

Playing with emergence:

constructionist examples from tiling, painting and simple machines



James Clayson
Professor Emeritus
Mathematics and Computer Science
The American University of Paris

James@clayson.org

Organizer, Constructionism 2010
Paris 16-20 August

Who am I?

Official me and then the real me



THE AMERICAN
UNIVERSITY
OF PARIS

knowledge, perspective, understanding

A small, private, US-style university located in Paris.

1000 students in a liberal arts-oriented college
(3-4 years)

200 students in masters-level graduate
programmes (1-2 Years)

100 different countries represented, multiple
passports, multiple languages and cultures

Liberal arts undergraduate college

- Humanities, social and natural sciences, languages, music, art, theatre and dance

Linked liberal arts

- Explores the contrasts, similarities and complementarities of the methods and styles of seemingly disparate disciplines: e.g. art history and painting
- *Explicitly includes the learner as an object of study*

First Bridge programme

- Courses designed to encourage students to build models of ideas and interactions.
- Visual Thinking links computational environments with introductory drawing

Bricoleur - flaneur

[The] 'bricoleur' ... derives his poetry from the fact that he does not confine himself to accomplishment and execution: he 'speaks' not only *with* things ... but also through the medium of things

Claude Lévi-Strauss

[The] flâneur ... a person who walks the city in order to experience it

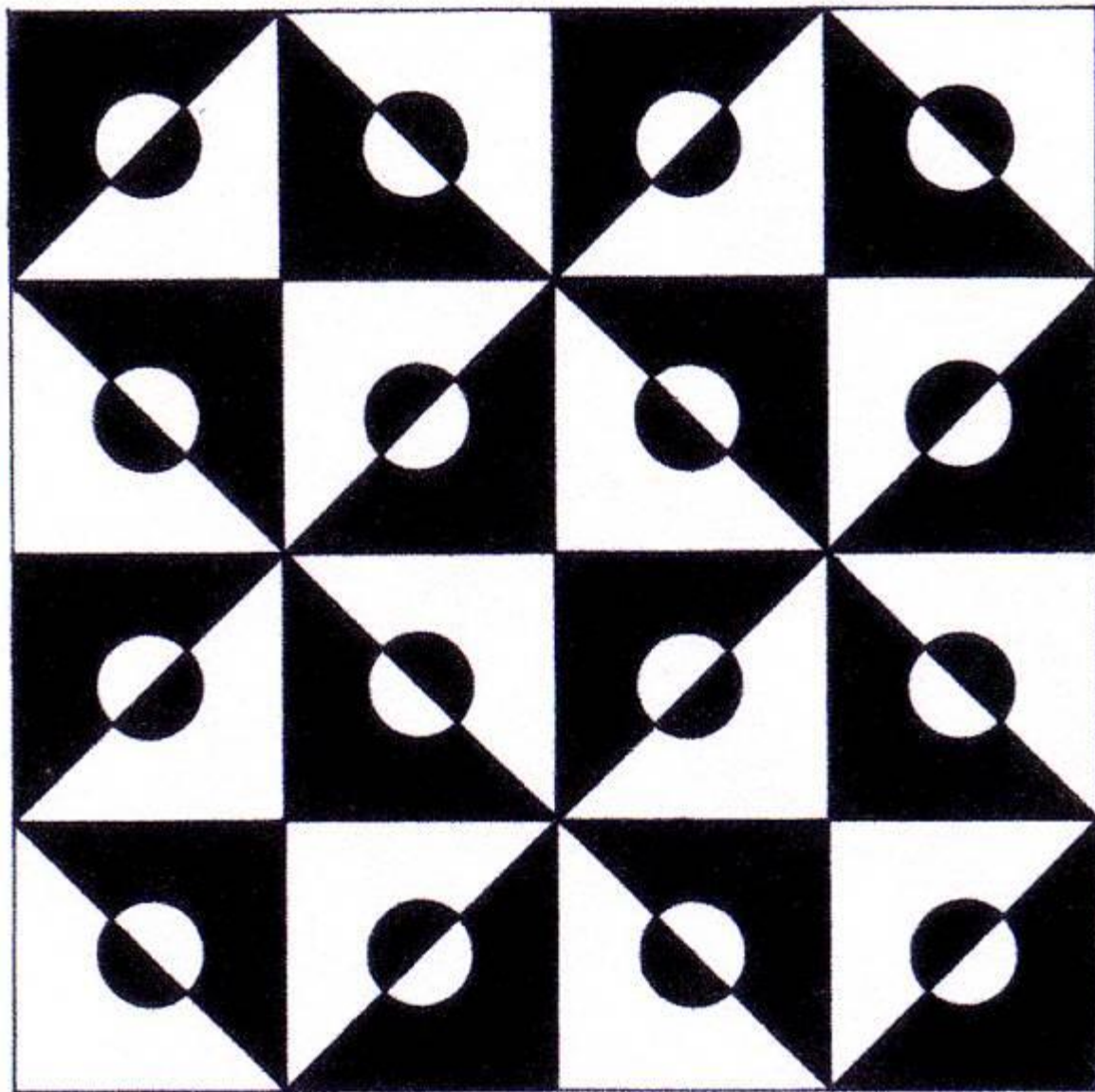
Charles Baudelaire

“To know what I mean ... I must see what I say”

EM Forster

Three student modelling examples of seemingly simple objects/things/images that led to:

- emergent surprise
- emergent sense-making
- emergent pleasure



Tile Exercise

Specificity

- Begin by **look**ing carefully at a *specific* tile design.

Deconstruction

- **Sketch** this design by noting its *most basic component elements* and the *shape of the replication* of those basic elements in tile space. Talk about it.

Reconstruction

- **Reconstruct** our view of the original tile design and *compare* the two.

Generalization

- **Generalize** our models to draw and place the components in order to generate a suite of images that *explore and extend* the themes we see in the original tile pattern.

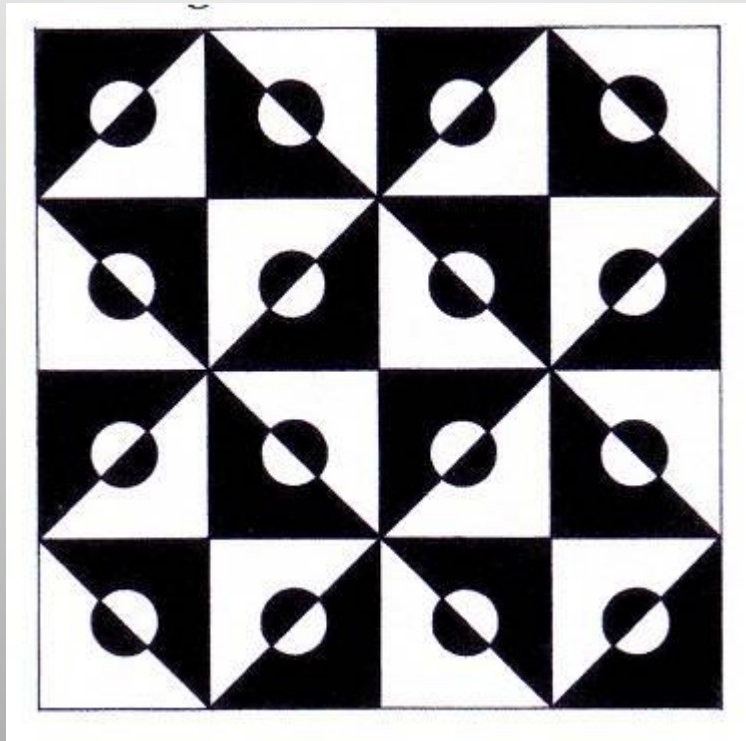
Emergence

- Introduce features in to the design elements to *encourage* the *emergence* secondary patterns in the final composite design. **Add weirdness.**

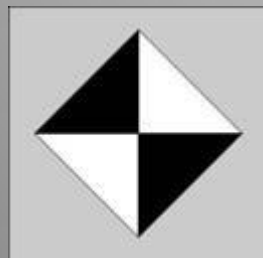
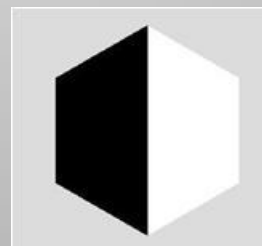
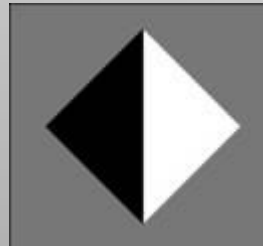
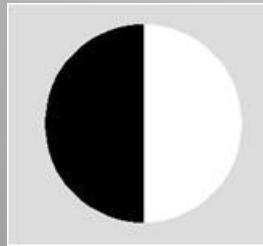
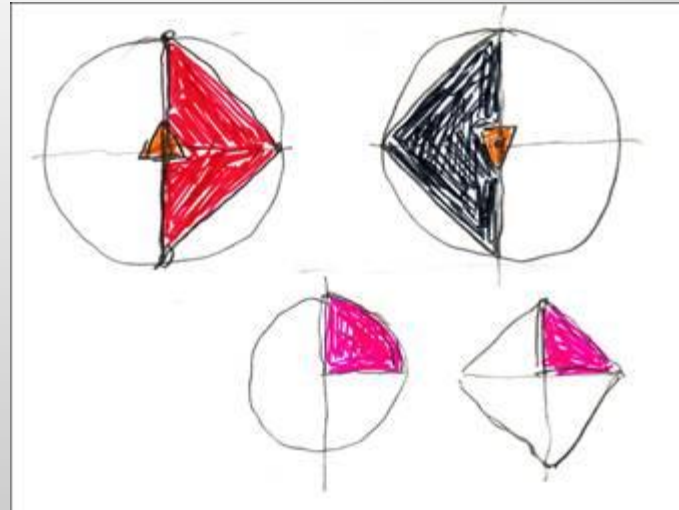
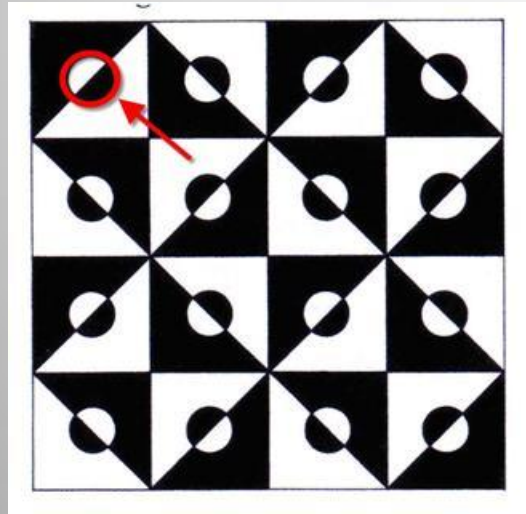
Language

- **Talk tile** (Lévi-Strauss sense) .

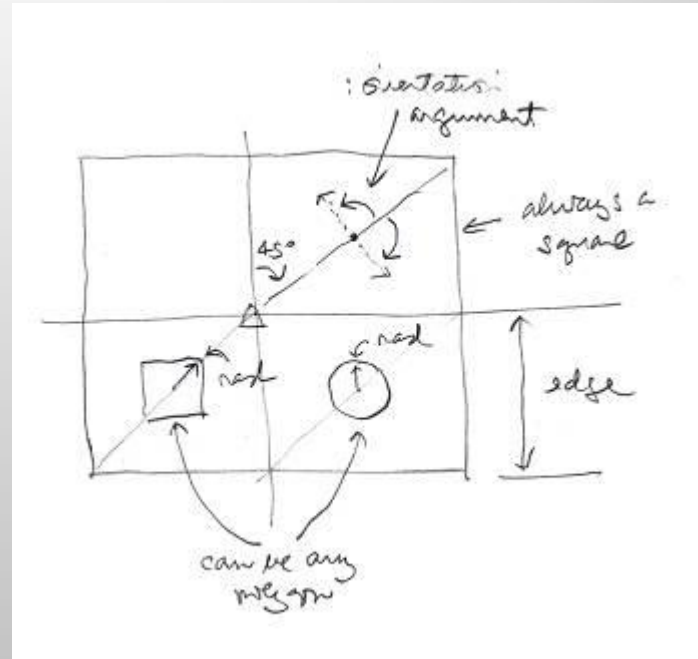
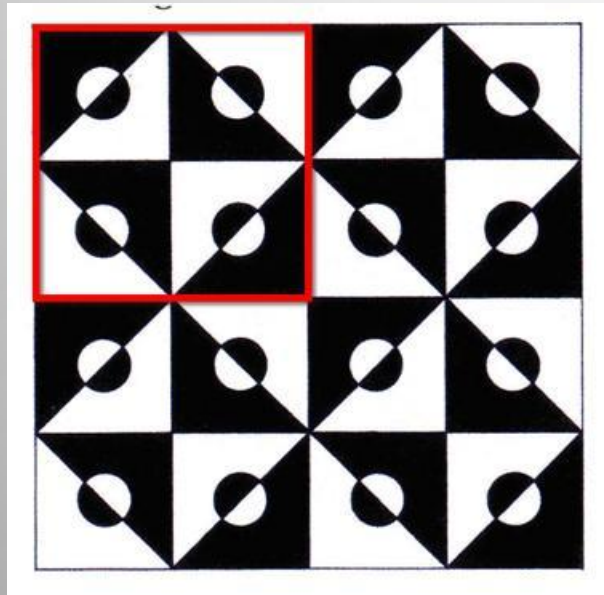
Specificity



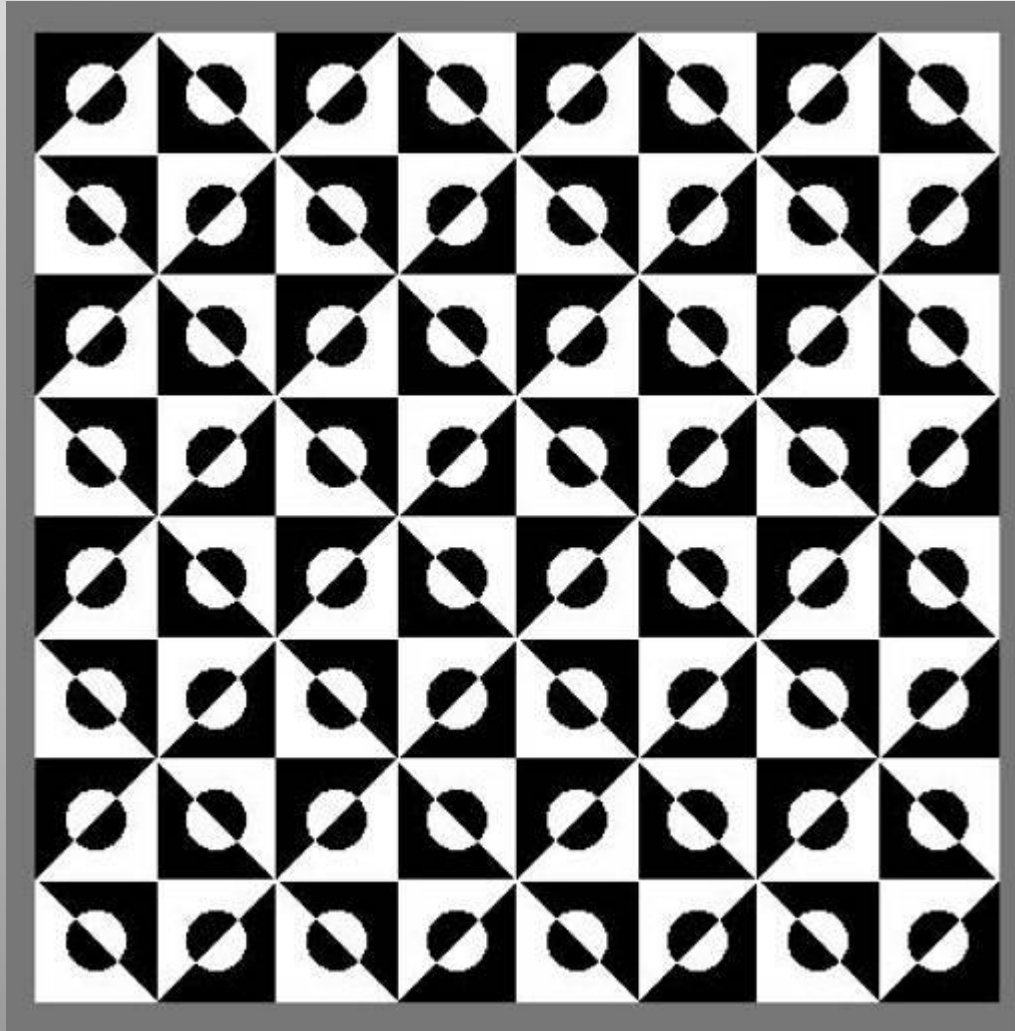
Deconstruction - seed



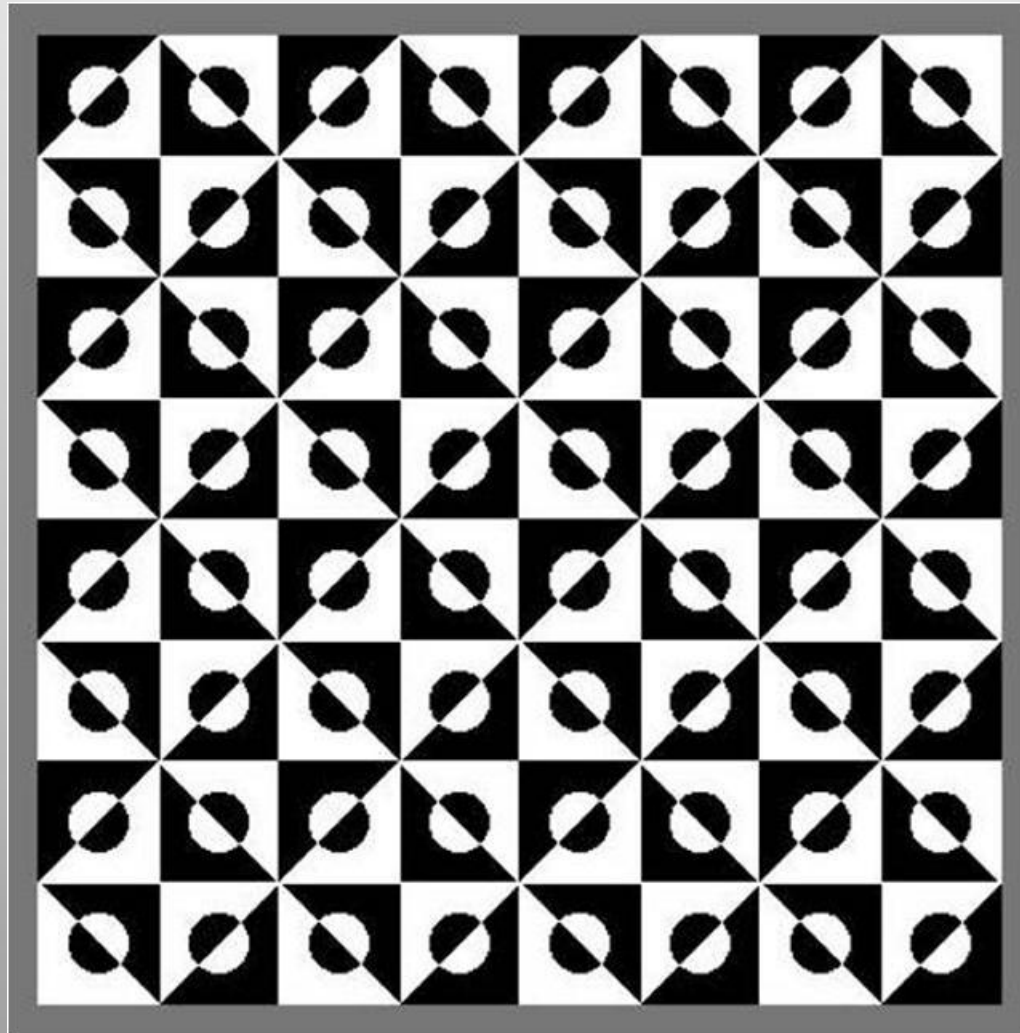
Deconstruction - placement



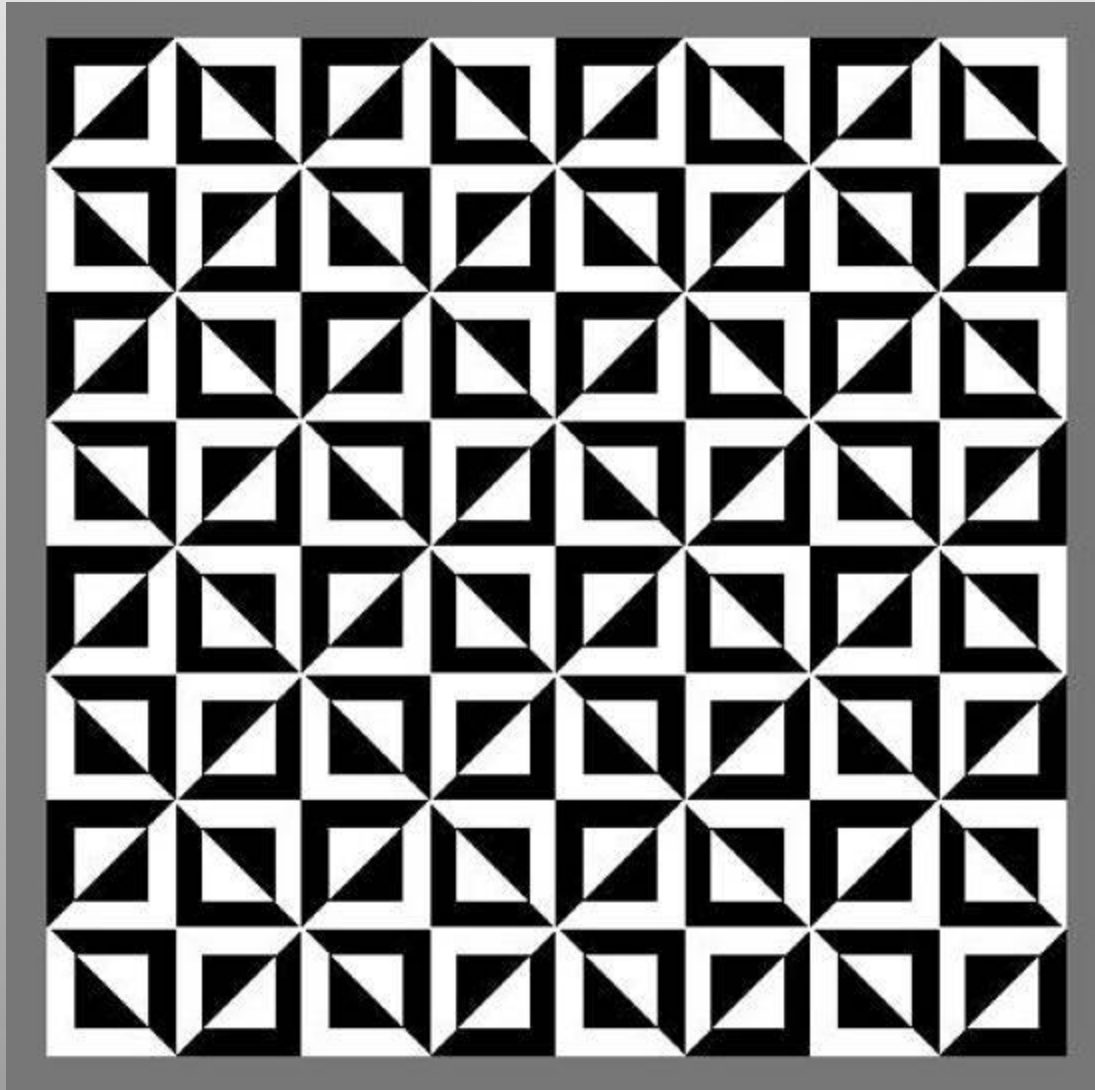
Reconstruction



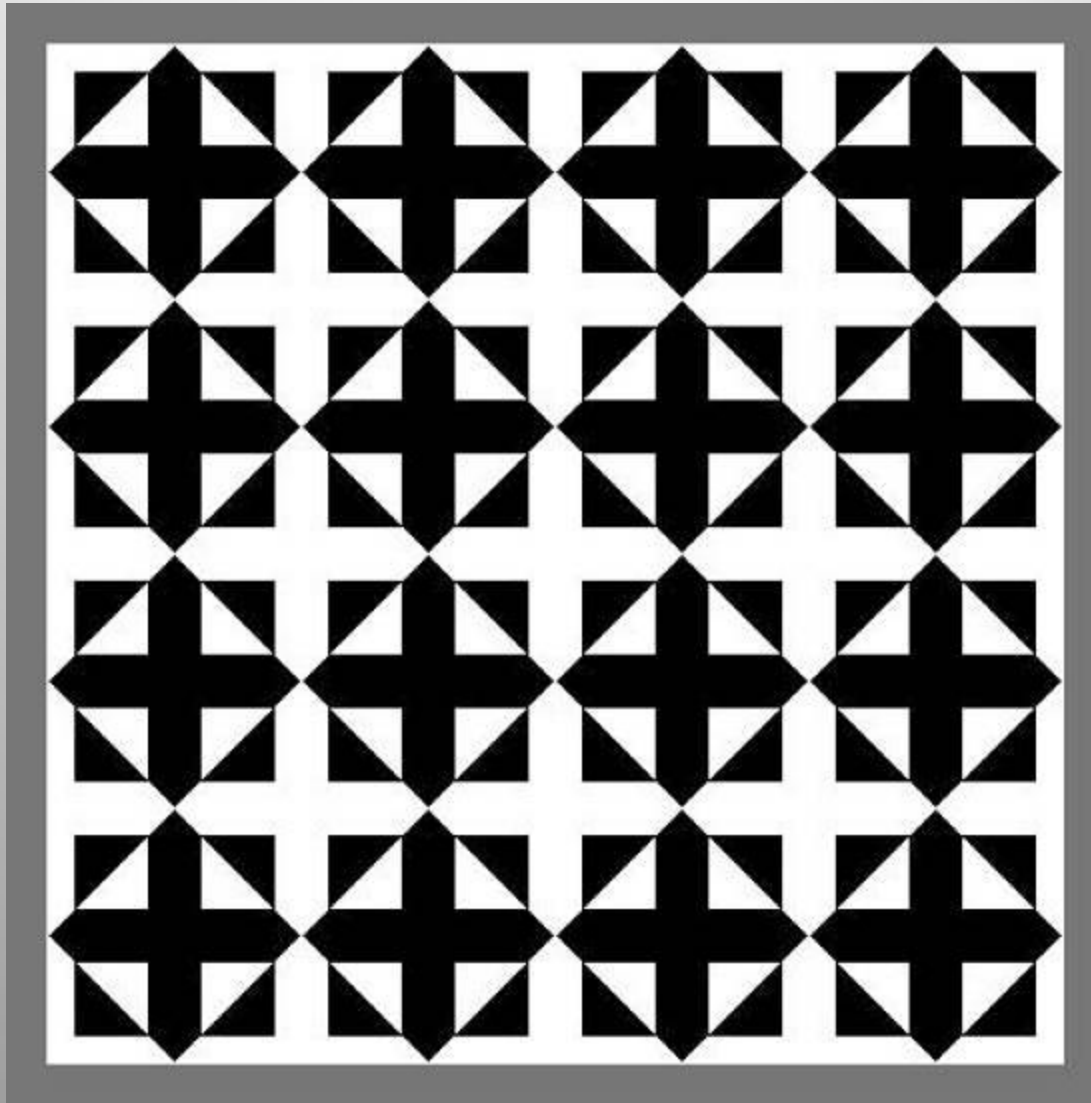
Generalization 1



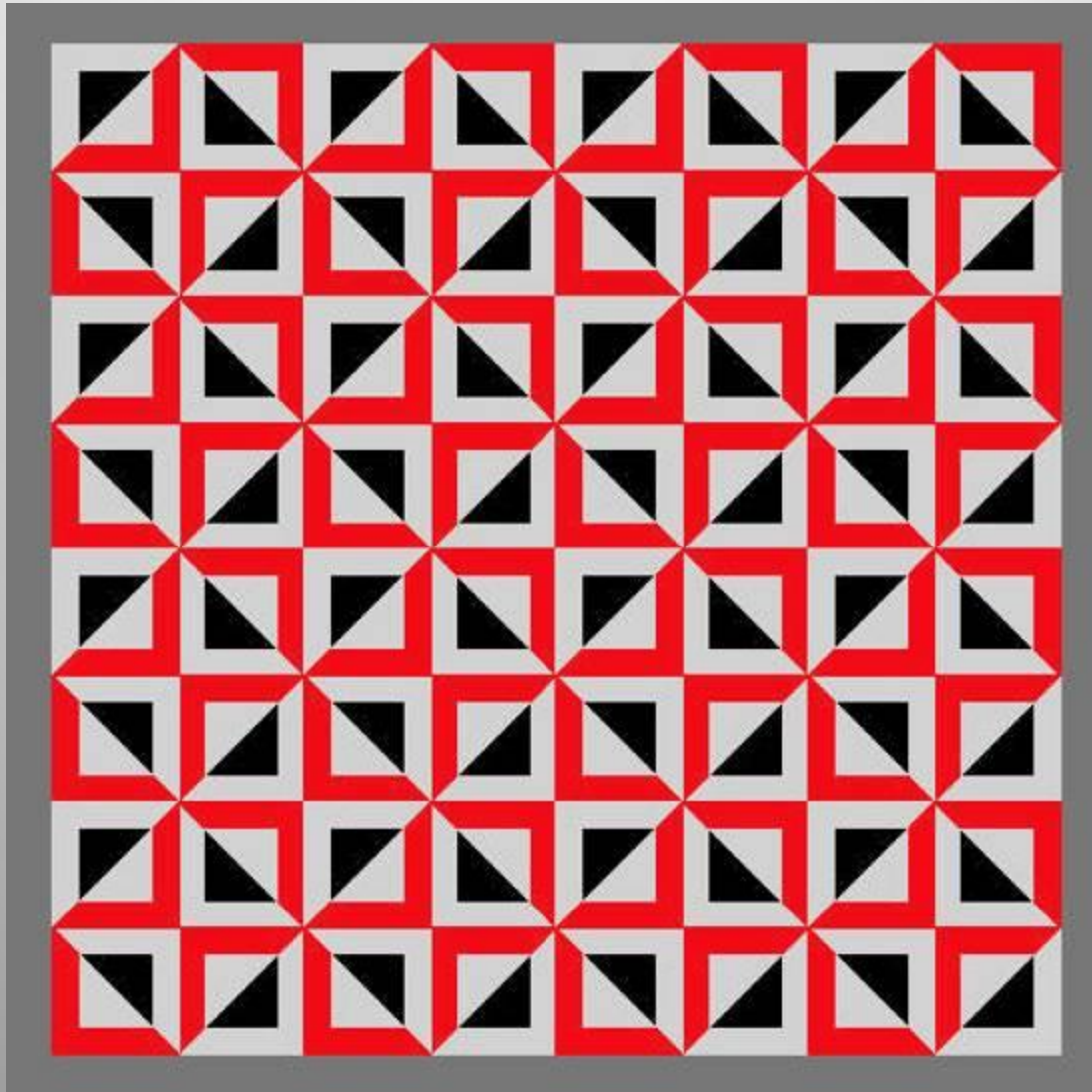
Generalization 2



Generalization 3

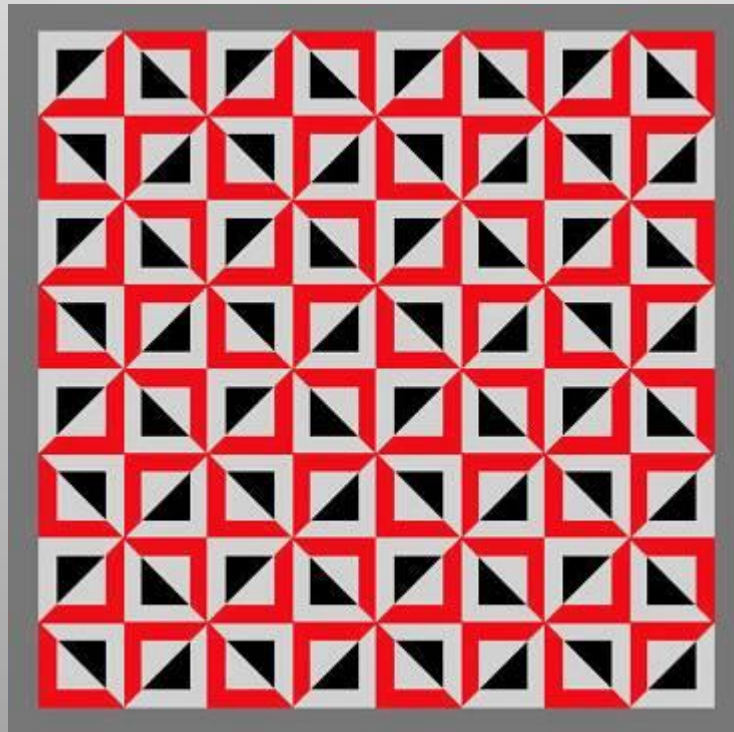


Triple emergence

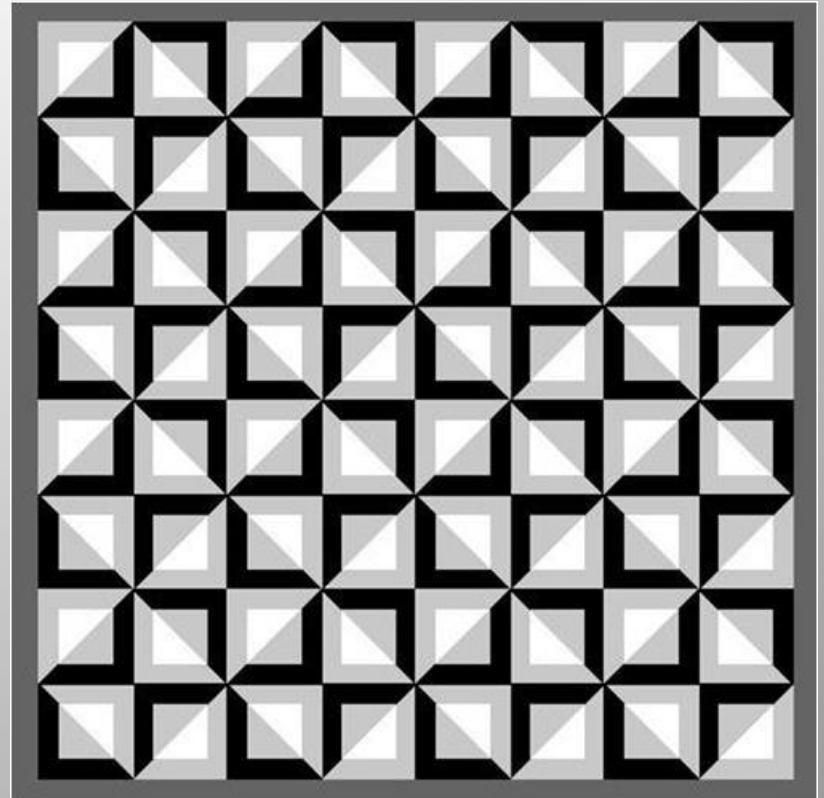
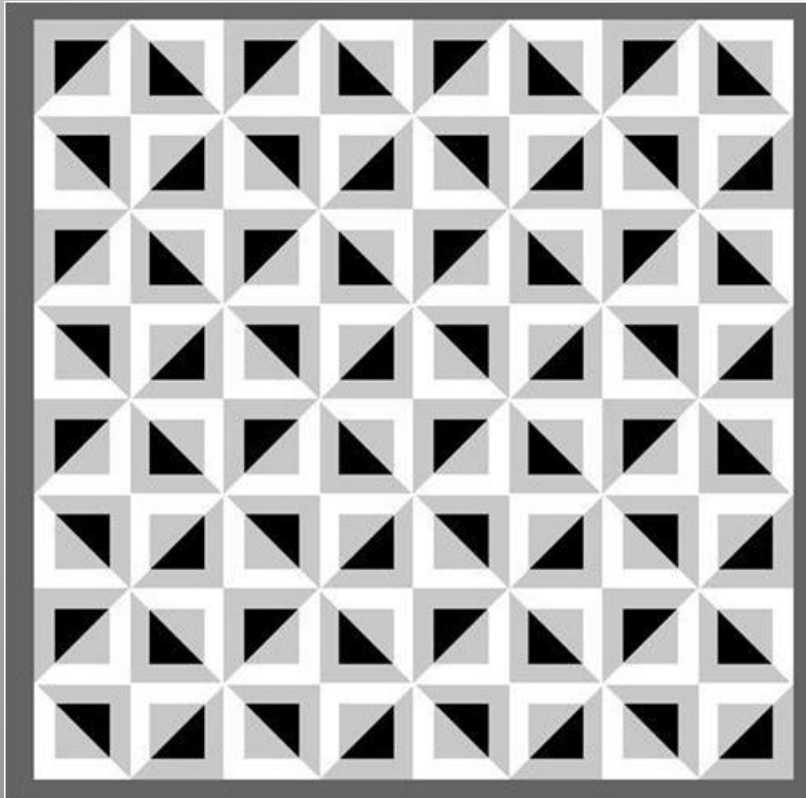


Tile language

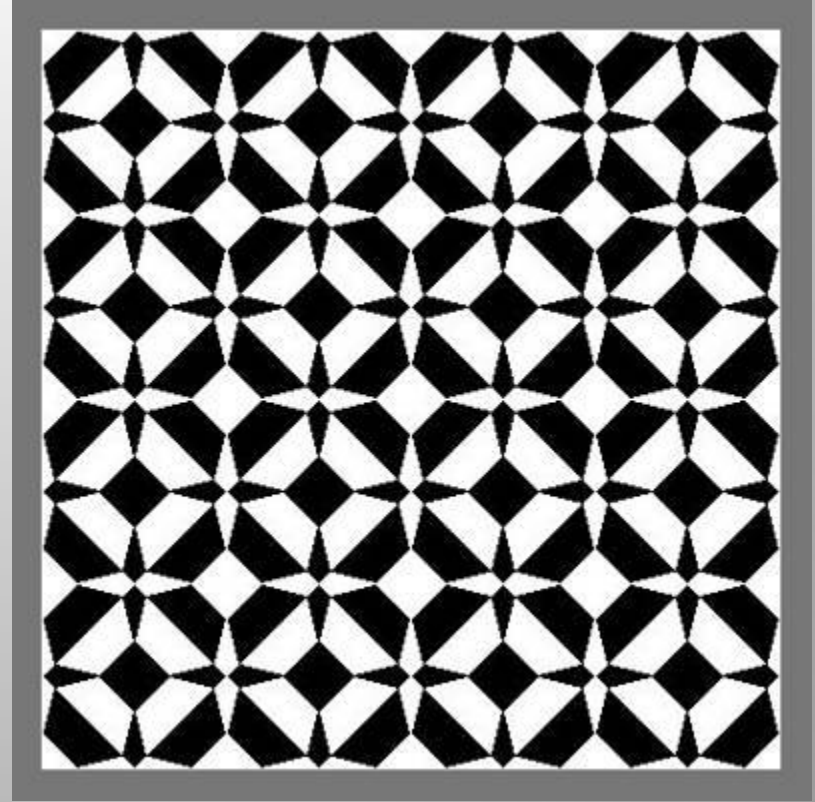
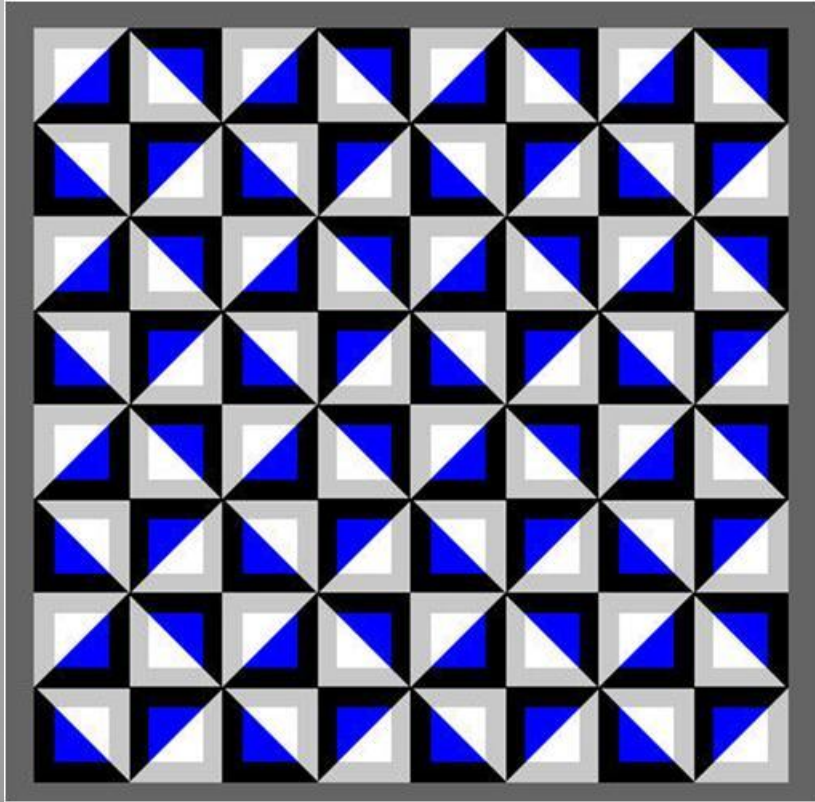
```
GeneralMatrixer [Map[BasicTile 50 4 20 [[200 200 200]red][black [200  
200 200]]:% Rt 90] [90 -90 90 -90]][4]4 100 100 [0] GetState
```



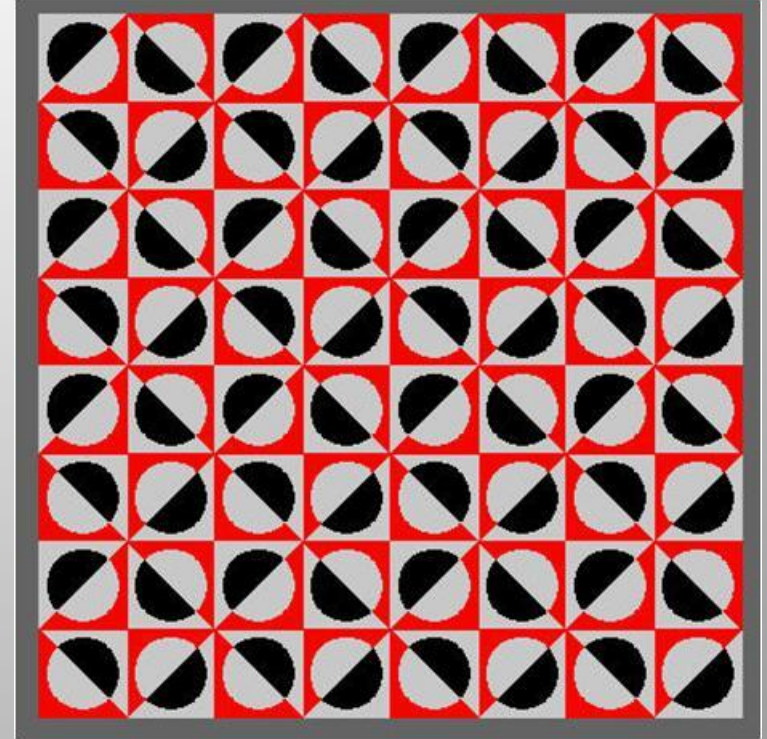
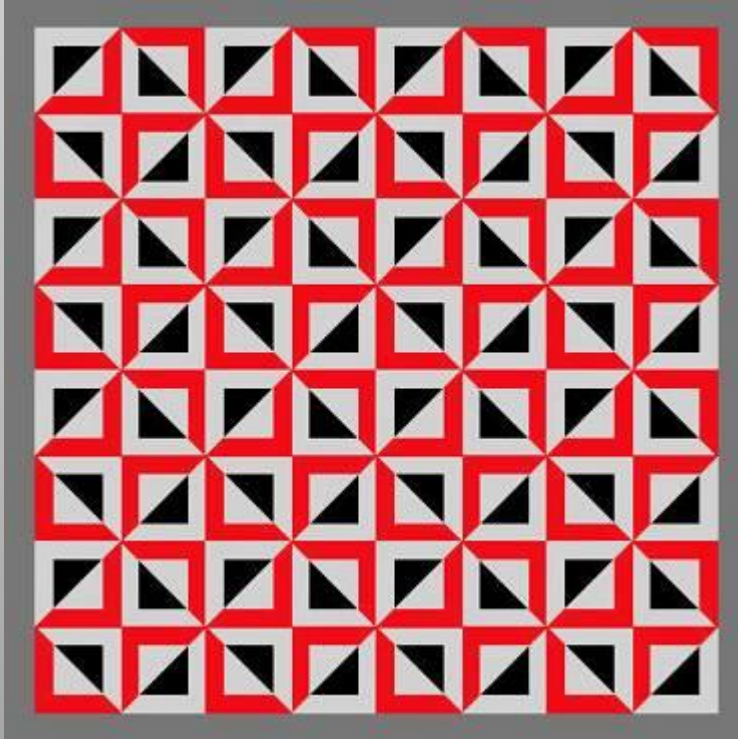
Speaking Tile



Speaking Tile



Speaking “Tile emergence”



Tile Exercise

Specificity

- Begin by looking carefully at a *specific* tile design.

Deconstruction

- *Sketch* this design by noting its *most basic component elements* and the *shape of the replication* of those basic elements in tile space. Take about it.

Reconstruction

- *Reconstruct* our view of the original tile design and *compare* the two.

Generalization

- Generalize our models to draw and place the components in order to generate a suite of images that *explore and extend* the themes we see in the original tile pattern.

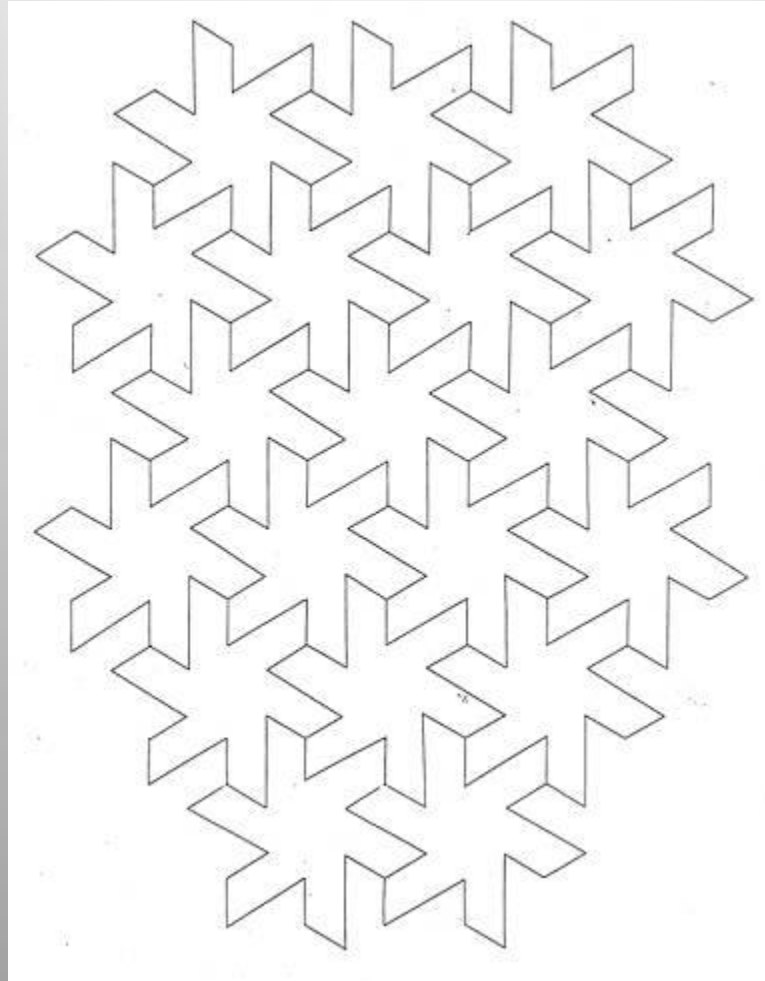
Emergence

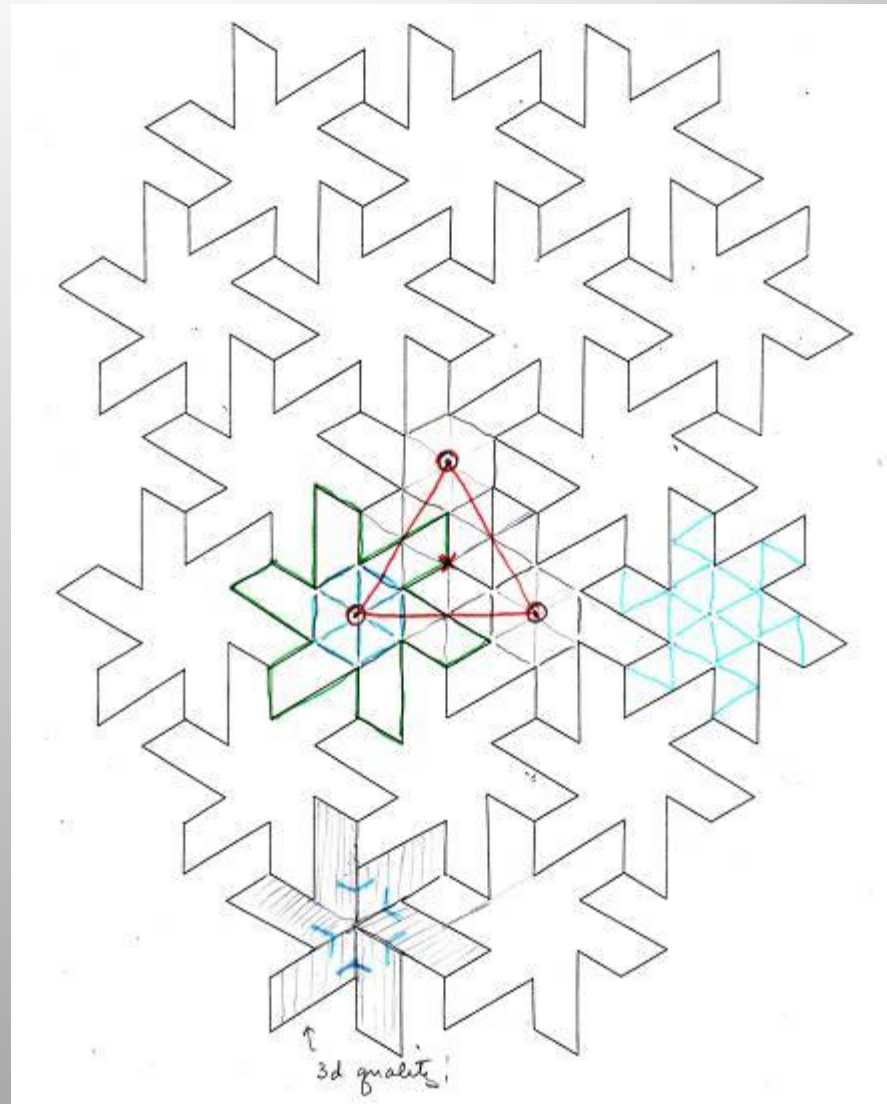
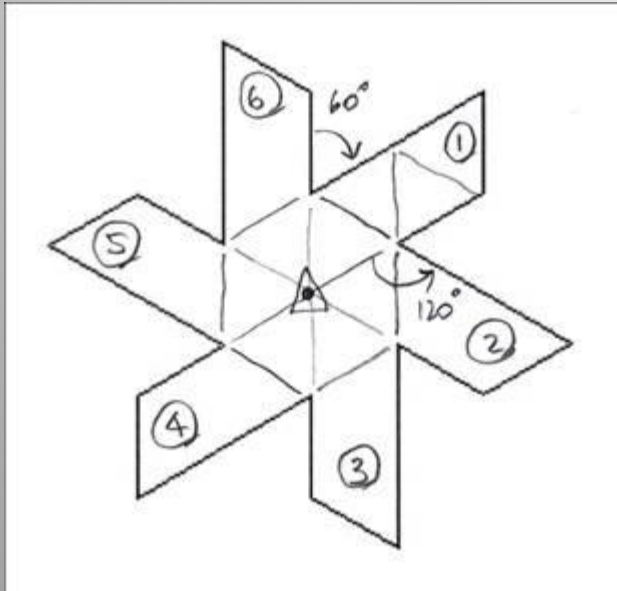
- Introduce features in to the design elements to *encourage* the *emergence* secondary patterns in the final composite design. Add weirdness.

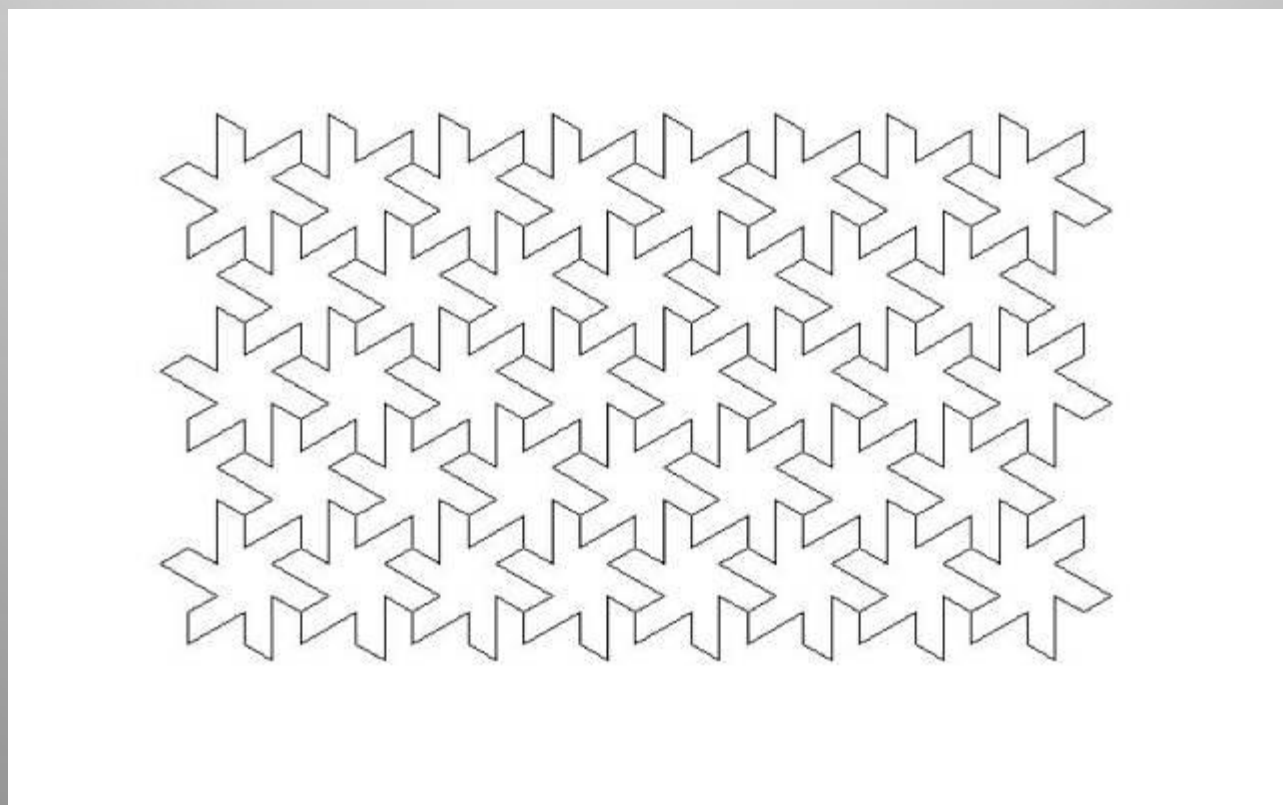
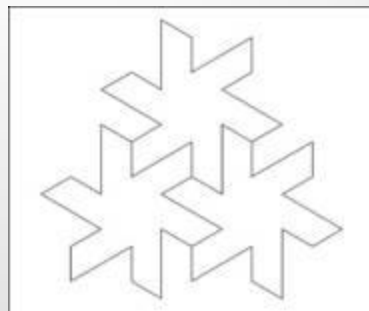
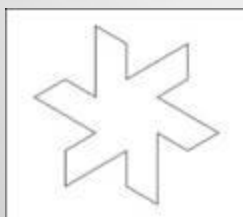
Language

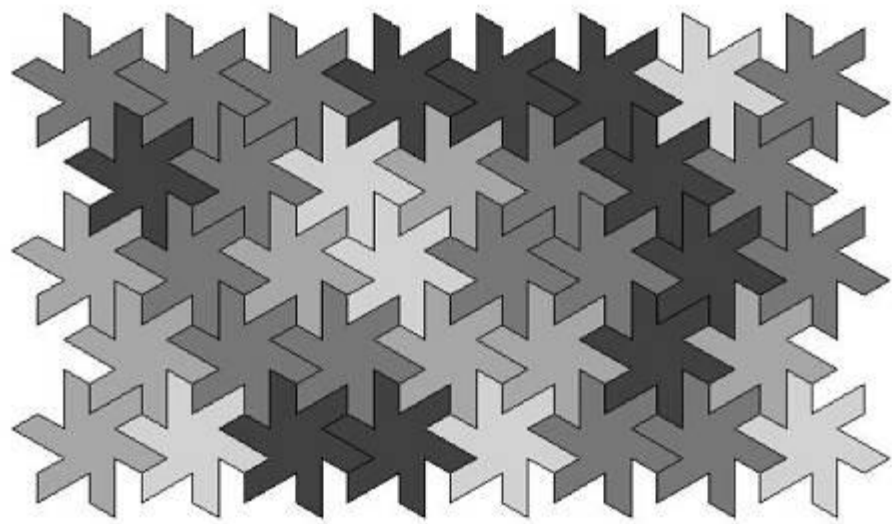
- *Speak tile.*

Another example

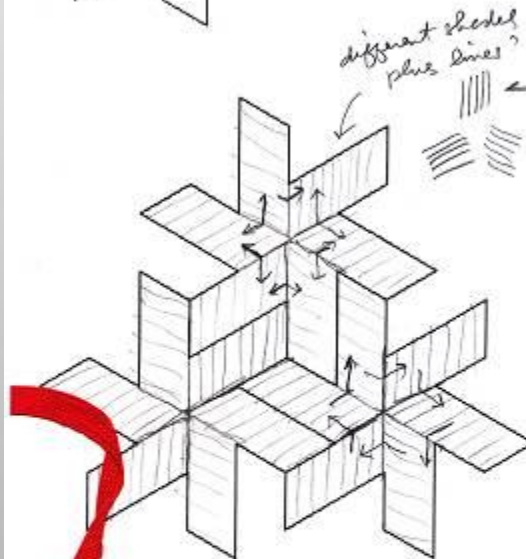
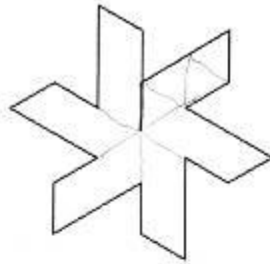








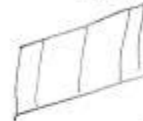
Emergence



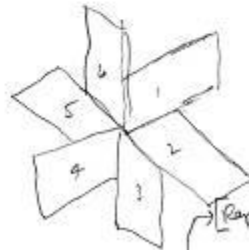
different shaded
plus lines?



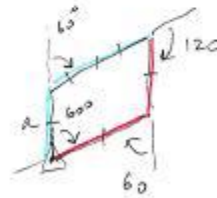
lines: regular or
random?



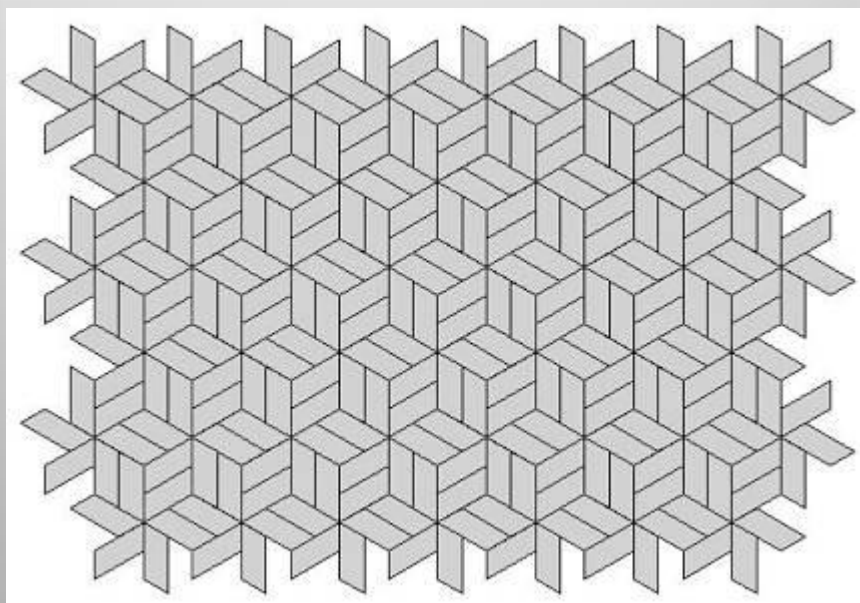
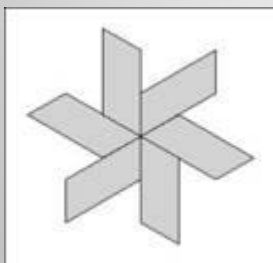
what about stages or
shades or blades?

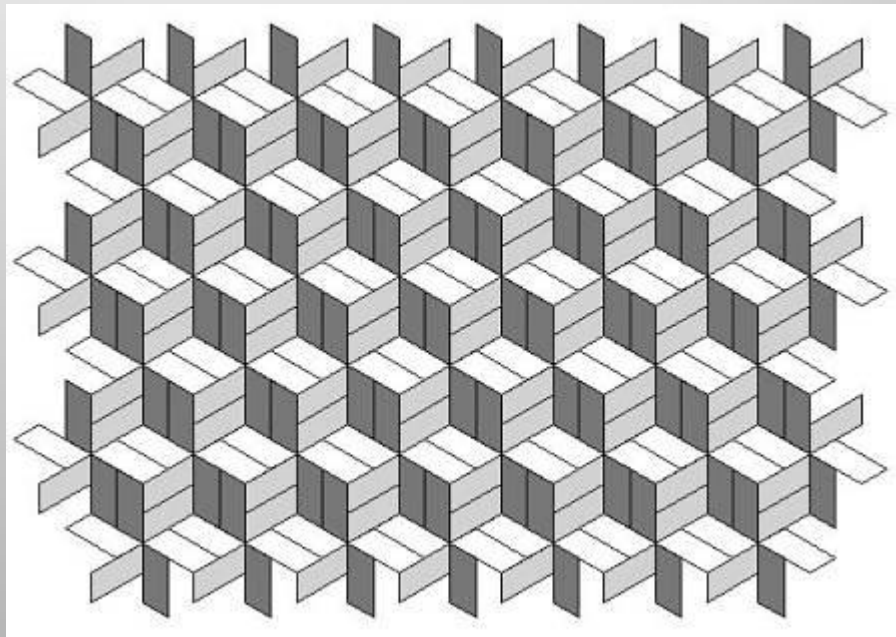


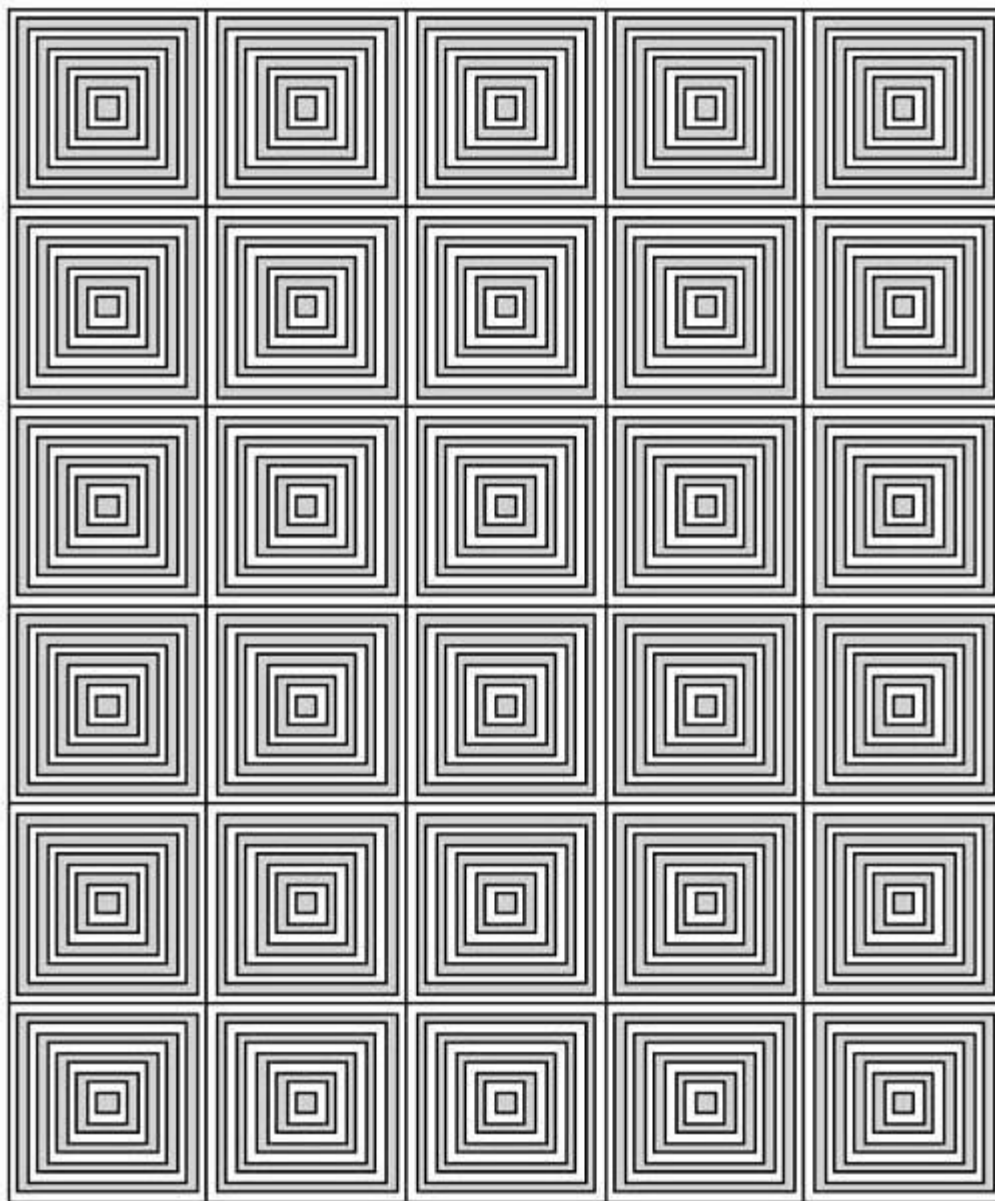
Polygon

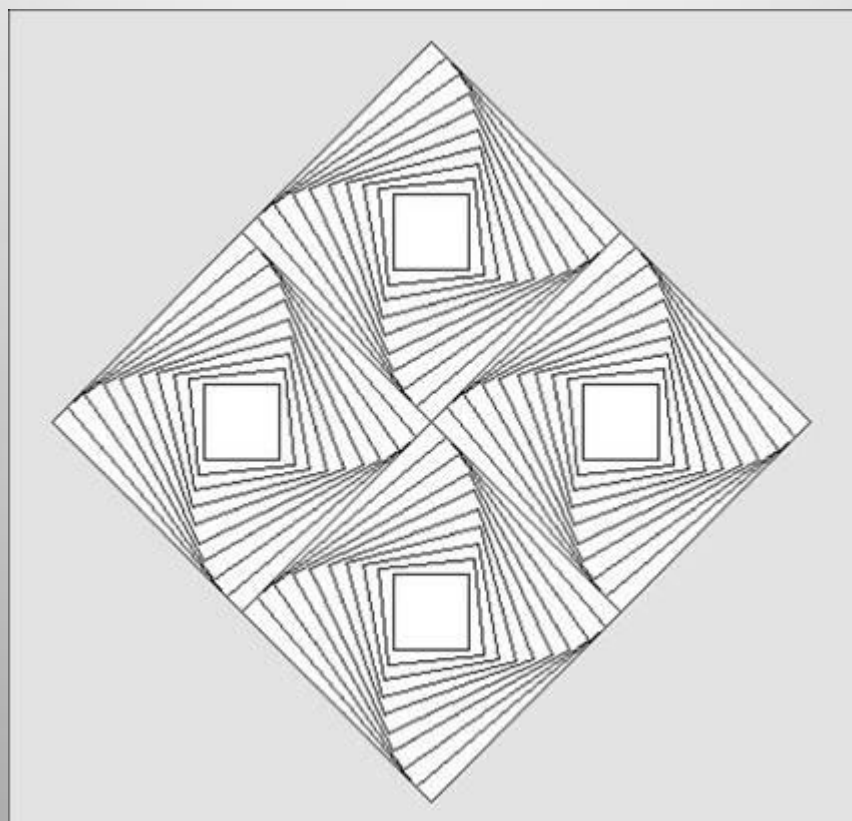


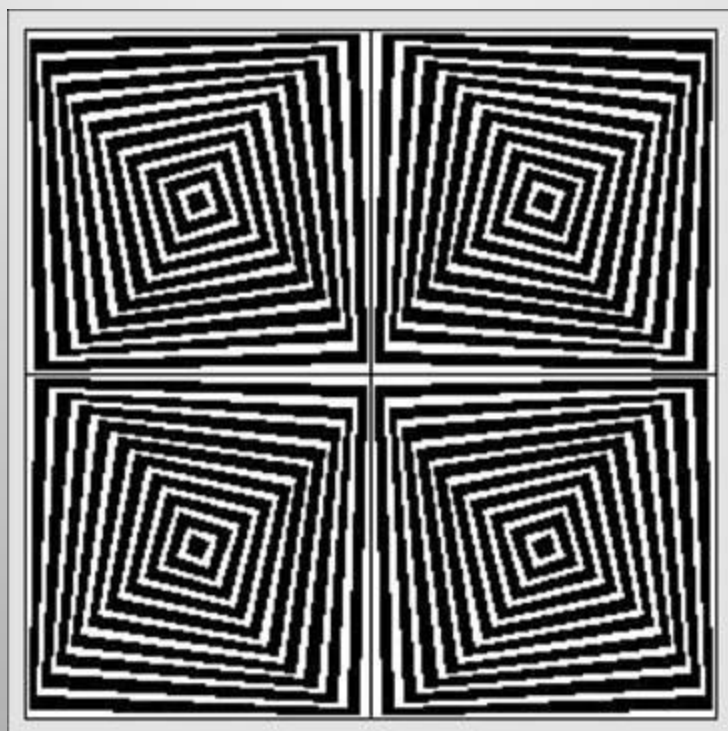
[Repeat 2 [Fd :a RT 60 Fd (2*a) RT 120]
Fd :a RT 60 Fd (2*a) RT 120]

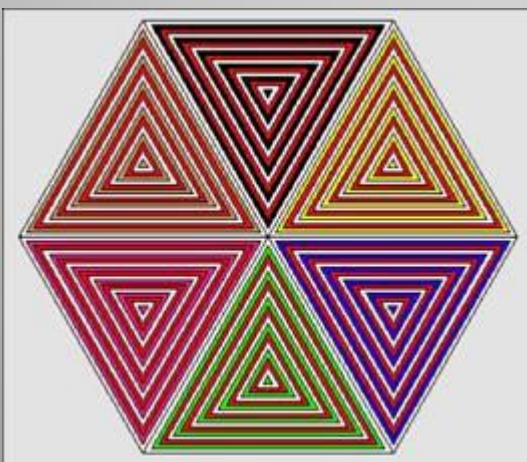
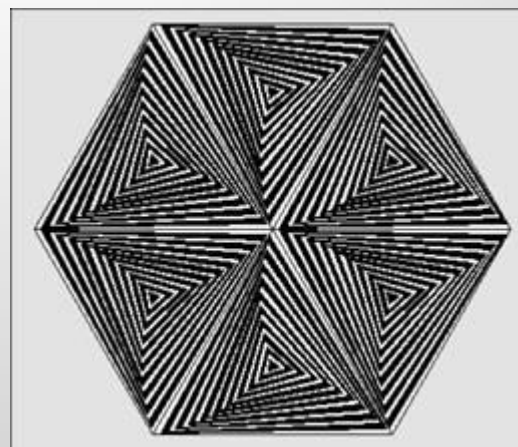
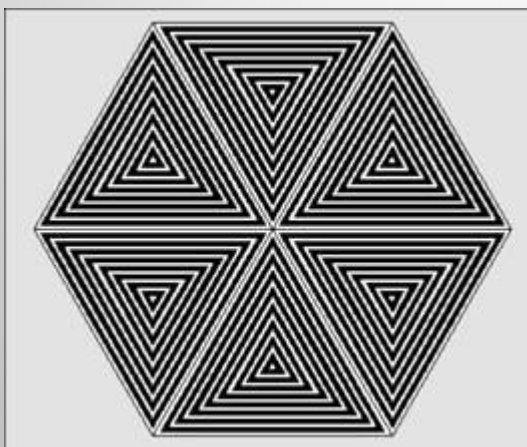












Painting Exercise

Specificity

- Begin by **look**ing carefully at a *specific* painting.

Deconstruction

- **Sketch** this design by noting its *most basic component elements* and the *shape of the replication* of those basic elements in tile space. Take about it.

Reconstruction

- **Reconstruct** your view of the original tile design and *compare* the two.

Generalization

- **Generalize** our models to draw and place the components in order to generate a suite of images that *explore and extend* the themes you see in the original painting.

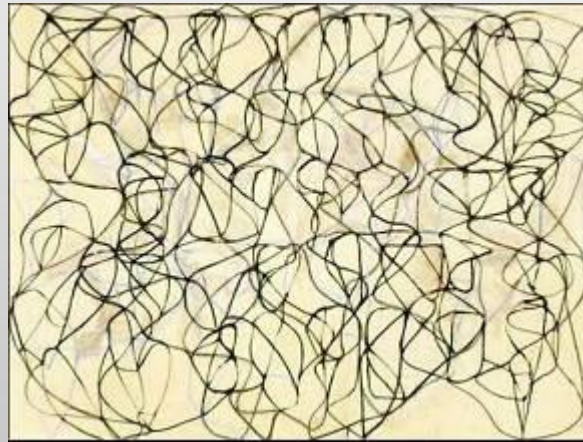
“Emergence”

- Introduce features in to the design elements to *encourage* the *emergence of* secondary patterns in the final composite design. **Add weirdness.**

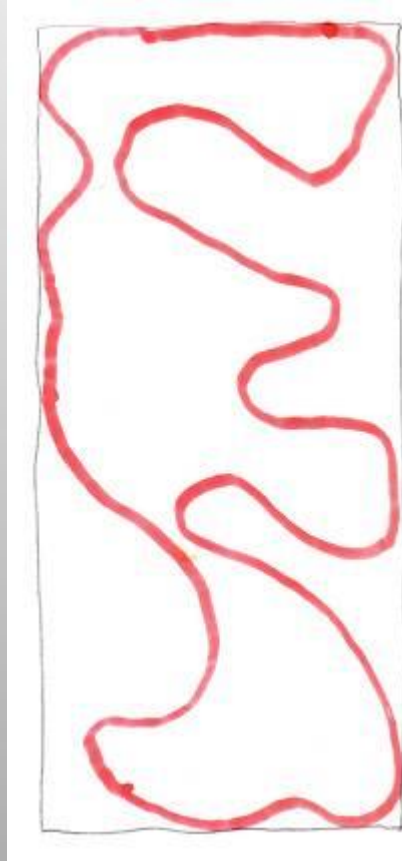
Language

- **Speak** your painting.

The sense of curve - inspired by Brice Marden



Tang Dancer, 1995-96, oil on linen and 72 by 33 inches



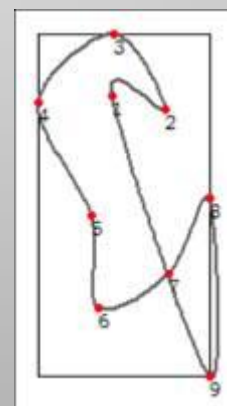
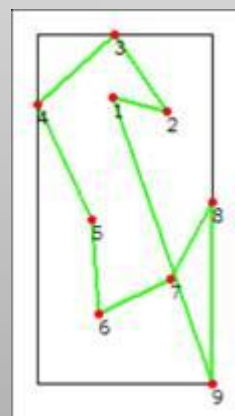
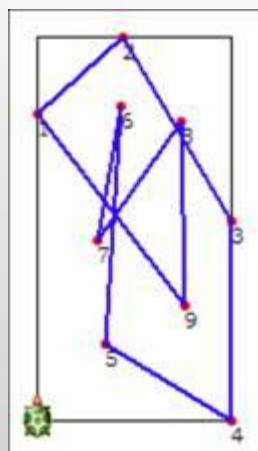
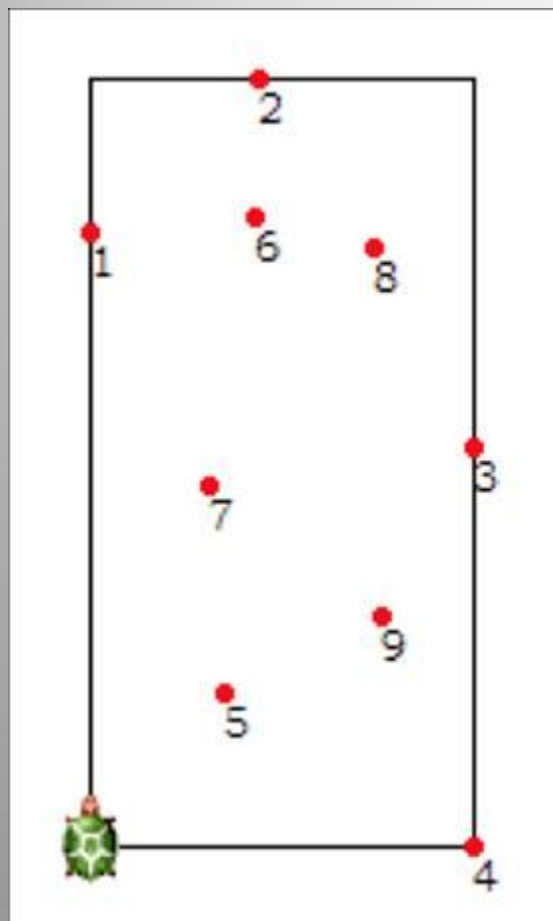
Talking the theme

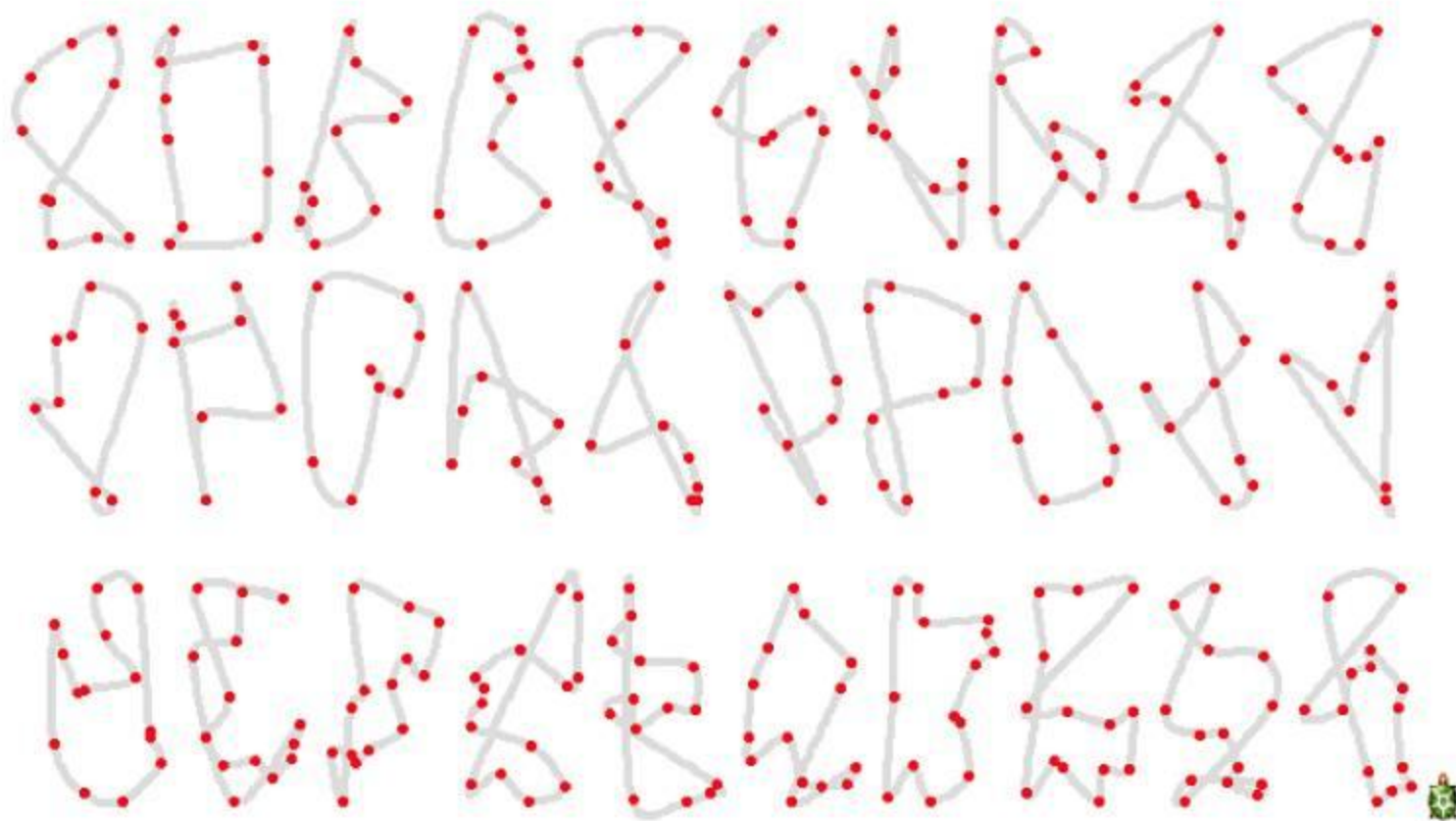
"I see a kind of quiet curving activity inside a rectangular frame. Black, dark green, yellow and red ribbons or trails mark paths that fill rectangular space. I very much like how the paths are not caught or stopped by the edges but move gently along the edges. I see soft sinuous waves: at ease in their curvings: exploring, playing with the rectangular.

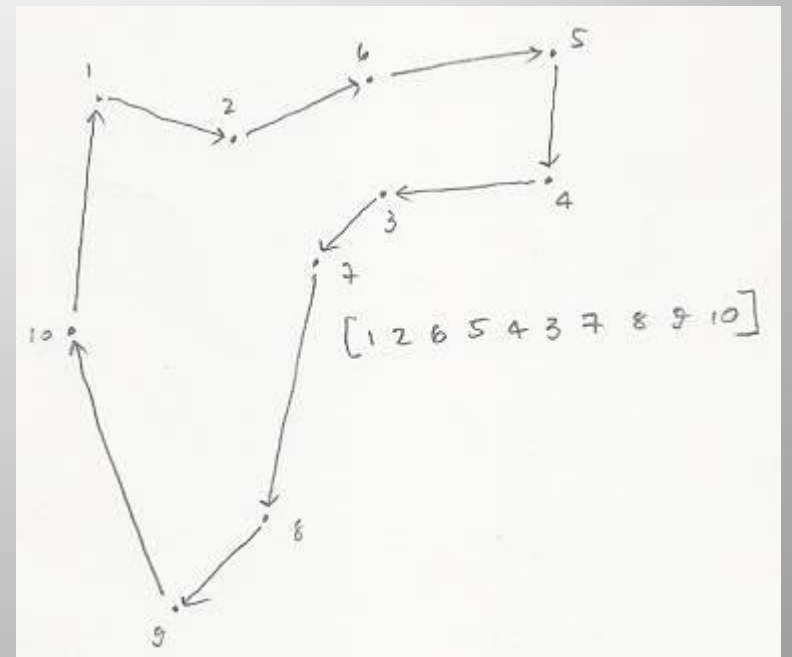
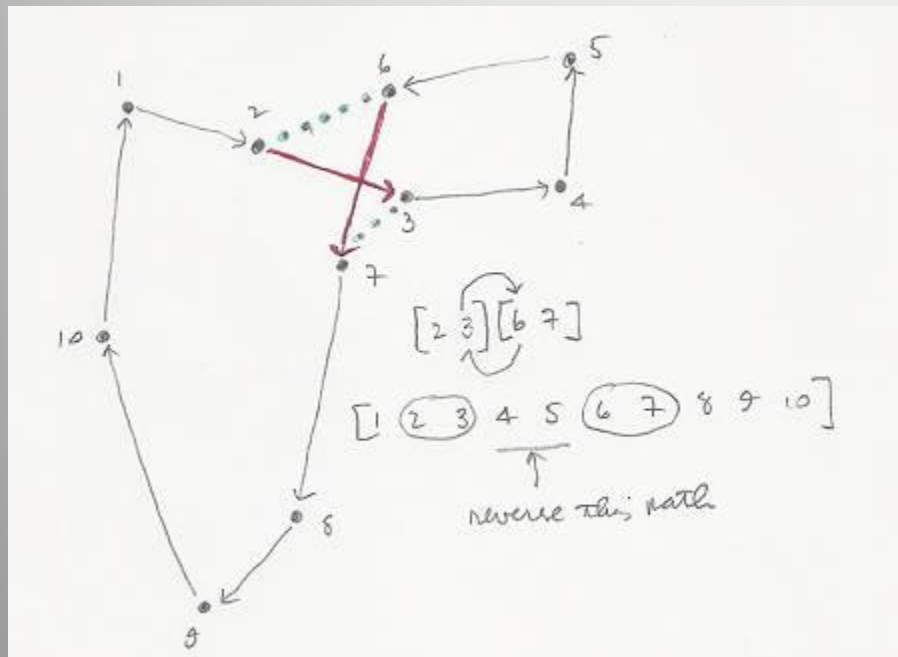
The act of pathing, rather than specific path, constructs this picture space. A kind of flat, wave space ... equally foreground and background. Curvature ground".

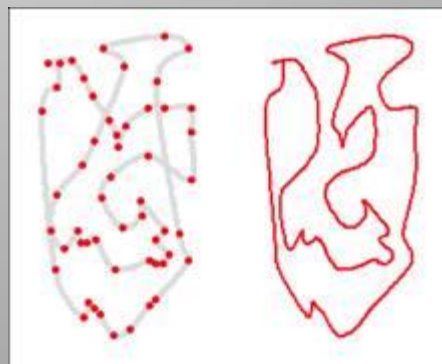
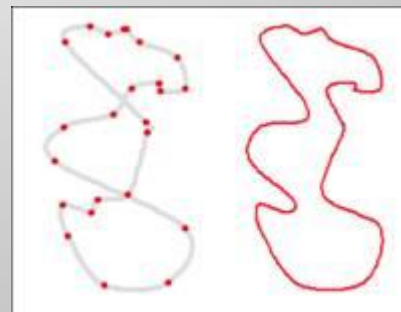
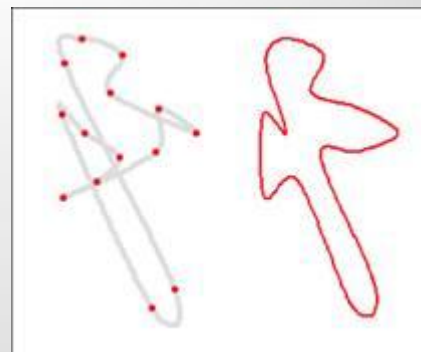
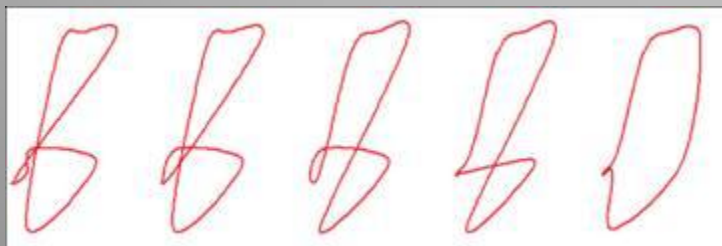
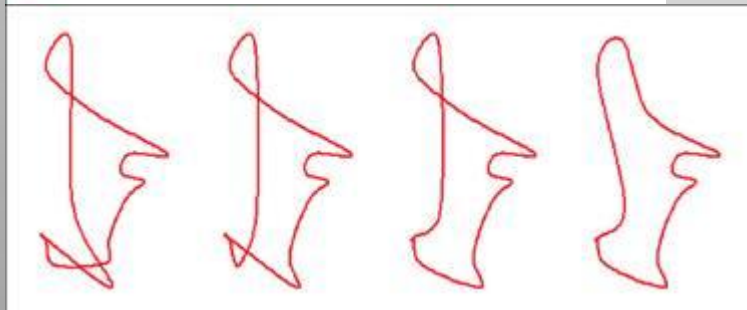
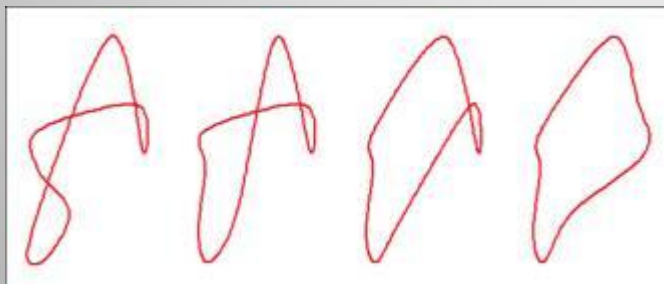
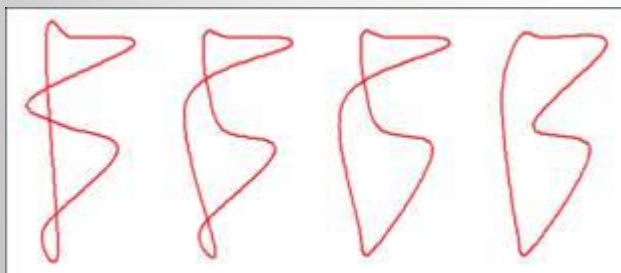
"The theme, therefore, that I want to explore computationally, is not just this specific painting, but the idea that it represents and of which it is one instance.

The theme that I want to explore is a pathing process that will grow from my description of elements from this specific Marden work".

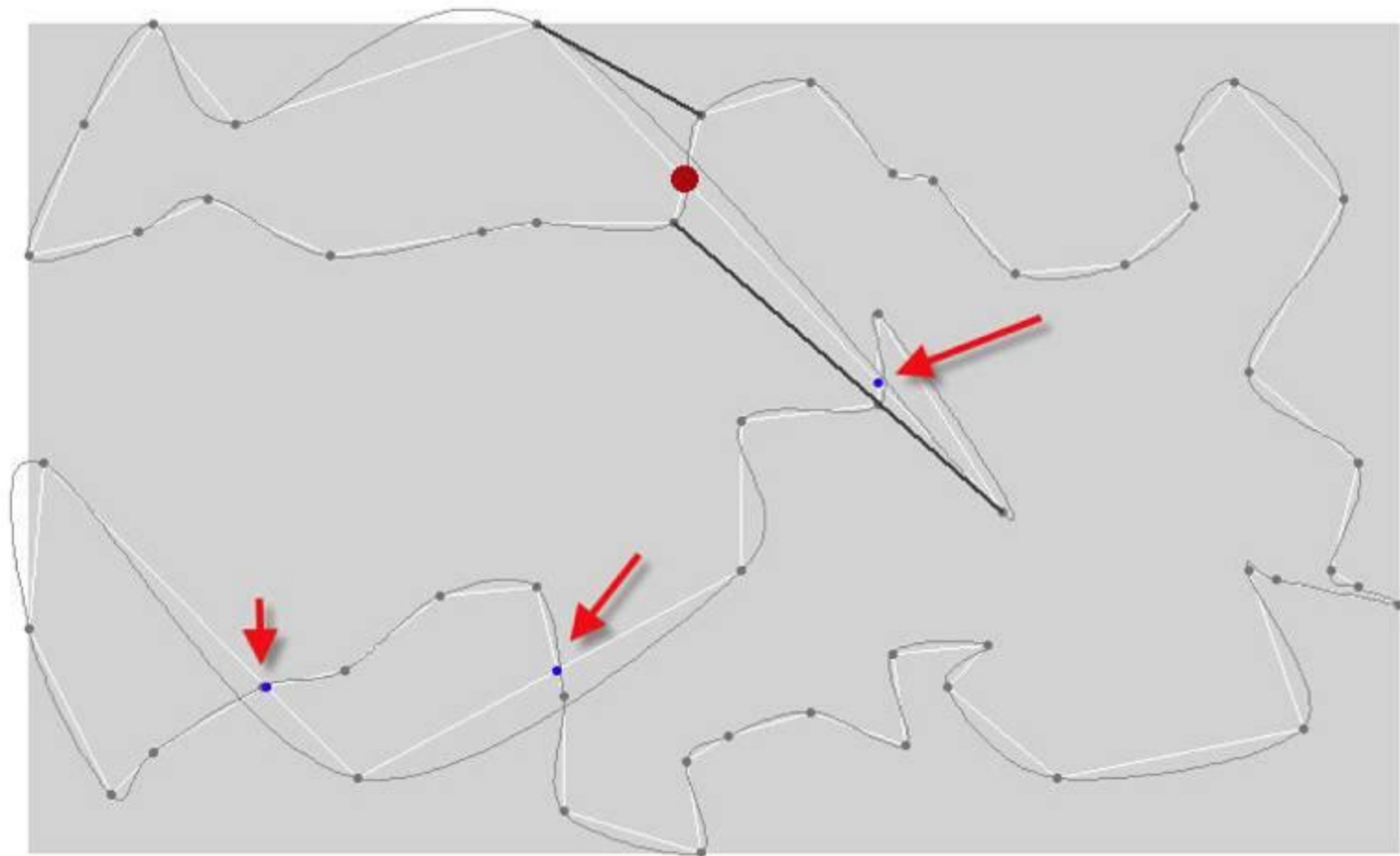


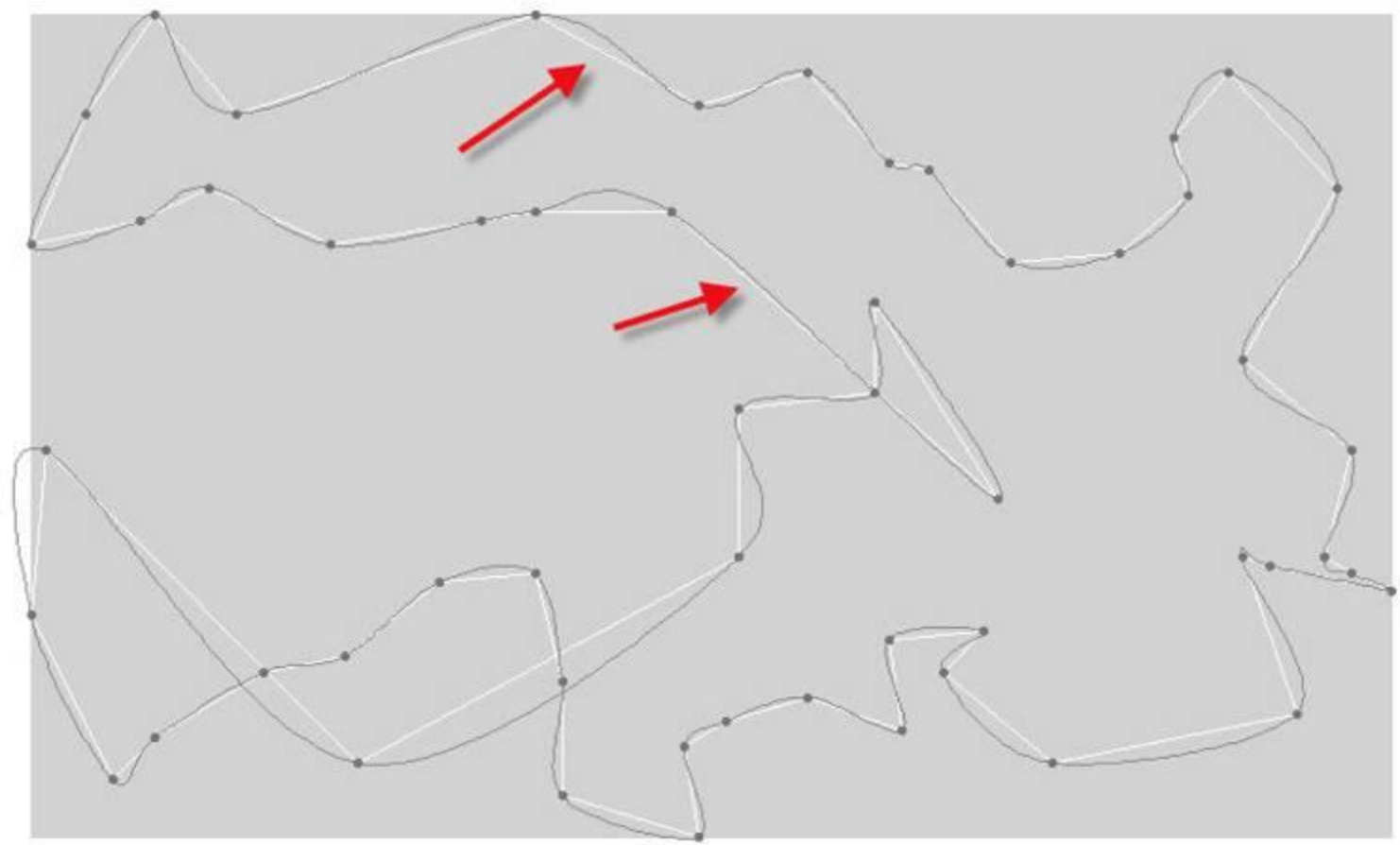


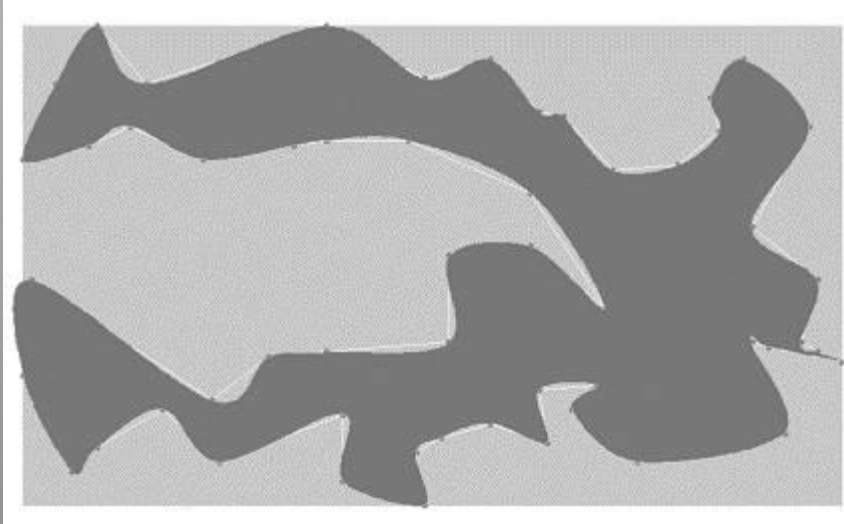


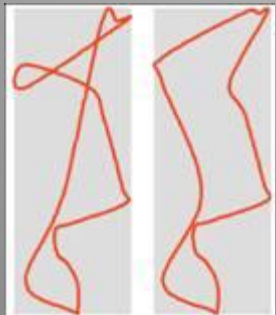
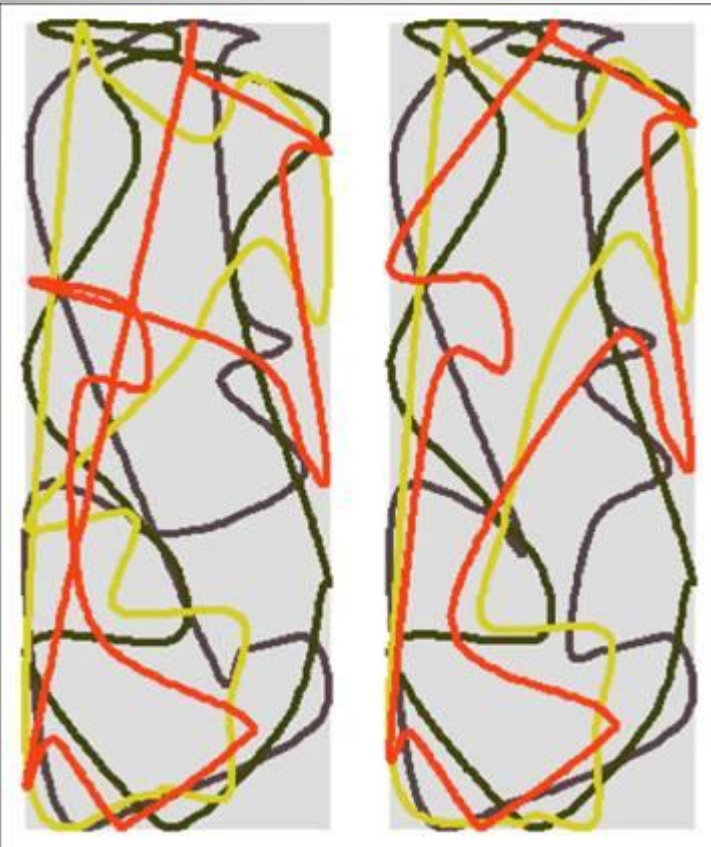


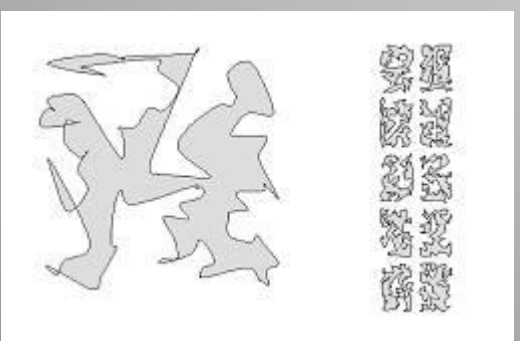
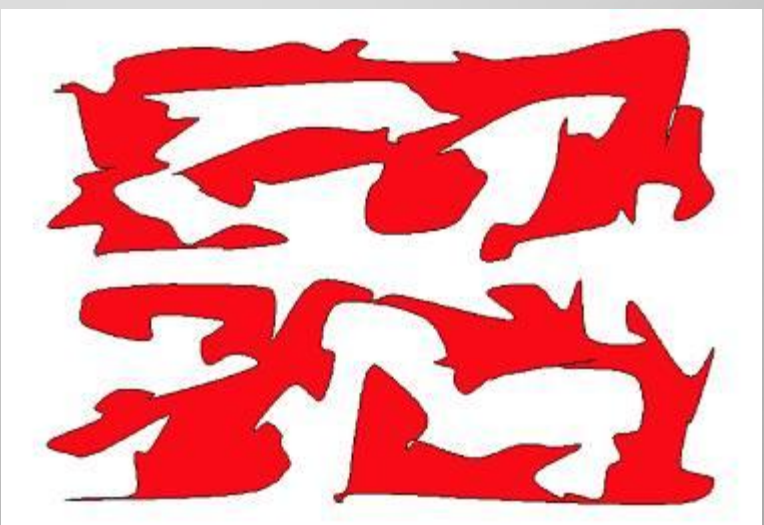


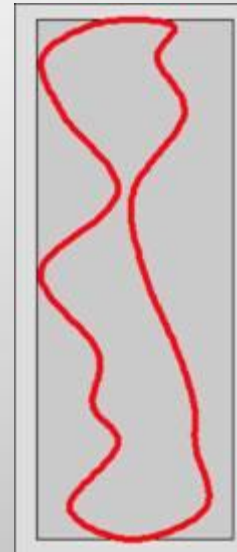
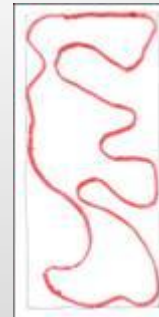
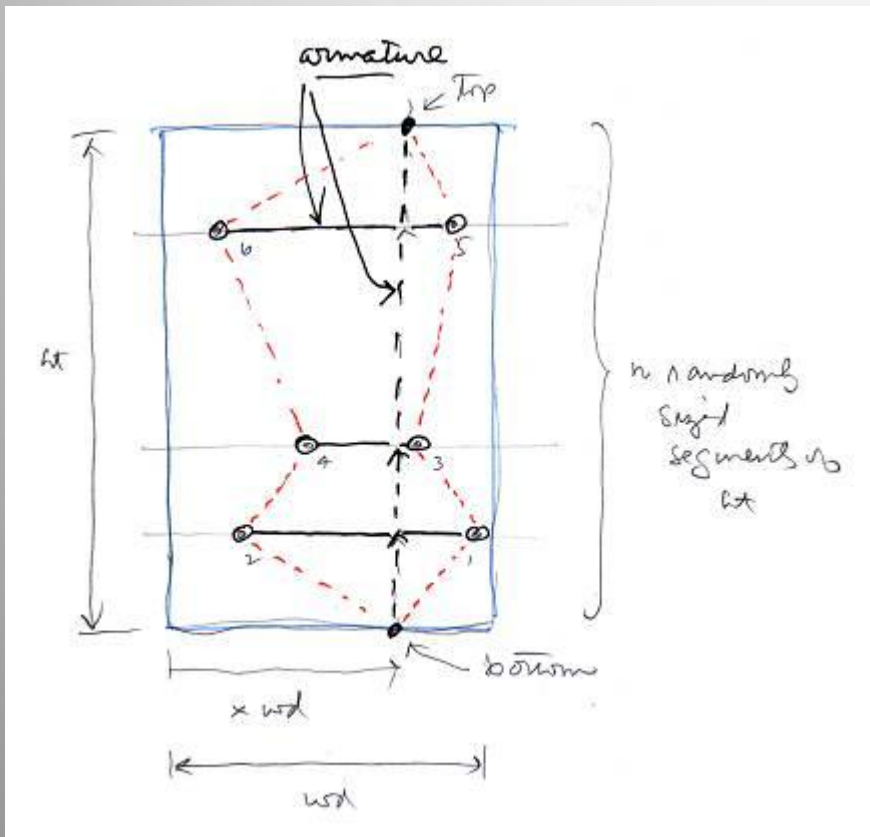












Machine Exercise

Specificity

- Begin by **look**ing (could be using your mind's eye) carefully at a *specific* “machine”.

Deconstruction

- **Sketch** this design by noting its *most basic component elements* and the *shape of the replication* of those basic elements in tile space.

Reconstruction

- **Reconstruct** your view of the original machine.

Generalization

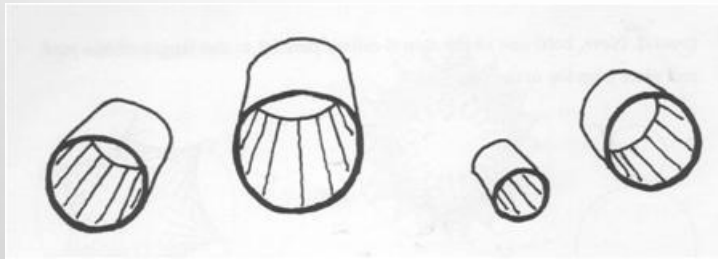
- **Generalize** your models to draw and place the components in order to generate a suite of images that *explore and extend* the ideas you see in the original machine.

“Emergence”

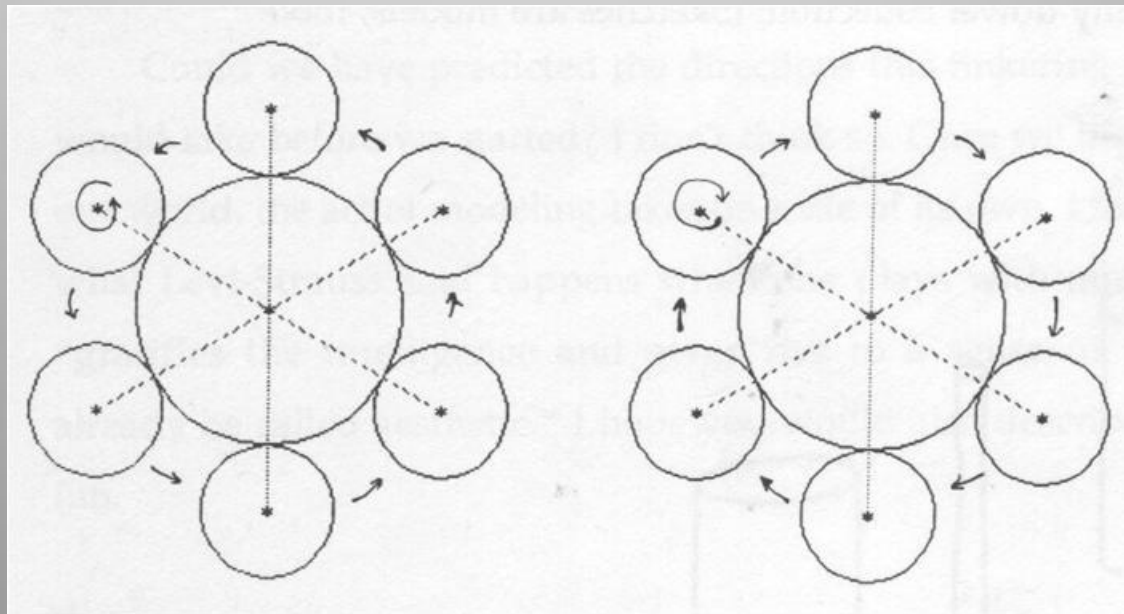
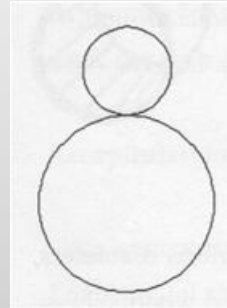
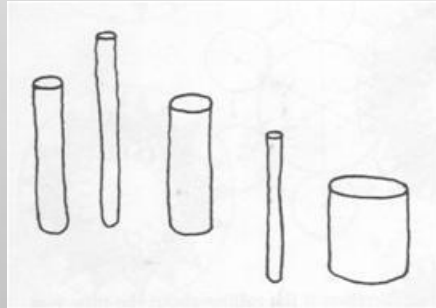
- Introduce features in to the design elements to *encourage the emergence of* secondary patterns in the final composite design. **Add weirdness.**

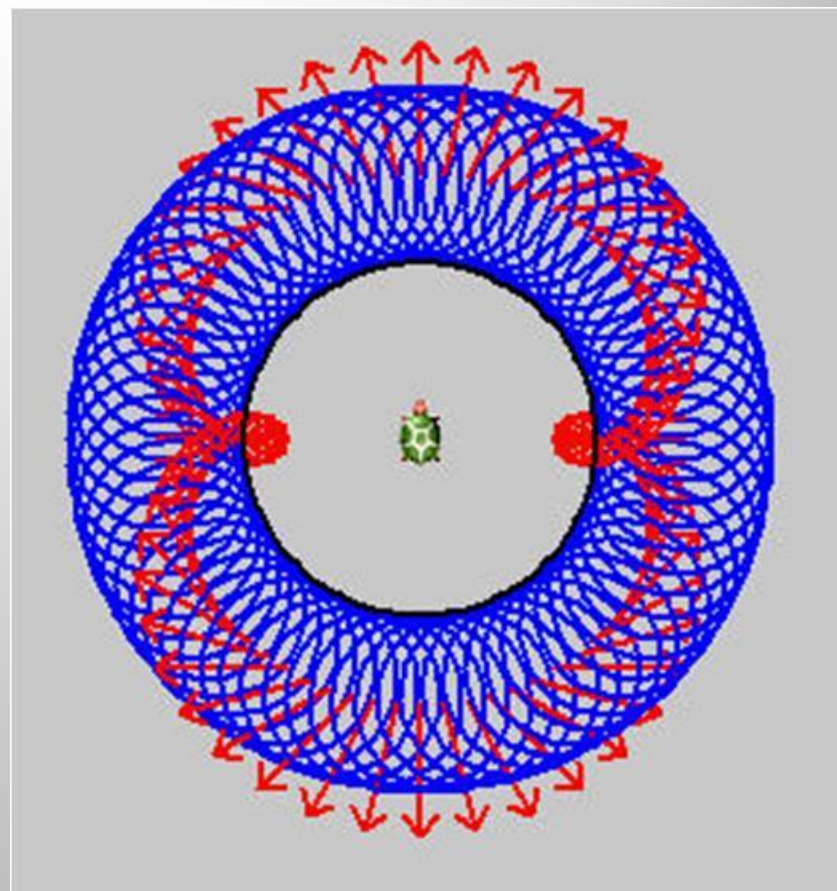
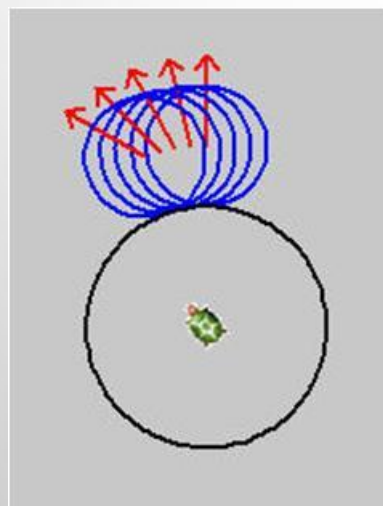
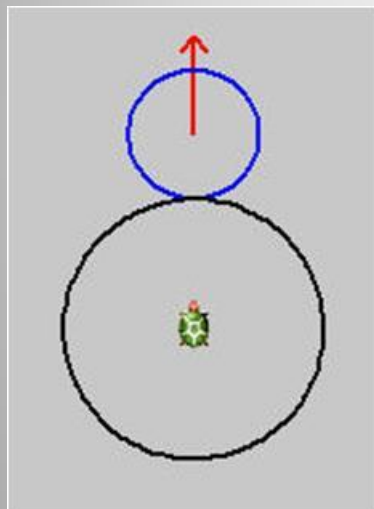
Language

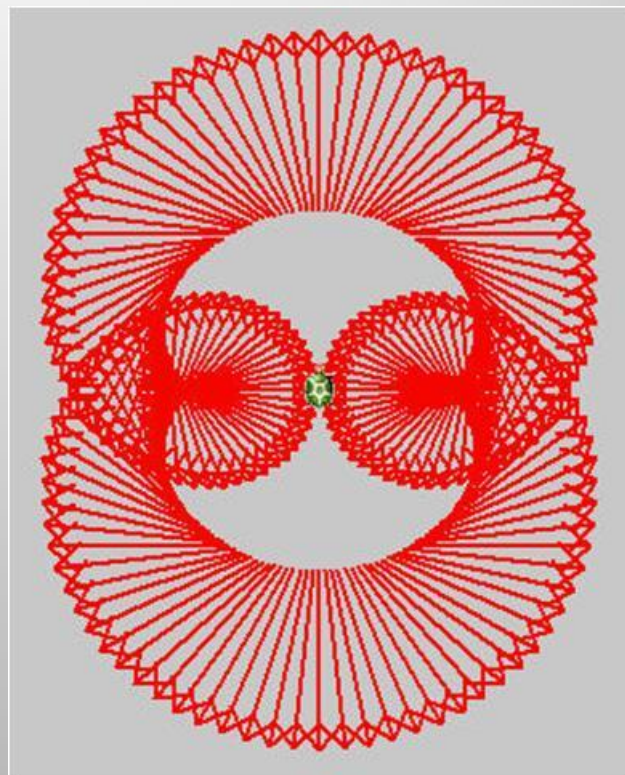
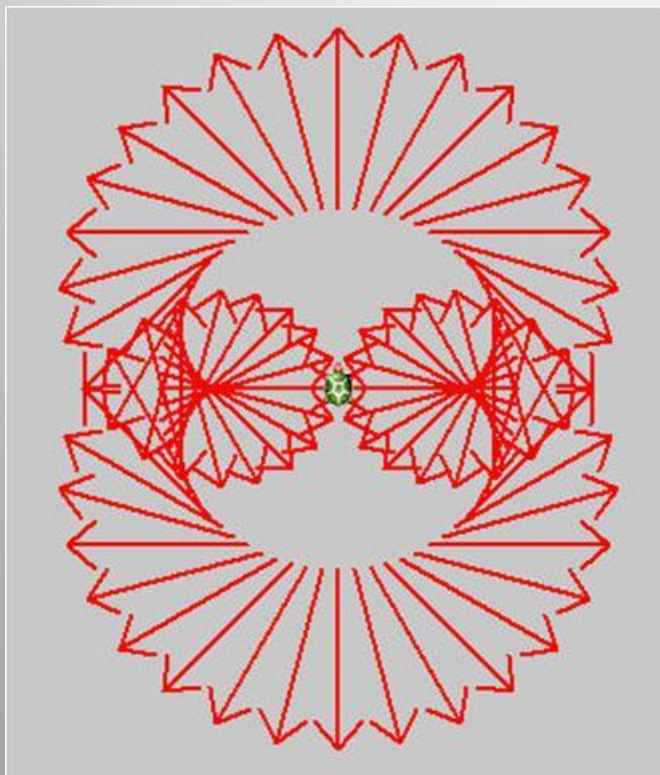
- **Speak** machine.

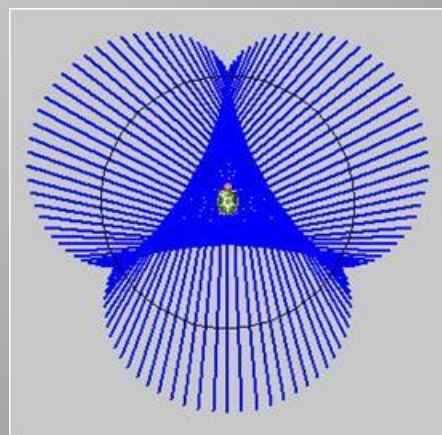
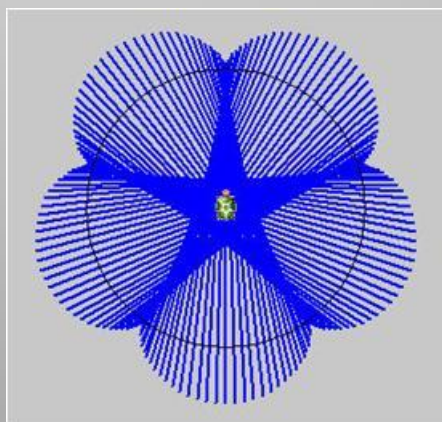
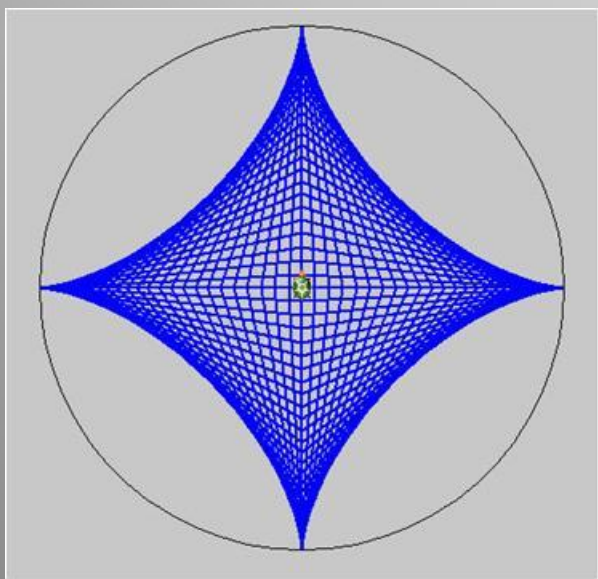
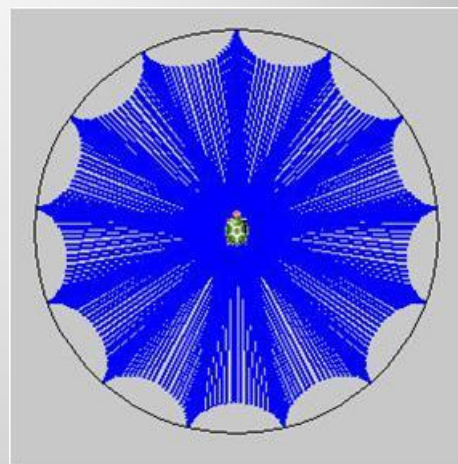
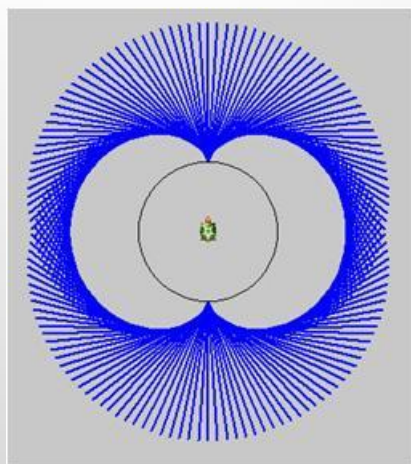
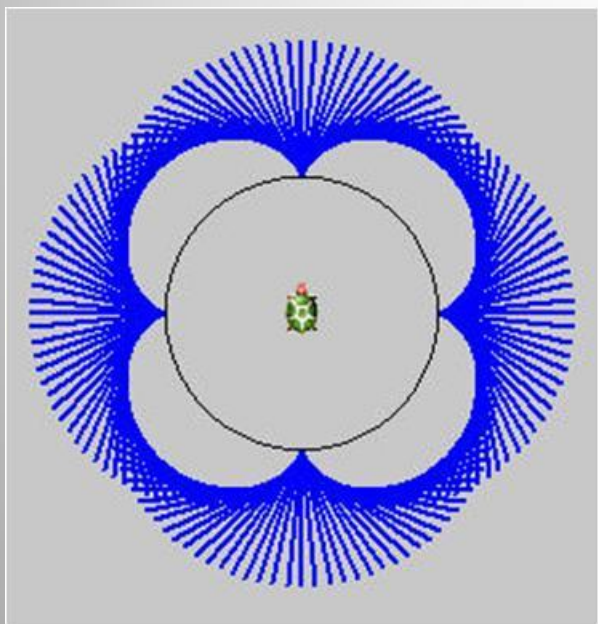


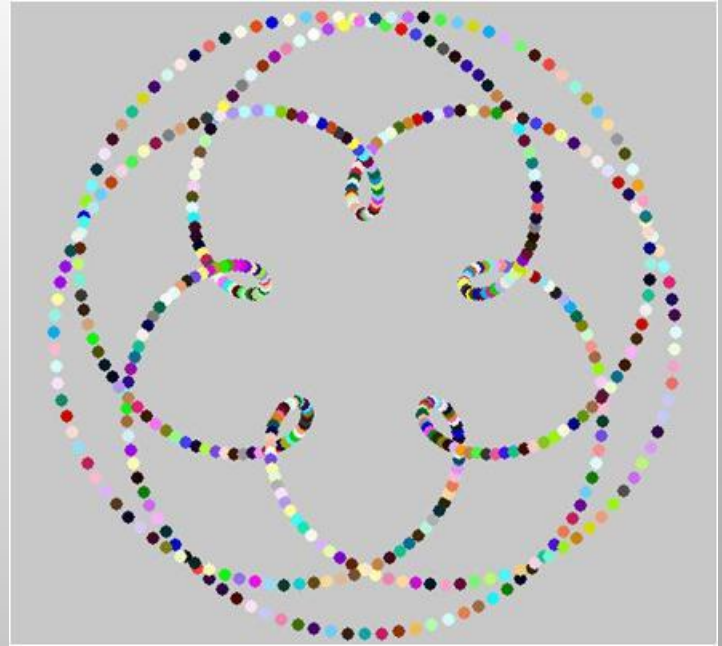
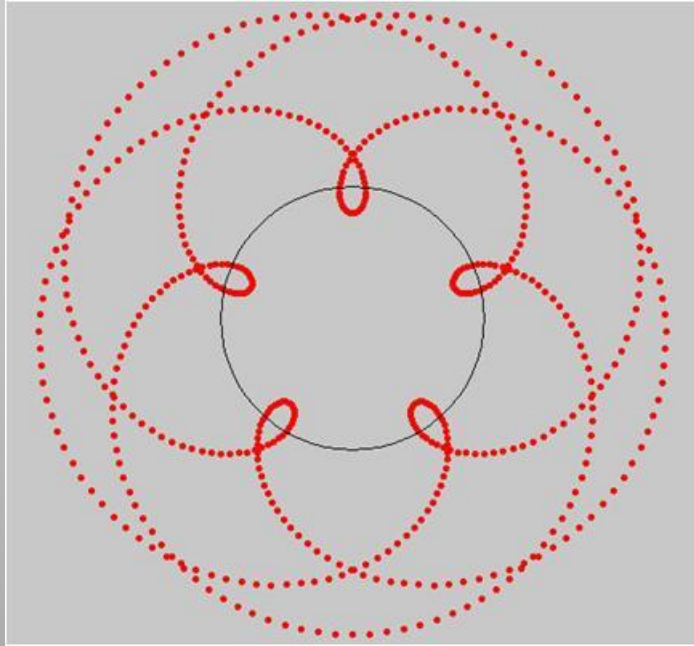
Roller on (or inside) a pipe











Conclusion ...

The notion that simple activities, simple objects, simple ideas when interacting - sometimes in simple ways – can often times lead to enormously complex – and *surprising* - behavior is a startling, totally counter-intuitive idea.

I feel that one needs to participate in the construction of an environment that plays with weird and strange emergence in order to emotionally and intellectually sense some of this weird dynamics of our world.

My experience has suggested that simple modeling of objects, ideas or images that interest students can give them a personal sense of weird and startling emergence. And this ***playing with emergence*** encourages them to think through problems in new and deeper ways.