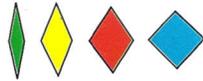
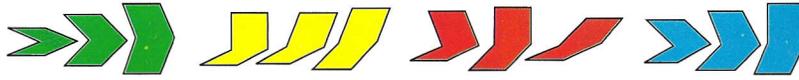


## Getting started

Each of the sixteen pieces in a ROMBIX set is called a *rombik*.  
Four of the rombik are called *keystones*. Each keystone is *rhomb*-shaped.



The other twelve rombiks are *twins*, made by combining keystone shapes in pairs in every possible way to form concave hexagons.



The rombiks belong to four *monochrome subsets* : green, yellow, red, blue.  
The blue subset is called *awkward*; each of the others is called *graceful*.  
The combined area of the rombiks in each subset is the same.

Some ROMBIX puzzles and games depend on color; others do not.  
Some of these puzzles and games are performed *inside* the tray; others are performed *outside* the tray.

## Circle Tilings

Any arrangement of all sixteen rombiks inside the tray is called a *Circle Tiling*.

There is one *Orderly Circle Tiling* called the *Cracked Egg*. When the Cracked Egg is oriented as shown here, the rombiks are *face up*; otherwise, they are *face down*.



CRACKED EGG

A *Chaotic Circle Tiling* is one in which the rombiks are arranged without regard to color. There are more than one thousand chaotic Circle Tilings. Try to find one.



CHAOTIC

A Circle Tiling with *Scattered Colors* is called a 'four-color map': no two rombiks of the same color share a common edge. There are only a few dozen of these Circle Tilings. Finding one is likely to take more than a few minutes.



SCATTERED

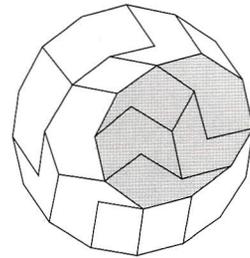
In a Circle Tiling with *Collected Colors*, the four rombiks of each color are segregated into a single connected region. There are only a few solutions. (Try to find one in which one monochrome subset is surrounded by the other three!)



COLLECTED

## Ovals

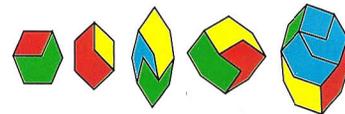
An Oval is a convex shape tiled by rombi, like the shaded 10-sided polygon shown here, that contains either 1, 3, 6, 10, 15, 21 or 28 rhombs. The length of each side of an Oval is equal to the length of an edge of a rombik. Counting keystones as Ovals, there are altogether twenty-eight different Ovals. Twenty-five of these Ovals, like this 10-rhomb example, can be embedded in a Circle Tiling. (Which three cannot?)



### Oval Tiling Challenges

1. Make a monochrome 6-rhomb Oval from the three twins of any graceful subset. (There is one solution for each of the three graceful subsets. Two of these solutions can be embedded in a Circle Tiling, just like the shaded 10-rhomb Oval shown above.)
2. Make a 10-rhomb Oval from the three twins of a single monochrome subset and the four keystones. (There is a solution for two of the monochrome subsets.)
3. Divide the twelve twin rombi among four 6-rhomb Ovals, each tiled by three twins—*no two of the same color*. (There is one solution.)
4. Divide the twelve twin rombi among four 6-rhomb Ovals, each tiled by three twins—*two of one color and one of a second color*. (There is one solution.)
5. Divide the sixteen rombi among 3, 4, 5, 6, 7, or 8 Ovals.

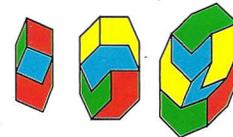
Here are the sixteen rombi divided among 5 Ovals:



(It is impossible to divide the sixteen rombi between *two* Ovals. Why?)

6. A *Stretched Oval* is a convex shape tiled by rombi that has one or more pairs of opposite sides that are at least *twice* as long as the edge of a rombik.

Here are the sixteen rombi divided among three Stretched Ovals:



Divide the sixteen rombi among *two* Stretched Ovals of the same shape. (There are two solutions.)

7. Remove one keystone from the set of sixteen rombi, thereby making a reduced set. Find a Stretched Oval that can be tiled by the reduced set. (There is one such Stretched Oval for each of the four reduced sets.)

## LOOSE ENDS

In this two-person game of strategy, each player has a complete set of sixteen rombiks. The players take turns. At each turn, a player places one rombik inside the tray, in a position that is compatible with a completed Circle Tiling. Whoever places the last rombik wins.

LOOSE ENDS is a short game, requiring only a few minutes of play. In successive games, the players take turns going first, in order to eliminate any possible advantage to the second player.

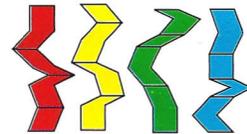
Try to place some of your rombiks in positions that create *holes* bordered either by rombiks or by both rombiks and one or more edges of the tray. If a hole accommodates one or more of your remaining rombiks but none of your adversary's, it is called a *haven*. An effective strategy is to block your adversary's efforts to create his own havens while you're making one or more havens for yourself.

### Ladders

A *Ladder* is a connected strip of rombiks that contains a total of seven rhombs: one square and two of each of the other three rhombic shapes. Each of the three non-square rhombs occurs *twice* — once leaning to the left and once to the right.

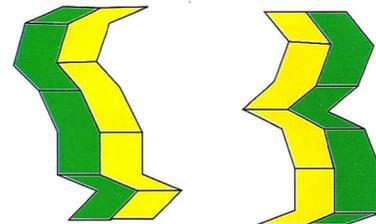


A *monochrome ladder* is composed of all the rombiks of one subset. The awkward subset forms forty-eight different ladders; the graceful subset forms ninety-six.



### Ladder matching

Any two graceful subsets can form exactly two different pairs of *matched ladders*, like the yellow-green pairs at the right. Both keystones lean to the same side in one pair; they lean to opposite sides in the other. Try to find the two matched ladder pairs for yellow-red and green-red pairings. (Hint: in any ladder of a matched pair, all of the rombiks are either *face up* or *face down*.)



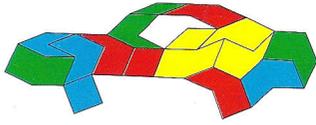
The two yellow-green matched pairs of ladders

The awkward subset can form only one pair of matched ladders with each graceful subset. Find these three matched pairs.

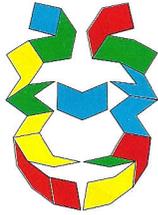
### Special ladders in a Circle Tiling

- Place a *symmetrical monochrome ladder* inside the tray, and then complete a Circle Tiling with the remaining rombiks.
- Place a *pied ladder* (using four differently colored rombiks) inside the tray, and then complete a Circle Tiling with the remaining rombiks.

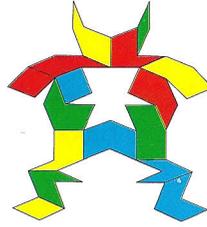
# SILHOUETTES



CAR



THEATER MASK



SUPER CAT



MAHARAJAH

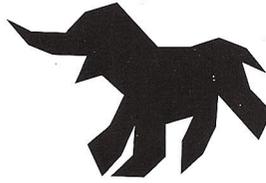
Complete the unfinished "SILHOUETTES" below



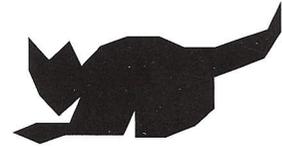
DUCK



DRAGON LIZARD



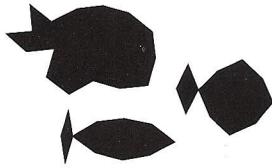
BABY ELEPHANT



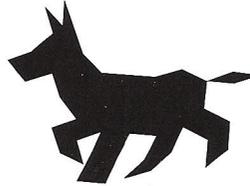
CAT



HEN



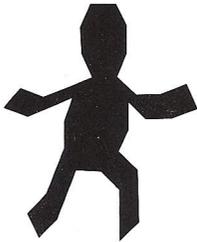
FISH



DOG



SNAKE



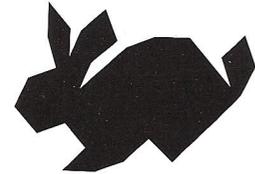
TURTLEMAN



ROOSTER



TREE



RABBIT