

Spot it! *Solitaire*

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MOVES Conference
Baruch 14-266 3:30pm -3:50pm



The Original Game:

On the next slide, I will show two *Spot it!* cards.

Try to be the first one
to yell out the common symbol.













OK





Audience Question

If there are 55 different cards, and each pair of cards contains exactly one pair of symbols in common, and there are 8 symbols per card, how many kinds of symbols are there?

- A. 55 symbols
- B. $55 * 8 / 2 = 220$ symbols
- C. $55 * 8 = 440$ symbols
- D. None of the above /Insufficient information

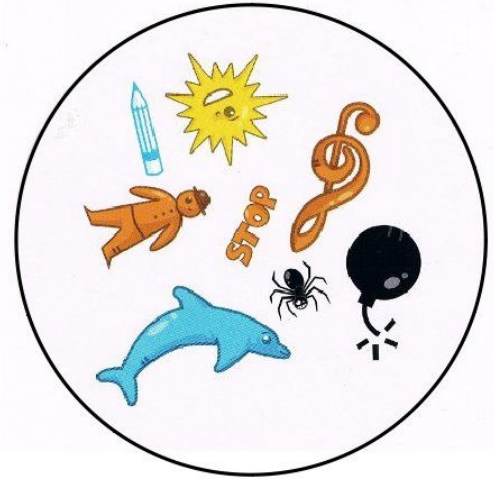
Gathering Clues:

Let's presume you don't know how to answer this.

If you had the deck in your hands, you would flick through and find 8 cards containing a spider as one of the symbols.

NOW you can answer the question!

Why???



Leadup Questions:

1. What is the minimum number of symbols?
(Count them! You see them!)
2. Since there are no other spider cards,
what must be true about all other
cards in the deck?
3. What is the maximum number of symbols?



How many cards *could* there be?

We have 55 currently, as given by the manufacturer, presuming they didn't lie to us.

Could we have more?

How did they arrange the symbols to make this work out?

Questions about Spot-it!

1. How many cards could there be?

Questions about Spot-it!

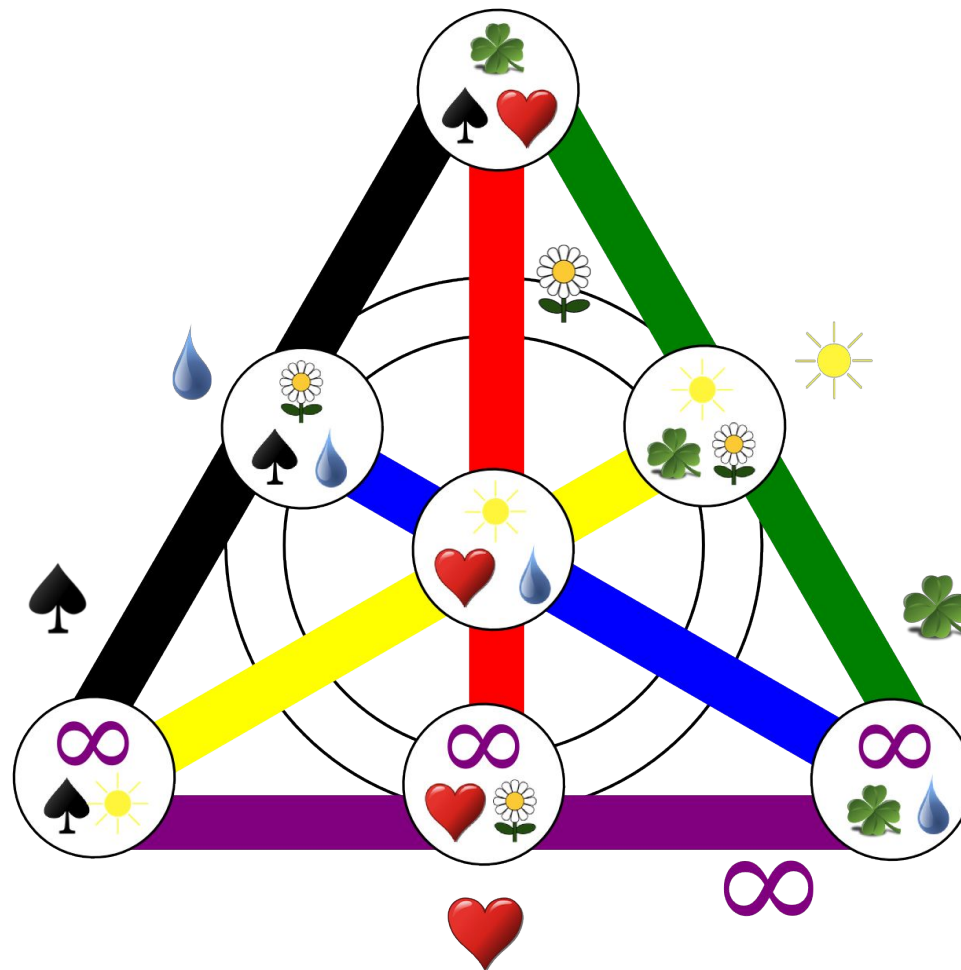
1. How many cards could there be?
2. How can we find any missing ones?

Questions about Spot-it!

1. How many cards could there be?
2. How can we find any missing ones?
3. How can we arrange the cards
in a meaningful pattern?



Maxime Bourrigan, *Dobble et la geometrie finie*.
Images de Mathematiques, CNRS 2011



Internet says....

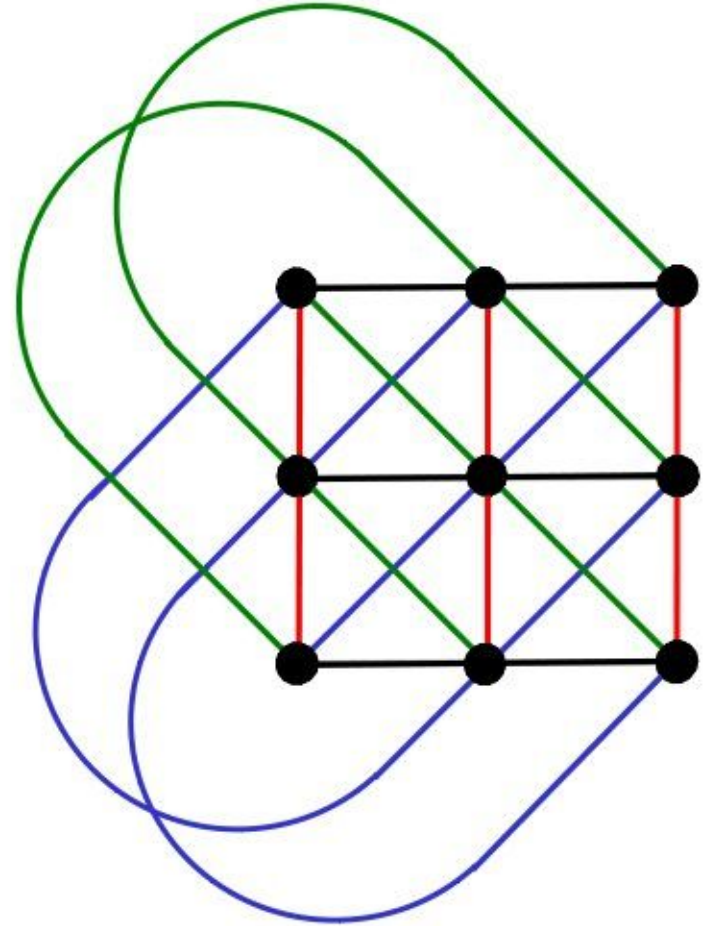
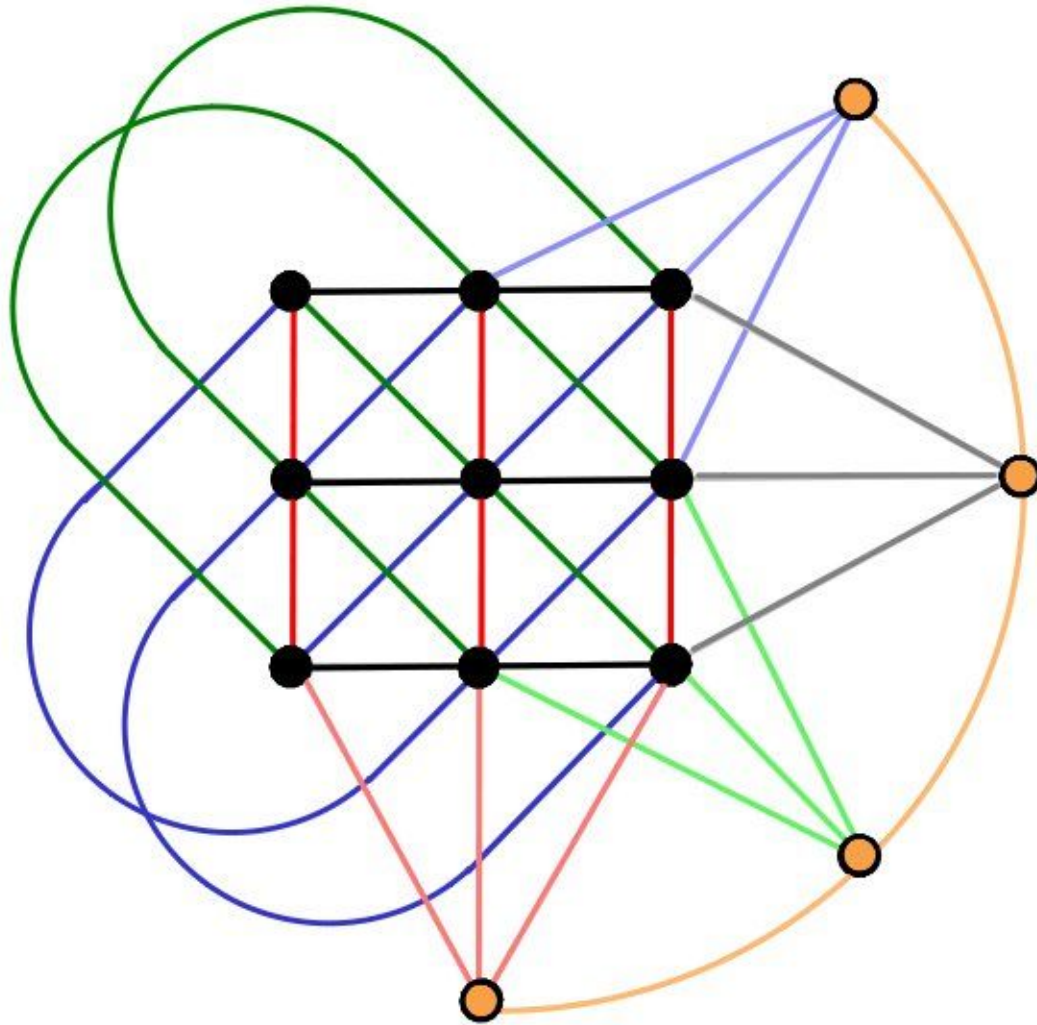
Spot-it!
is related to

the order 7 projective plane!

Some clues:

1. The order 7 projective plane has 57 elements.
2. All points/lines in a finite projective plane are isomorphic.
3. If you remove one single line from a finite projective plane, you get an affine plane.
4. Affine planes can be built from their own axioms instead, then extended if desired.

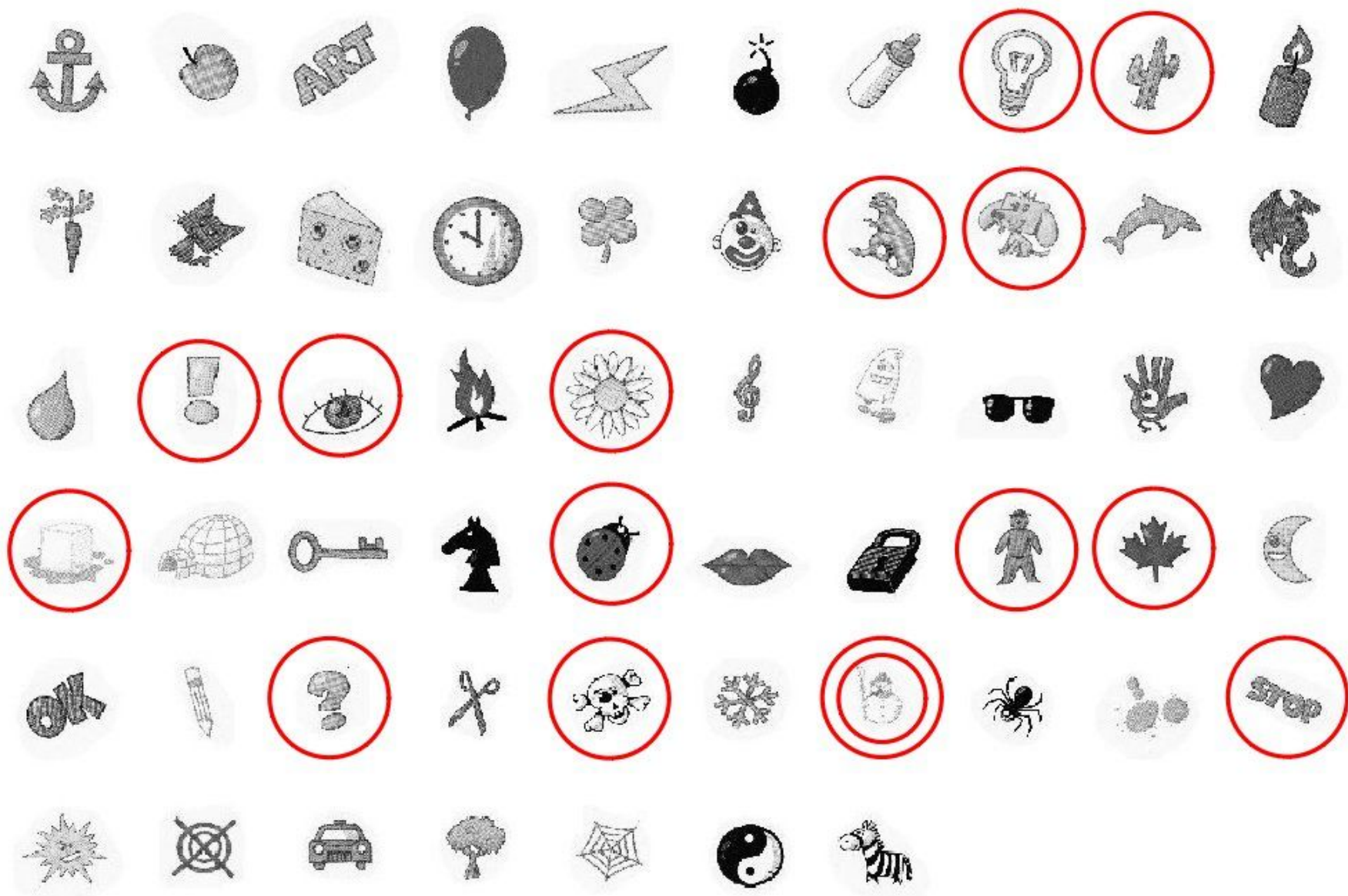
Projective Plane to Affine Plane

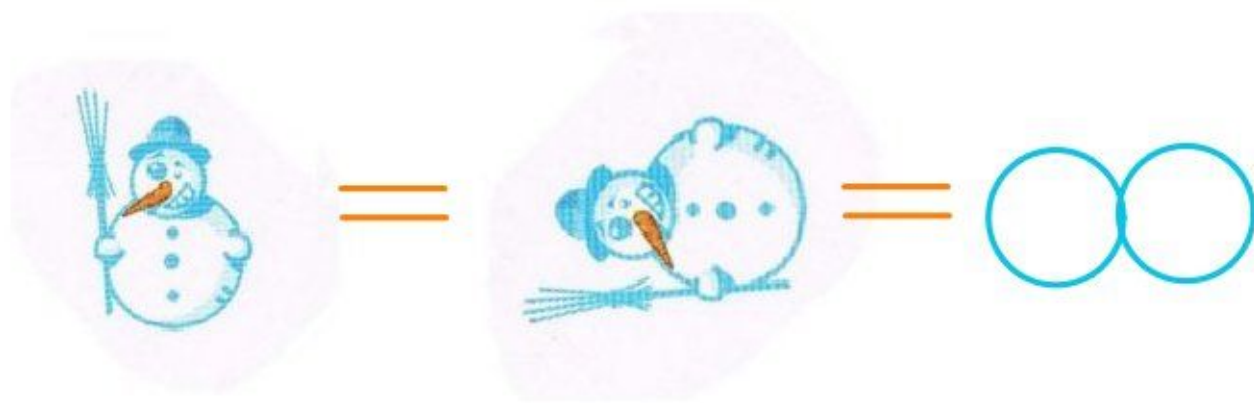


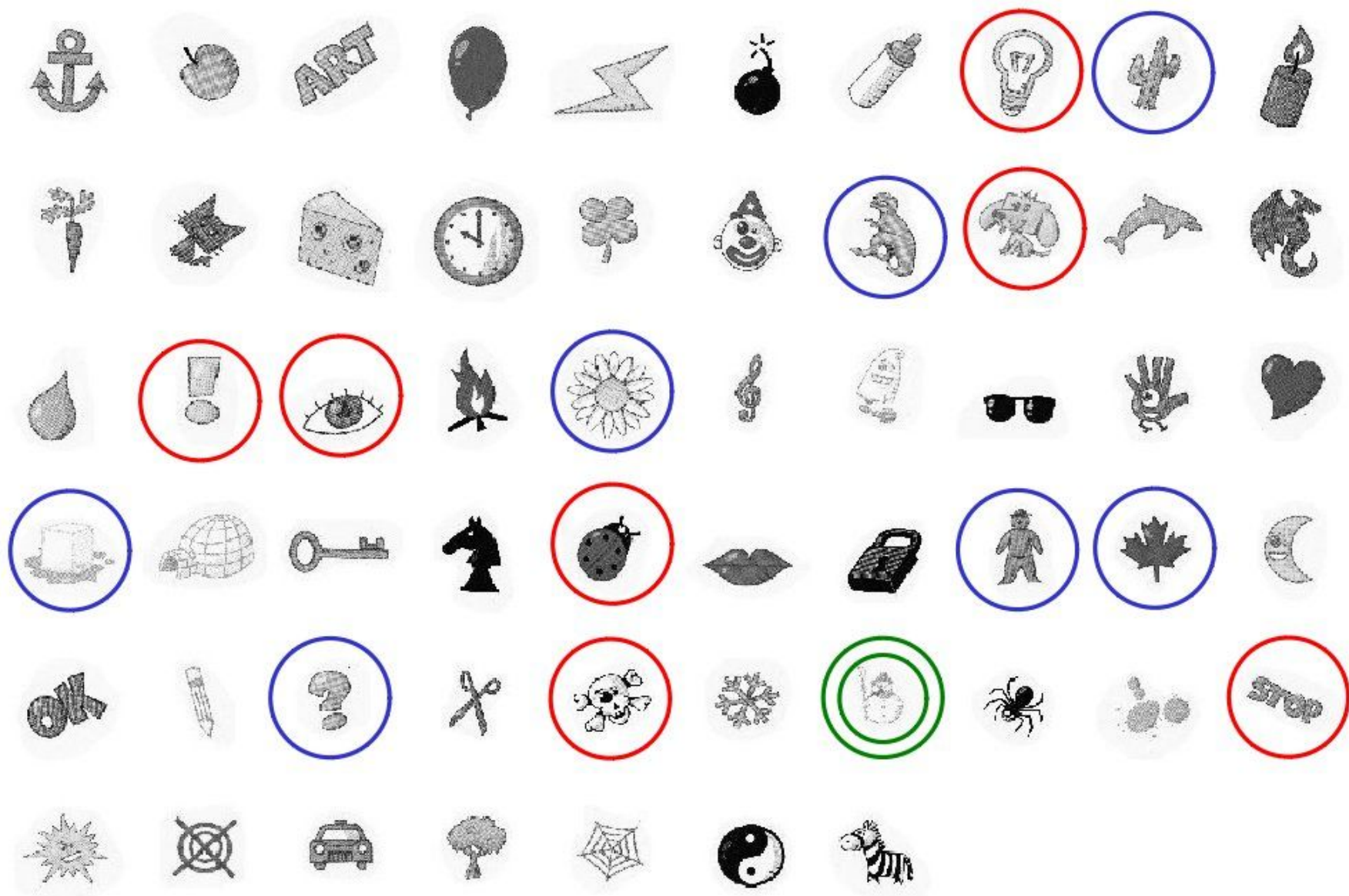
Order 7 Finite Projective Plane!



How did I find the missing cards?







Please Read My Upcoming Paper....



Cambridge
Undergraduate
Mathematics Journal.

- Since 1939, not quite every year....
- Paul Erdos, Martin Gardner, John Conway, Hardy, Penrose... and soon... ME!



So, how do you line them all up?

Steps to Solve...





8
ice
cube
cards



7 more
glasses



7 more
knights



7 more
apples



7 more
lips



7 more
suns



7 more
spots



7 more
eyes

**Horizontal
Family
Card ---->**

**Vertical
Family --->
Card**

**(Other 6
icecube
cards under
vertical
family
card)**



By ROW:

glasses

knights

apples

lips

suns

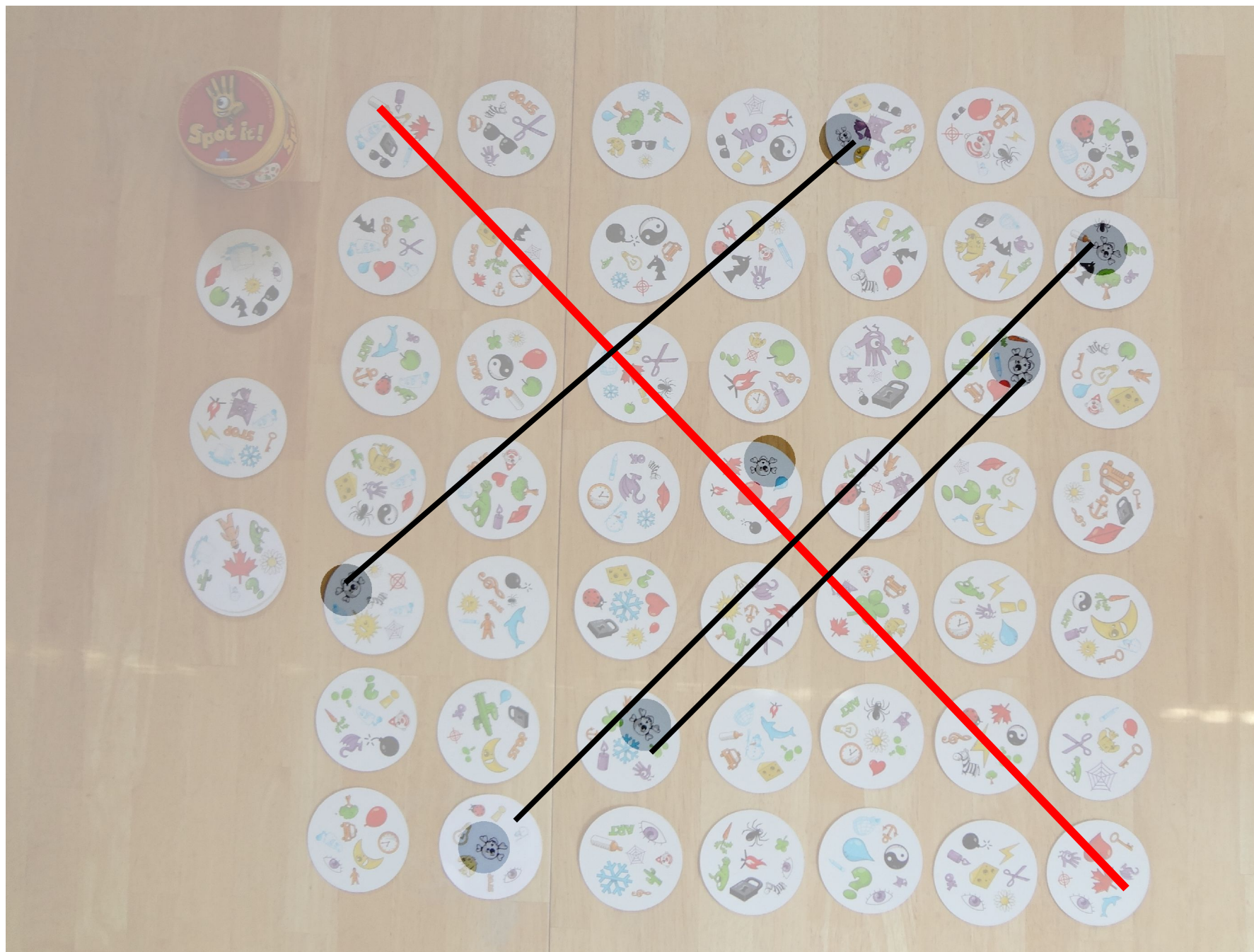
splots

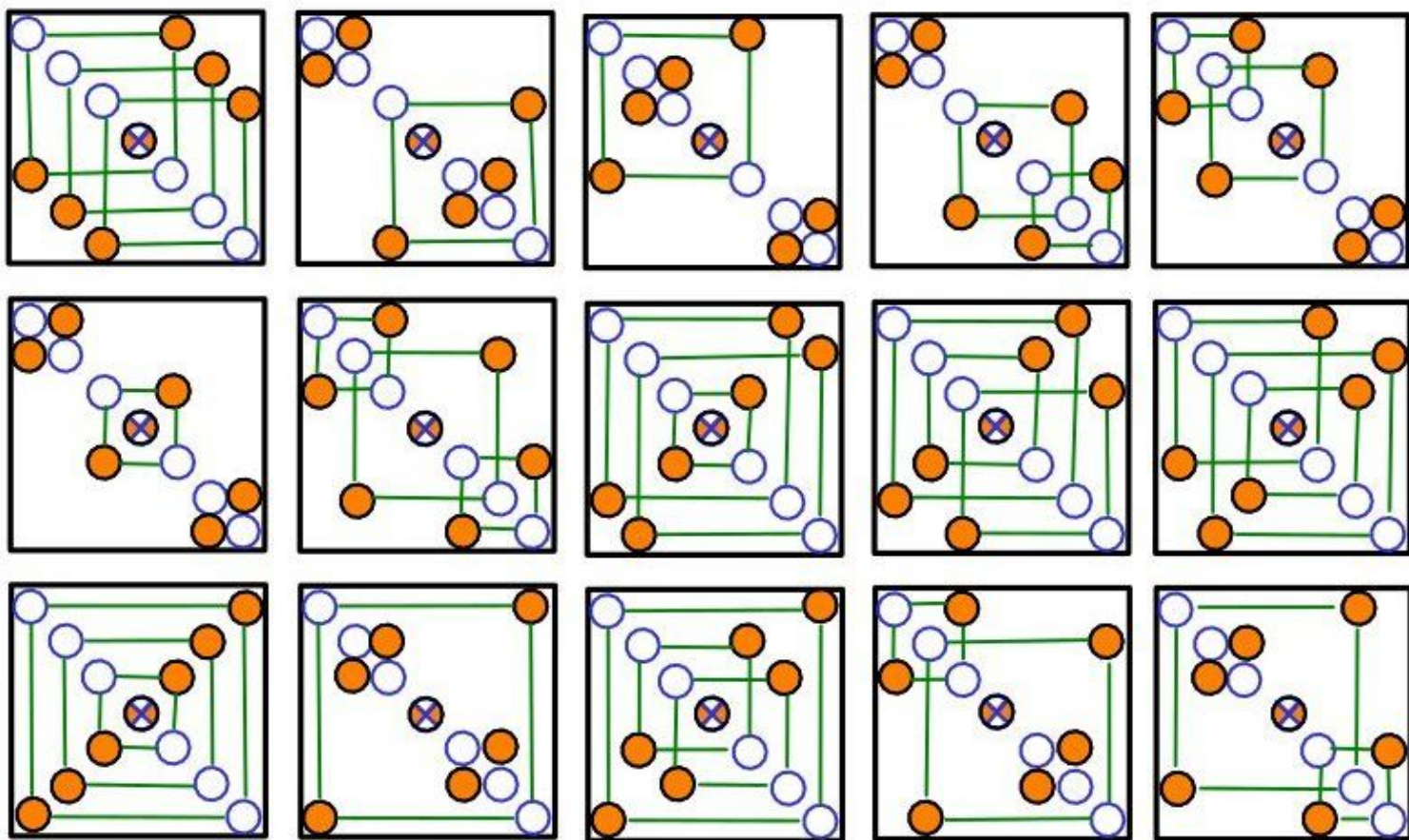
eyes

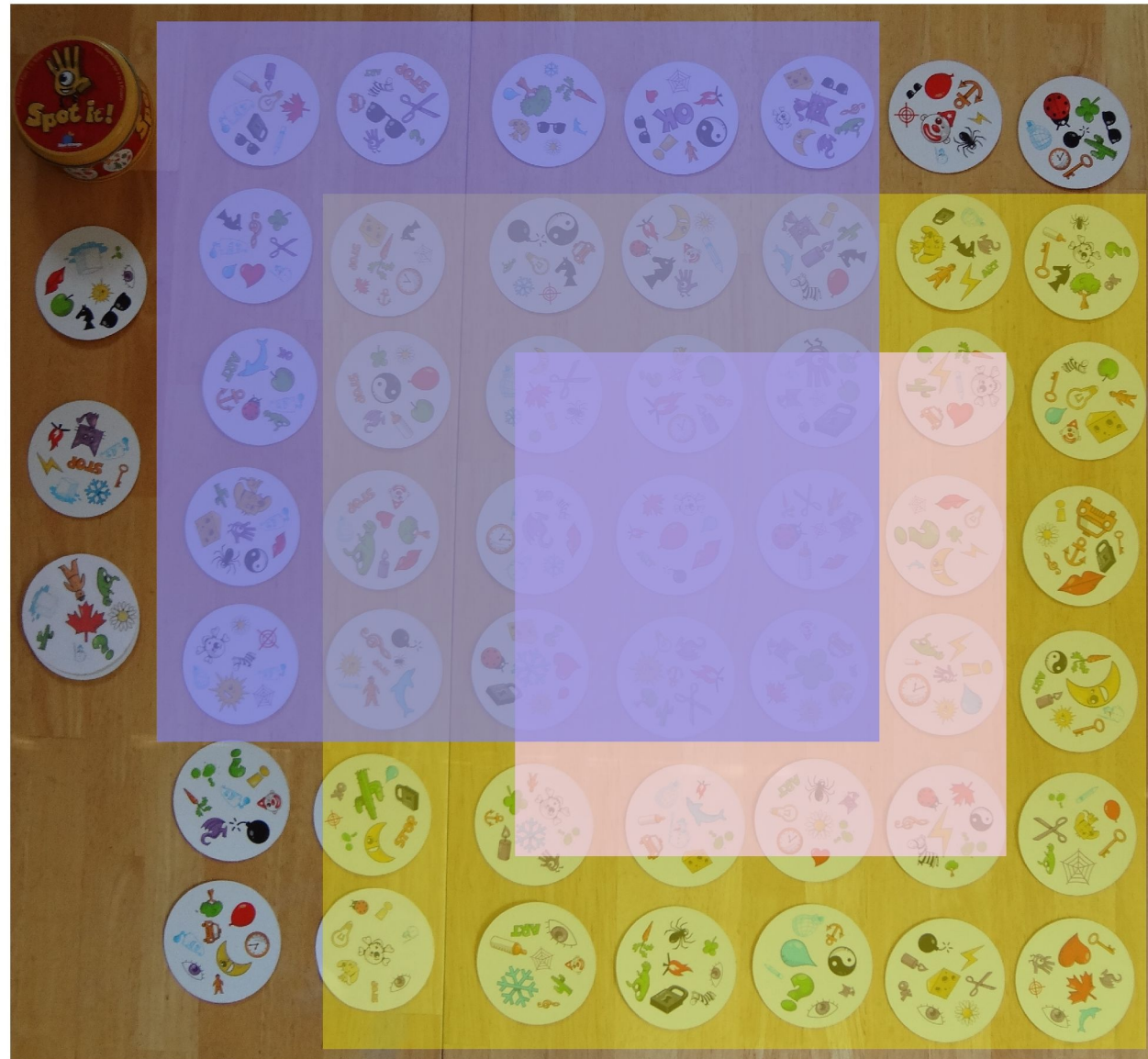
By COLUMN: Lightning Fire Cat Ghost Key Snowflake 'STOP'











**Swap
Top
Two
Rows**

**Swap Two Leftmost
Columns**

A 10x10 grid of 100 circular cards, each containing a different colorful illustration of various objects and symbols. The grid is divided into four quadrants by a central 2x2 area of lighter-colored cards. The top-left and bottom-right quadrants are yellow, the top-right and bottom-left quadrants are light blue, and the central 2x2 area is light green. The illustrations include a wide variety of items such as fruits, vegetables, animals, tools, and abstract shapes, all rendered in a simple, cartoonish style. The cards are arranged in a regular pattern, with the central 2x2 area being a lighter shade of green than the surrounding quadrants.



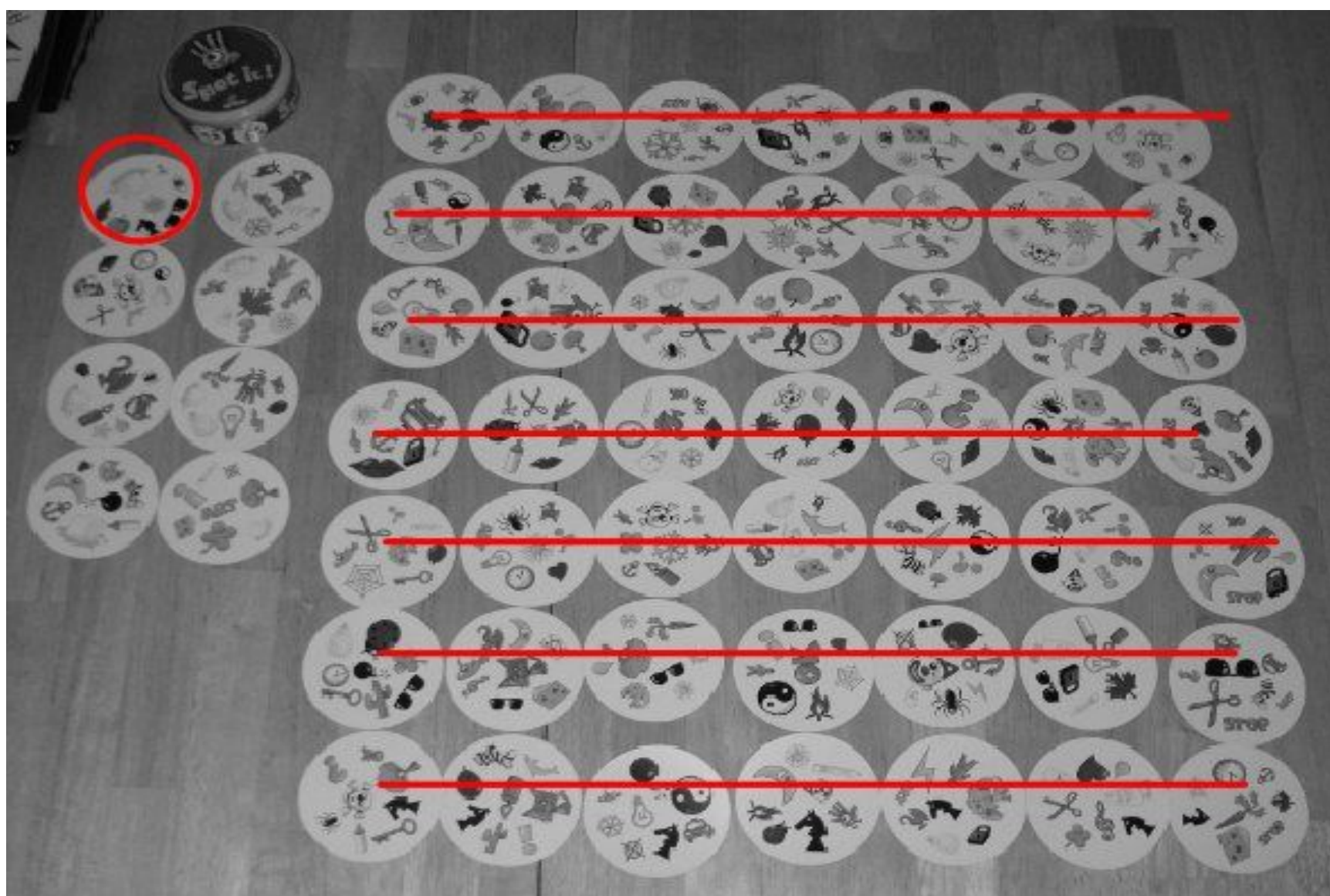


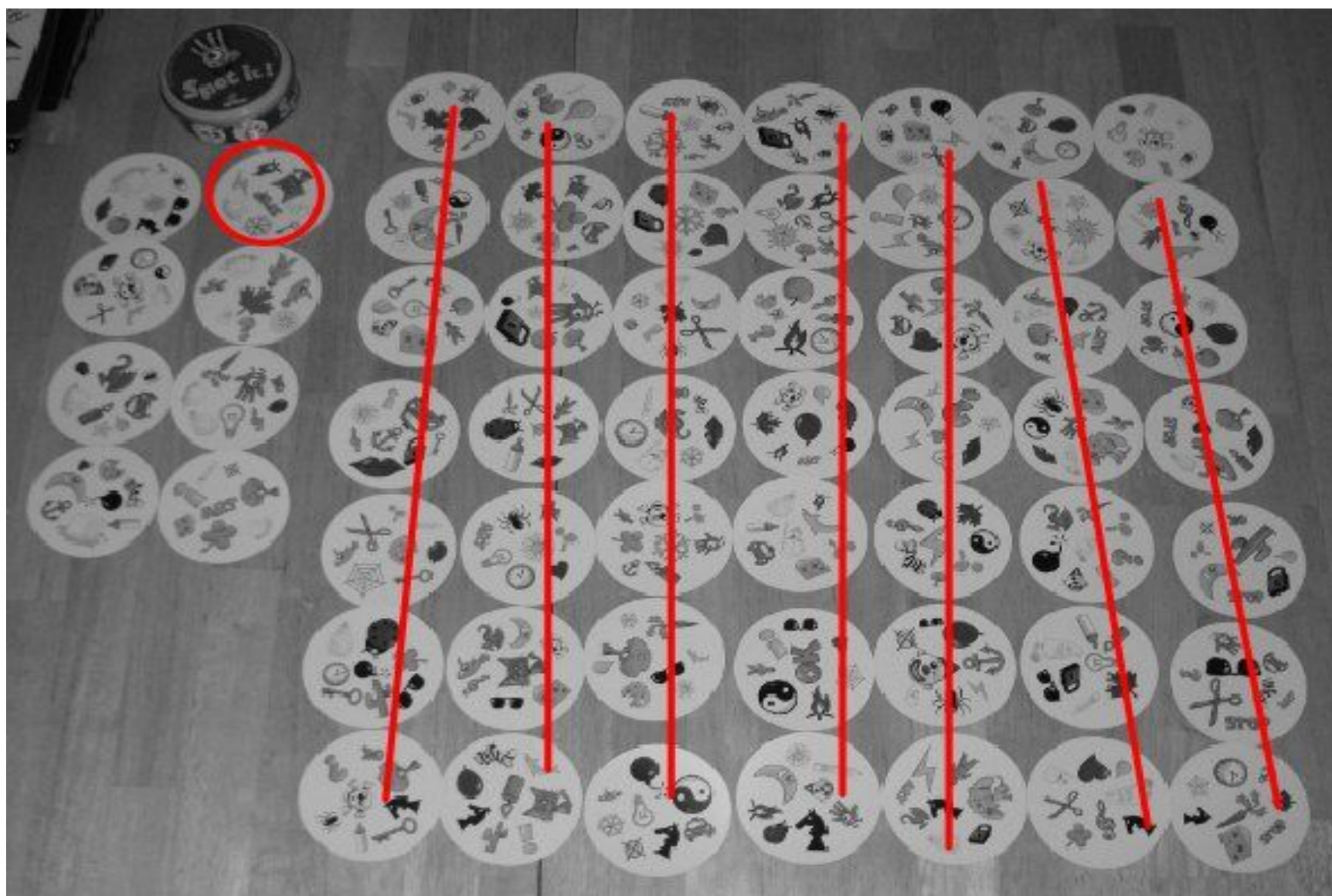


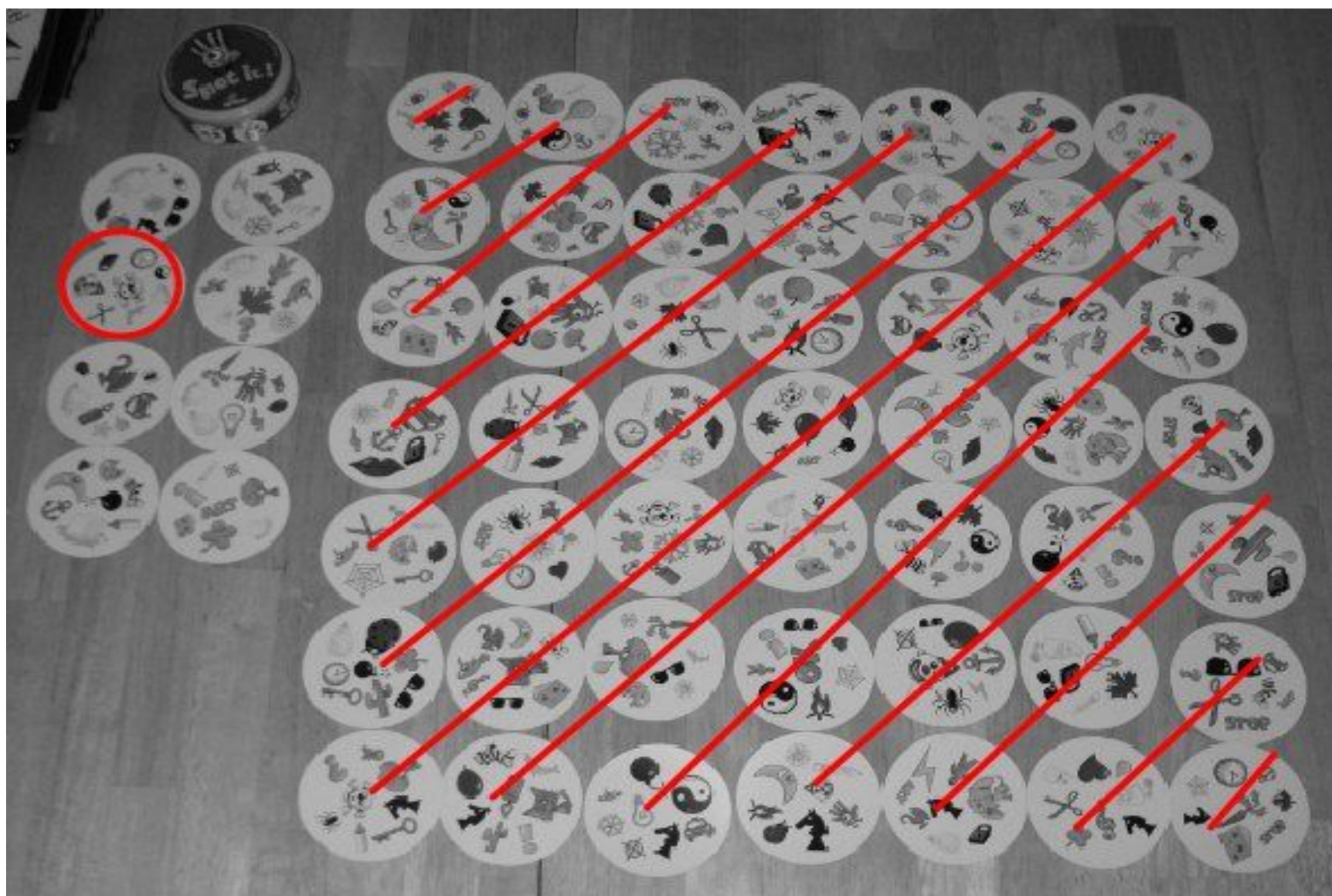
Swap Rows 1 and 7 & Swap Columns 1 and 7.

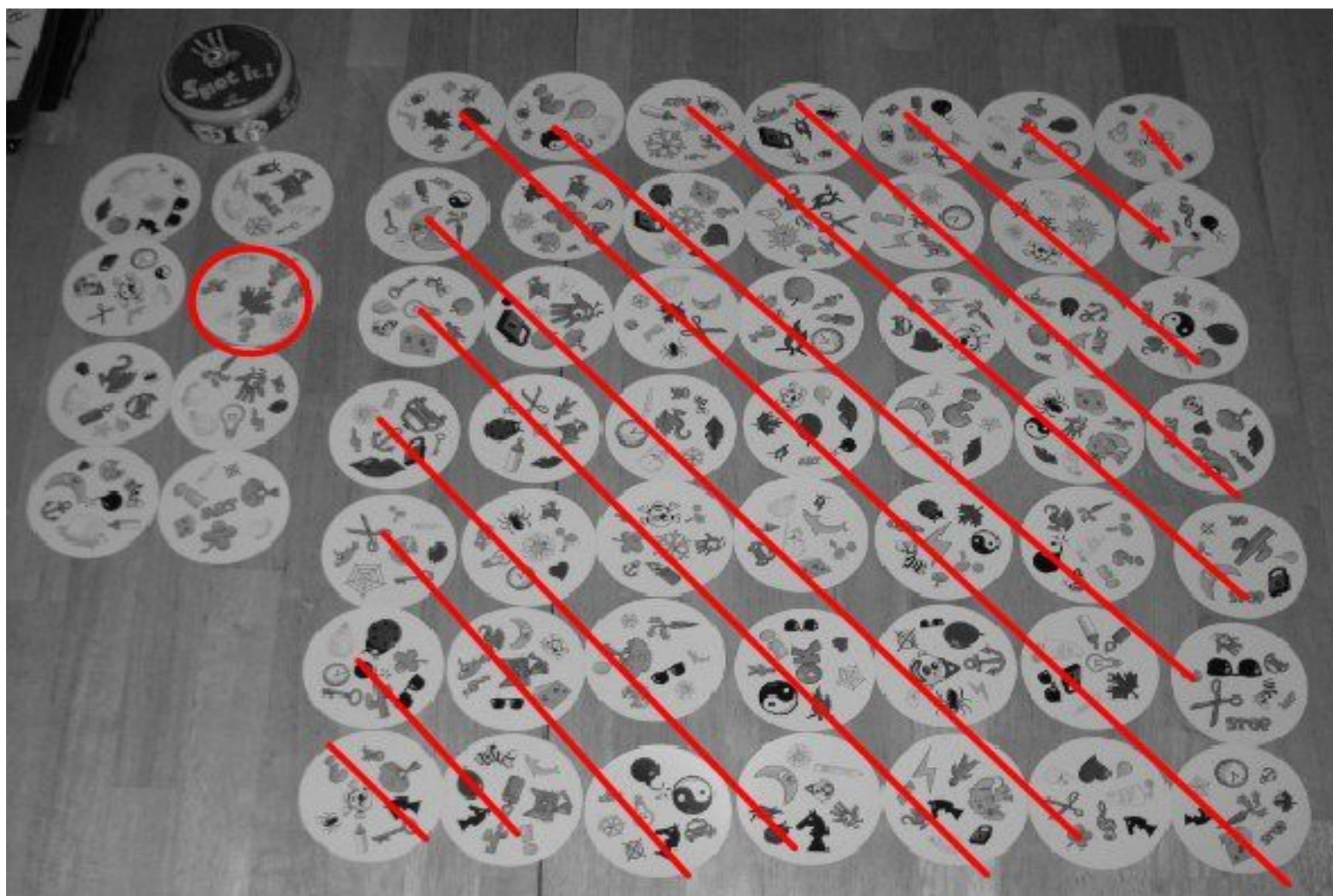
SUCCESS!!!

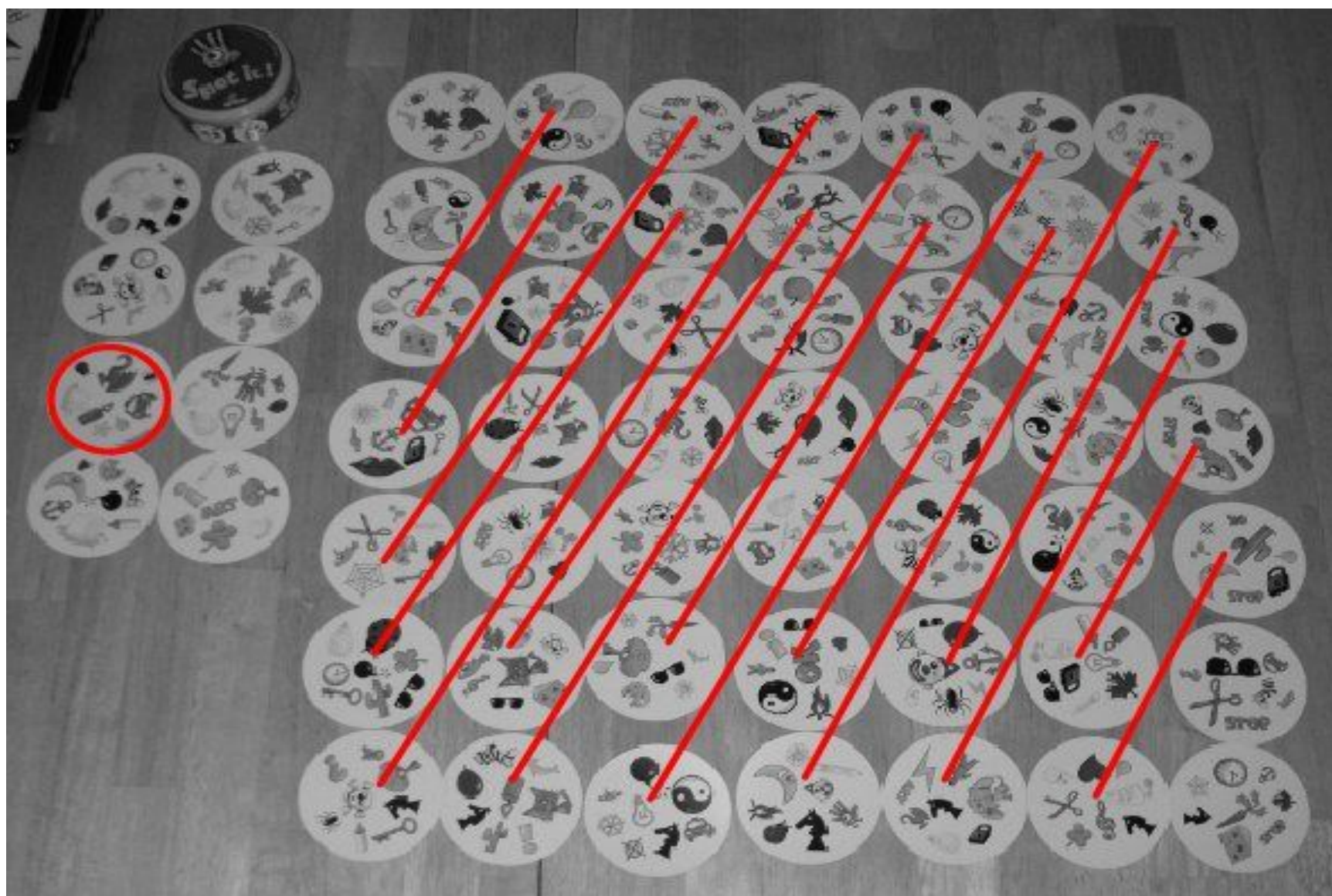


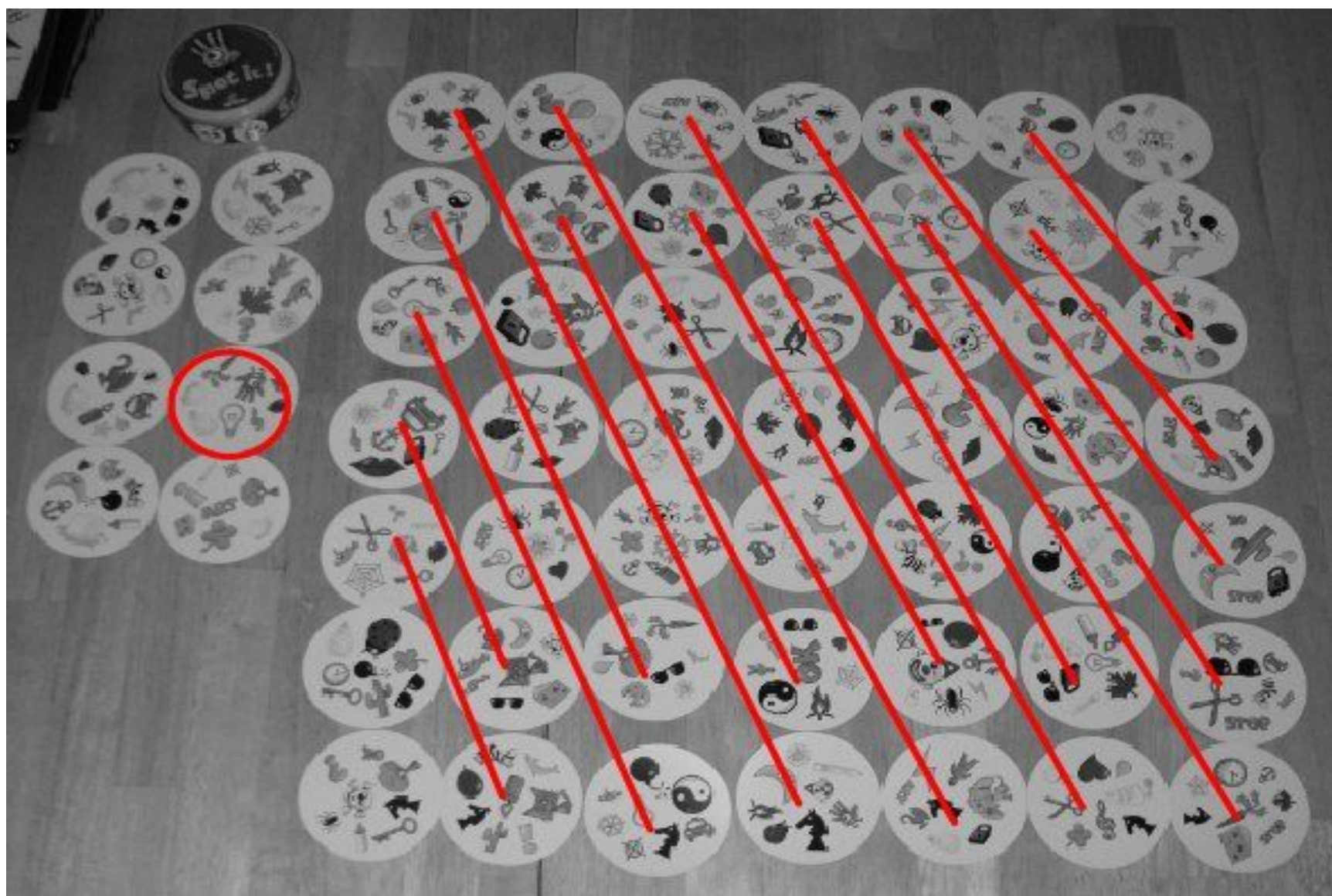


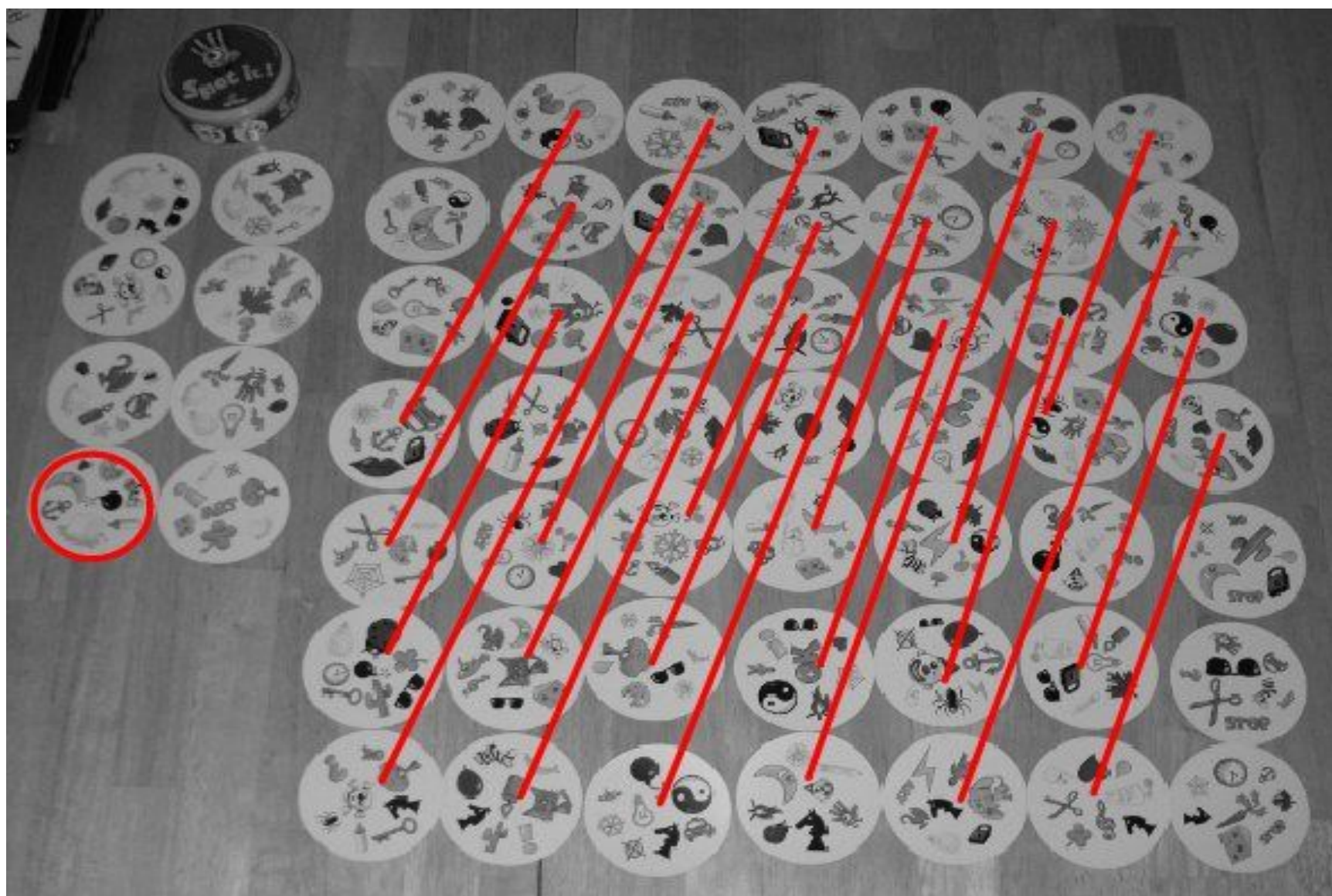


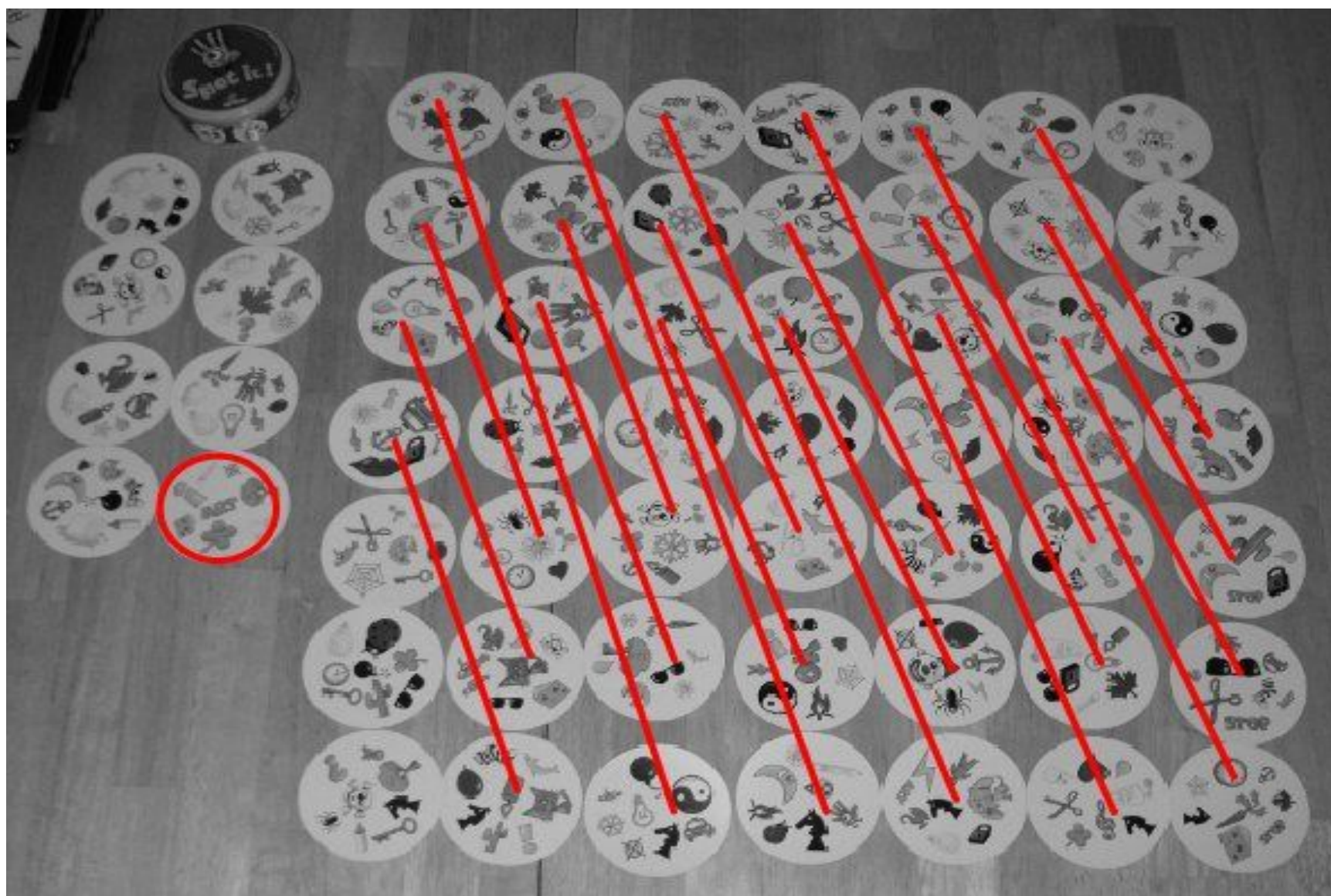














Buy-it!

<http://www.donnadietz.com>

Finite Projective Fun - Mozilla Firefox

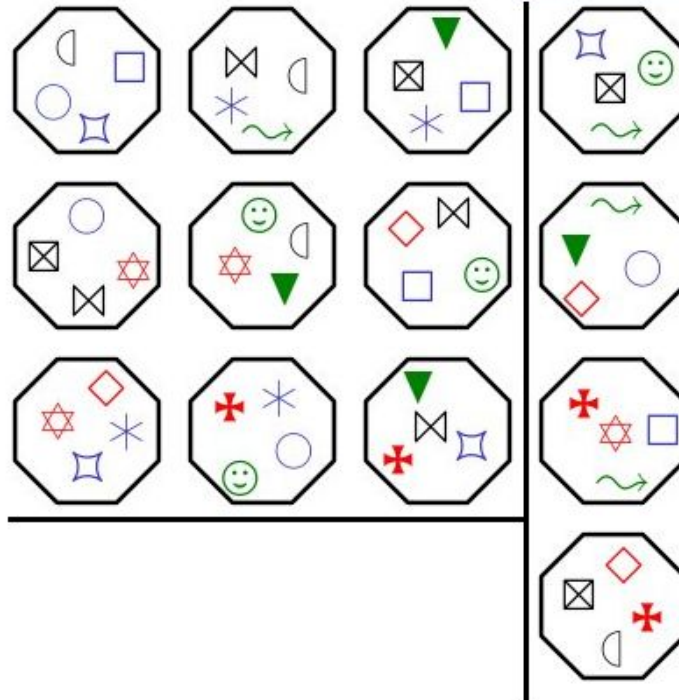
Finite Projective Fun

www.donnadietz.com/projective3.html

Most Visited

Printers - CUPS 1.5.3

New Game



Your goal is to arrange the tiles into a pattern which demonstrates the fundamental properties of a finite projective geometry! (Click and drag a tile on top of an existing tile, and those two tiles will swap.) First, pull aside four tiles which have a symbol in common and place them in the rightmost column. Then, arrange the remaining 9 into a square so that each row, each column, and each diagonal has a common symbol. You are on a torus. (That is, a "pac-man" board.) So, there are more diagonals than you can see immediately. Have fun!

THANKS!