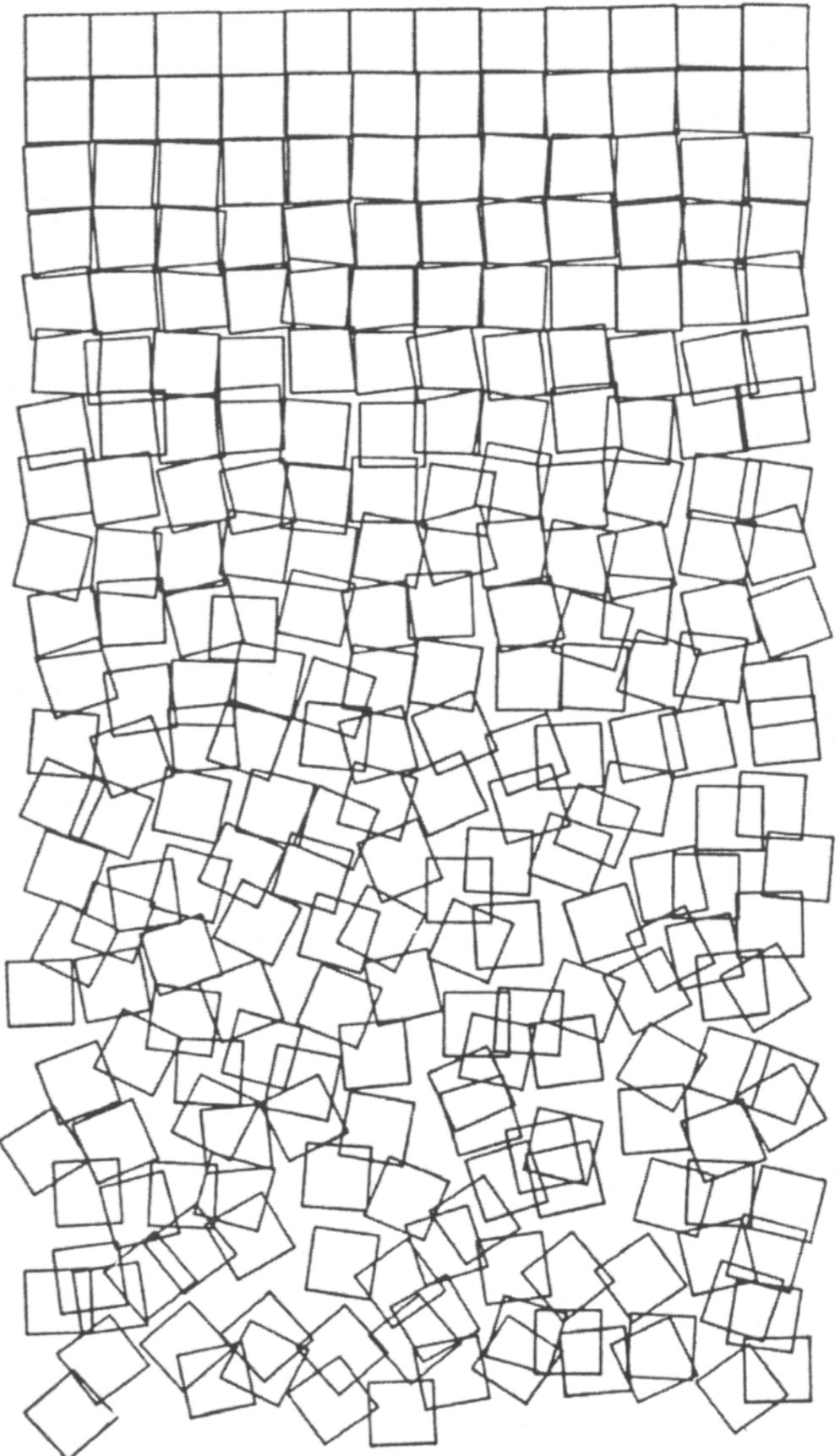
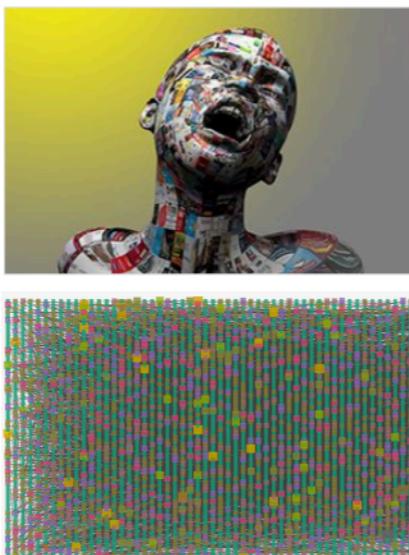


RANDOMNESS & CREATIVE CODE

DANIEL C. HOWE
UNIVERSITY OF THE ARTS
LONDON, JULY 9, 2021



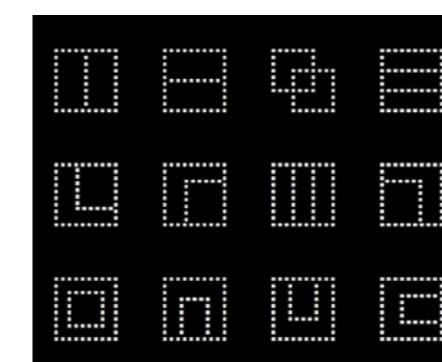
Schotter (Gravel) - Georg Nees, 1968



desperate course was to ask a fellow prov
of mine to trace Ah-Q through his crimin
ord. [REDACTED] got
: no such individual – by the name of Ah
Ah-Gui, or anything like it – existed. Th
I had no way of finding out whether this
deed the case, or whether my acquaintar



swimming back alone to the bathing rock, head under, he reaches out to grasp the familiar ledge, a fold in the rose-tinged granite just above the surface of the waist-deep water at its edge, by the stone which he can see clearly though unfocused through the lake water. but he has not reached it yet, his expectant hand breaks the surface, down through 'empty' water and his knuckles graze the rock, his face will not rise up, dripping and gasping, out of the water, instead, it 'falls' forward and, momentarily, down, into the shallows, stumbles, breathes a choking mouthful, which he



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SINCE THE BEGINNING OF THE 20TH CENTURY, RANDOMNESS IS ONE OF THE KEY PIECES THAT CONSTITUTE THE LANGUAGE OF ART.

LALI BARRIÈRE

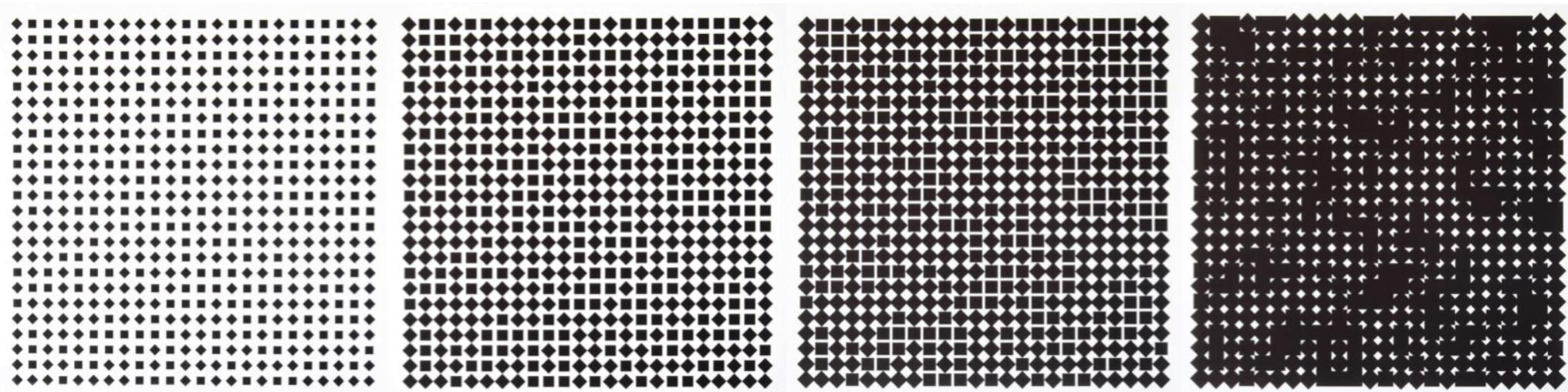
- INTRODUCTION: RESOURCES
 - THEORETICAL: DEFINITIONS
 - AESTHETIC: EXAMPLES IN ART
 - STRATEGIC: WHY USE RANDOMNESS?
 - PRACTICAL: USING RANDOMNESS EFFECTIVELY
-

OBJECTIVES

RESOURCES



<https://github.com/dhowe/rws>



VERA MOLNAR, CARRÉS EN
2 POSITIONS 1-4 , 2011-13

A screenshot of a GitHub repository page for `dhowe/rws`. The page shows a commit history for the `master` branch, which includes updates to `README.md`, creation of `RandomRects.js`, `RandomWalk1.js`, and `RandomWalk2.js`, renaming `Recode-Quads.js`, creating `Recode-Schotter.js`, and uploading `randomness.png`. The most recent commit was made 15 seconds ago. Below the commit history is the `README.md` file, which contains the following content:

```
A micro-workshop on randomness

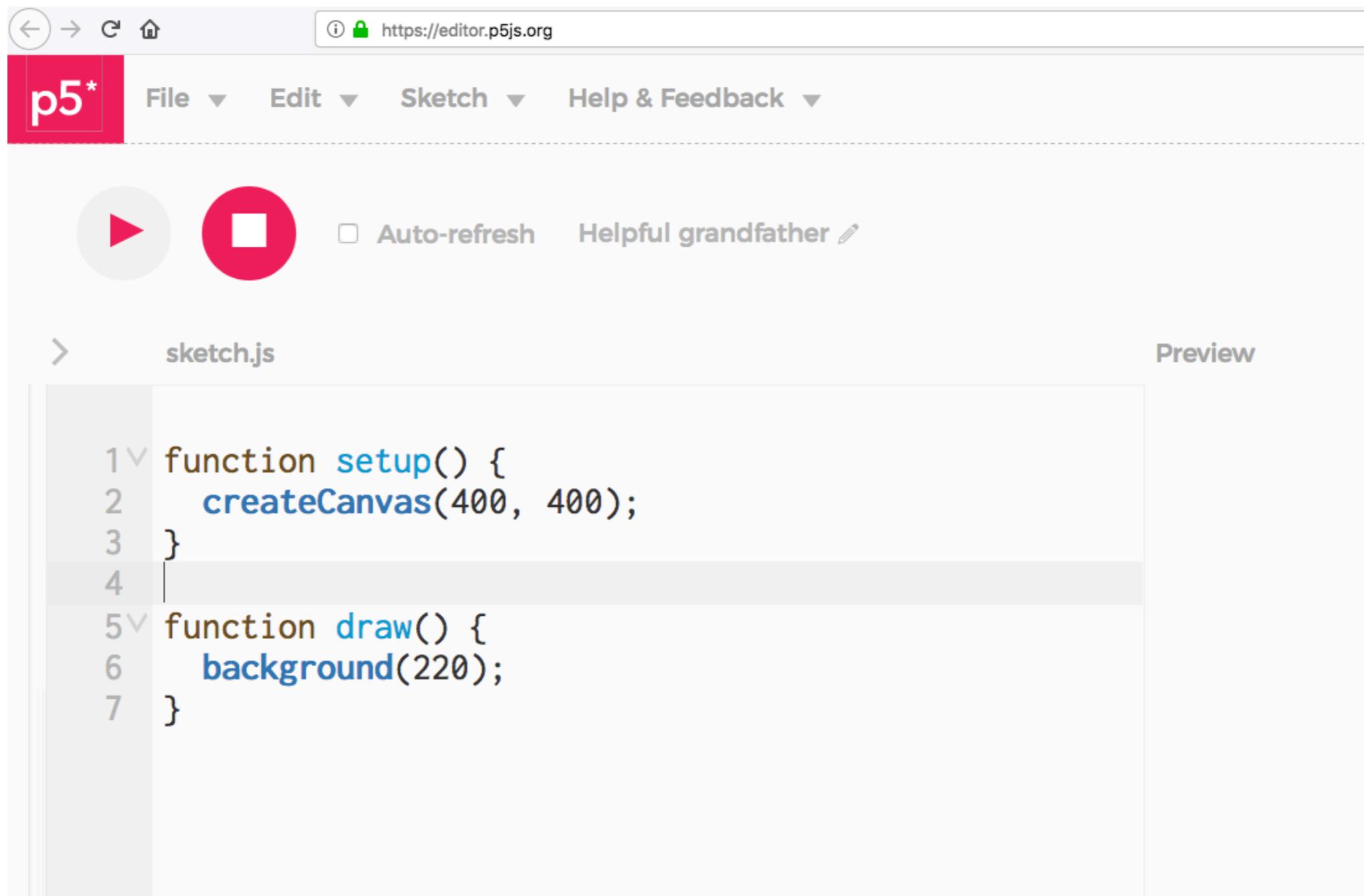
Resources


- Lecture slides \(.pdf\)
- p5.js editor and reference
- Vera Molnar on randomness (2-min video)

```

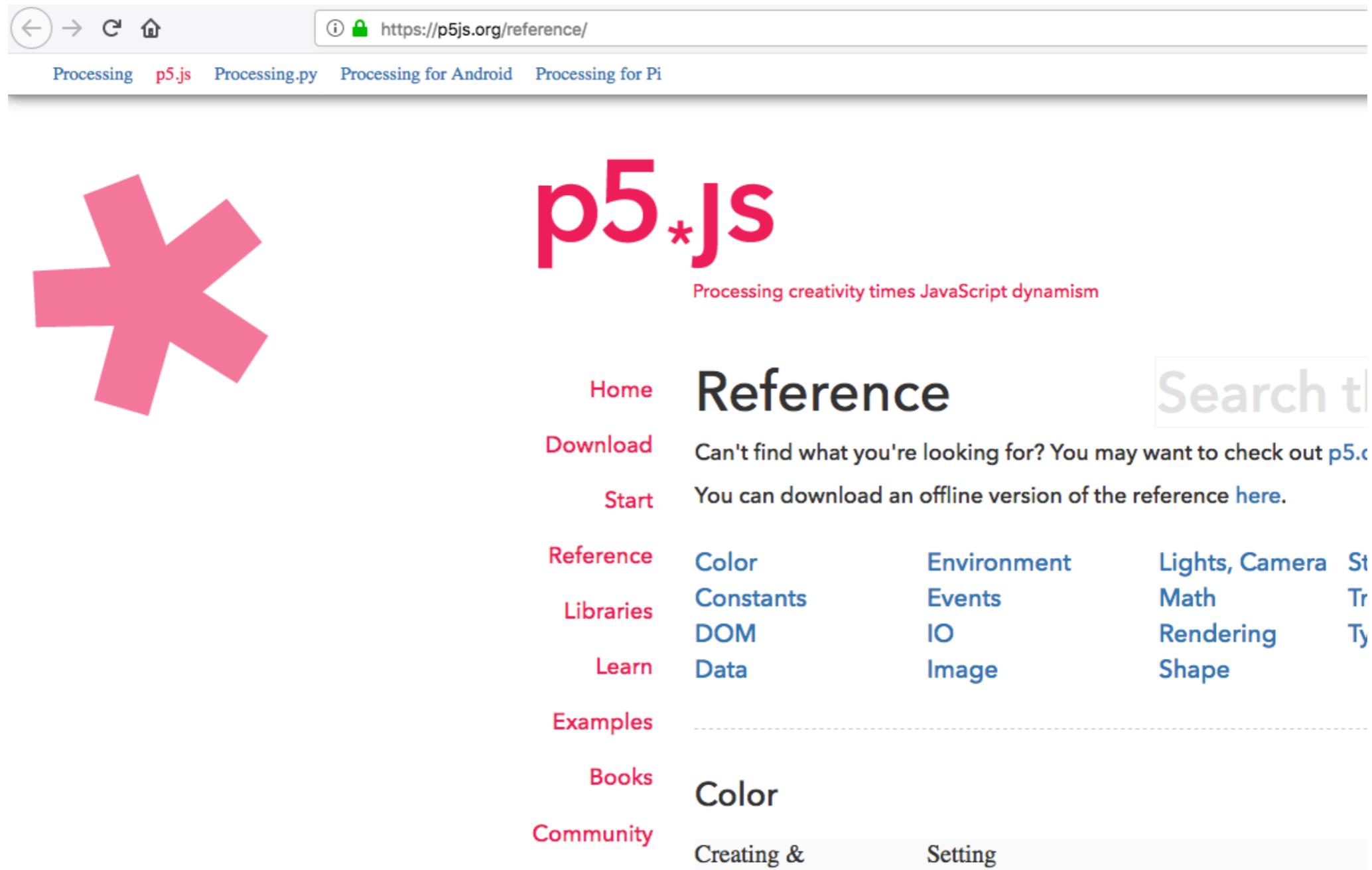
<https://raw.githubusercontent.com/dhowe/rws/master/slides.pdf>

TOOLS: P5.JS EDITOR



<https://editor.p5js.org>

TOOLS: REFERENCE



The screenshot shows the p5.js reference website at <https://p5js.org/reference/>. The page features a large pink asterisk icon on the left. The title "p5.js" is prominently displayed in pink, with the subtitle "Processing creativity times JavaScript dynamism" below it. A search bar is visible on the right. The main content area includes navigation links like Home, Download, Start, Reference, Libraries, Learn, Examples, Books, and Community. Under the "Reference" section, there are tables for Color, Environment, Math, DOM, Events, IO, Data, Image, Rendering, Shape, and Text. The "Color" section is expanded, showing sub-sections for Creating & Setting.

Processing p5.js Processing.py Processing for Android Processing for Pi

p5.js

Processing creativity times JavaScript dynamism

Home

Download

Start

Reference

Libraries

Learn

Examples

Books

Community

Color

Environment

Math

DOM

Events

IO

Data

Image

Rendering

Shape

Text

Creating &

Setting

Search t

<https://p5js.org/reference/>

RANDOM()

Description

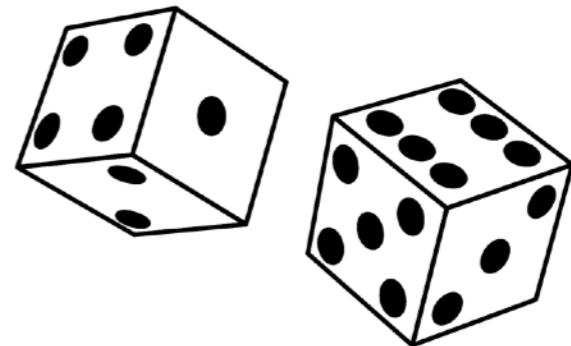
Return a random floating-point number.

Takes either 0, 1 or 2 arguments.

If no argument is given, returns a random number from 0 up to (but not including) 1.

If one argument is given and it is a number, returns a random number from 0 up to (but not including) the number.

If two arguments are given, returns a random number from the first argument up to (but not including) the second argument.



QUICKSTART

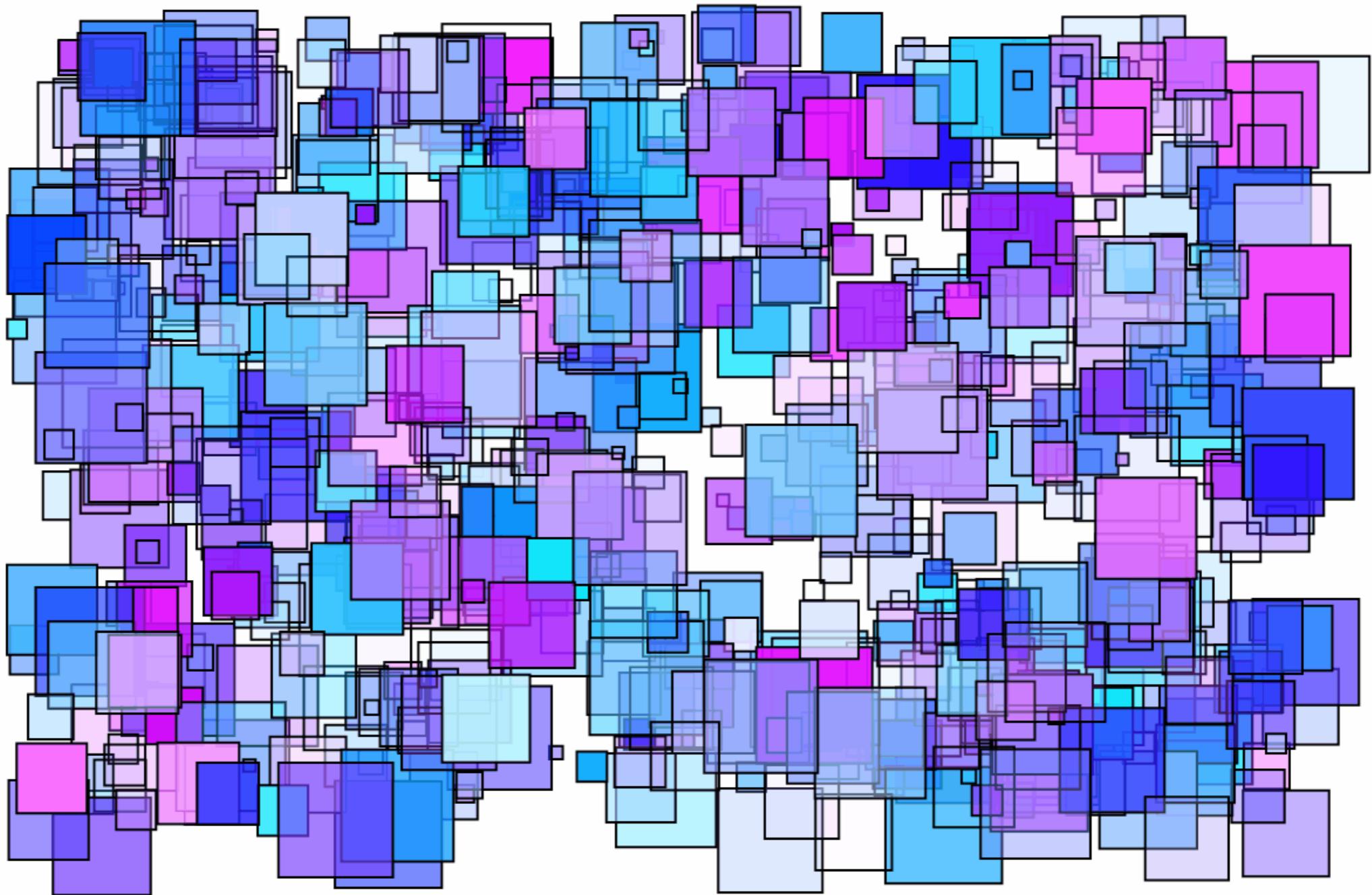
> sketch.js*

```
1  function setup() {
2    createCanvas(500, 400);
3    background(255);
4  }
5
6  function draw() {
7    let x = random(0, width);
8    let y = random(0, height);
9    let sz = random(5, 50);
10
11   let r = random(0, 255);
12   let g = random(0, 255);
13   let a = random(0, 255);
14
15   fill(r, 255-g, 255, a);
16   square(x, y, sz);
17 }
18
19
20
```

Preview

file: [RandomRects.js](#)

QUICKSTART



THEORETICAL

CAN WE DEFINE RANDOMNESS ?

RANDOMNESS HAS AN INCREDIBLY POWERFUL PLACE IN OUR CULTURE. IF YOU THINK ABOUT IT, YOU CAN SEE IT DRIVING THE ALGORITHMS THAT RUN OUR INFORMATION ECONOMY, PATTERNS THAT MAKE UP THE TRAFFIC OF OUR CITIES, AND ON OVER TO THE WAY THE STARS AND GALAXIES FORMED.

DJ SPOOKY

HOW TO DEFINE RANDOMNESS ?

RANDOMNESS

IS '2' A RANDOM NUMBER ?

RANDOMNESS

A NUMBER IS RANDOM WHEN THERE
IS AN EQUAL PROBABILITY FOR IT TO
BE SELECTED FROM A SET OF
POSSIBLE VALUES...

RANDOMNESS



**CONSIDER THE FOLLOWING TWO
SEQUENCES OF 20 COIN FLIPS:**

- A. HTHHTTTHTTTHTHHTHTHH
- B. TTTTTTTTTTTTTTTTTTT

WHICH IS MORE LIKELY, A OR B?



ACCORDING TO PROBABILITY, THE TWO ARE EQUIALLY LIKELY, EACH HAVING A CHANCE OF 1 IN 1024

- A. HTHHTTTHTTTTHHTHHHTHTHH
- B. TTTTTTTTTTTTTTTTTTT

BUT WHICH SEQUENCE IS MORE RANDOM?

LESS
RANDOM
(SHORTER)



B. TTTTTTTTTTTTTTTTT

write T 20 times

C. TTFFTFFTTFFTTFF

write TTFF 5 times

A. HTHTTHTHTHHTHHHTH

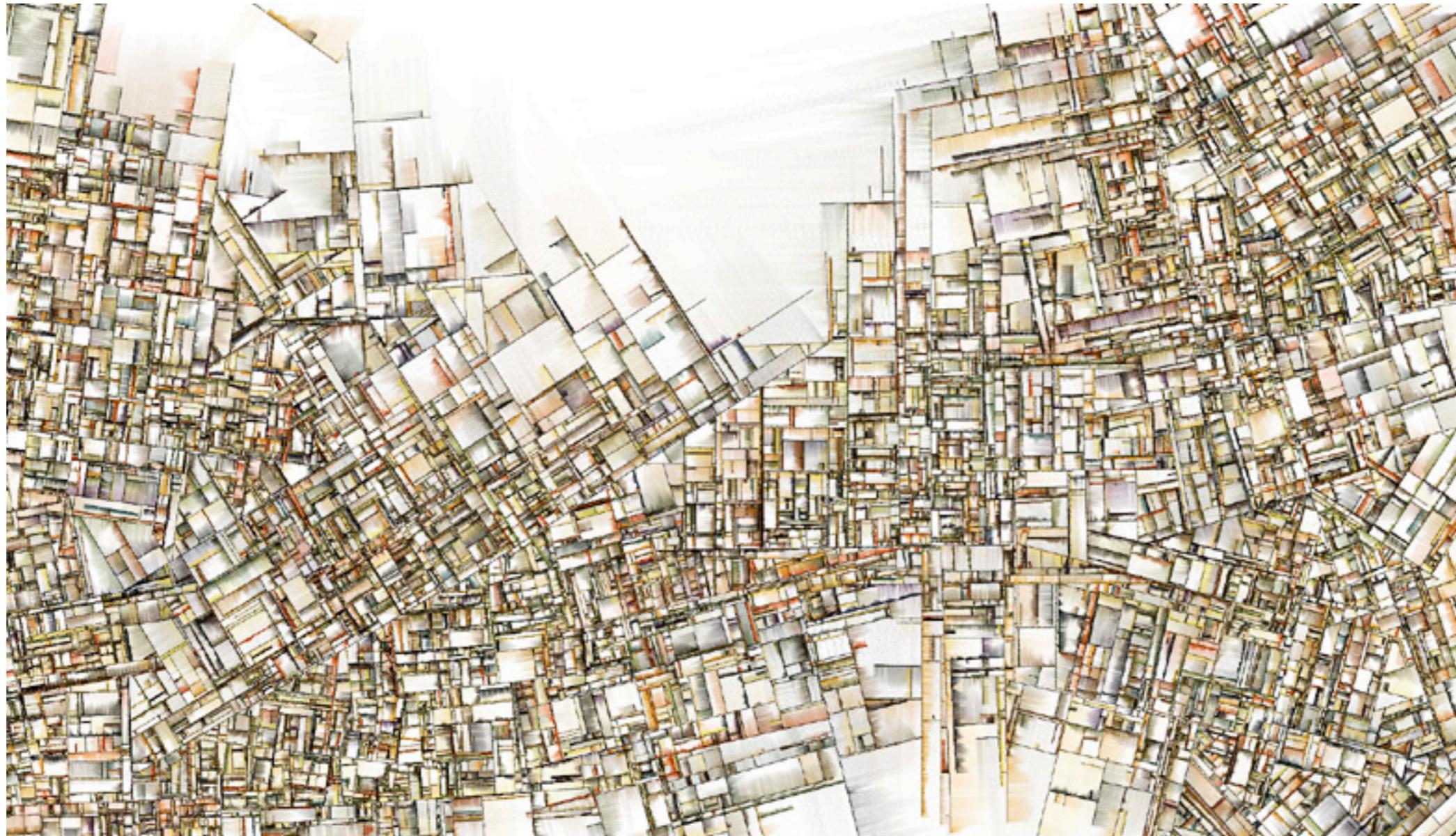
write HTHTHTTHTHTHHTHHHTH

MORE
RANDOM
(LONGER)

from Kolmogorov, 1965

ANOTHER WAY OF THINKING ABOUT
KOLMOGOROV'S APPROACH IS TO ASK ...

IS THERE A PATTERN TO THE SEQUENCE?



Jared Tarbell, Substrate, 2003

RANDOMNESS IN ART + DESIGN

HISTORICAL EXAMPLES

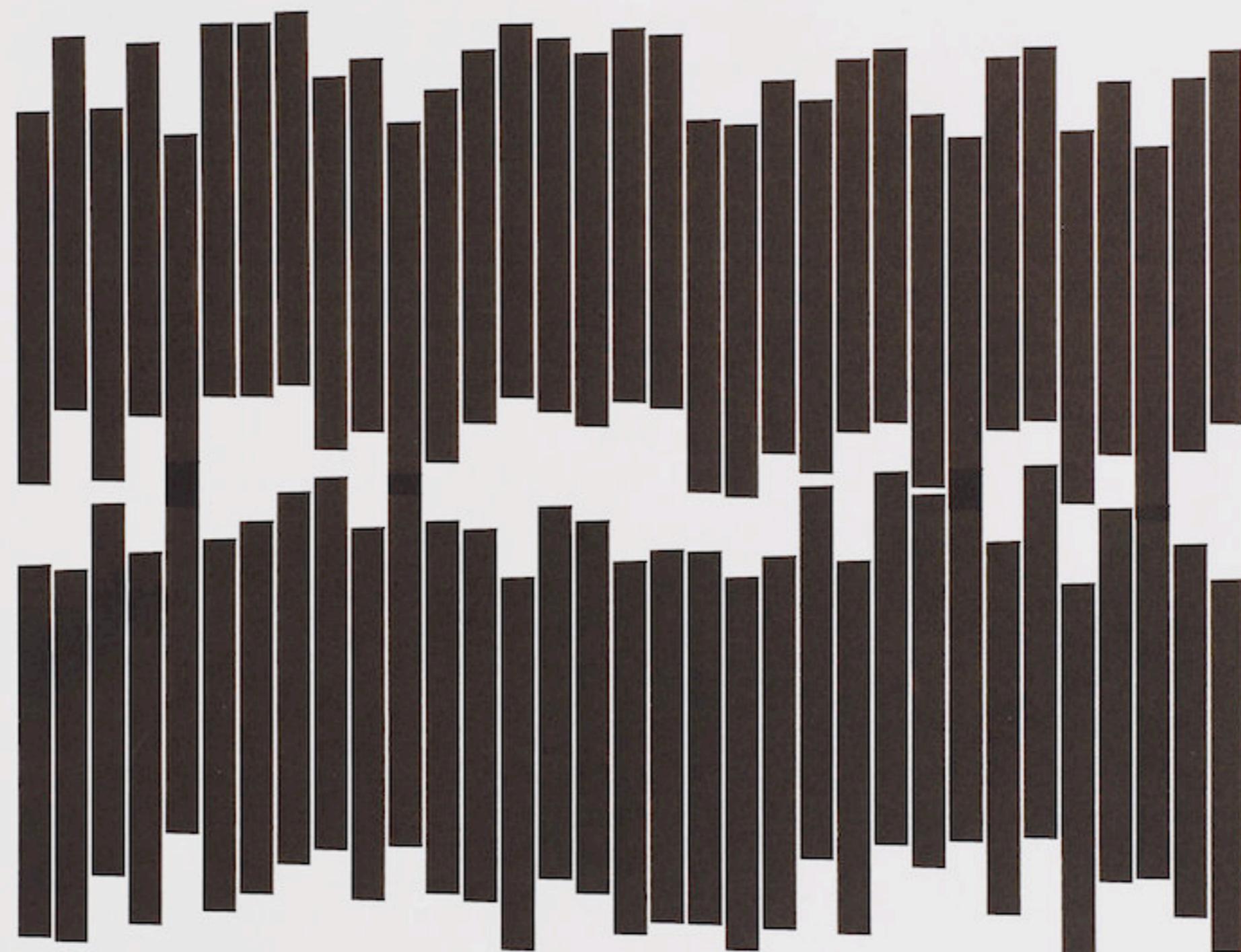
VERA MOLNAR

“*The machine, thought to be cold and inhuman, can help to realize what is most subjective, unattainable, and profound in a human being.*

-Vera Molnár

Vera Molnár (born 1924) is a French media artist of Hungarian origin. She is a pioneer of computer and generative art, active for over 75 years...

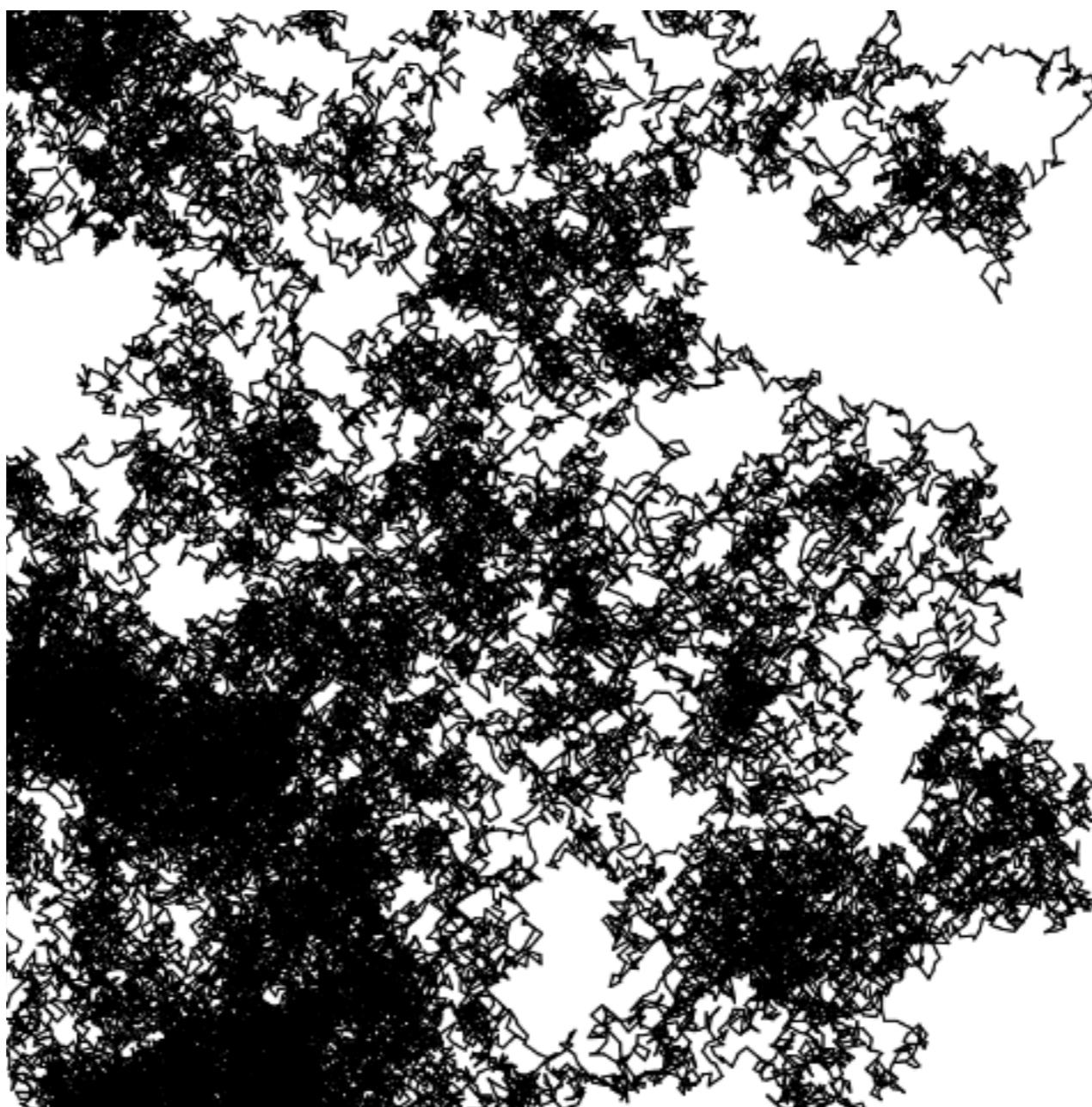




14/85

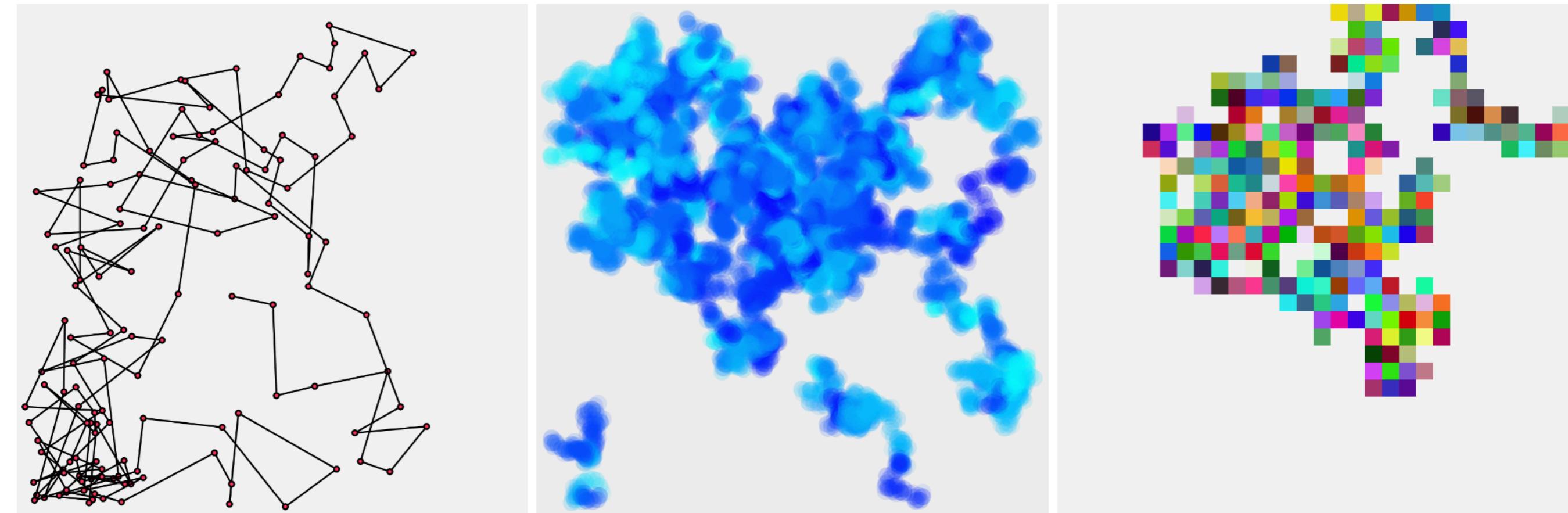
VERA MOLNAR

RANDOM WALK



a single random walker over thousands of steps...

RANDOM WALK

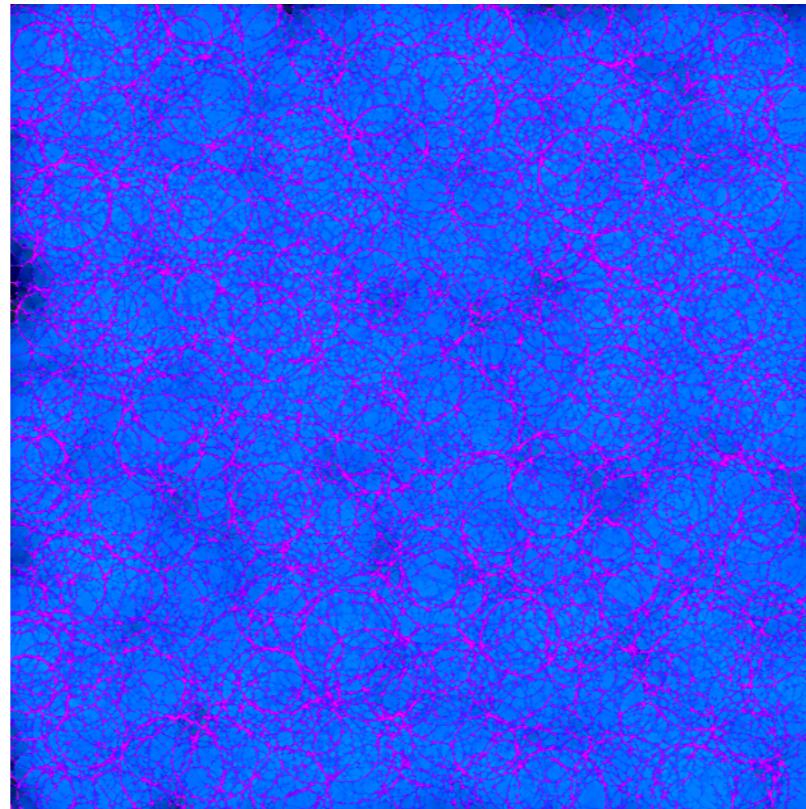


visualizing random walks...

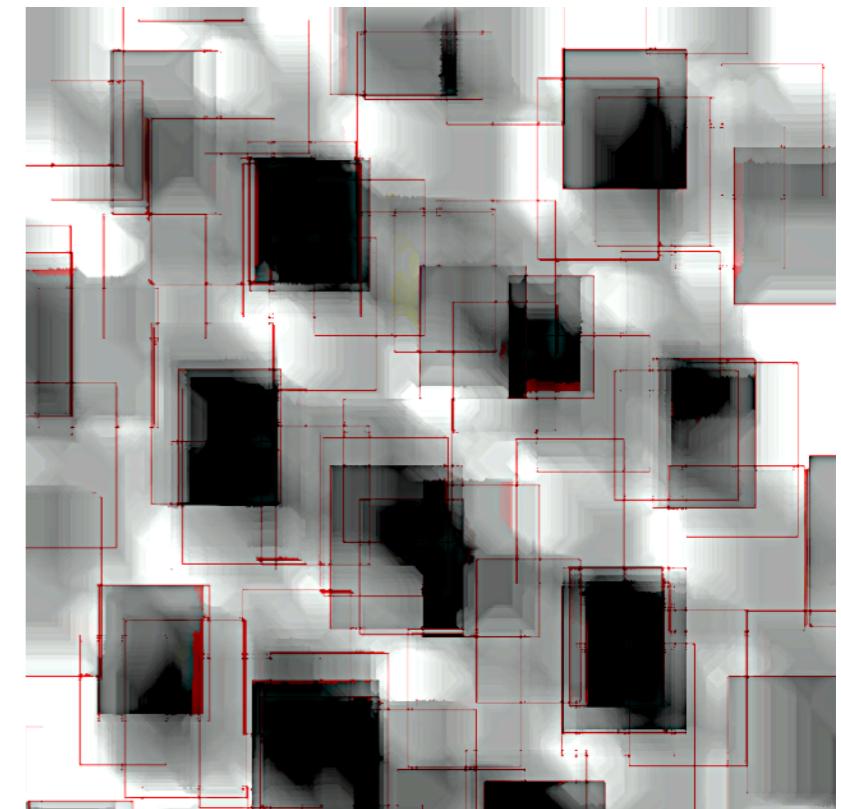
MULTIPLE RANDOM WALKS



as circles



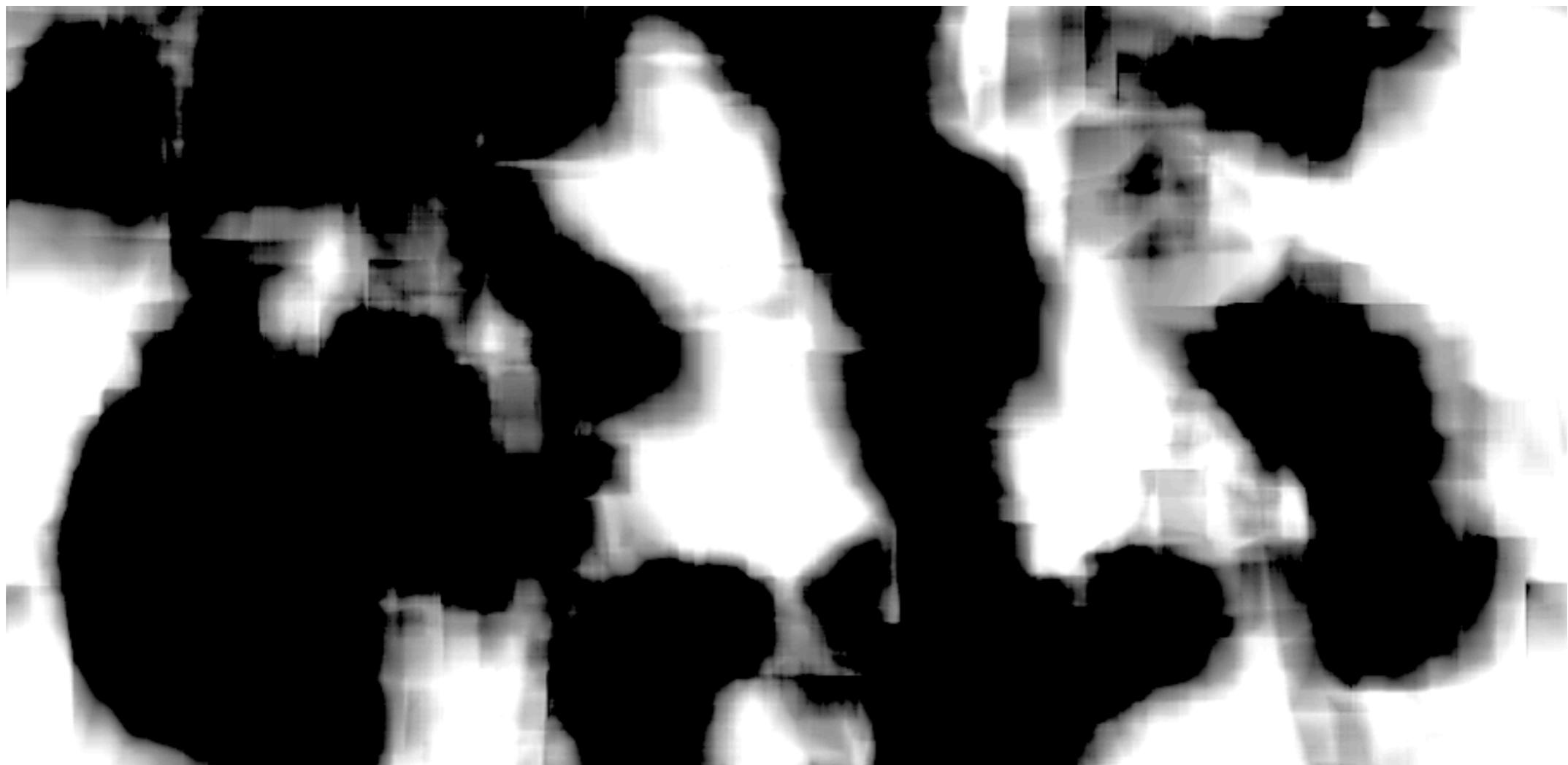
on a grid



as rectangles

random walkers interacting ...

MULTIPLE RANDOM WALKS



multiple random walkers interacting ...

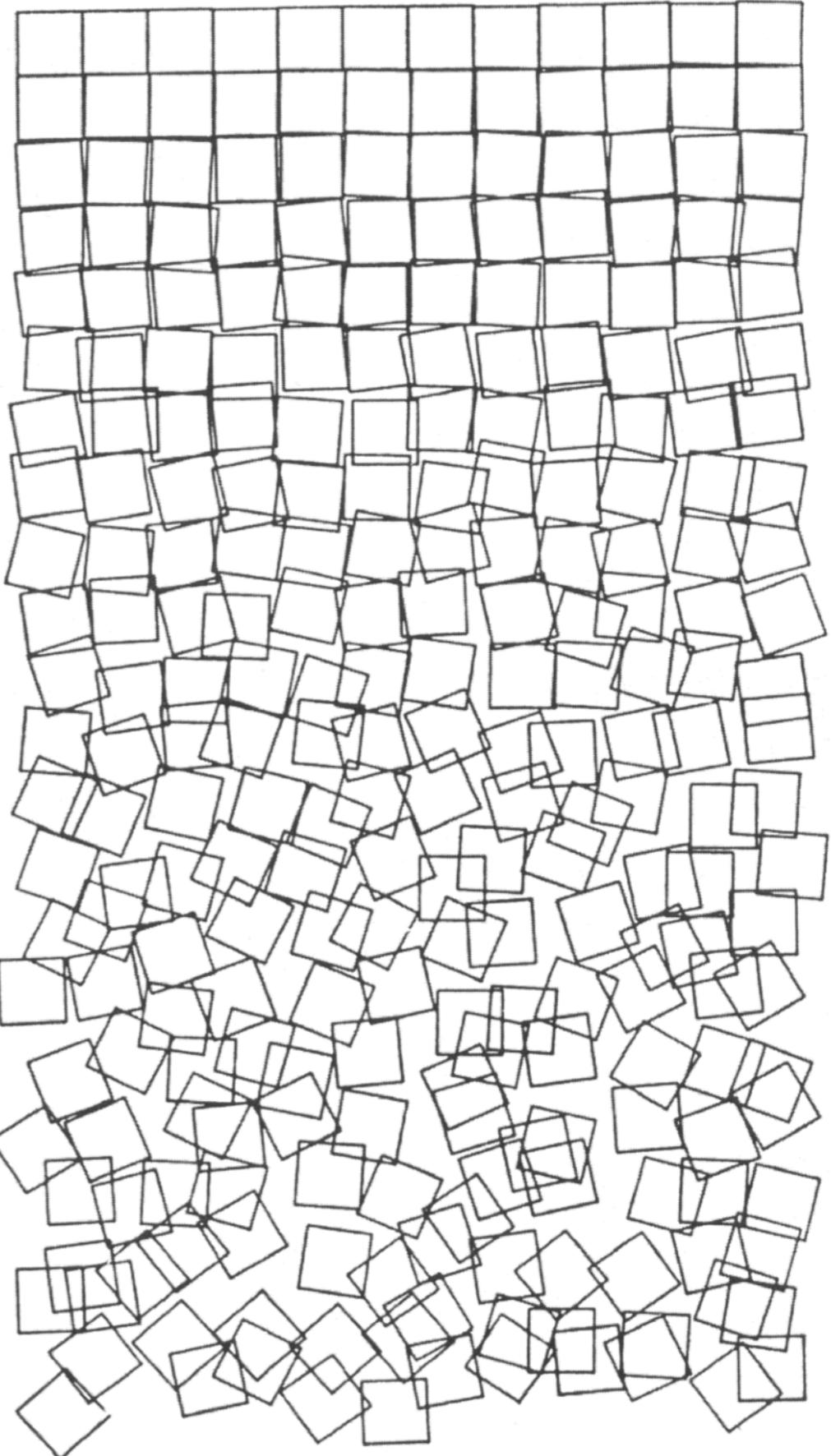
RECODING

COPYING DIRECTLY FROM WORKS OF ART GIVES THE ARTIST INSIGHT INTO THE CREATIVE PROCESS: INSIGHTS WHICH CANNOT BE LEARNED FROM ANY OTHER SOURCE.

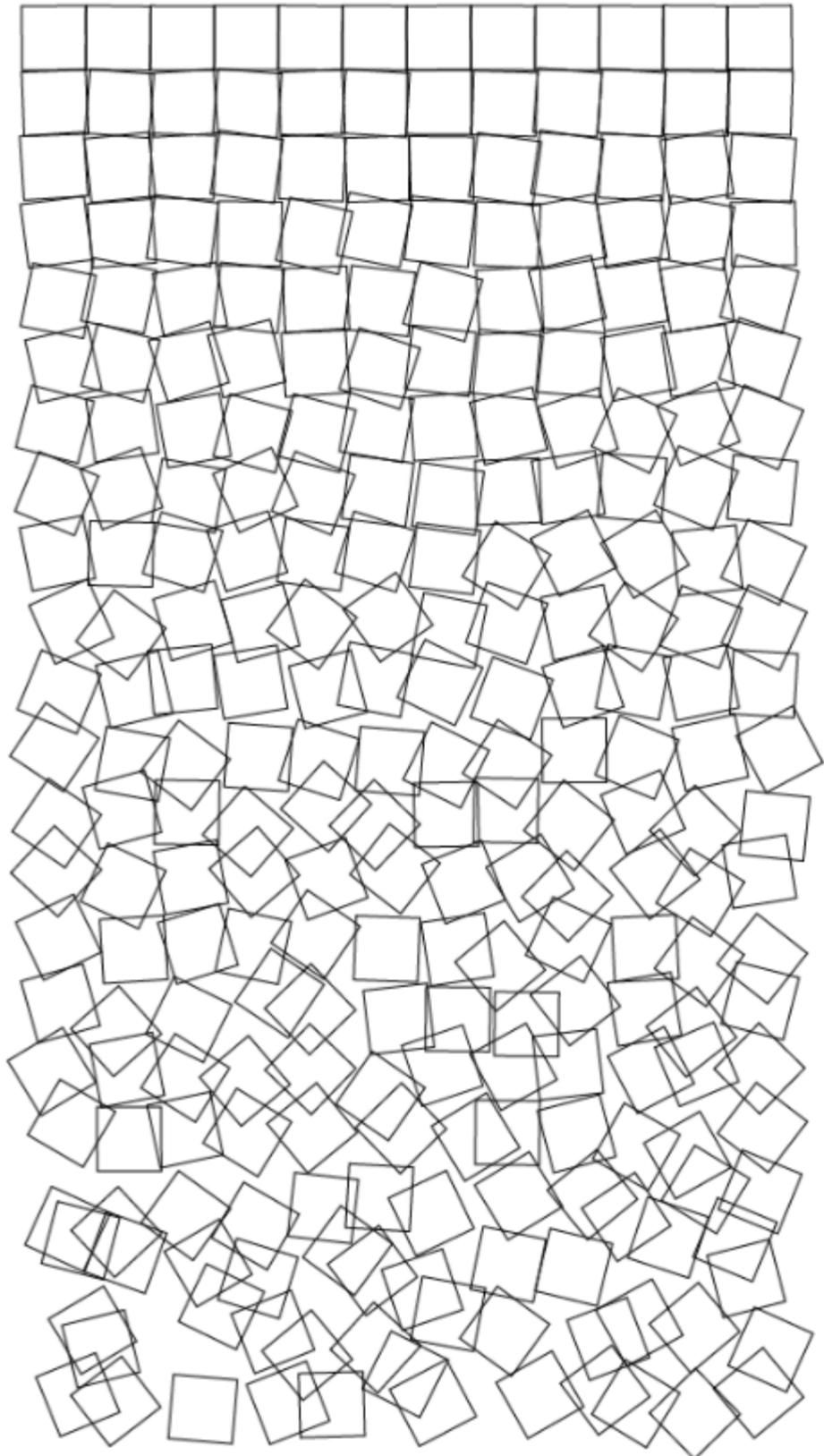
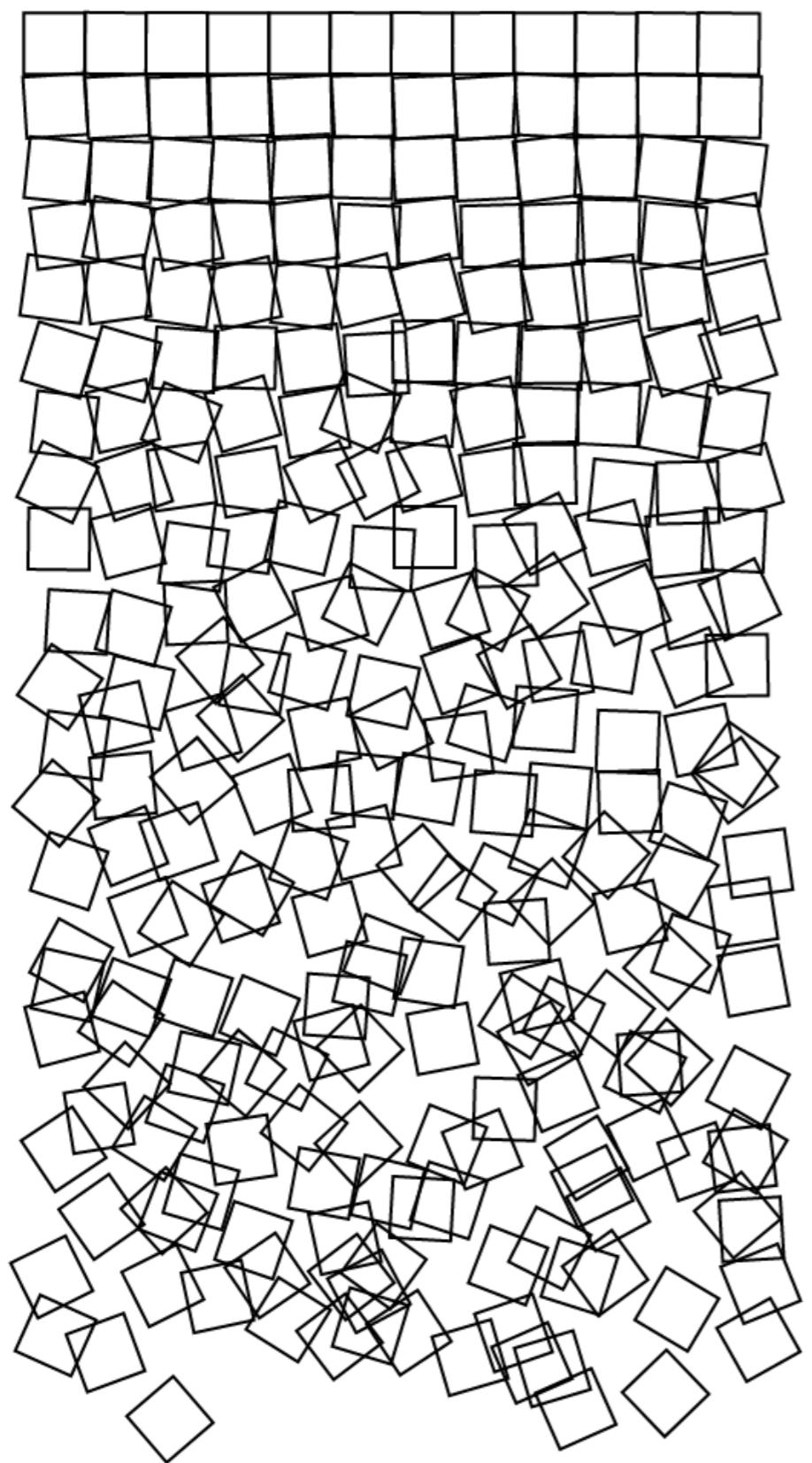
- GERALD KING

**LET'S DESCRIBE THIS WORK
AS CONCISELY AS WE CAN,
USING PLAIN ENGLISH...**

?



Schotter (Gravel) - Georg Nees, 1968



Recode of Schotter (*Gravel*) by Georg Nees, 2021

```
let sqSz = 20;

function setup() {
  createCanvas(400, 600);
  noFill();
  background(255);
  translate(width/5, height/8);

  for (let i = 0; i < 12; i++) {
    for (let j = 0; j < 22; j++) {

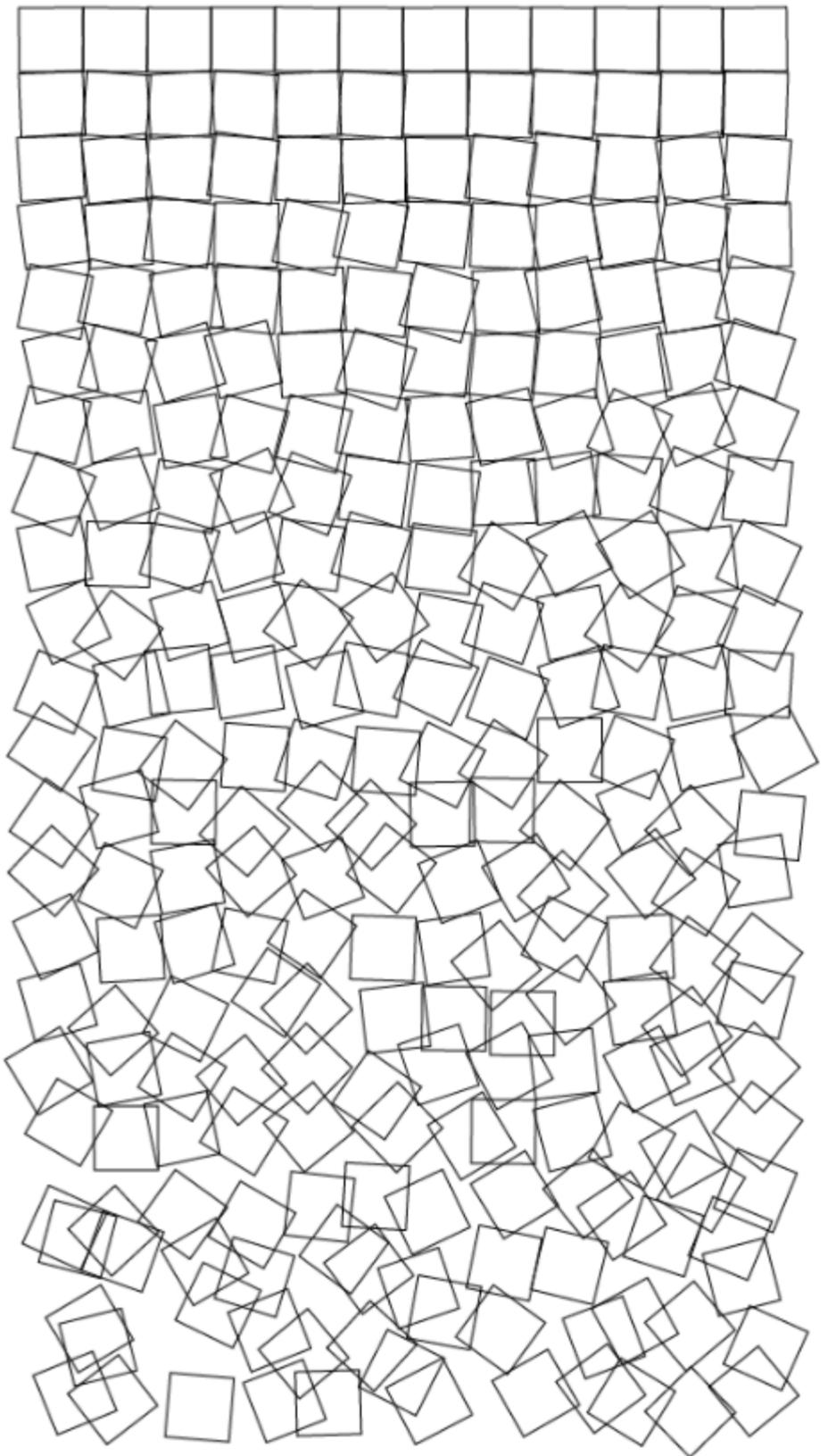
      let displace = max(j, 0.2);
      let randRot = random(-4, 4) * displace;
      let randShift = random() * displace;

      translate(i * sqSz, j * sqSz);
      rotate(radians(randRot));

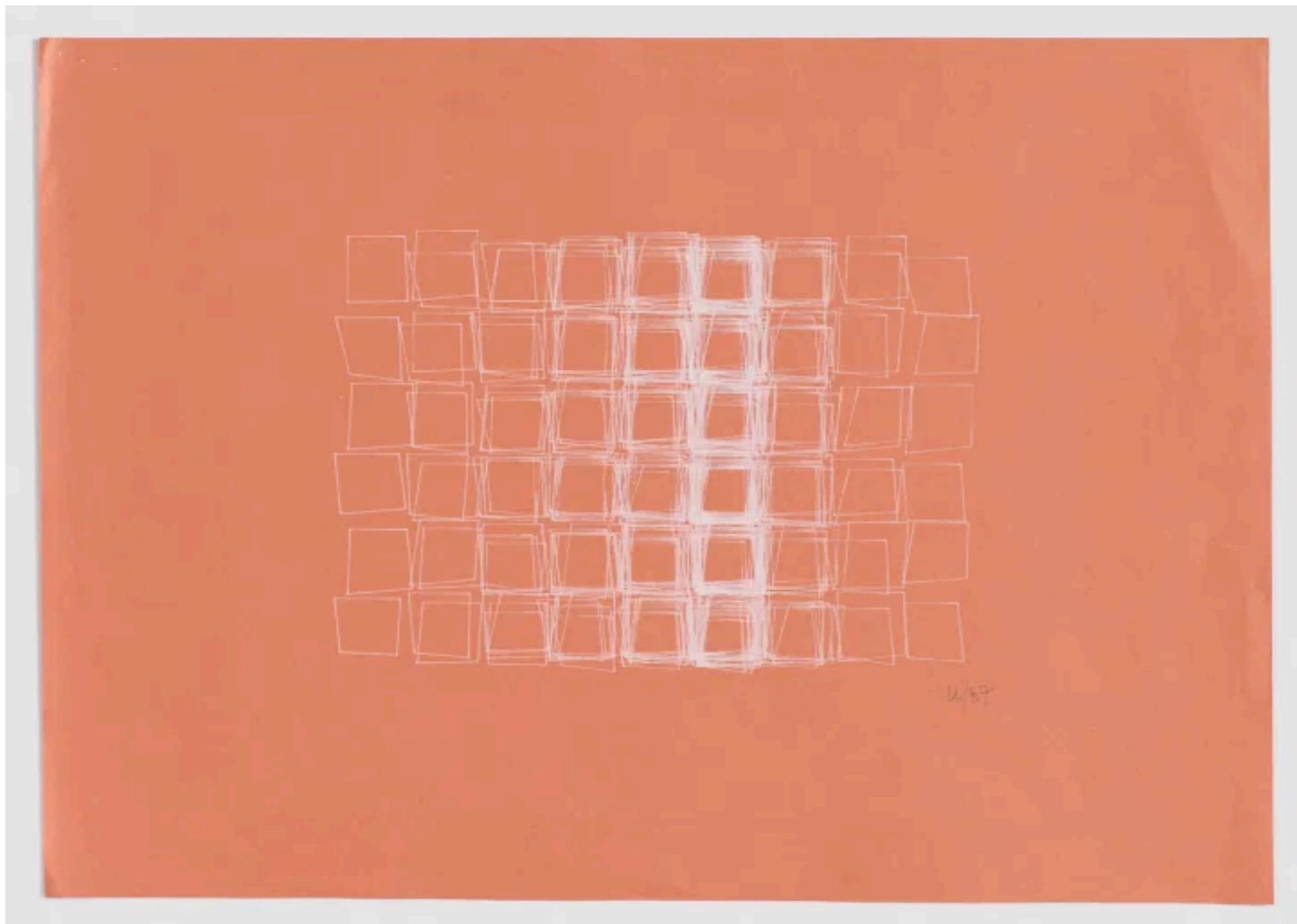
      square(-sqSz / 2 + randShift, -sqSz / 2 + randShift, sqSz);

      rotate(radians(-randRot));
      translate(-i * sqSz, -j * sqSz);
    }
  }
}
```

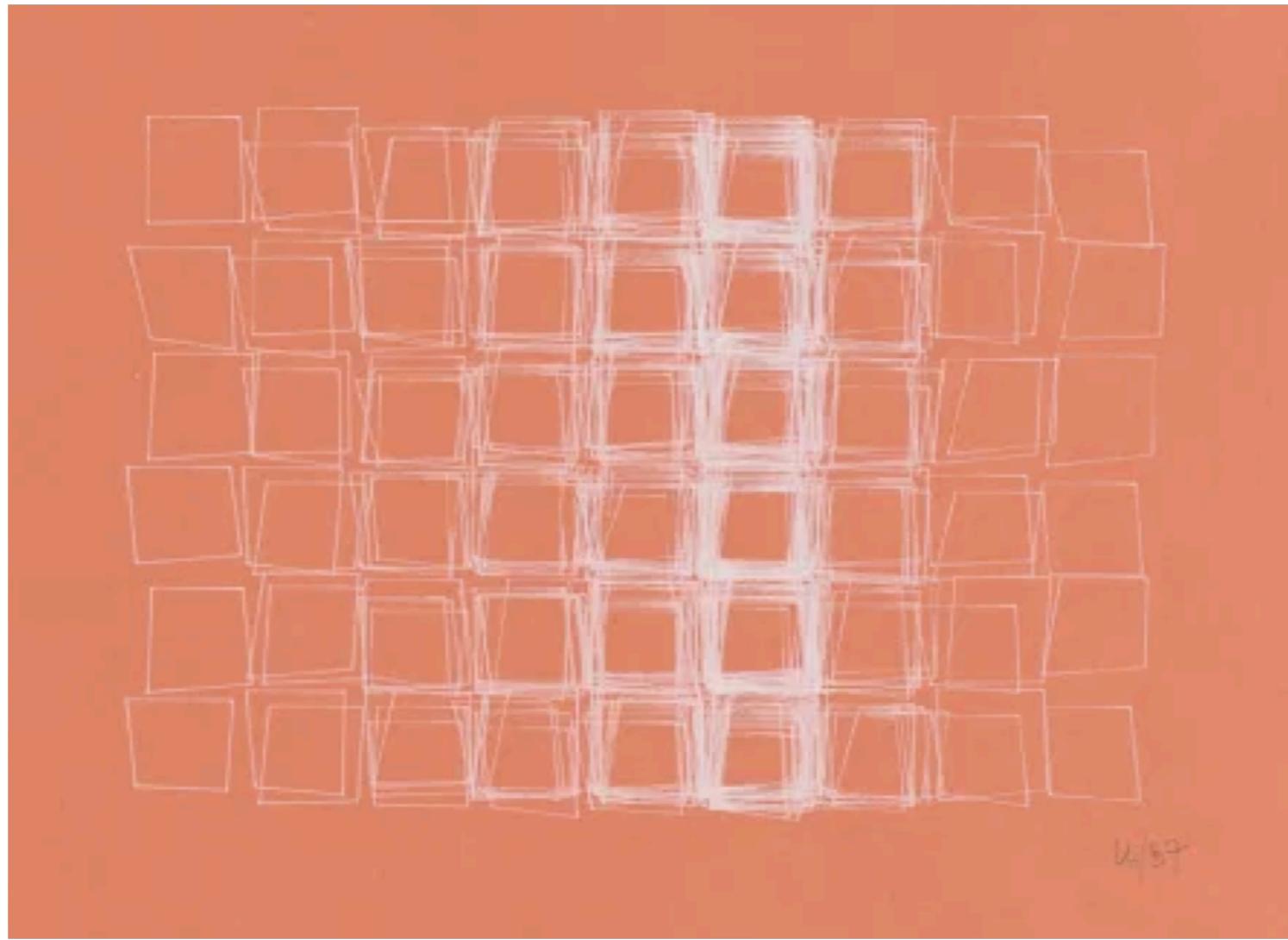
file: Recode-Schotter.js



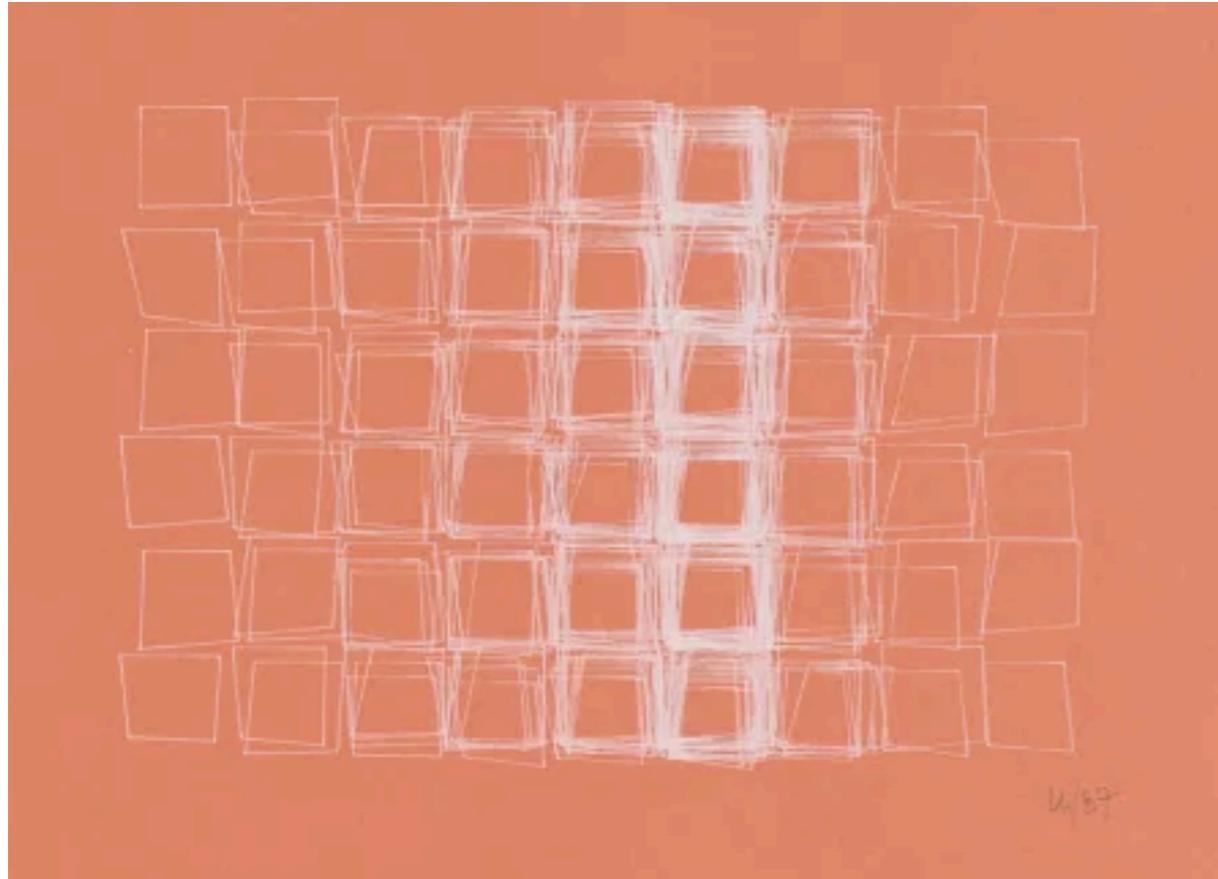
Recode of Schotter (*Gravel*) by Georg Nees, 2021



VERA MOLNAR “STRUCTURE DE QUADRILATERES” (1987)

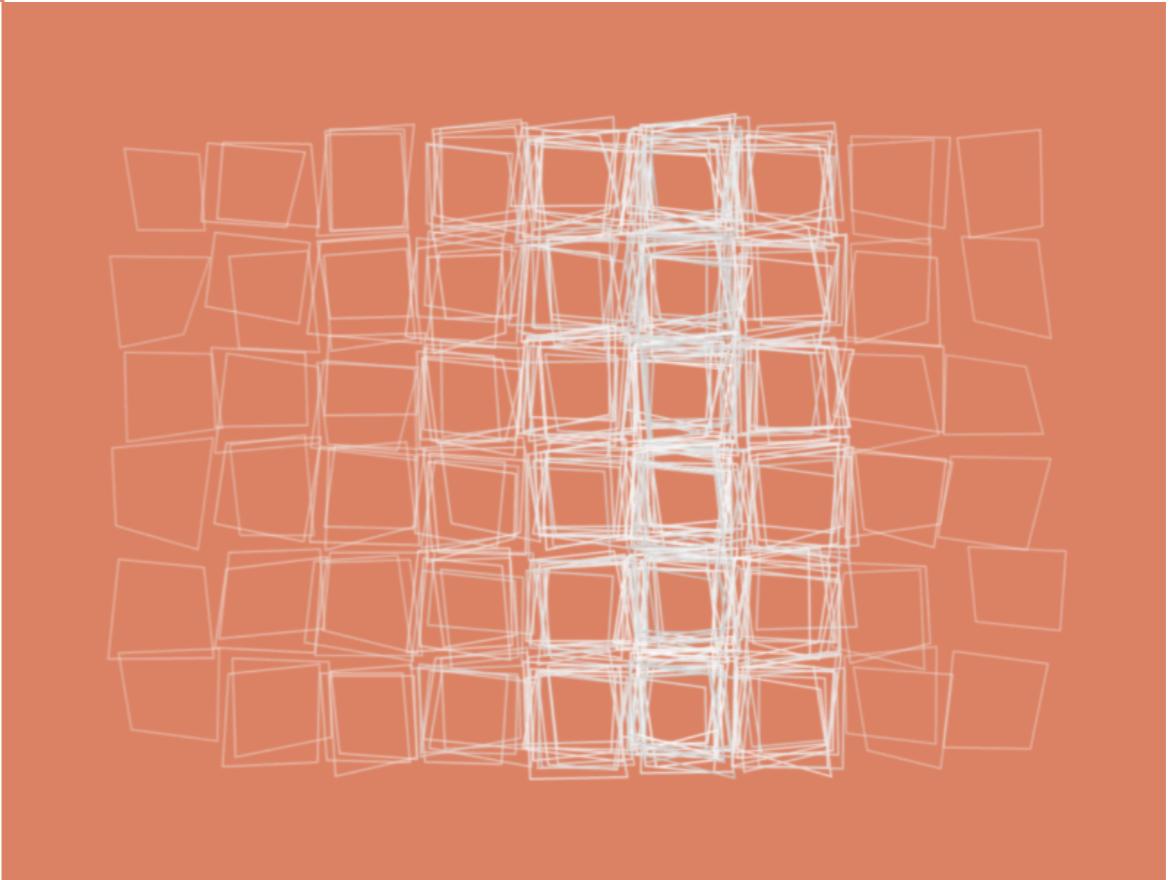


- white lines on a salmon-colored background
- a grid of squares, this time with 9 columns and 6 rows
- moving from left to right, the number of quads in each column increases, reaching a max in the 6th column, and then decreasing again...
- each of the 4 points in the square is randomly offset from its position (thus making the squares into quadrilaterals)



ORIGINAL

RECODE



VERA MOLNAR "STRUCTURE DE QUADRILATERES" (1987)

```

let sz = 50, k = 8;
let num = [1,2,3,6,10,18,9,2,1];

function setup() {

  createCanvas(690, 520);
  background(222, 133, 103);
  noFill();

  for (let i = 0; i++ < 6; ) {
    for (let j = 0; j++ < 9; ) {
      for (let h = 0; h < num[j-1]; h++) {

        let x1 = 50 + j * 60 - sz / 2 + random(-k, k);
        let y1 = 50 + i * 60 - sz / 2 + random(-k, k);

        let x2 = x1 + sz + random(-k, k);
        let y2 = y1 + random(-k, k);

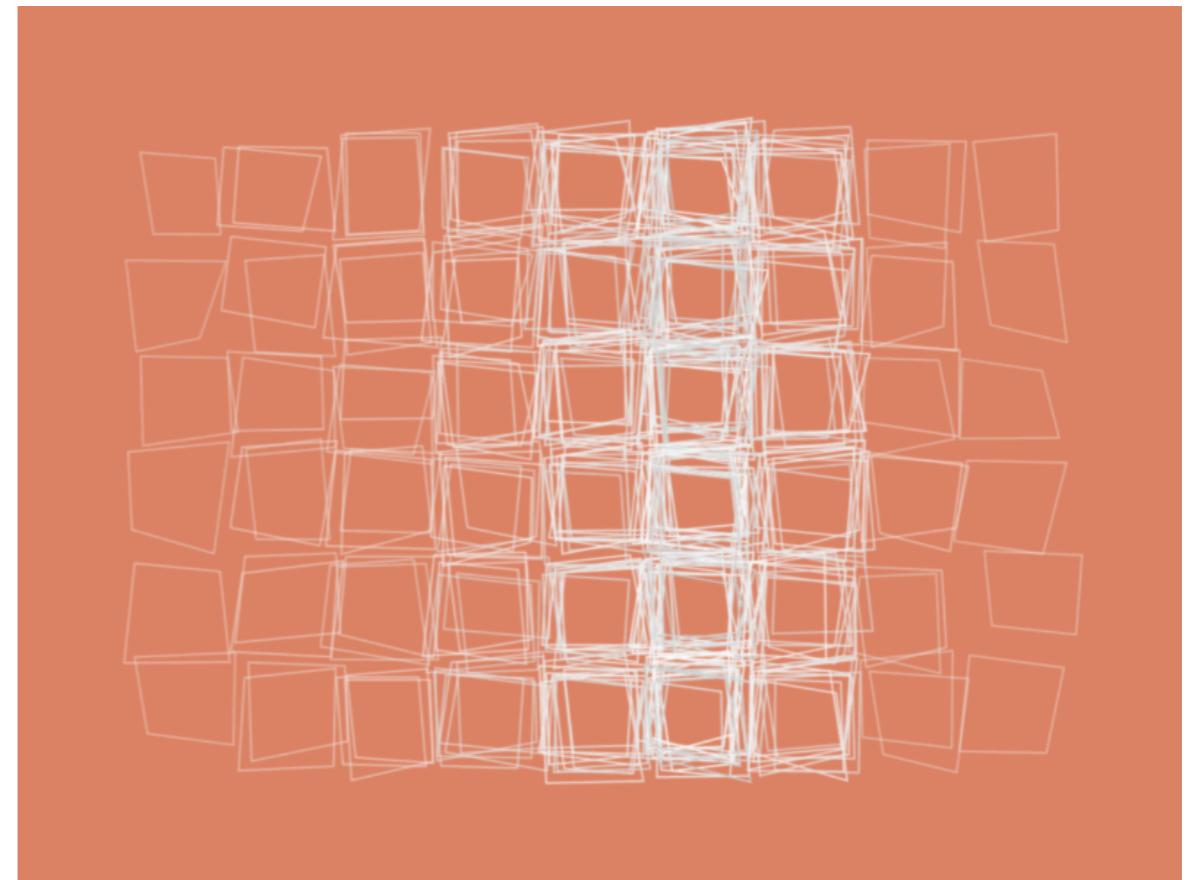
        let x3 = x1 + sz + random(-k, k);
        let y3 = y1 + sz + random(-k, k);

        let x4 = x1 + random(-k, k);
        let y4 = y1 + sz + random(-k, k);

        stroke(random(240-num[j-1]*2, 255), 100+num[j-1]*12);
        quad(x1, y1, x2, y2, x3, y3, x4, y4);
      }
    }
  }
}

```

file: [Recode-Quads.js](#)

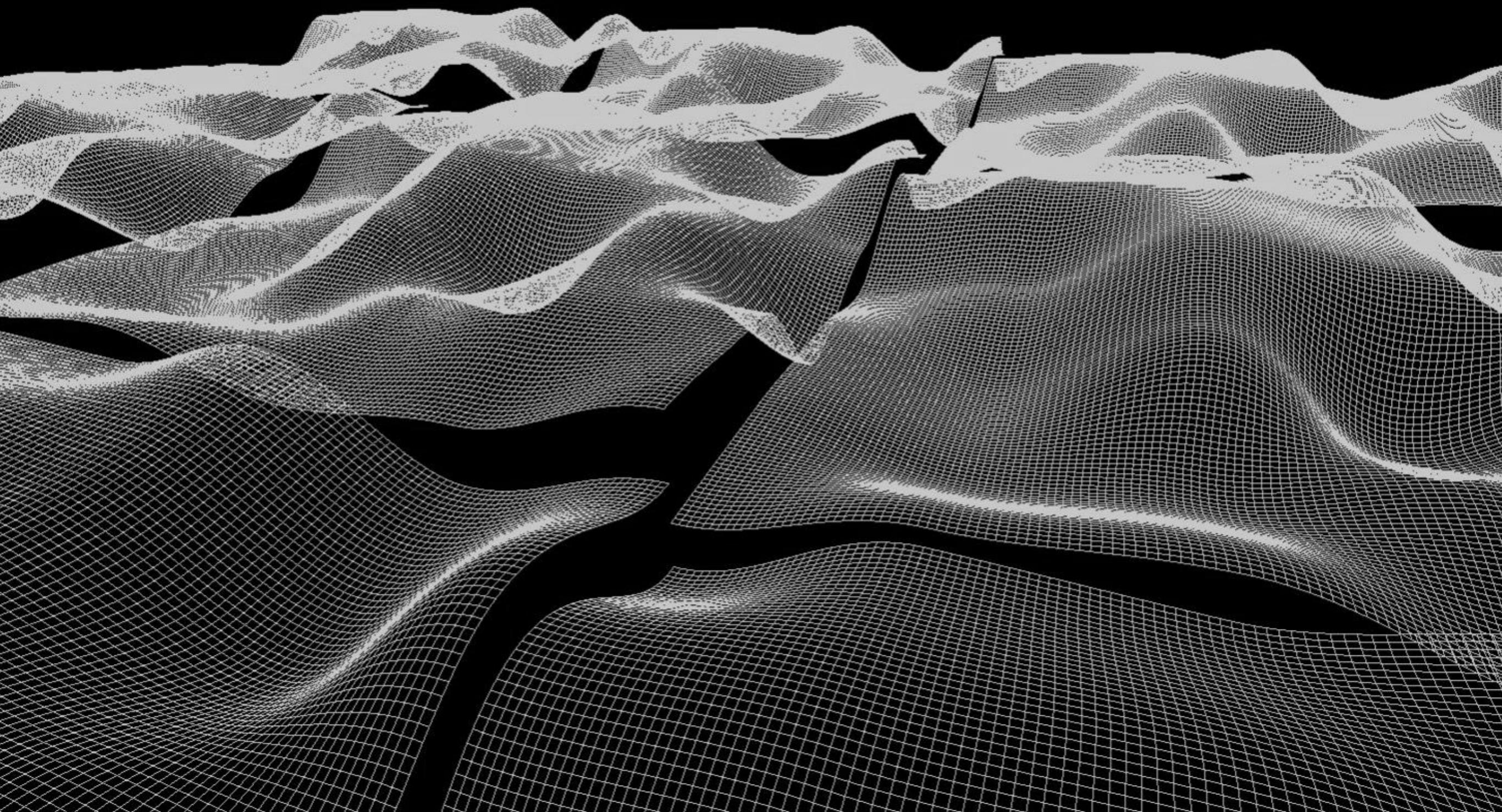


RECODE OF VERA MOLNAR “STRUCTURE DE QUADRILATERES” (1987)

LIFE CANNOT BE CALCULATED. THAT'S THE BIG MISTAKE OUR CIVILIZATION MADE. WE NEVER ACCEPTED THAT RANDOMNESS IS NOT A MISTAKE IN THE EQUATION - IT IS PART OF THE EQUATION.

JEANETTE WINTERSON

NOISE()



- THEORETICAL: DEFINITIONS
 - AESTHETIC: EXAMPLES IN ART
 - STRATEGIC: WHY USE RANDOMNESS?
 - PRACTICAL: USING RANDOMNESS EFFECTIVELY
-

WRAPUP

END

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