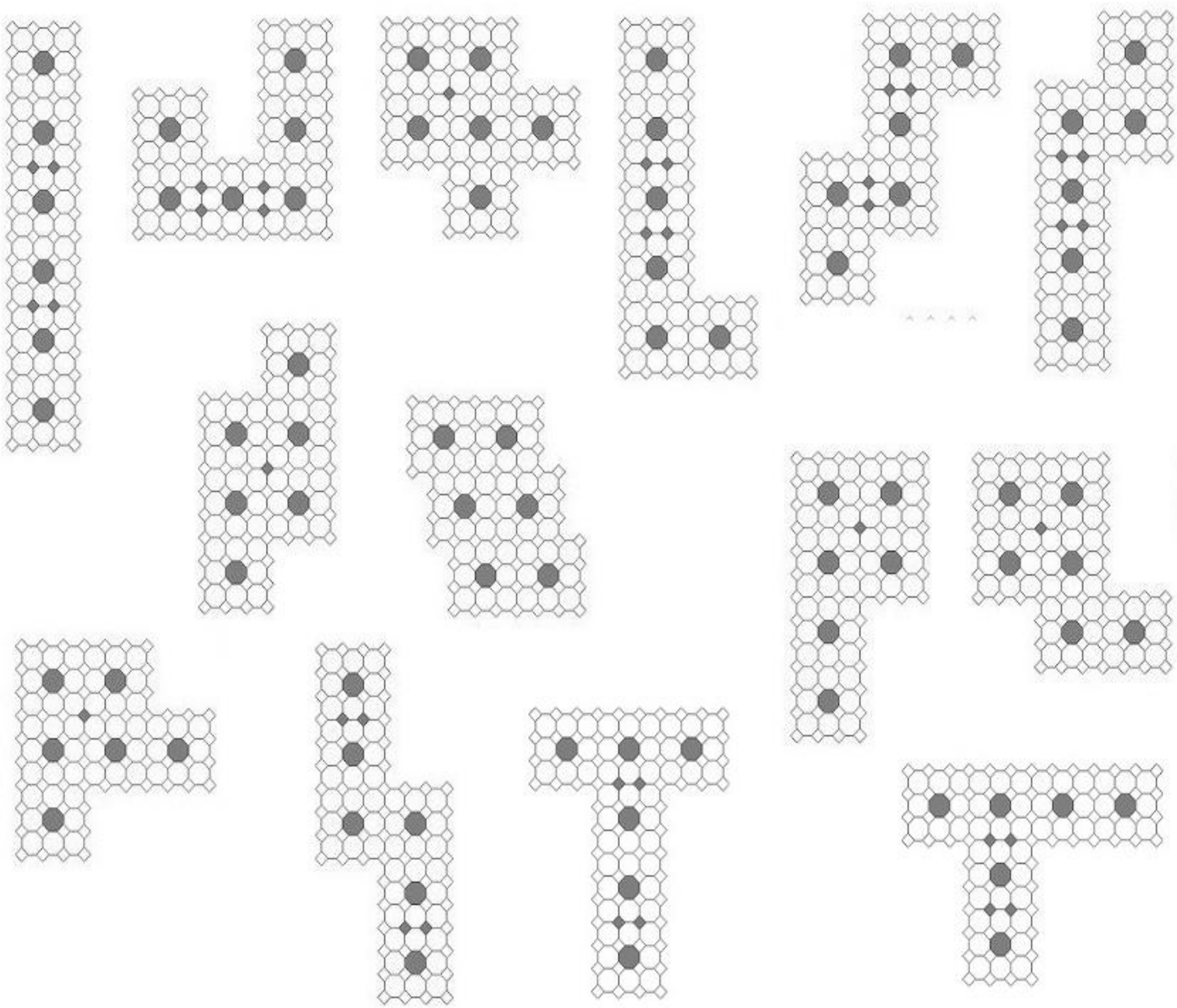


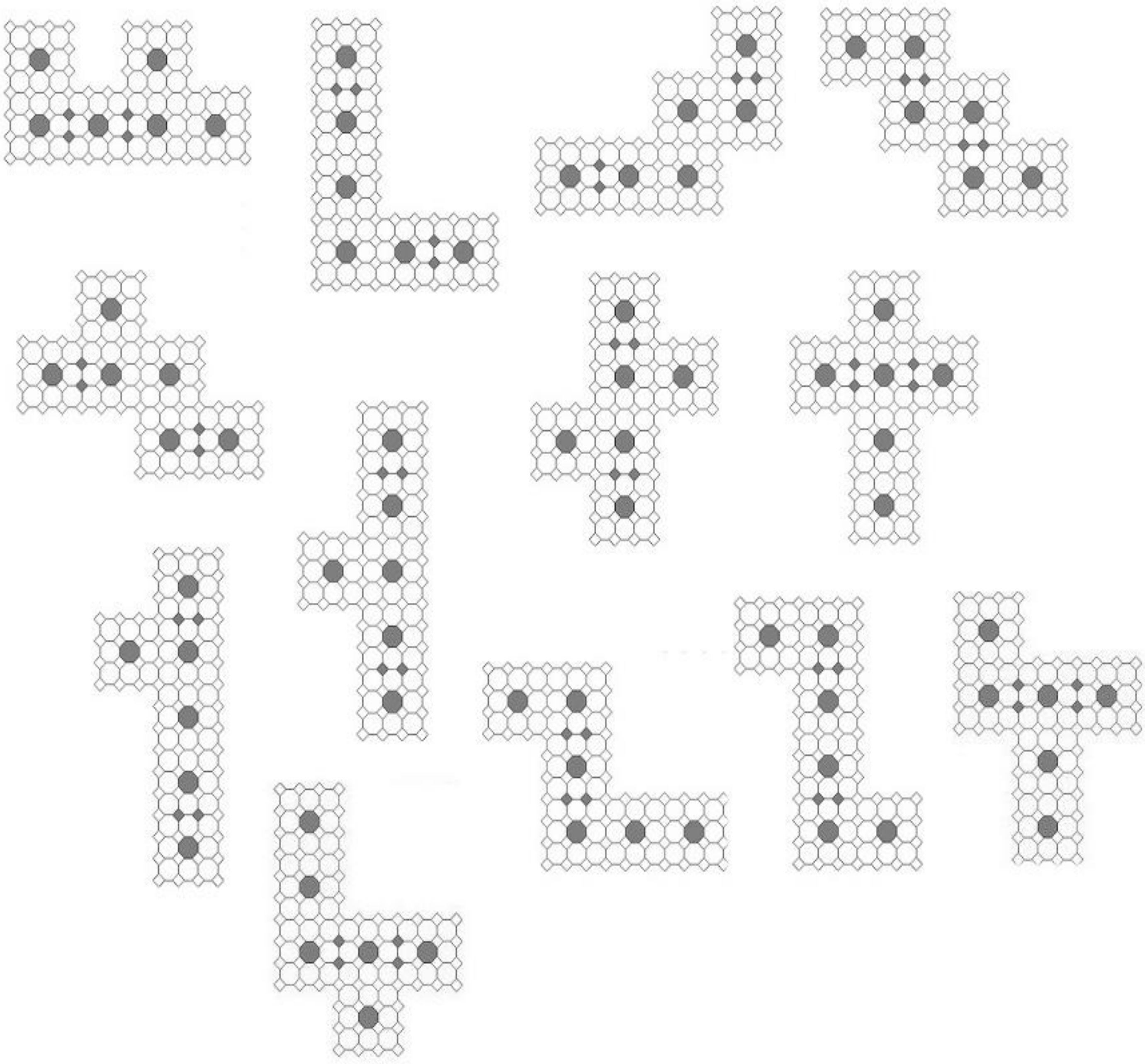
    

The 35 hexominoes are named after letters of the alphabet they most resemble. Can you see the A, C, D, E, high F, low F, G, H, I, J, K, L, M, long N, short N, O, P, Q, R, S, tall T, short T, U, V, W1, W2, W3, X, italic X, short Z, tall Z, high 4, low 4?

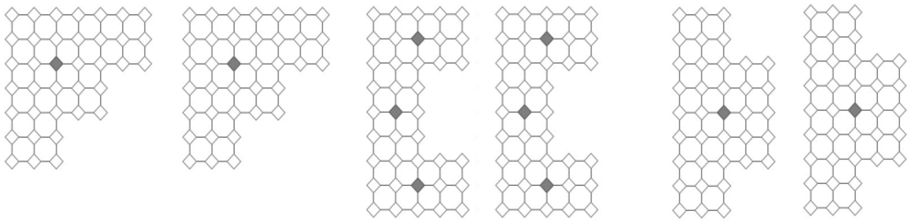
   

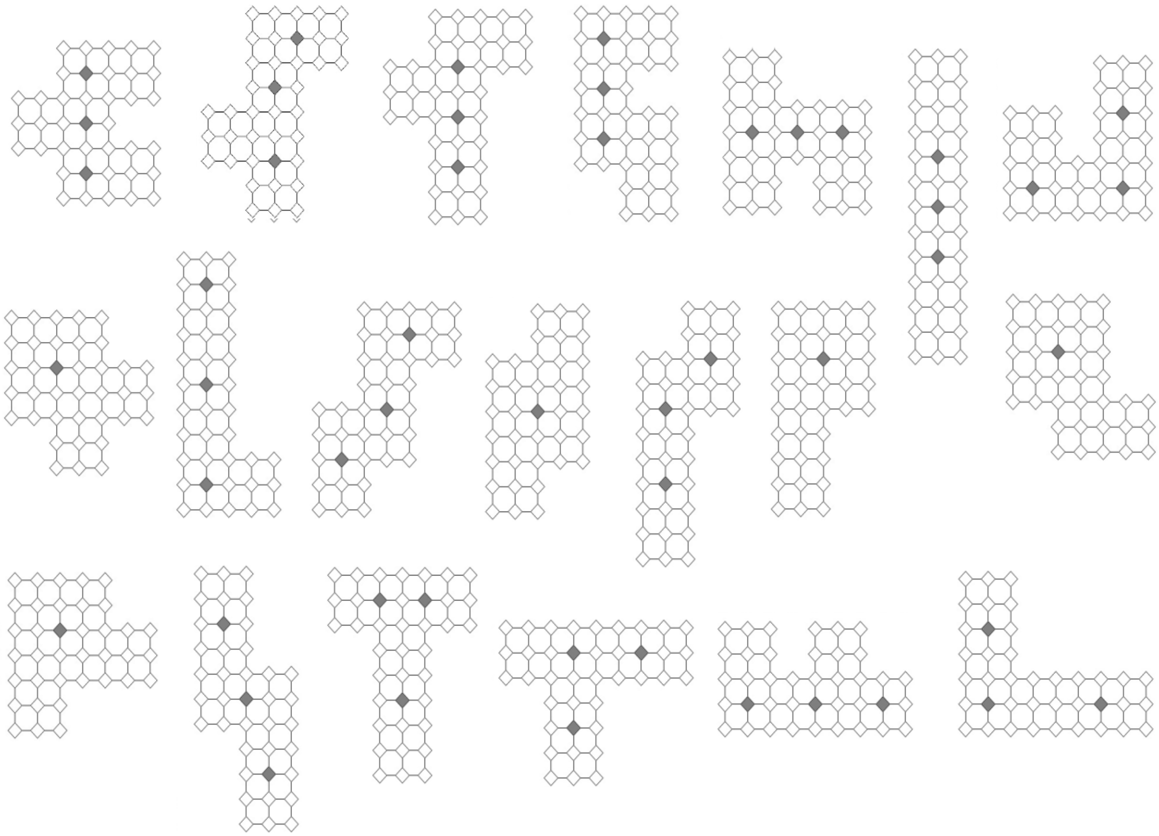


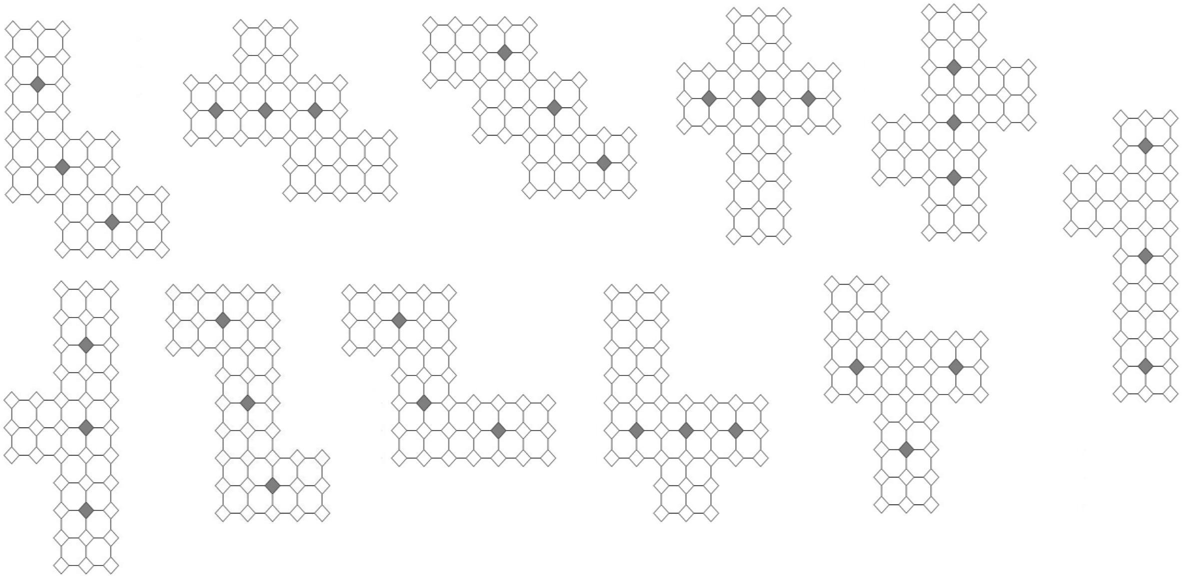


HEXOMINO TWINS

Build pairs of doubled hexominoes. We show three samples of twins. Form twins for all the other shapes below, with the little holes placed for both as you see them.



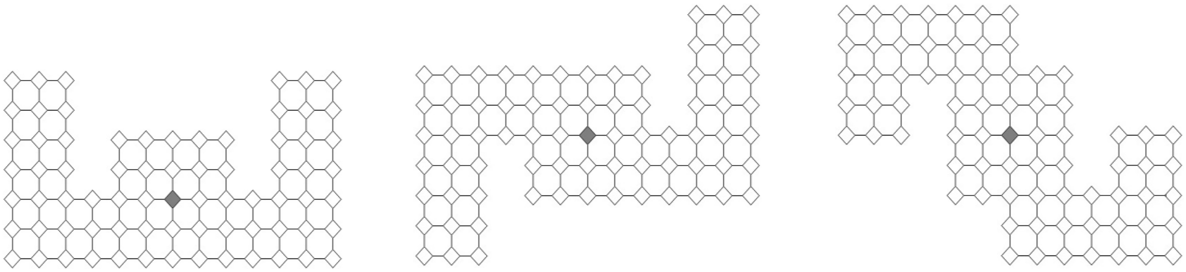




The only hexomino not solvable as twins is the O (the two 4x6 rectangles), because there are not enough squares available in the figure to accommodate all the squares of the set.

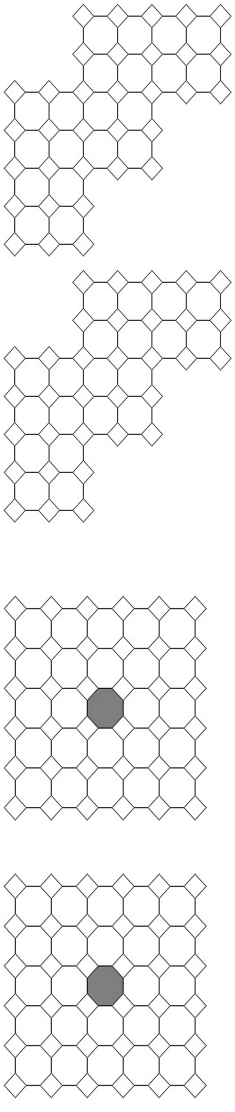
SIAMESE TWINS

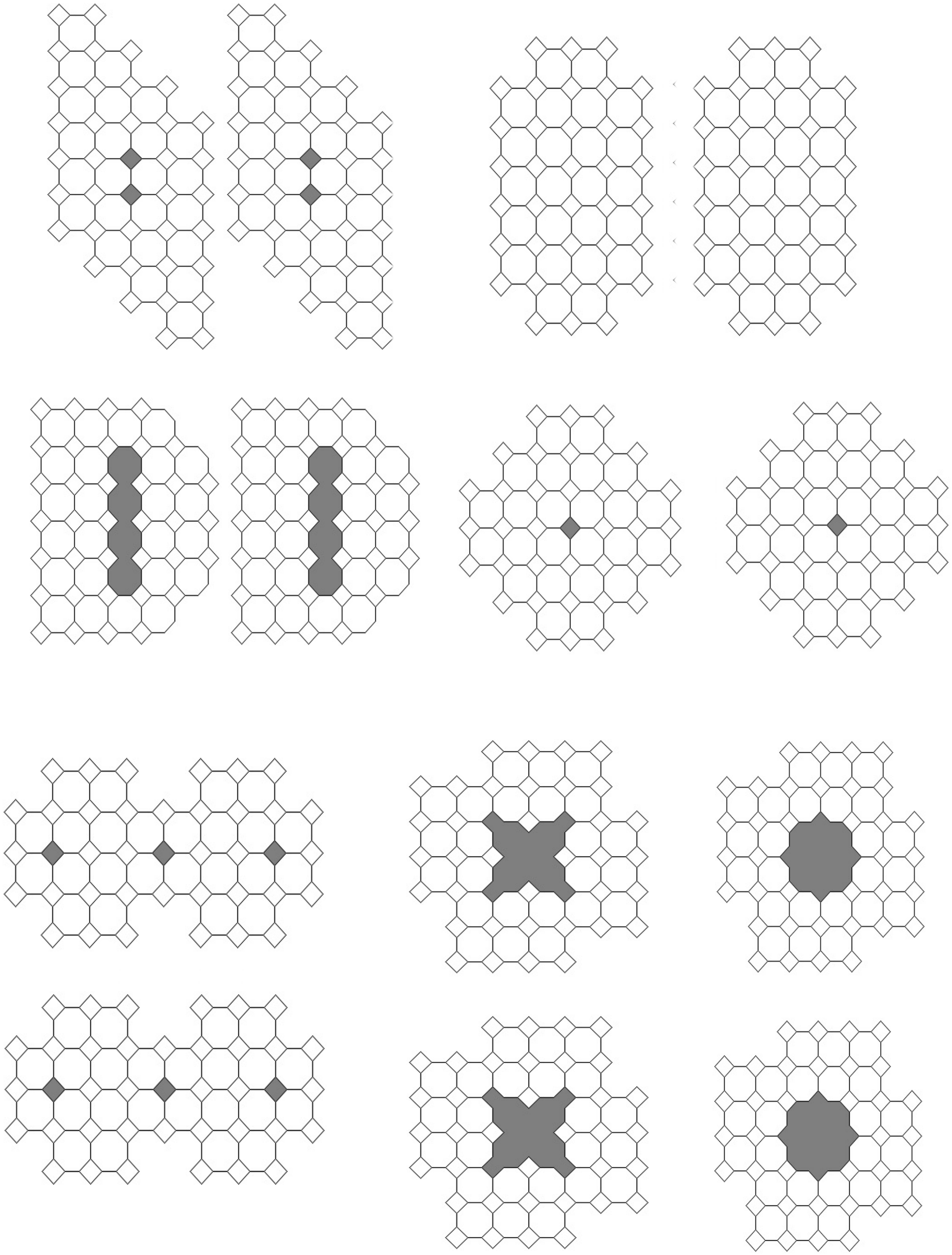
Any hexomino shape can be duplicated and the pair joined into Siamese twins with mirror or rotational symmetry. Here are three pairings of the J hexomino. How many other ways can you think of putting two J's together into a symmetrical shape? And then solve it with the Ochominoes set. If it needs a hole, get the hole into the center.



MORE TWINS

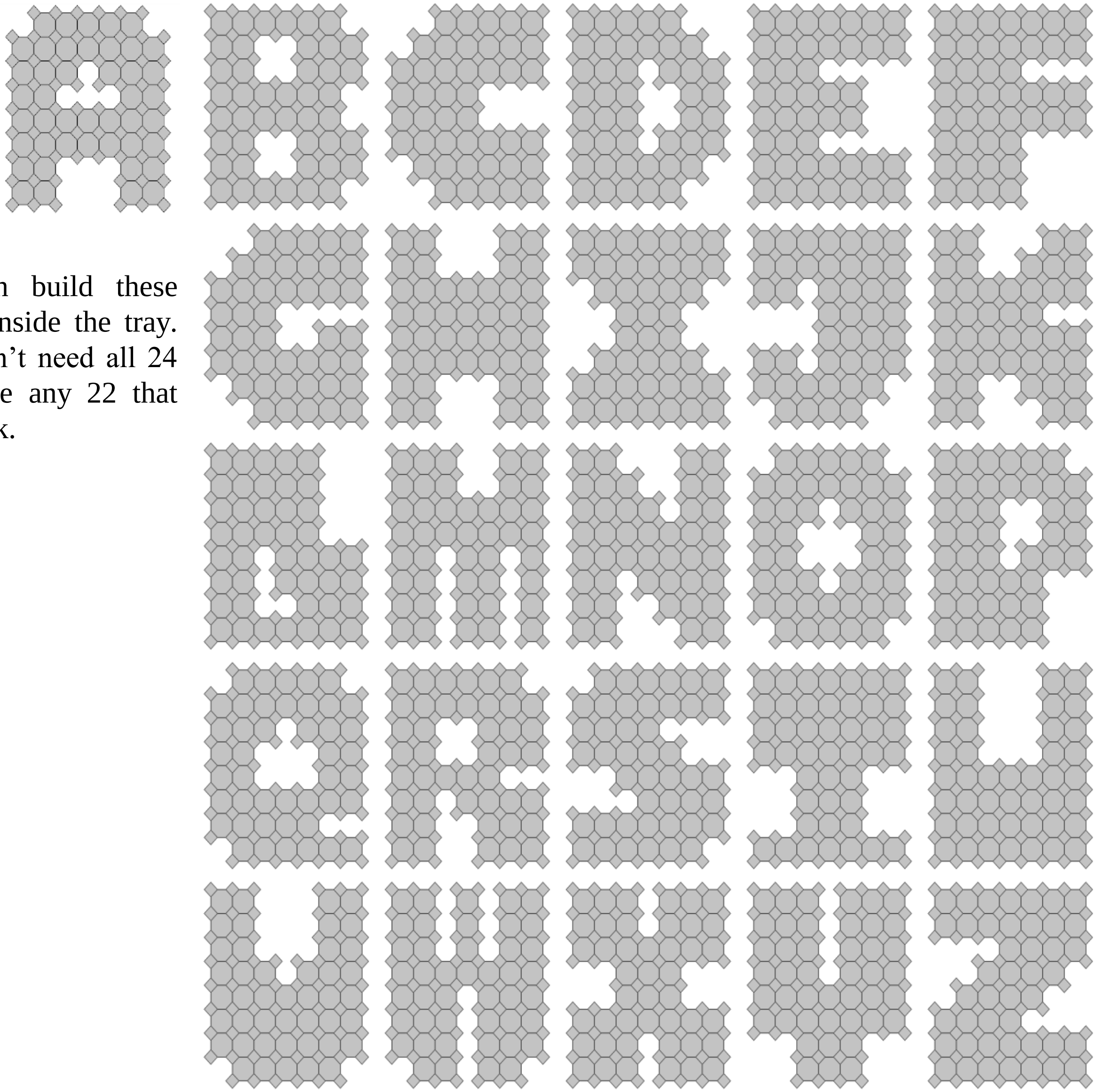
Which pair uses only 20 tiles?





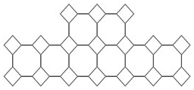
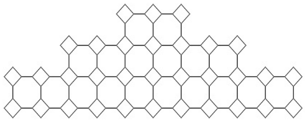
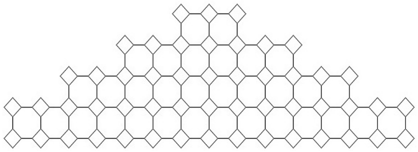
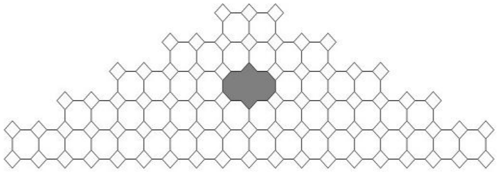
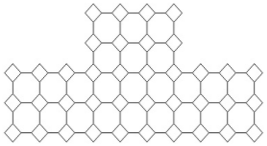
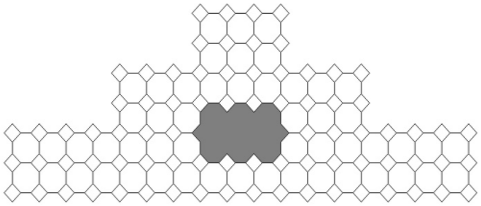
A HANDSOME ALPHABET

You can build these figures inside the tray. You won't need all 24 tiles. Use any 22 that will work.

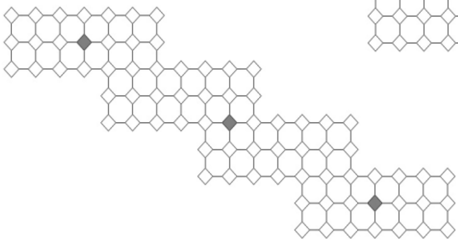
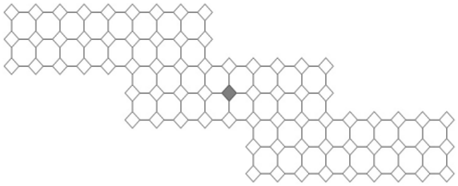
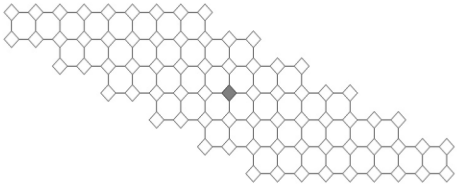
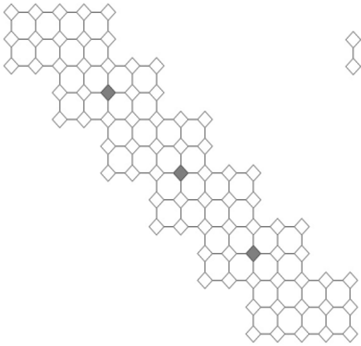
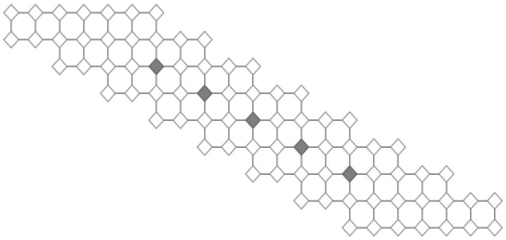
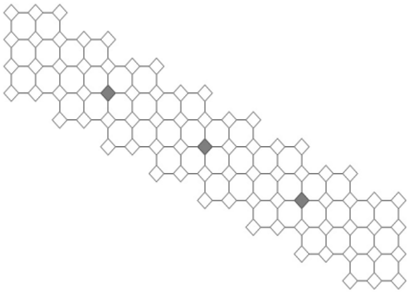


STAIRS AND STEPS

Up and down, with 4 to 24 tiles. Dark areas are holes.

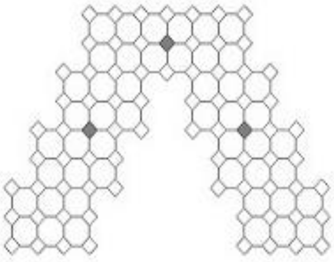







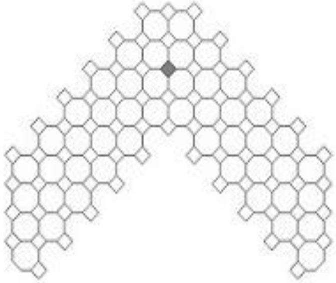
Up and up, a staggered challenge. The little black squares are open spaces.

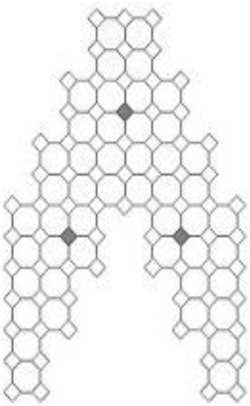







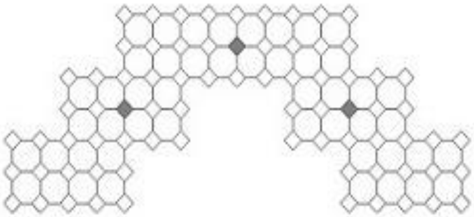
ARCHES

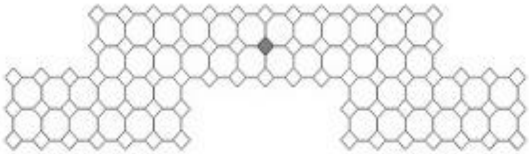
How many other arches can you design?

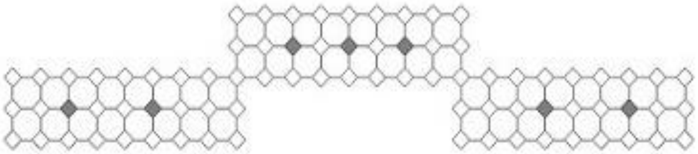


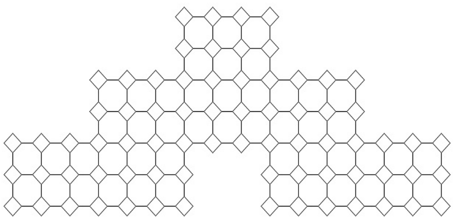


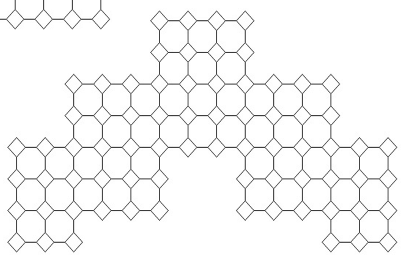


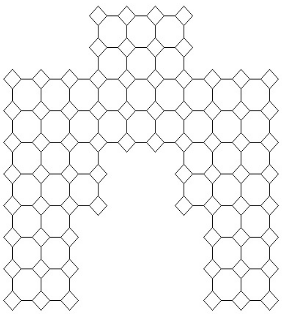


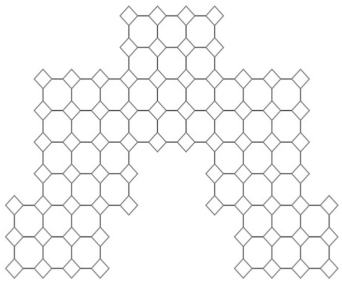






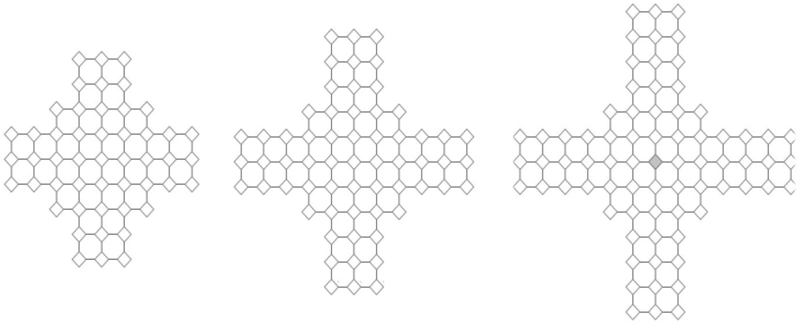


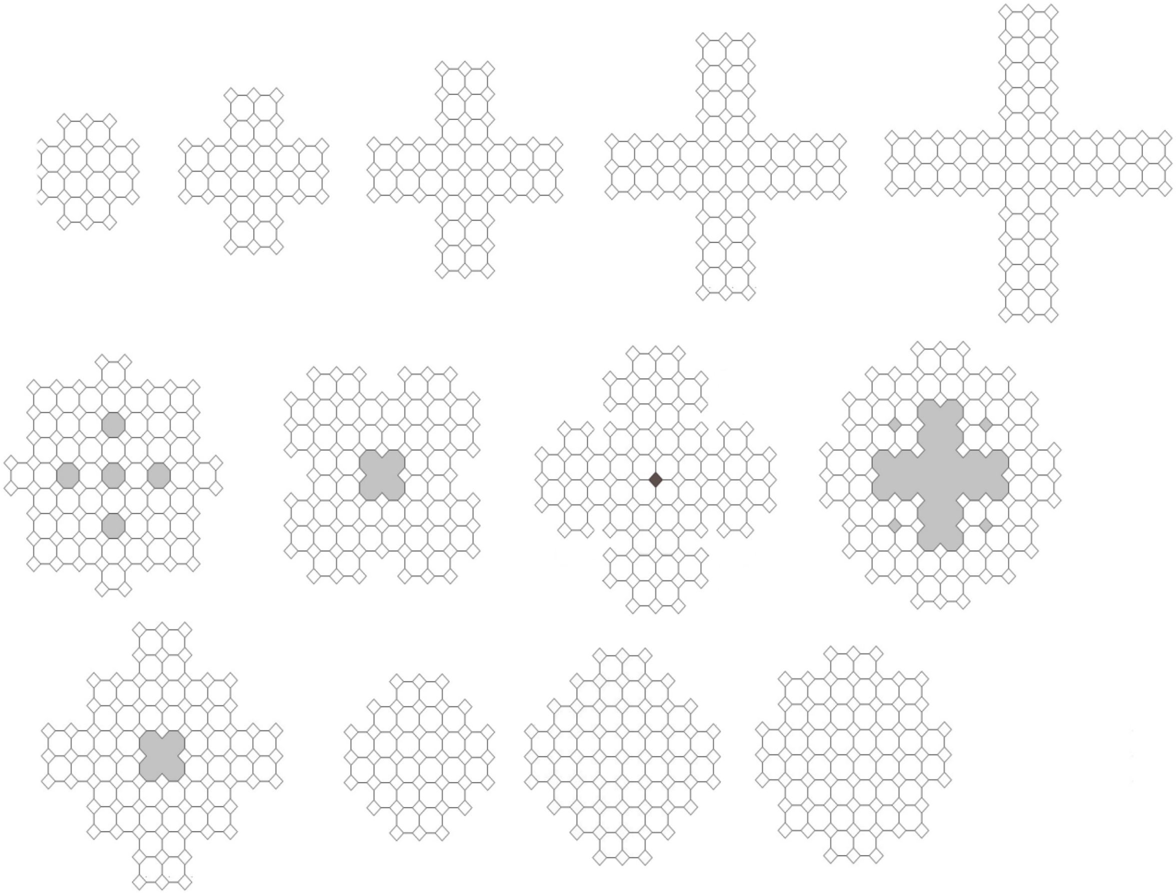




FOUR-WAY SYMMETRY

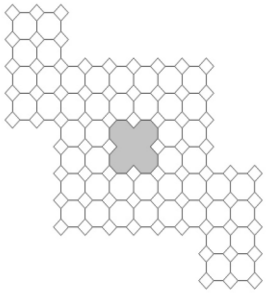
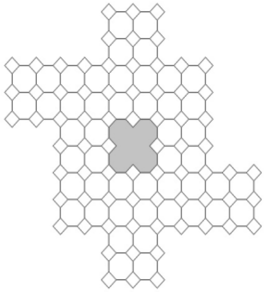
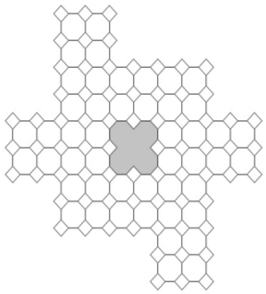
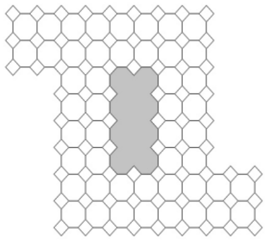
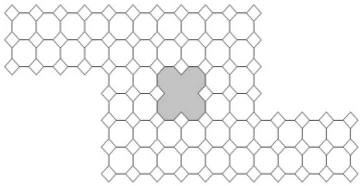
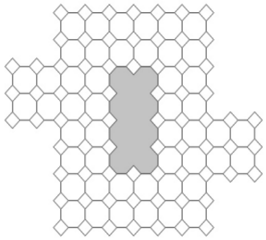
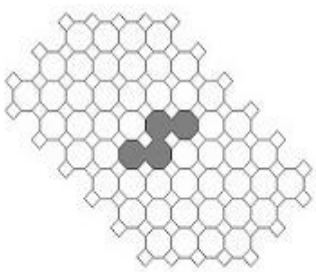
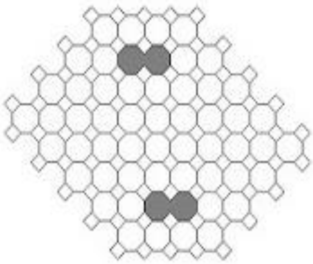
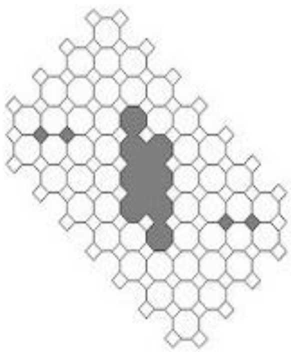
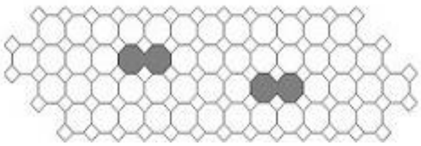
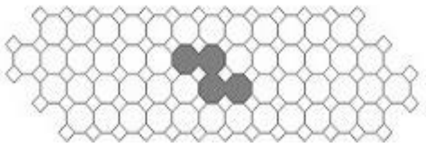
Here’s a collection of shapes, from small to full size, with every kind of symmetry all at the same time: mirror, rotational and diagonal. Solve these and then create your own additions to this group..





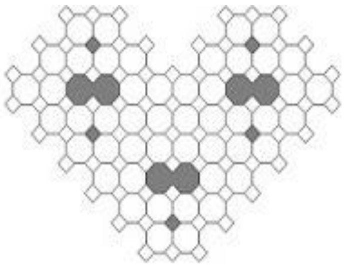
ROTATIONAL SYMMETRY

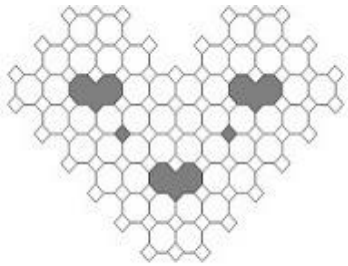
These figures can be turned half-way around and be the same shape. Can you construct other such figures with some or all of the Ochominoes tiles?

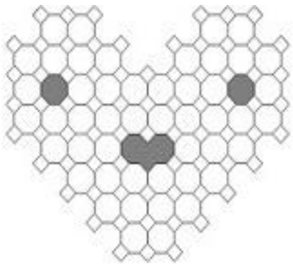












VALENTINES

These figures have mirror symmetry, also known as reflection.

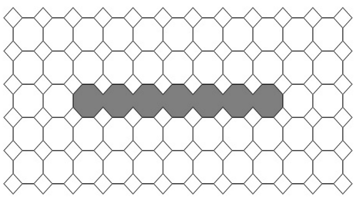


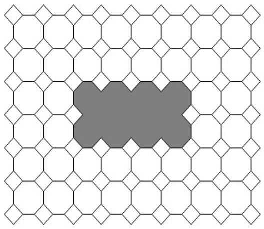


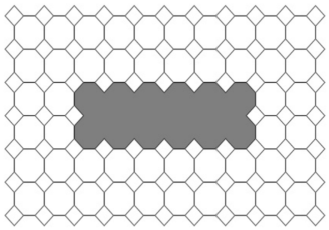


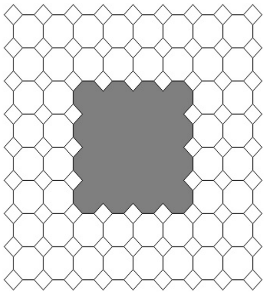
FRAMES

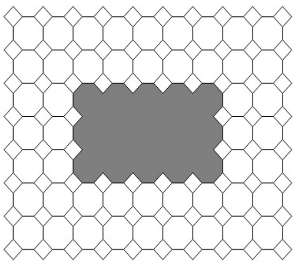
Which ones don’t need all 24 tiles?

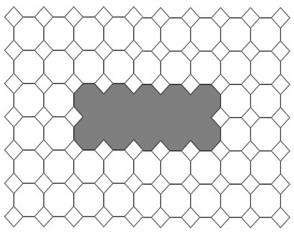






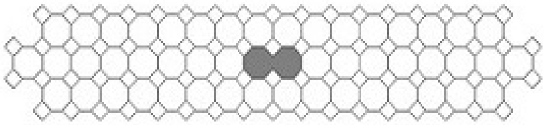
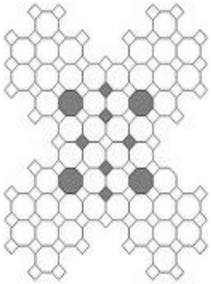
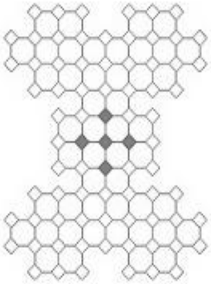
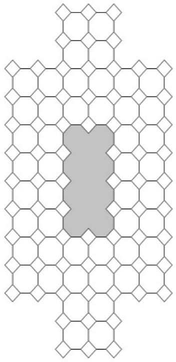
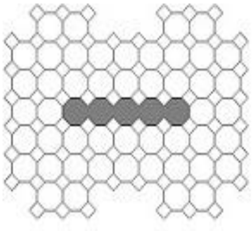
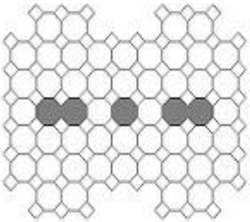
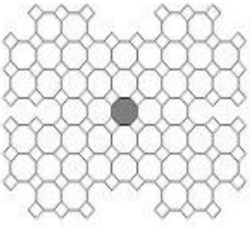
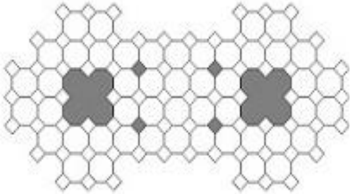
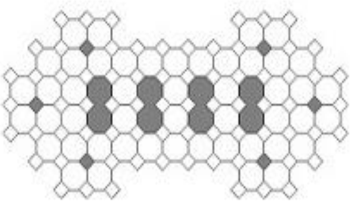
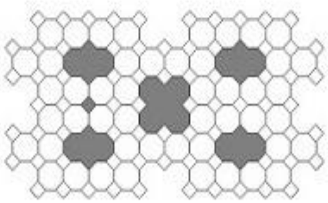
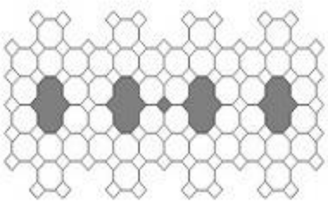
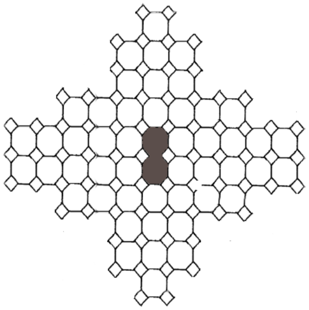
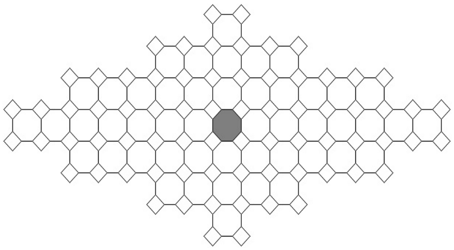
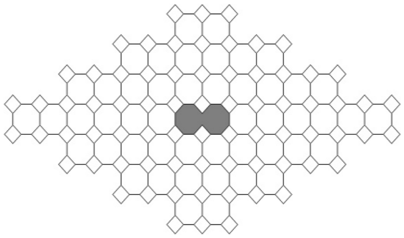






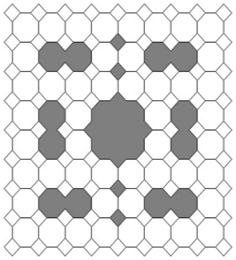
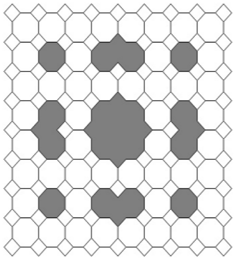
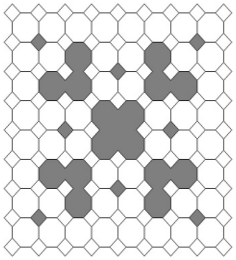
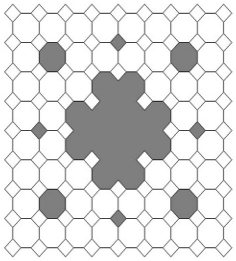
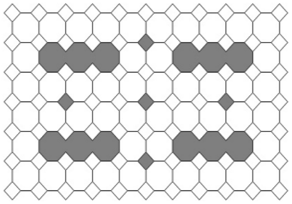
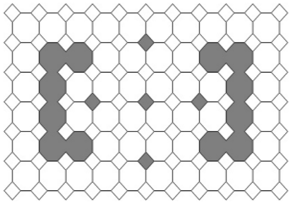
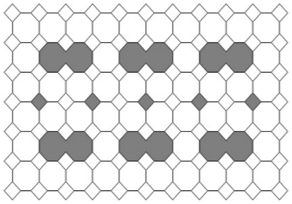
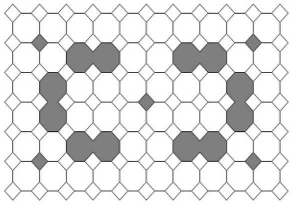
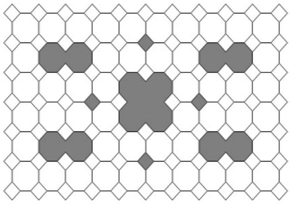
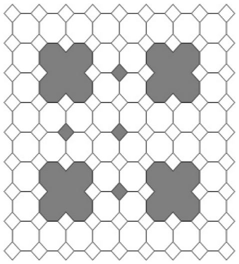
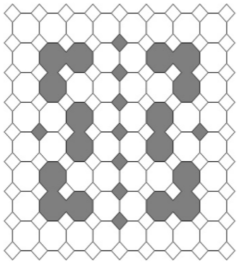
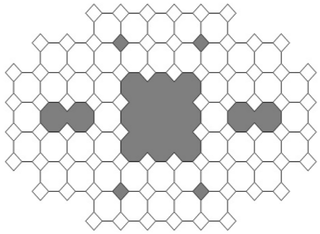
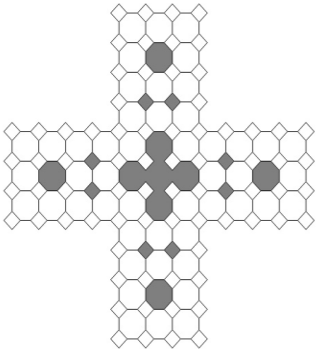
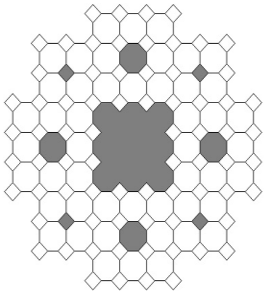
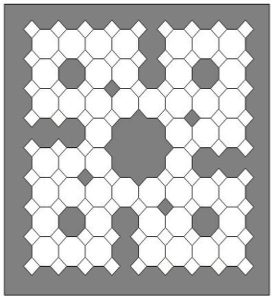
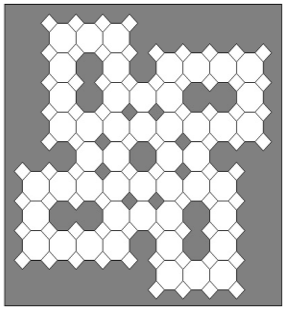
MIRROR SYMMETRIES

Differently symmetrical when you view them horizontally or vertically. Many patterns are possible. Solve these, then create your own!

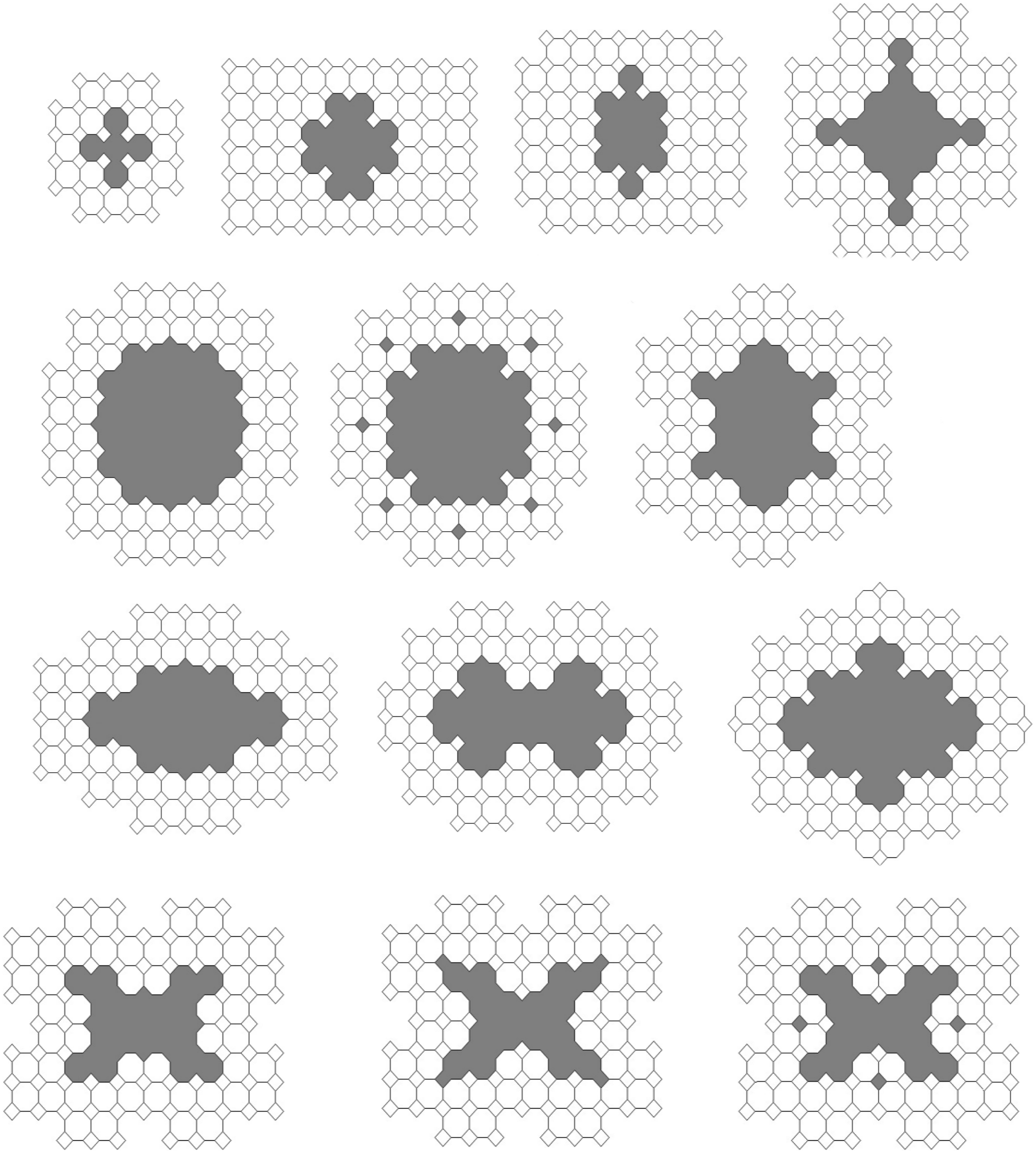















LACE AND LATTICES

Fine and fancy symmetrical patterns of holes. Solve these, then create others.

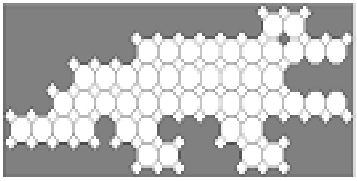

















RINGS AND PIRATE FLAGS

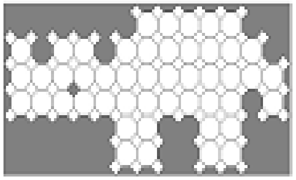


THE ANIMAL ZOO

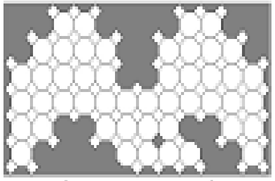
Dan’s animals are a beautiful demonstration of the connection between math and art. These are so expressive. Can you design other creatures? And how do you like the parade of travel vehicles?



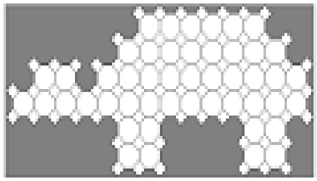
Alligator



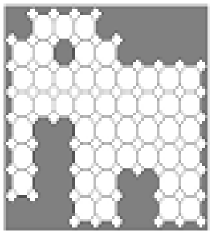
Rhinoceros



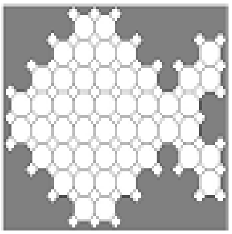
Flying Eagle



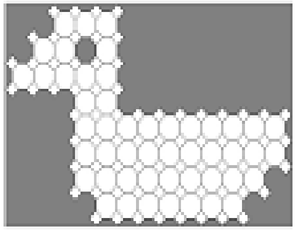
Turtle



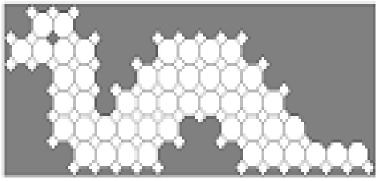
Elephant



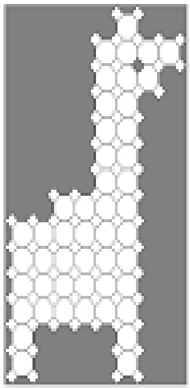
Fish



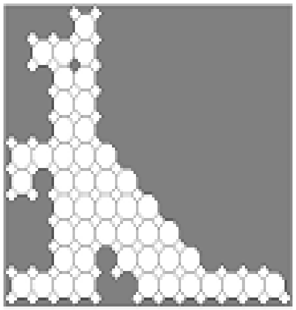
Duck



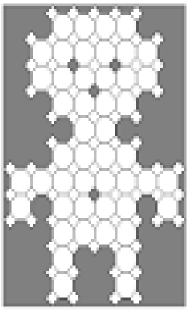
Snake



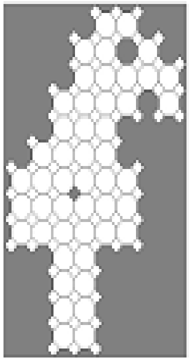
Giraffe



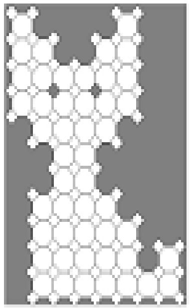
Kangaroo



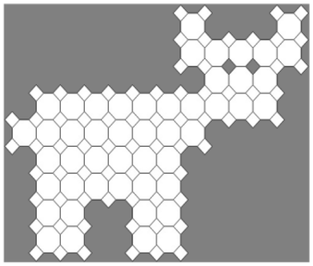
Robot

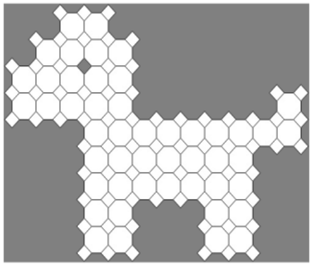


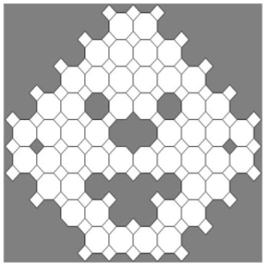
Parrot

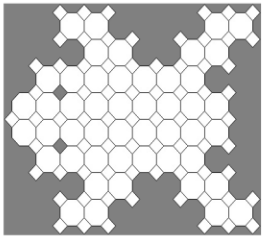


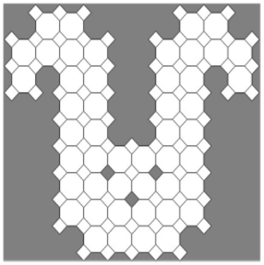
Cat

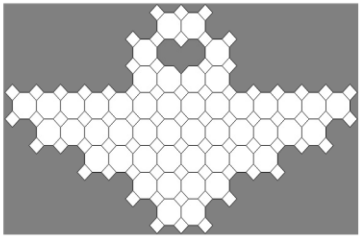

Moose

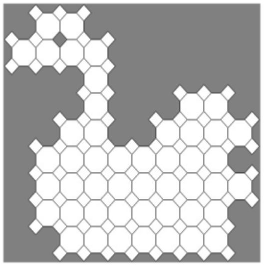

Horse

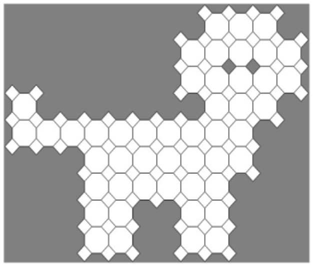

Clown

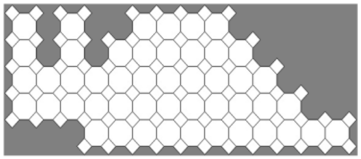

Frog

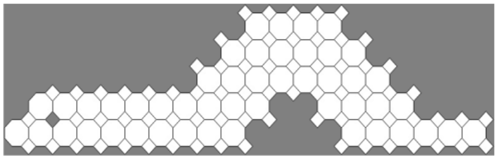

Bunny

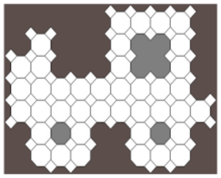
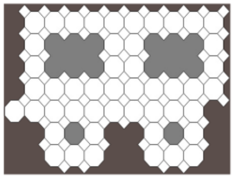
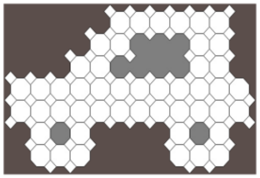
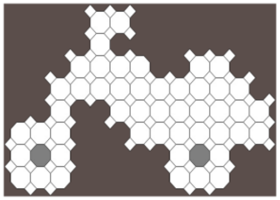

Owl


Swan


Lion


Snail

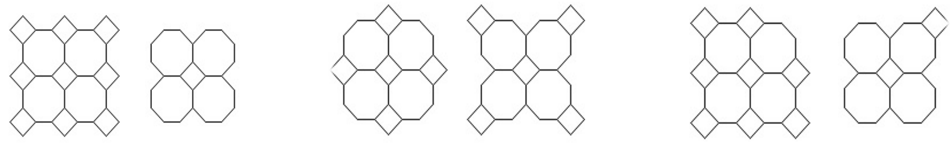

Worm


MOLECULES (2x2 patches)

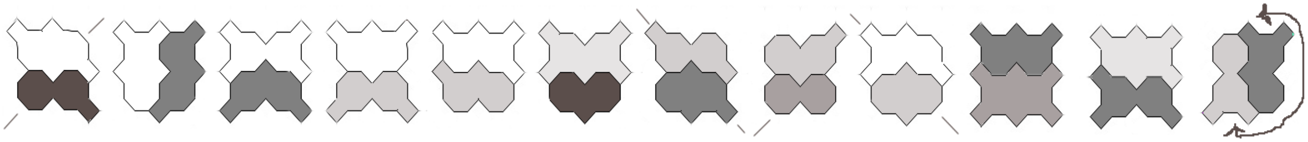
Take a close look at the Ochominoes tiles. Some are symmetrical in one direction or another, and when you join two of them along their longest sides, they can form a 2x2 symmetrical patch .Yet you can also make symmetrical patches with two non-symmetrical tiles, or even with one symmetrical and one non-symmetrical tile. There are 51 distinct molecules—12 are diagonally symmetrical, 1 is rotationally symmetrical, 20 have mirror symmetry, and 18 are not symmetrical at all.

Here are a few examples of complementary pairs (each has what the other is missing). Notice which ones are diagonal, and that there are never any interior holes:



Unusual challenges:

1. Form 12 symmetrical patches simultaneously, each made of 2 tiles.
2. How many identical symmetrical patches can you make simultaneously? Our best result is 7.
3. Added challenge: No patch contains two of the same color.
4. Form patches with anywhere from 0 to 8 squares on their borders.
5. Is it possible to form 12 symmetrical patches that are all different shapes? Here's one solved by Alex Streif. See that both diagonal and rotational symmetries occur besides the straight-forward reflections.

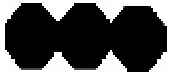


6. How many ways can any one tile form a symmetrical patch with any of the other tiles? Look for all types of symmetry: vertical, diagonal, and rotational.
7. Can you form a single ribbon 2 octagons wide with only symmetrical pairs? Can it create a loop by having the end pieces also form a pair with each other? Solve this and win a prize.

Game One: PARTNERS

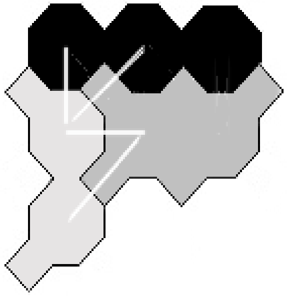
A four-player game for two teams

Start: Partners sit across from each other. Divide the tiles among the four players as follows: three players take the six tiles each of one color; the fourth player takes the 3 pairs of remaining colors. Have a notepad and pencil handy for keeping score. Place one of the 3-bars in the center of the play area. The tray and other three bars are not used.



Play: Take turns placing one tile out of your hand against any tile or tiles in the play area. The first move will be against the bar. Score as many points as the octagons in your tile are touching. They can touch both by sides of octagons and by contact through a square "bridging" across to another tile. Here is an example of a move worth 5 points:

Next player adds
another tile,
for 4 points:



Continue adding tiles and trying to set up positions for your partner to get a good score. Play until all tiles have been played. If a player cannot find a move, that player passes until a move becomes possible again. If no more pieces can be played, the game ends and players add up their scores.
Advanced version: your move must touch one of your partner's pieces!

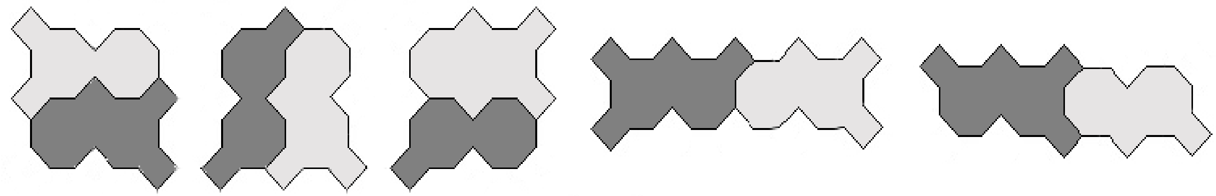
Goal: To have the highest joint point score of the partnership. In case of a tie, everyone wins! If one player still has a piece that could not be played, the other team wins.It is acceptable to help other players find a good move, even if it is the other team. More fun that way! Because every player can see every other player's remaining pieces, this is an "open information" game. No luck, no secrets.

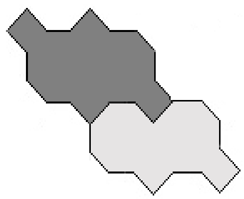
Game Two: MOLECULES

For two to four players

Start: All the pieces at the side of the play area, open on the table in a common pool for all players to draw from. The four bars and tray are not used.

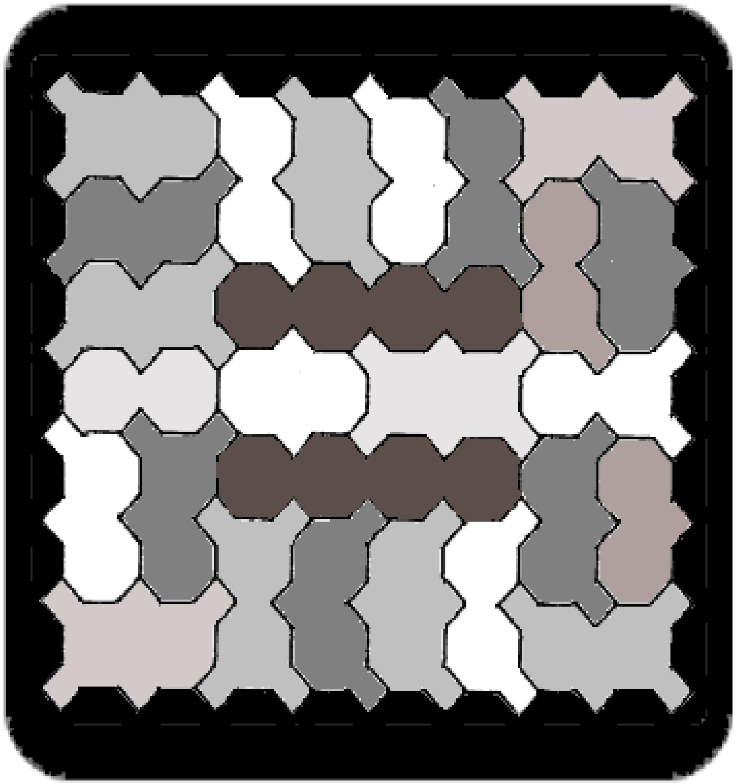
Play: First player chooses any tile and places it in the center of the play area. Next player chooses any suitable tile and places it next to the first piece so as to form a symmetrical shape. A symmetrical pair can be rotational, vertical, diagonal, and form a 2x2 or 4x1 or even offset array. Here are samples of possible combinations, left to right: rotational, vertical (mirror or reflection), diagonal, mirror, rotational. Below, an unusual but perfectly permissible offset rotational pair. The easiest pairs to form are simply symmetrical tiles stacked on top of each other. Using them up too soon will make the later moves more difficult, so don’t always take the easiest path first.





In brief, every tile added must be symmetrical with every tile it touches, in any direction. When no further moves are possible, a player may, instead of adding a new tile, reposition one already in play so as to open up space for a new tile. A series of such transpositions may be necessary before a new tile can enter the board. Players need not play in order; whoever sees a new match first gets to make it. Players earn one bonus point for every match they form.

Goal: To play out all the tiles and get the most points.



OCHOMINOES™ *by Kadon*

OCHOMINOES *are lasercut and handcrafted by*
Kadon Enterprises, Inc. — Maryland, USA
www.gamepuzzles.com