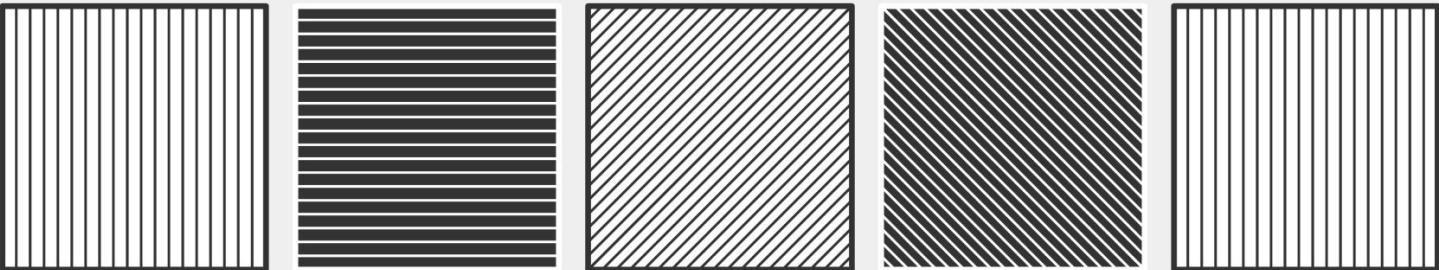


# ANATOMY OF GENERATIVE ART



# ABOUT THE ARTIST

- Created a rstats zine exploring radial computational art
- Deeply loves fruit based generative art and has two projects on topic: Citrus Pop and Fruitchet
- [Currently] Loves all things grid based, minimal, geometric



Ijeamaka Anyene Fumagalli

# ART FROM CODE by DANIELLE NAVARRO

The screenshot shows the homepage of the [ART FROM CODE](https://art-from-code.netlify.app) website. The page has a dark background featuring a central, semi-transparent, multi-colored geometric shape composed of overlapping hexagons in shades of red, orange, yellow, green, and blue. At the top left, the site's name "ART FROM CODE" is displayed in white, along with navigation links for "Home", "Sessions", and "Slides". A search icon is located at the top right. On the right side, there is a sidebar titled "On this page" containing links to "Welcome!", "About the workshop", "About the instructor", "Day 1: July 25", and "Day 2: July 26". The overall aesthetic is minimalist and modern.

[art-from-code.netlify.app](https://art-from-code.netlify.app)

# WHAT IS GENERATIVE ART?

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“Generative art operates within a rule structure but has an element of chance that is crucial to what many artists enjoy about it. The final work is partly produced by an autonomous system, which may be strictly regulated by the rules or operate within parameters.”

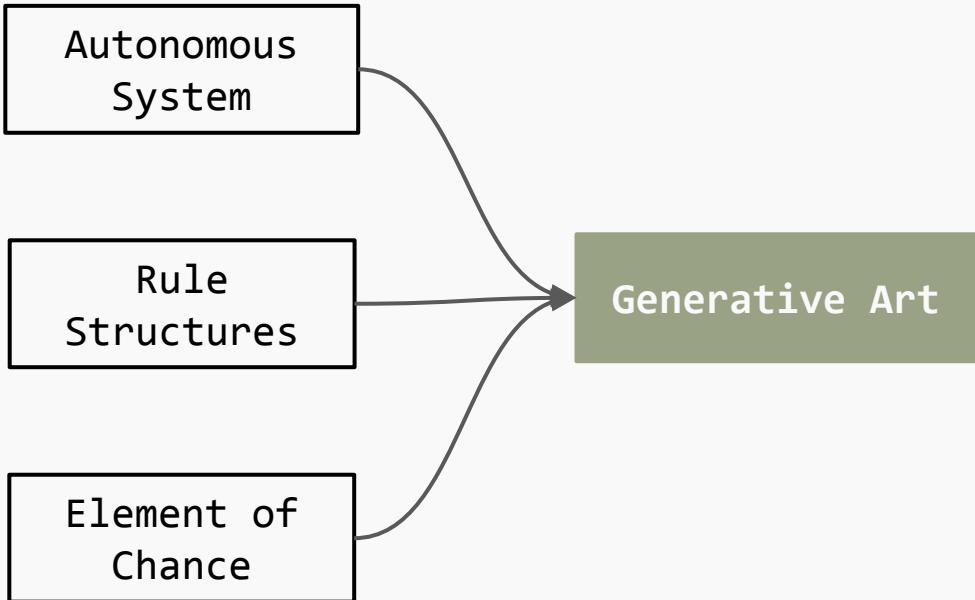
- *Charlotte Kent, Beyond the Janus-Faced Typologies of Art and Technology*

# WHAT IS GENERATIVE ART?

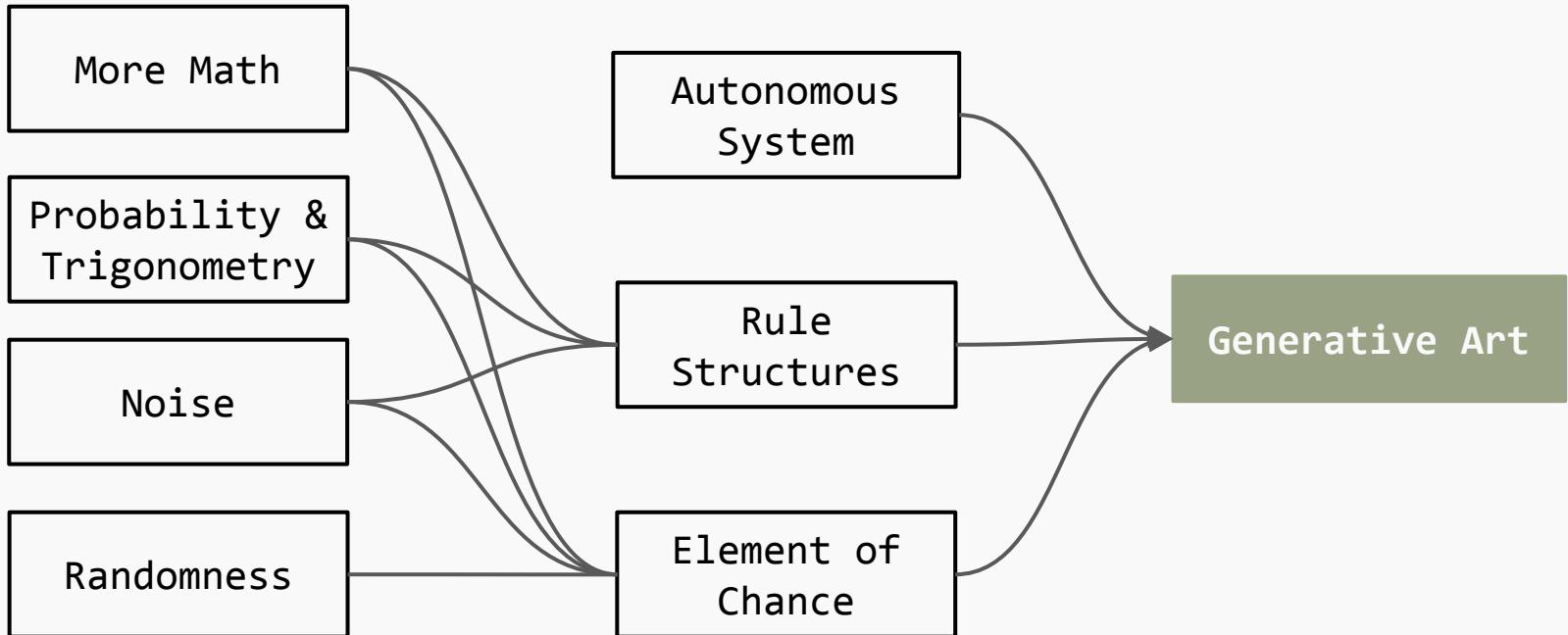
“Generative art operates within a rule structure but has an element of chance that is crucial to what many artists enjoy about it. The final work is partly produced by an autonomous system, which may be strictly regulated by the rules or operate within parameters.”

- *Charlotte Kent, Beyond the Janus-Faced Typologies of Art and Technology*

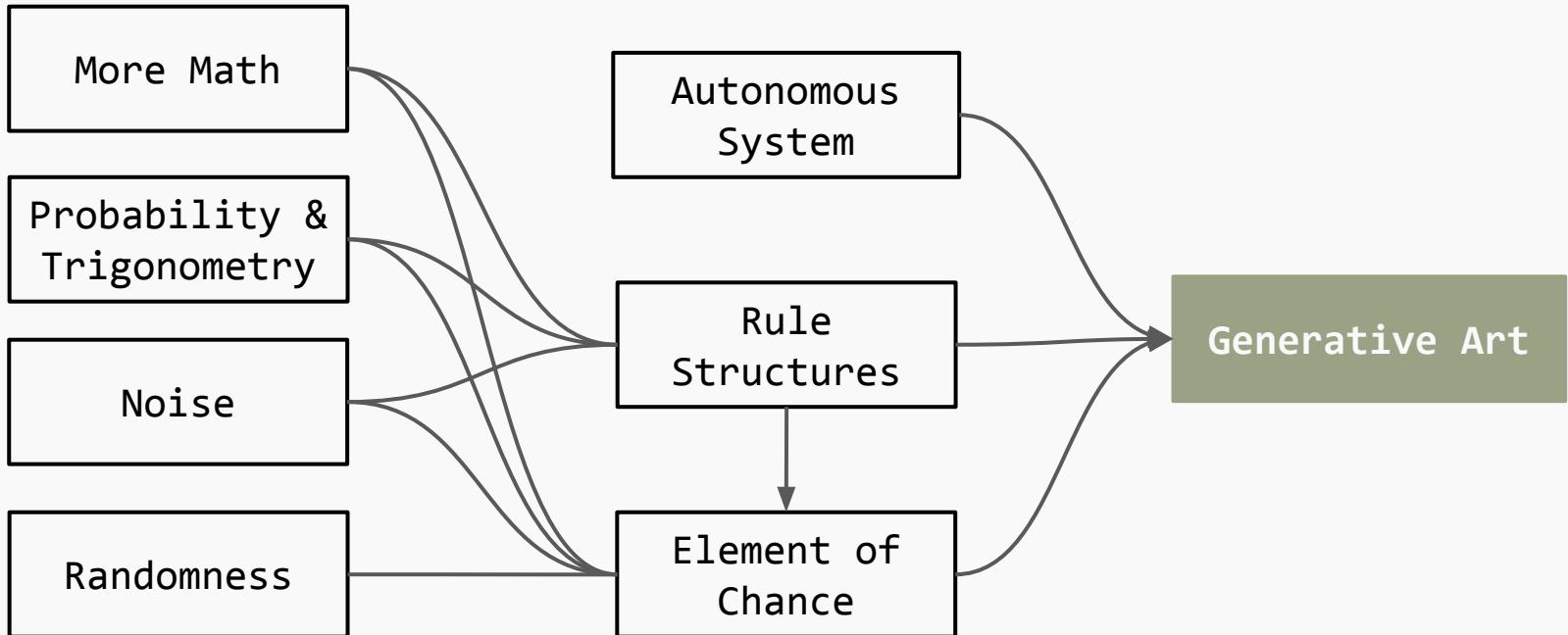
# WHAT IS GENERATIVE ART?



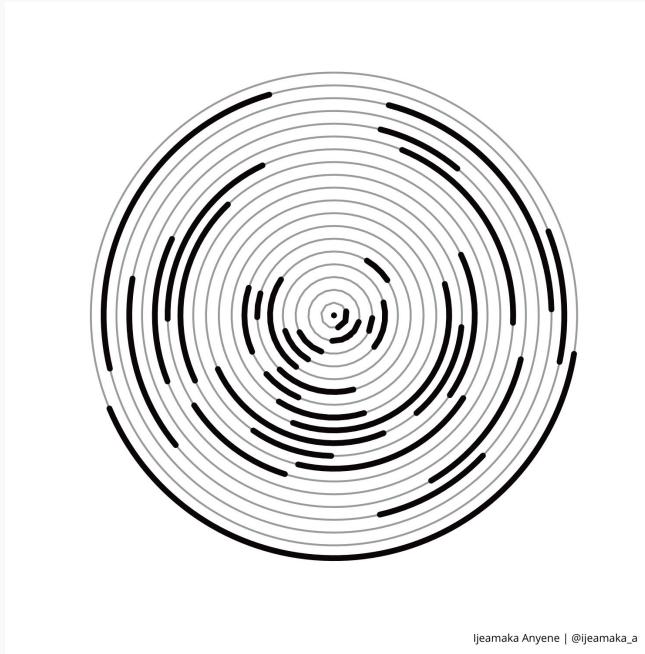
# WHAT IS GENERATIVE ART?



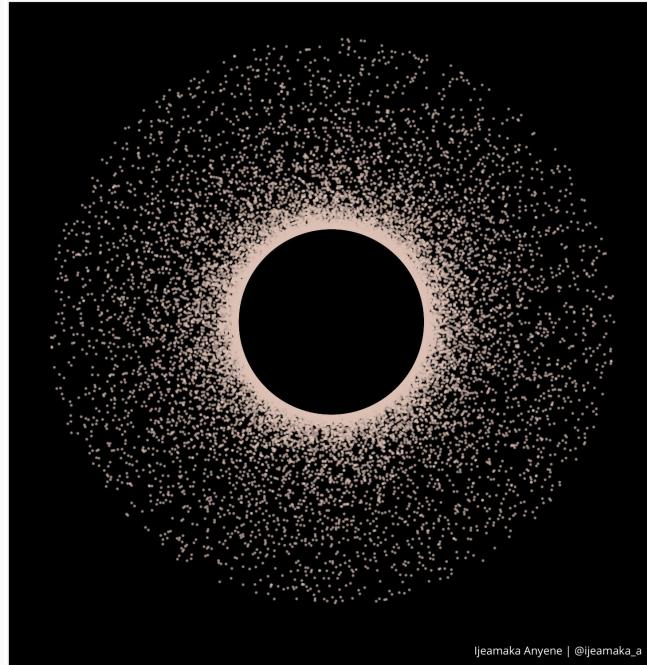
# WHAT IS GENERATIVE ART?



# WHY CREATE GENERATIVE ART?



Pattern 08, Radial Patterns in  
ggplot2 (2021)



Pattern 31, Radial Patterns in  
ggplot2 (2021)

Fit data to idea, not idea to data

# CREATING GENERATIVE ART

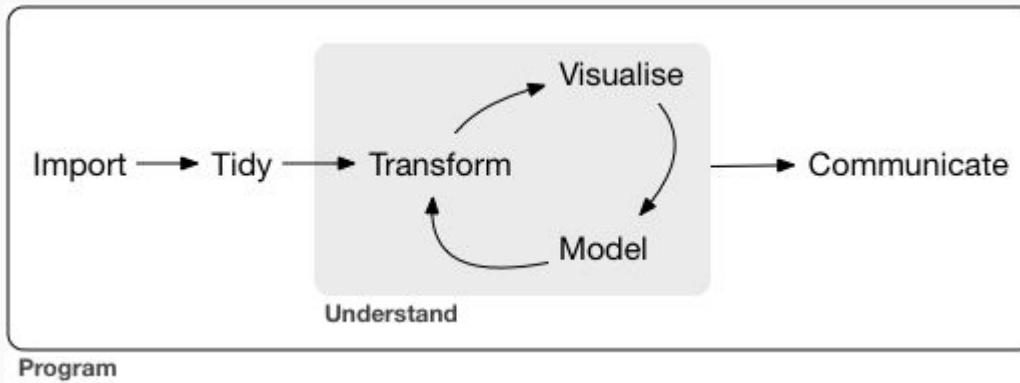
---

p5.js

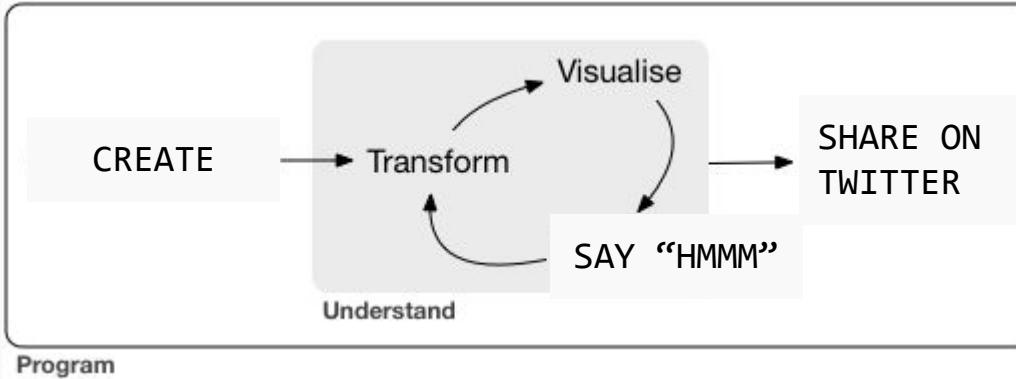


Processing

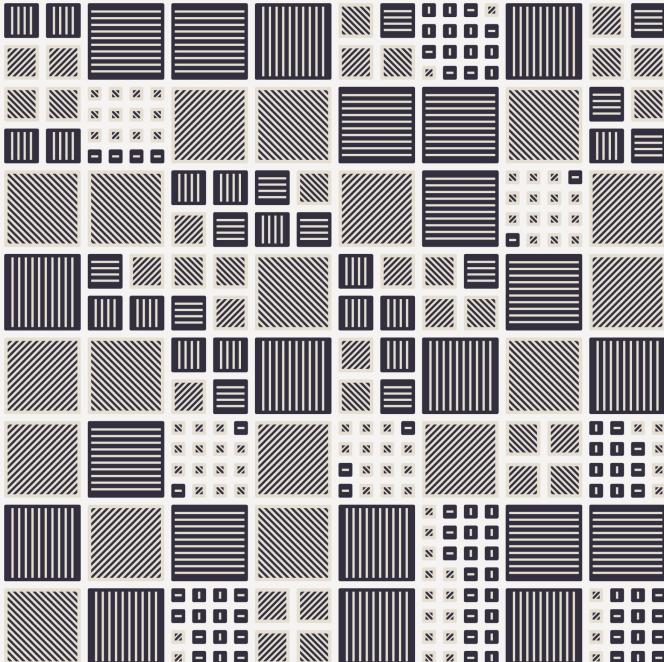
# WHY IN R?



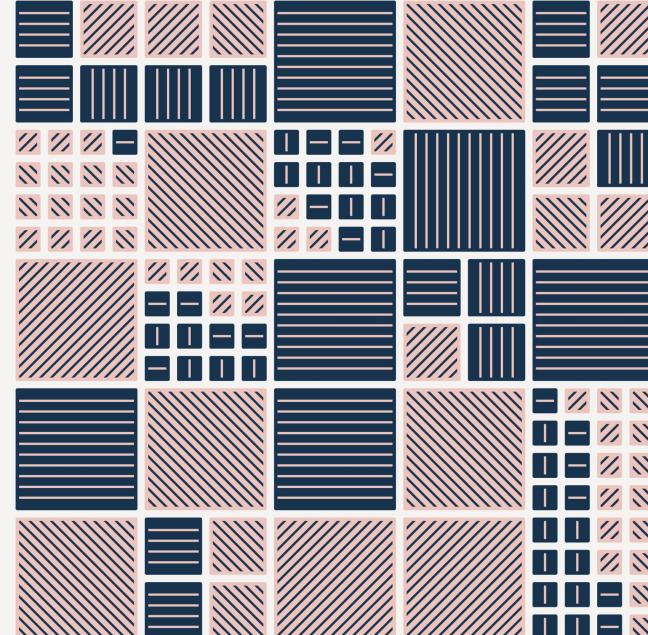
# WHY IN R?



# GENERATIVE ART SYSTEM

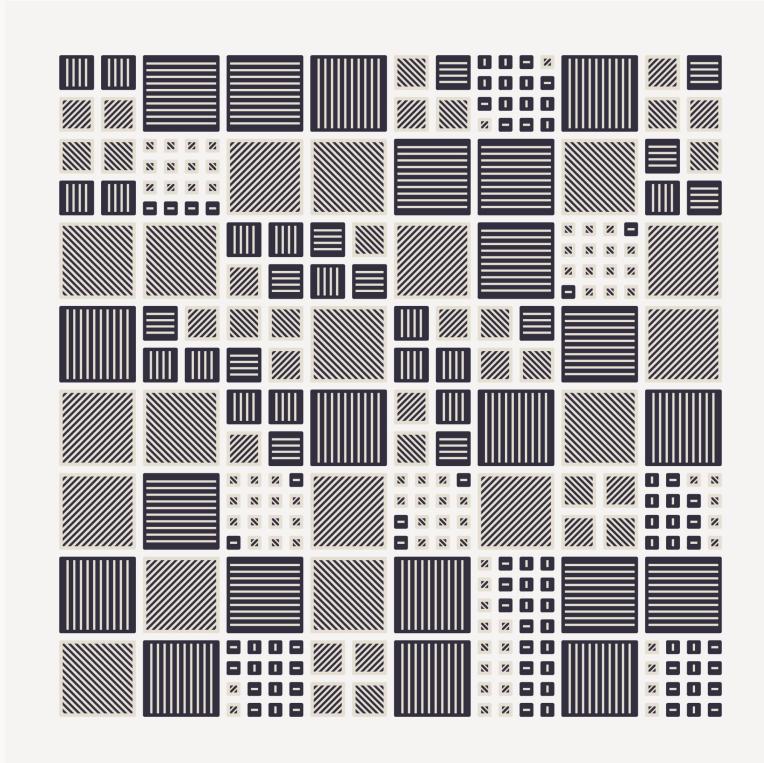


Seed 1959

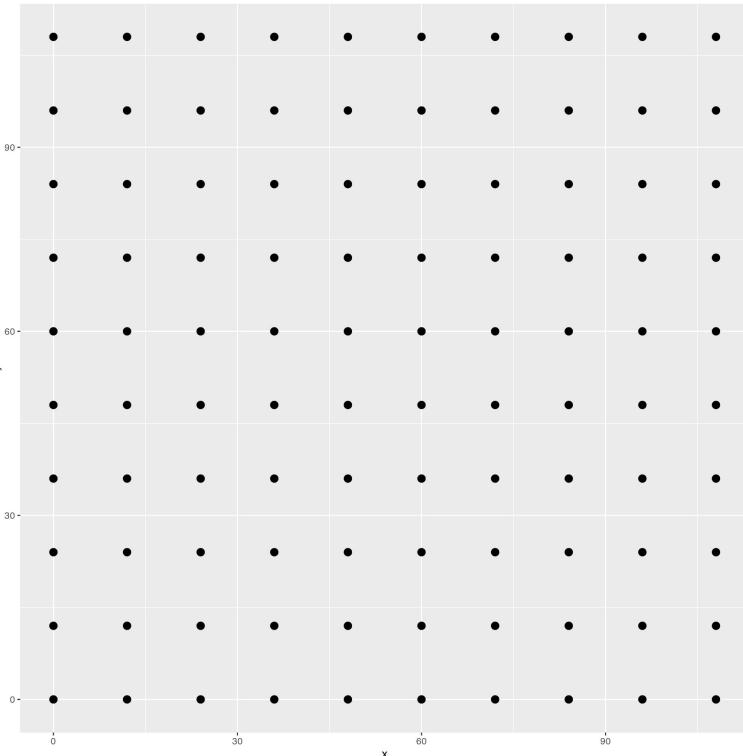


Seed 237

# RULE STRUCTURES



Seed 1959 - Final Product



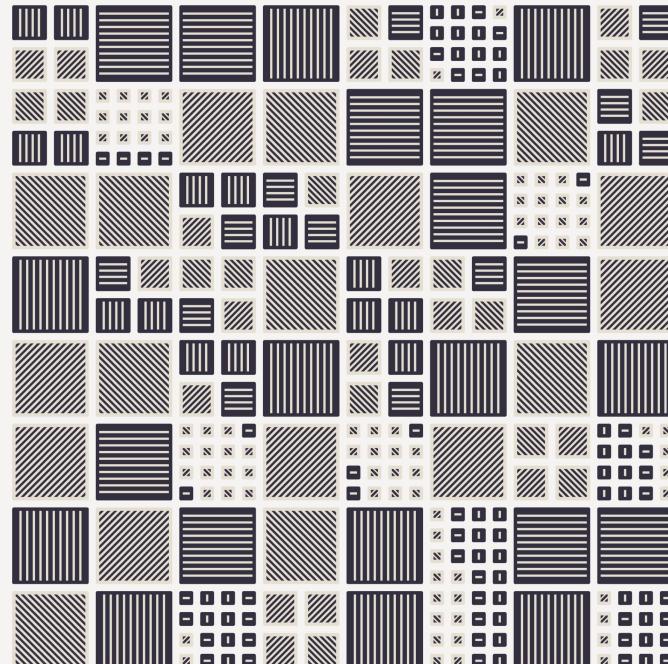
Seed 1959 - Underlying Structure

# RULE STRUCTURES

Grid with squares of various sizes

Each square will have vertical, horizontal, or diagonal lines

Square can have one color as background and another color for lines



Seed 1959

# RULE STRUCTURES

```
subdivide_grid =  
function(x, y,  
width){
```

*Turns an evenly spaced grid of x, y coordinates into an irregular grid*

```
}
```

```
hatch_lines =  
function(x, y,  
width){
```

*Takes x, y coordinates of irregular grids and turns them into hatch marks*

```
}
```

```
select_colors =  
function(x, y,  
color_palette){
```

*Takes x, y coordinates of squares and assigns a color to `fill` and `color`*

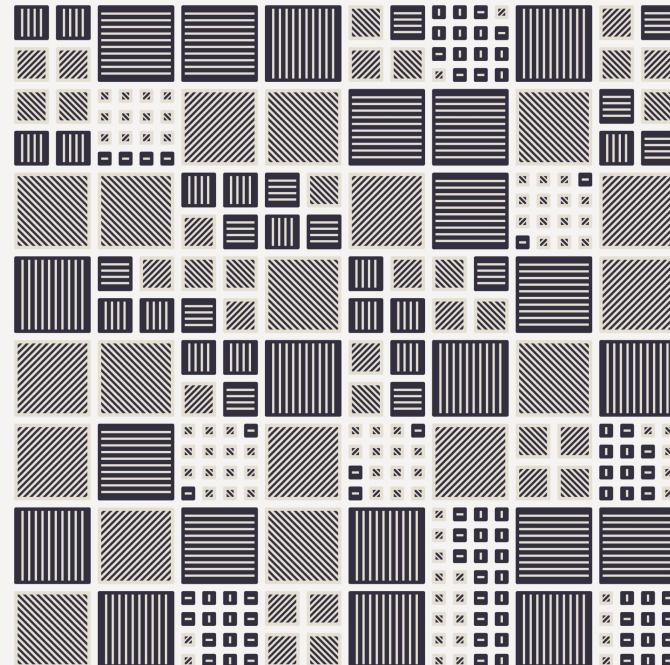
```
}
```

# RULE STRUCTURES

```
subdivide_grid =  
function(x, y, width){
```

*Turns an evenly spaced grid of  
x, y coordinates into an  
irregular grid*

```
}
```



Seed 1959

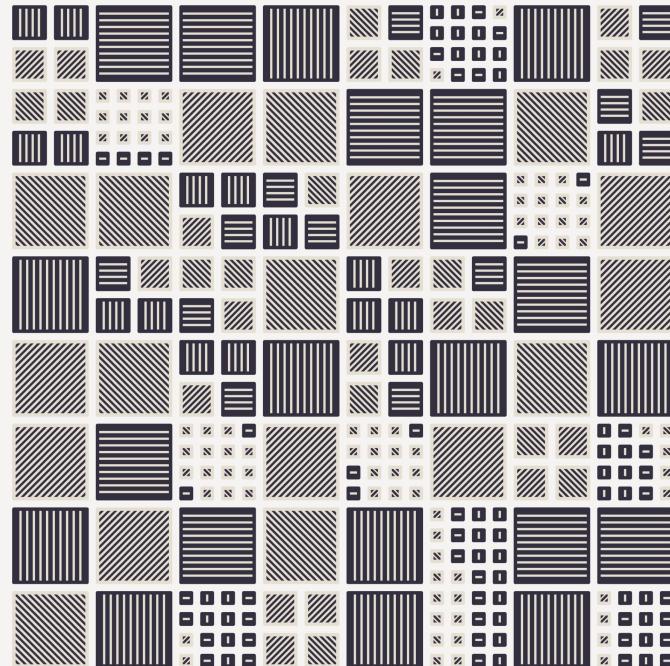
# RULE STRUCTURES

```
subdivide_grid =  
function(x, y, width){
```

*Turns an evenly spaced grid of  
x, y coordinates into an  
irregular grid*

```
}
```

How does the function know  
which x,y coordinate to  
turn into a small, medium,  
or large square?



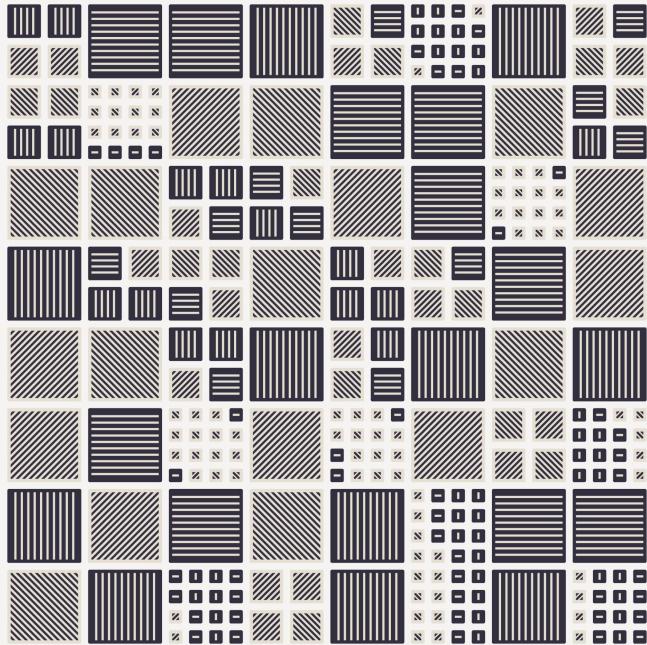
Seed 1959

# ELEMENT OF CHANCE

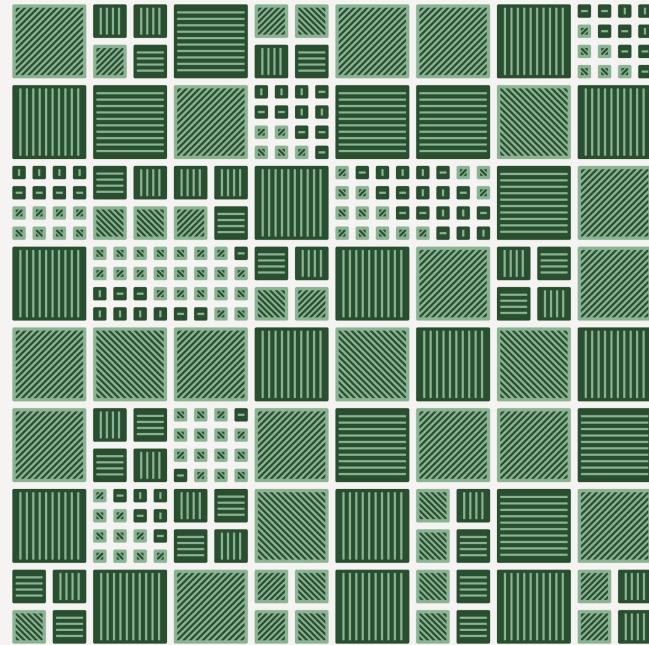
---

The artist gives away a level of control to the generative system

# ELEMENT OF CHANCE



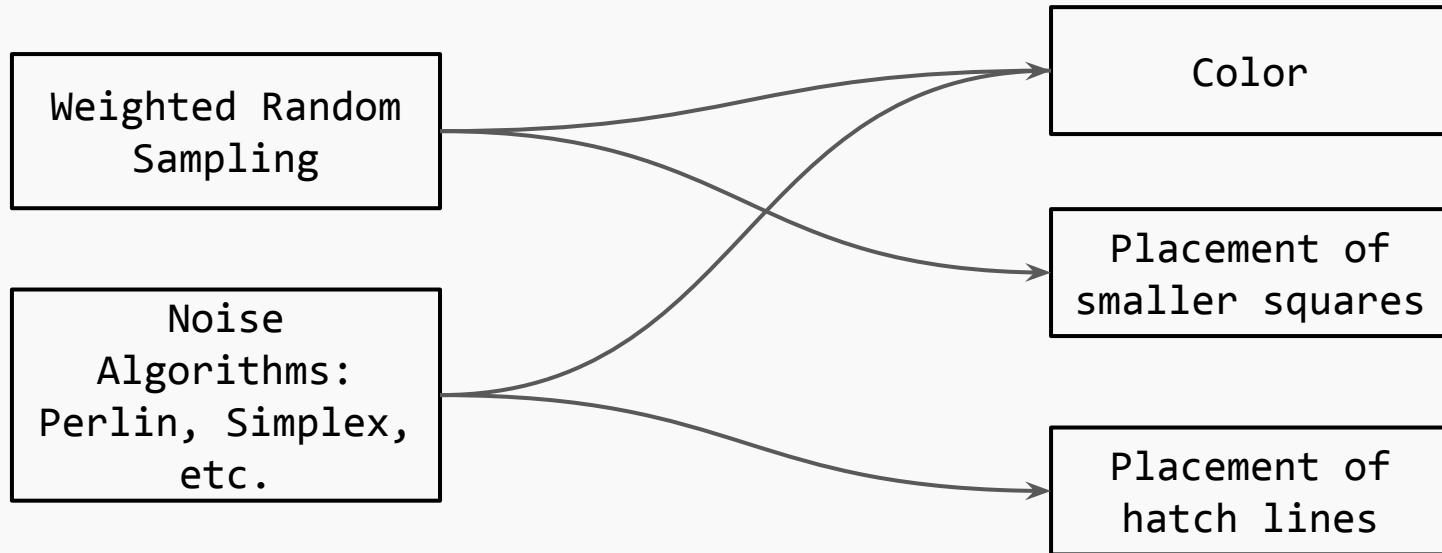
Seed 1959



Seed 1146

**Differences:** Color, placement of smaller squares  
and placement of hatch lines

# ELEMENT OF CHANCE



# ELEMENT OF CHANCE

Random Samples



Probability Weights

**Weighted random sampling for  
probabilistic aesthetics**

# ELEMENT OF CHANCE

Random Samples



Probability Weights

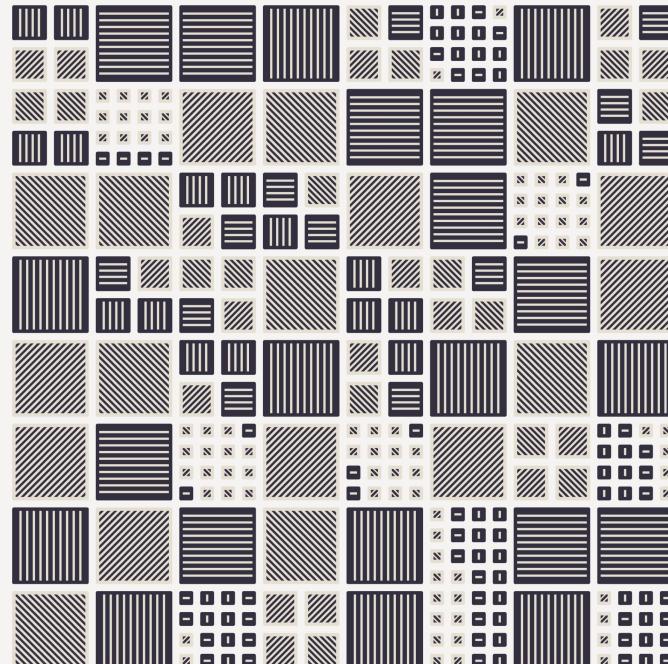
**Weighted random sampling for  
probabilistic aesthetics**

Give features or options to aesthetics in your system, different probabilities of occurring.

# PLACEMENT OF SMALLER SQUARES

## Weighted Random Sampling

```
sample(  
  c("smallest squares",  
    "medium squares"  
    "largest squares"),  
  prob of selection =  
  c(0.25, 0.25, 0.75)  
)
```



Seed 1959

Element of Chance

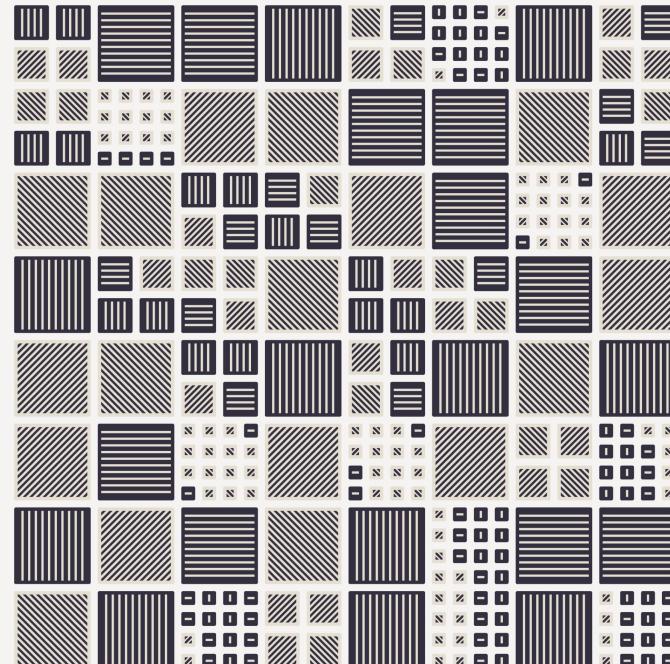
# SELECTION OF COLOR

## Weighted Random Sampling

```
color_palette1 =  
  hexcodes = c(c1, c2, c3, c4, c5),  
  prob = c(0.90, 0.10, 0.10,  
         0.50, 0.50)
```

..and so forth

```
sample(  
  color_palette1 hex codes,  
  prob = color_palette1 prob  
)
```



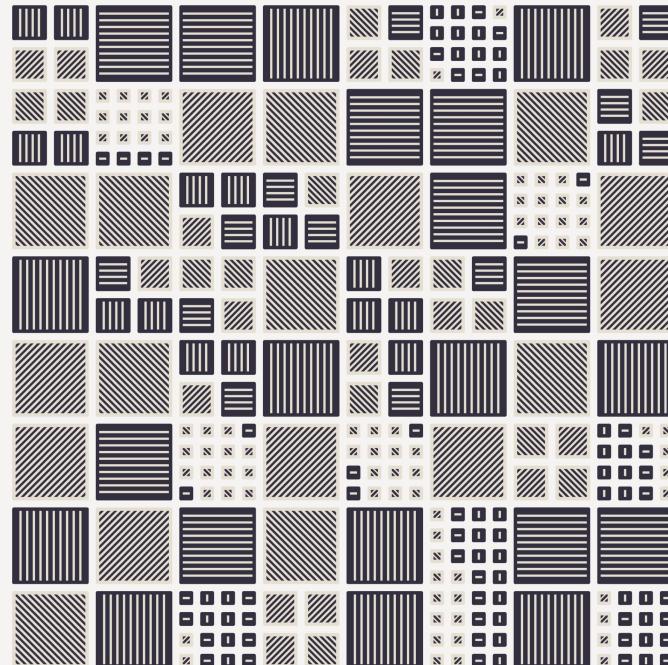
Seed 1959

Element of Chance

# PLACEMENT OF COLOR

## Noise Algorithm

First, let us explain what  
is a noise algorithm



Seed 1959

Element of Chance

# WHAT IS NOISE?

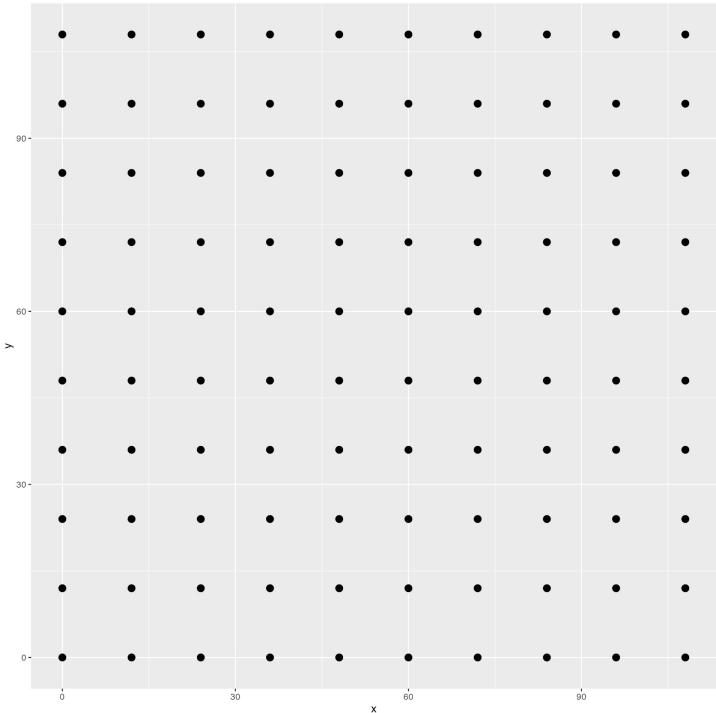
## Simple Definition

A way of incorporating visual appearance of movement into a static piece

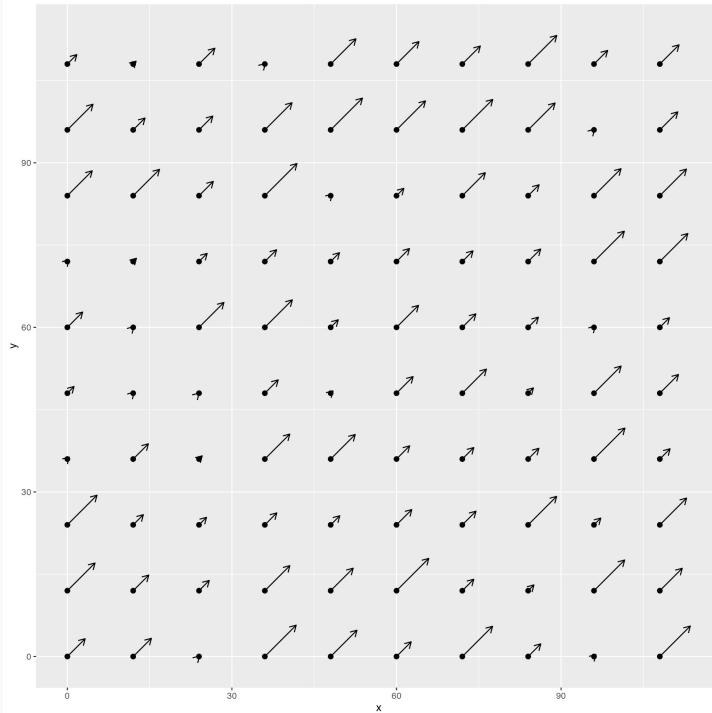
## More Complex but Still Simple

Incorporation of fluctuations in the data. These fluctuations are often in the form of multidimensional patterns or mathematical functions

# NOISE - PROBABILITY DISTRIBUTION

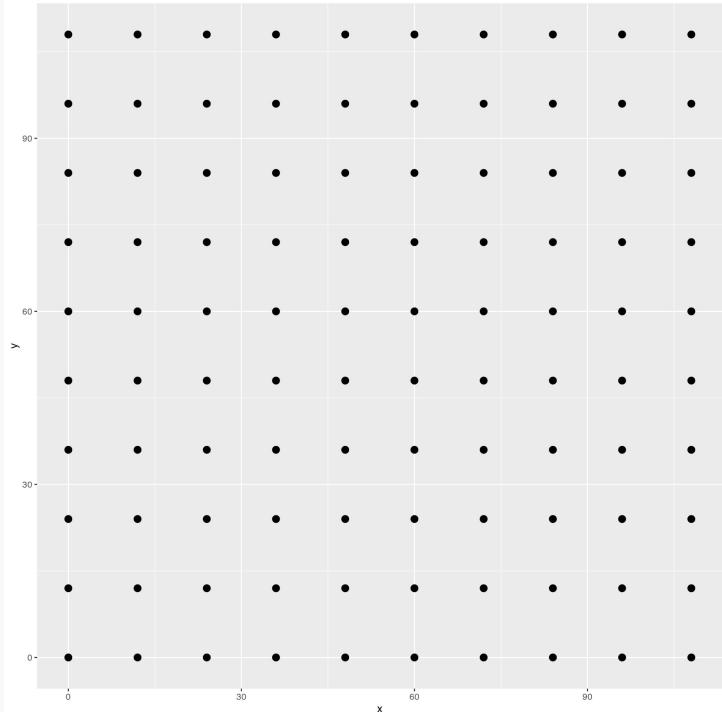


Original Grid Structure

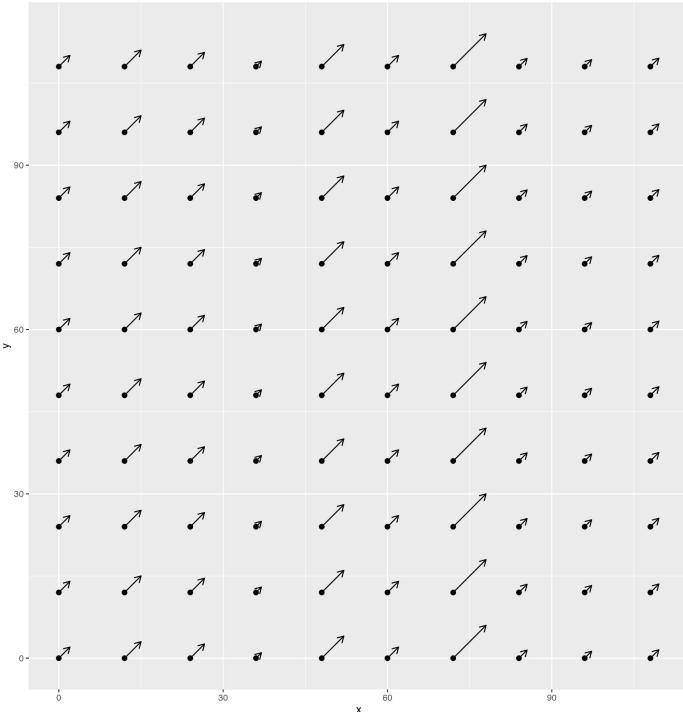


Random Sampling from a Uniform Distribution

# NOISE - PROCEDURAL GENERATORS



Original Grid Structure

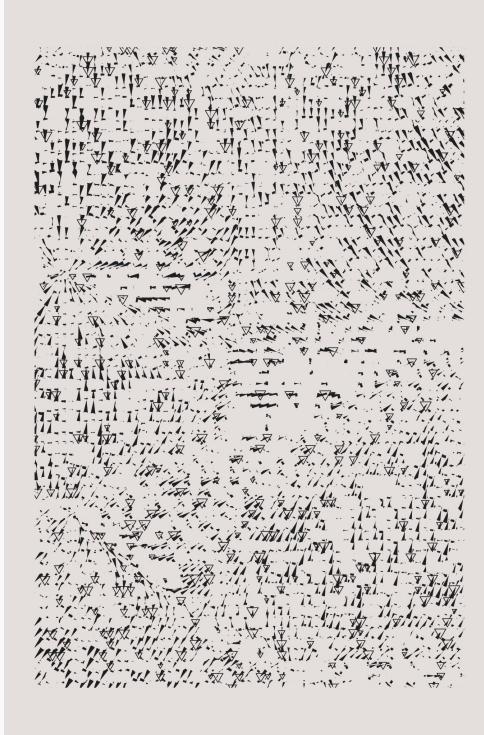


Generated values from perlin  
noise generator

# PROCEDURAL NOISE GENERATORS



Incursions, Water Colours  
Series by Danielle Navarro



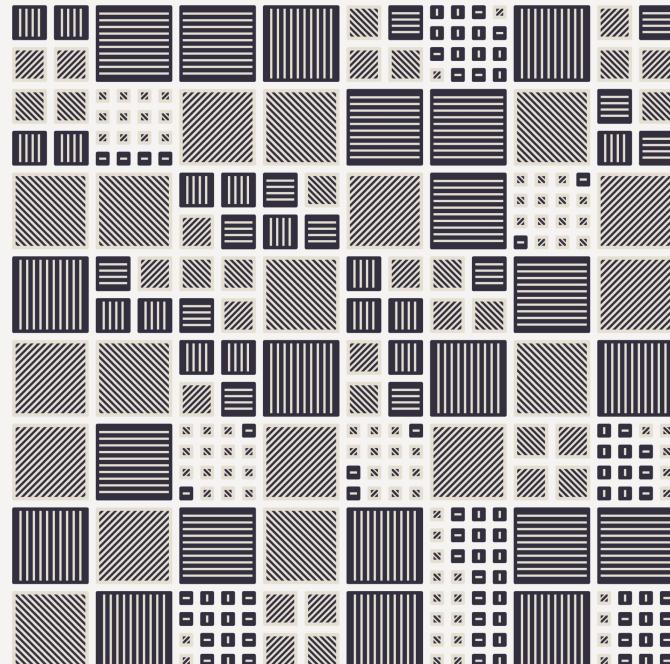
Noise Study #161 by  
Jacquie Tran

# PLACEMENT OF COLOR

## Noise Algorithm

```
noise =  
ambient::gen_waves(  
    x column in grid,  
    y column in grid,  
    frequency of noise)
```

Returns a vector of noise values for each x, y coordinate provided in the grid



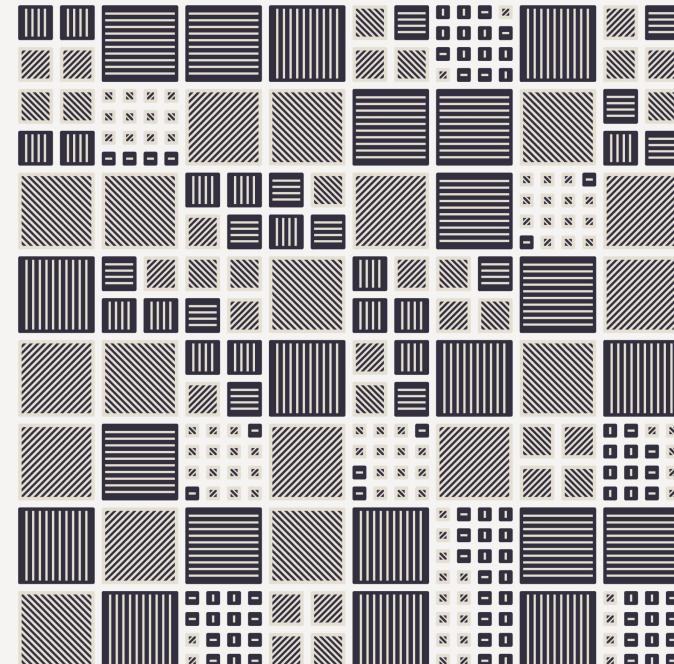
Seed 1959

Element of Chance

# PLACEMENT OF COLOR

## Noise Algorithm

Noise Value	Color Option
0 - 1	Black bg, beige lines
1+ - 2	Black bg, beige lines
2+ - 3	Beige bg, black lines
....	



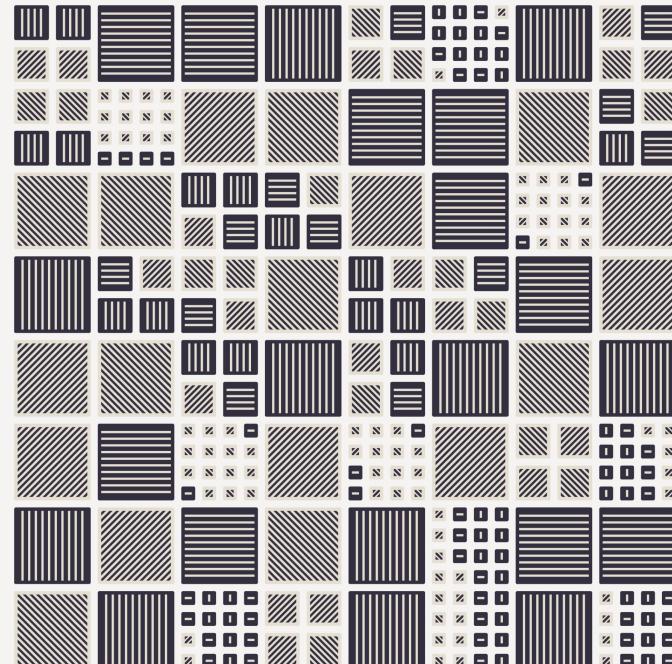
Seed 1959

Element of Chance

# PLACEMENT OF HATCH LINES

## Noise Algorithm

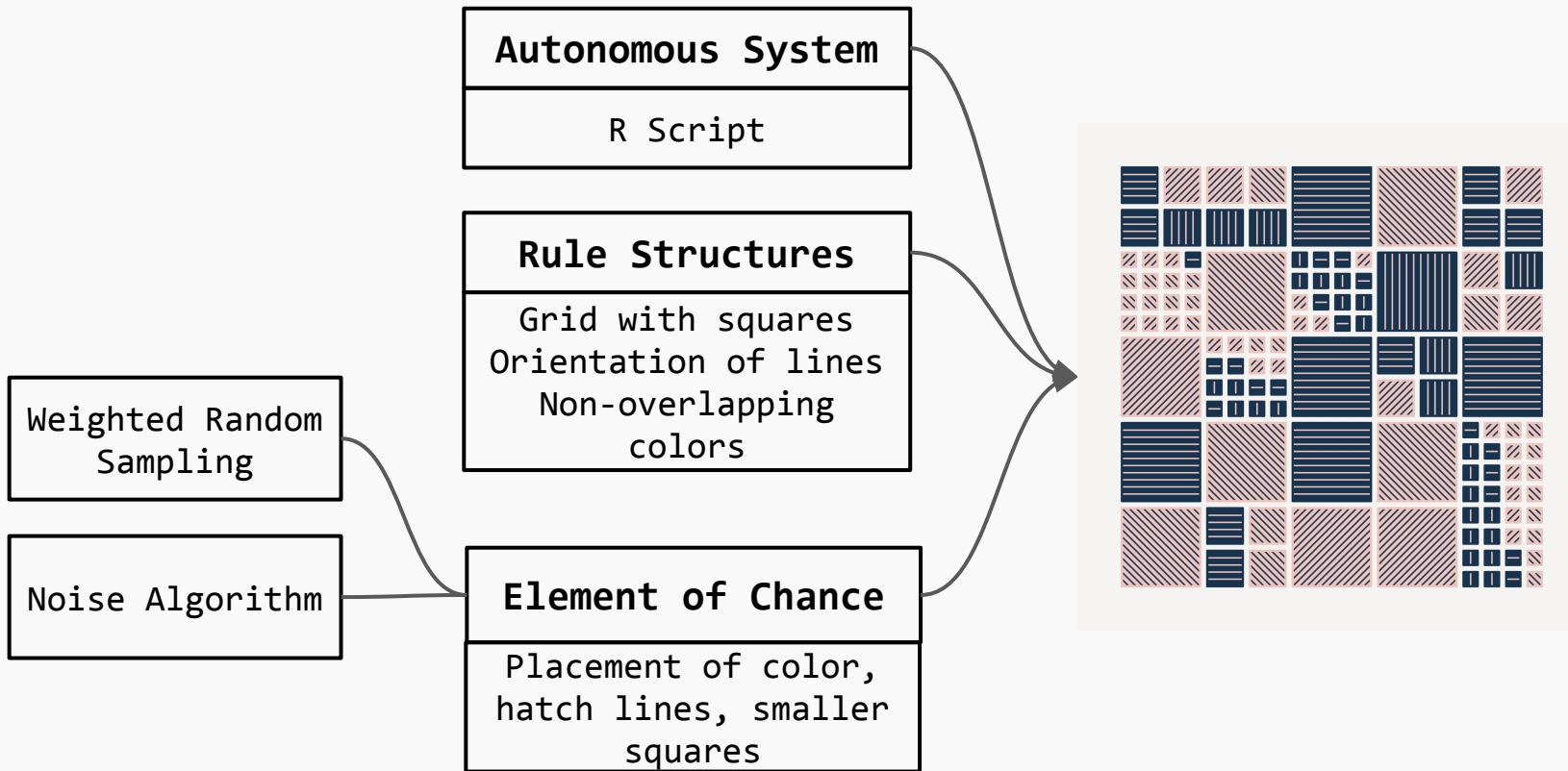
Noise Value	Line Option
0 - 1	Vertical Lines
1+ - 2	Horizontal Lines
2+ - 3	Diagonal Lines
....	

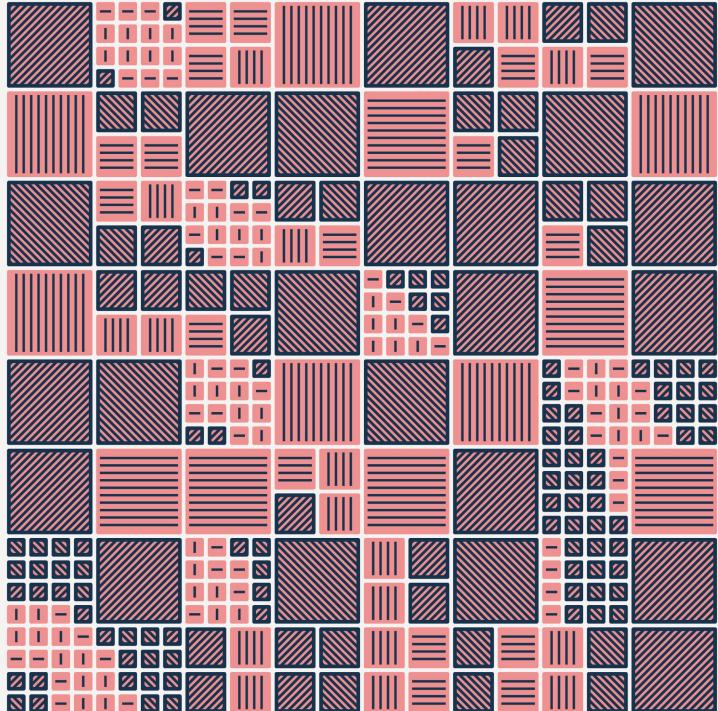


Seed 1959

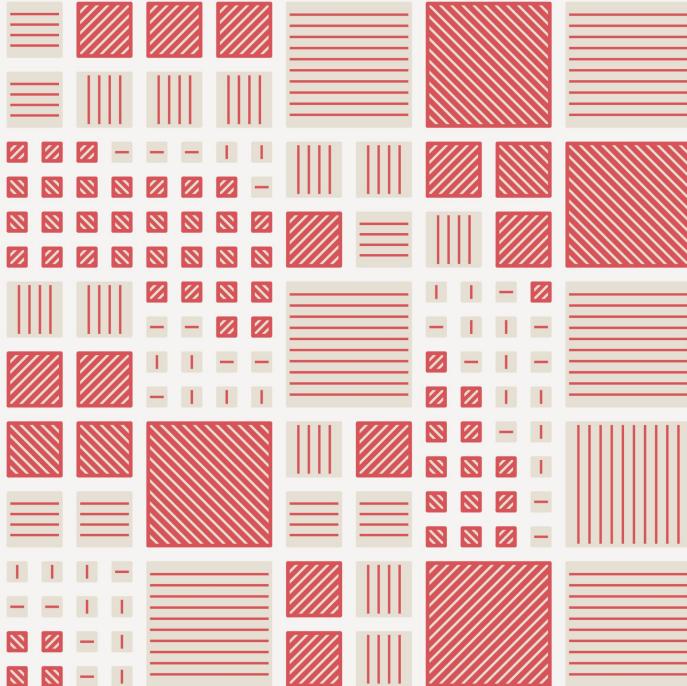
Element of Chance

# WHAT IS GENERATIVE ART?





Seed 145



Seed 1561

# WHERE YOU CAN FIND ME

Twitter: ijeamaka\_a

Portfolio: ijeamaka.art

