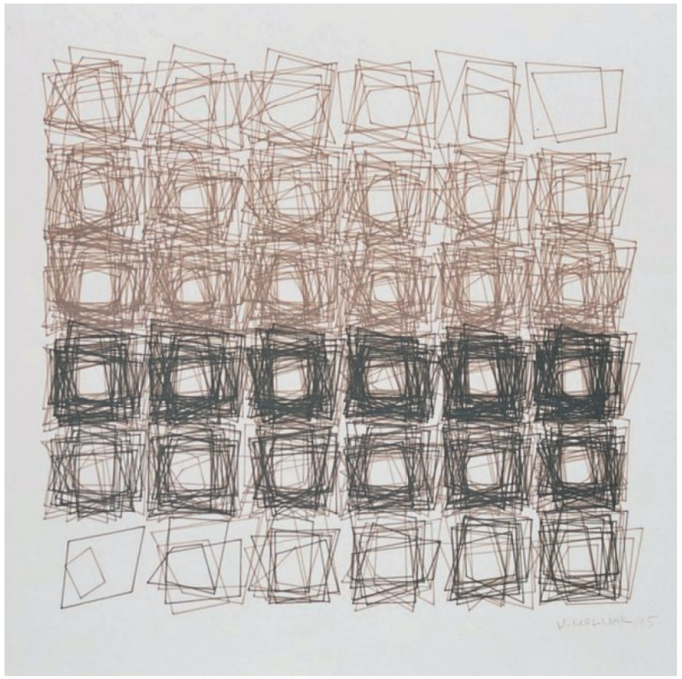
Recoding project algorithmic aesthetics

Tristan Debeaune & Wendy Gervais

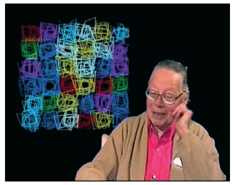
Chosen artwork

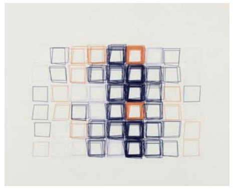


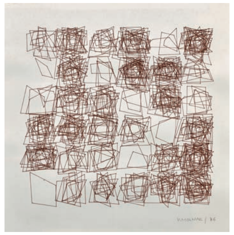
Véra Molnar, *Structure de quadrilatère*, 1985

Ink on paper. 30 cm x 30 cm
Used technique : algorithm on computer + plotter

Vera Molnar realised several versions of the artwork, with different patterns and colors.







Analysis

The version we chose is made by a **squared light-grey canvas**, in which a **black and brown squared pattern** is drawn with fine lines.

It is a **6 per 6 grid**. Each cell of the grid is randomly scribbled : each one looks like a deformed square (called **quadrangle**), drawn several times in each cell. All cells are different, appearing to be **randomly generated**, and they overlap on each other. The number of quadrangles drawn over the same position, and their colour, are **variable according to the position in the grid, as following :**

- The 3 first rows of cells are drawn brown only. The density of lines grows row by row, right to left, from top right (2 quadrangles) to bottom left (about thirty).

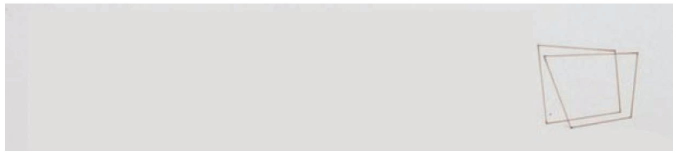
- The 3 last rows of cells are a superposition of half brown and half black lines. The repartition of density is the symetrical of the previous, it is mirrored (the density increases row by row from bottom left to top right).

All-in-all, this artwork is a randomly generated grid of quadrangles we are now trying to recreate.

Pseudo-code

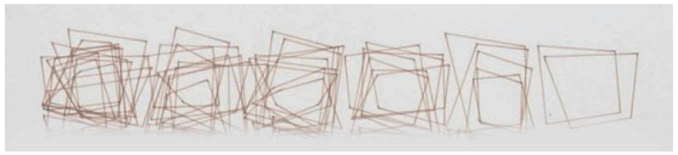
1. Take a brown pen.

2. Start on top-right corner of the canvas. Draw two brown deformed and superposed squares, their shapes do not matter, it can be random, but ehy are centered over the start position.

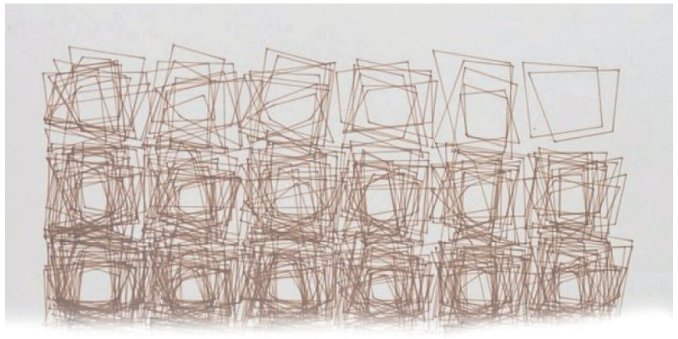


3. On the left of this first shapes, start again but draw 3 more random squares over the same position.

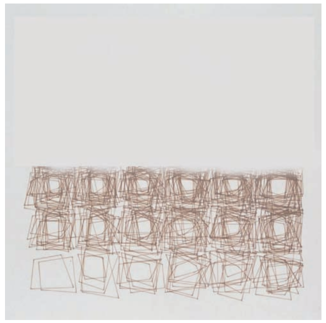
4. Repeat on the row until having 6 squares denser and denser, increasing the amount of lines each time.



5. Repeat this 2 more times, starting from the right each time. Do not worry if the quadrangles overlap,



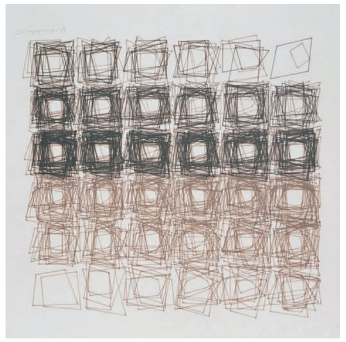
6. Rotate the canvas upside down.

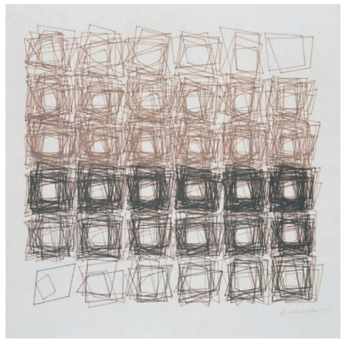


7. Take also a black pen.

8. Repeat the 5 first steps again. But this time, for each shape, begin by drawing the first half of the lines brown, then the second half black. You should have the same amount of lines for each quadrangle than before, but black and brown superposed.

9. Rotate the canvas upside down again, you are done.





Pseudo-algorithm

```
function setup()
    create a 700*700 canvas
    DrawMesh(3, 6, 6)
```

step 2

```
function DrawSquare(quad_amount, column, line)
    push()
        translate by 60*column on x axis, 60*line on y axis, 0 on z axis
        for k from 0 to quad_amount, with a step of 1
            dispersion <- []
            add 8 random relative integers between -10 and 10 to the dispersion array
            draw a quadrangle centered on the square generated by the 4 vertices (40,40),
(80,40), (80,80), (40,80) using the 8 integers of dispersion added to the 8 coordinates
        end for

    pop()
```

steps 1 to 5

```
function DrawMesh(width, height)
    for j from 0 to height/2, with a step of 1
        for i from width to 0, with a step of 1
          ijquad_amount <- 2*(width-i-1 + width*j + 1)
          draw in brown
            DrawSquare(ijquad_amount, i, j)
        end for
    end for
```

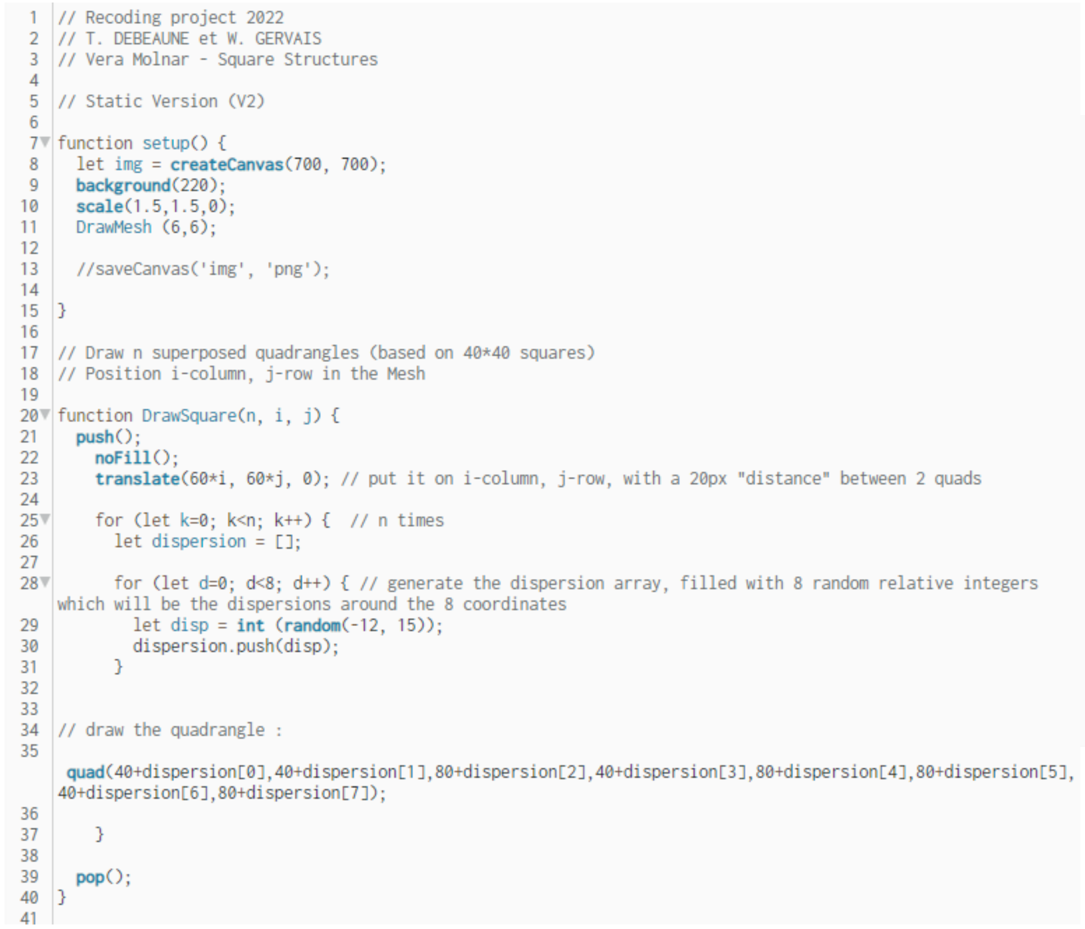
steps 6 to 8

```
    for j from 0 to height/2, with a step of 1
        for i from width to 0, with a step of 1
          ijquad_amount <- width-i-1 + width*j + 1
          drawn in brown
            DrawSquare(ijquad_amount, width-1-i, height-1-j)
          drawn in black
            DrawSquare(ijquad_amount, width-1-i, height-1-j)
        end for
    end for
```

p5 version

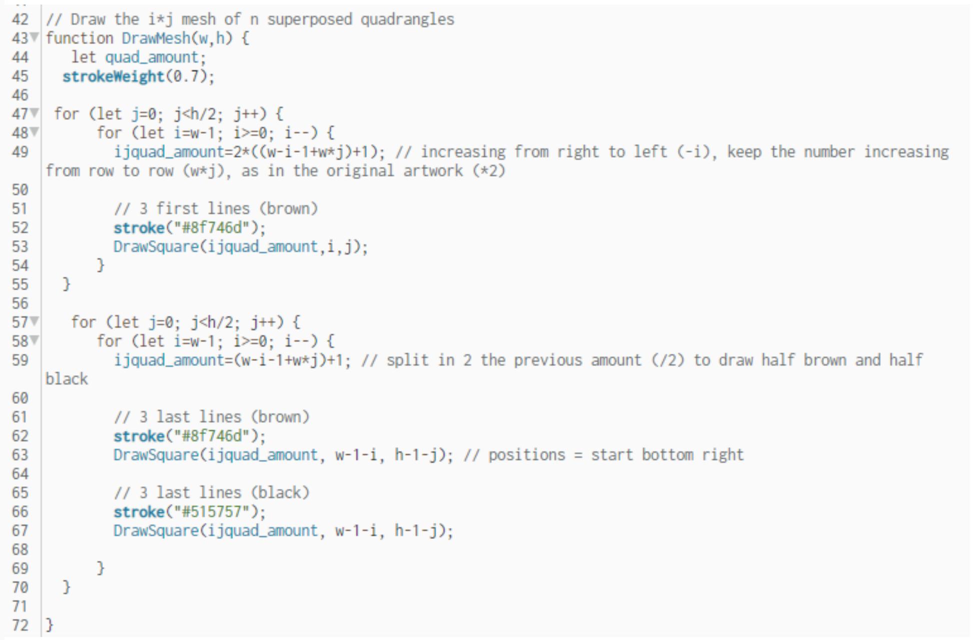
Code

p5 - https://editor.p5js.org/kau.grv/sketches/OC2bP--qy
gitlab (STATIC) - https://gitlab.com/debeaunetristan/projet-recoding



```
// Recoding project 2022
// T. DEBEAUNE et W. GERVAIS
// Vera Molnar - Square Structures

// Static Version (V2)

function setup() {
  let img = createCanvas(700, 700);
  background(220);
  scale(1.5,1.5,0);
  DrawMesh (6,6);

  //saveCanvas('img', 'png');

}

// Draw n superposed quadrangles (based on 40*40 squares)
// Position i-column, j-row in the Mesh

function DrawSquare(n, i, j) {
  push();
    noFill();
    translate(60*i, 60*j, 0); // put it on i-column, j-row, with a 20px "distance" between 2 quads

    for (let k=0; k<n; k++) {  // n times
      let dispersion = [];

      for (let d=0; d<8; d++) { // generate the dispersion array, filled with 8 random relative integers which will be the dispersions around the 8 coordinates
        let disp = int (random(-12, 15));
        dispersion.push(disp);
      }


// draw the quadrangle :

 quad(40+dispersion[0],40+dispersion[1],80+dispersion[2],40+dispersion[3],80+dispersion[4],80+dispersion[5],40+dispersion[6],80+dispersion[7]);

    }

  pop();
}

```

One function (DrawSquare(n, i, j)) draws, in cell i-row, j-column of the a grid, the shape made of n quadrangles.

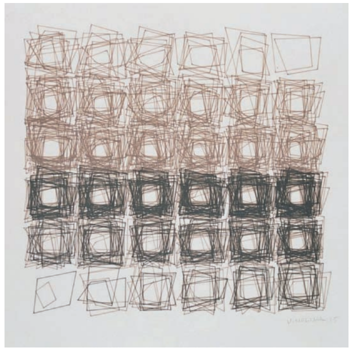


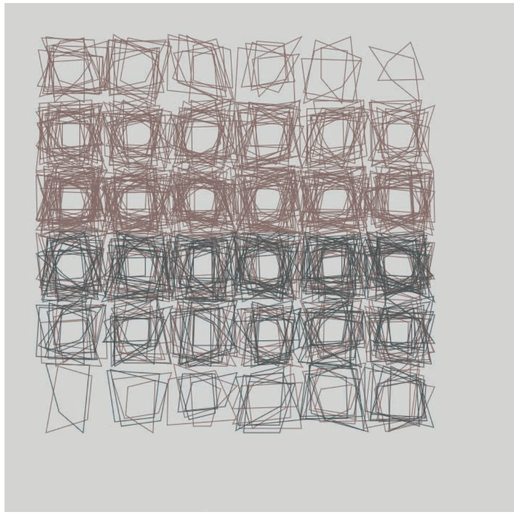
```
// Draw the i*j mesh of n superposed quadrangles
function DrawMesh(w,h) {
   let quad_amount;
  strokeWeight(0.7);

 for (let j=0; j<h/2; j++) {
      for (let i=w-1; i>=0; i--) {
        ijquad_amount=2*((w-i-1+w*j)+1); // increasing from right to left (-i), keep the number increasing from row to row (w*j), as in the original artwork (*2)

        // 3 first lines (brown)
        stroke("#8f746d");
        DrawSquare(ijquad_amount,i,j);
      }
  }

   for (let j=0; j<h/2; j++) {
      for (let i=w-1; i>=0; i--) {
        ijquad_amount=(w-i-1+w*j)+1; // split in 2 the previous amount (/2) to draw half brown and half black

        // 3 last lines (brown)
        stroke("#8f746d");
        DrawSquare(ijquad_amount, w-1-i, h-1-j); // positions = start bottom right

        // 3 last lines (black)
        stroke("#515757");
        DrawSquare(ijquad_amount, w-1-i, h-1-j);

      }
  }

}
```

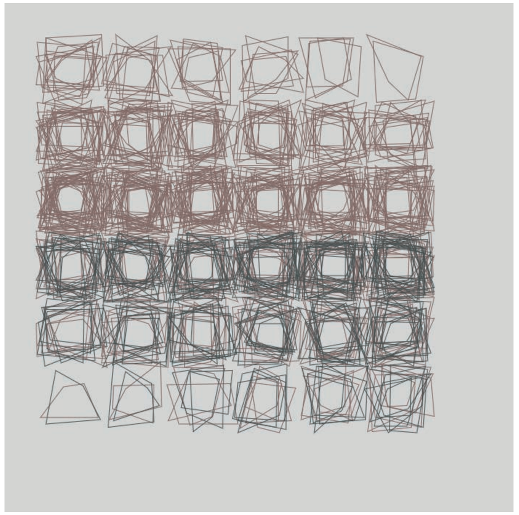
The other (DrawMesh(i,j)) draws the final brown and black mesh as in the pseudo-code.

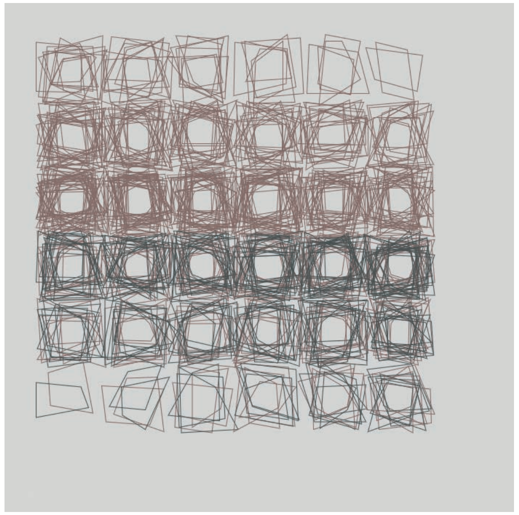
We call **DrawMesh(6,6)** to obtain the same grid as the artwork.

Outputs


Original







3 consecutive outputs of our code
(using savecanvas())

To belong to the same class than the original artwork the best we could, we used a 0.7 stroke weight, #8f746d and #515757 as brown and black (we found with an eye dropper tool on the original artwork). Otherwise, the randomly generated integers of the loops of the algorithm create different outputs which respect the randomness of the artwork - aesthetically we are satisfied of our results.

In the first version we used rotate functions to do the two parts, but we eventually managed to respect the pseudo-code better by really drawing each shape in the good order. We also increased the range of the random numbers so as the shapes can overlap.