

## Color Patterns in Bull by Vasarely

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### Abstract

We discuss how Victor Vasarely used the idea of “program” to define his works, making him a visionary in the potentials of using coding for the practical production and social impact of art, well before the emergence of computers as tools in the hands of artists. We analyze the color patterns in his painting "Bull". We show the hidden and “almost regular” structure in the color usage, and ponder about the reason behind the minor deviation from the perfect regularity: a conscious choice, or a mistake in execution?

### “Programs” by Vasarely

Victor Vasarely (1906-1997) was a Hungarian-born artist, who studied at the Műhely Academy with Sándor Bortnyik, where he got acquainted with the ideas of the Bauhaus. Vasarely moved to Paris in 1930, and – after two decades of searching for his own style of expression – he became world-famous for his fully abstract, geometrical works, and is considered to be the father of Op-Art. His oeuvre – partly on show in three museums dedicated to him in France and in Hungary – is the testimony of a searching mind. He took a topic (e.g. contrast of black and white) and played around with it by using different techniques (most often paint on canvas, but also print, plexy or mirror surfaces as 2D sheets or surfaces in 3D works). Many of his works are based on optical illusions, impossible 3D constructs or symmetries [1, 2]. While his paintings give illusion of depth, motion and light sources, Vasarely was concerned about the expression of human values for a general public, and outside the physical and mental terrain of galleries [2,3].

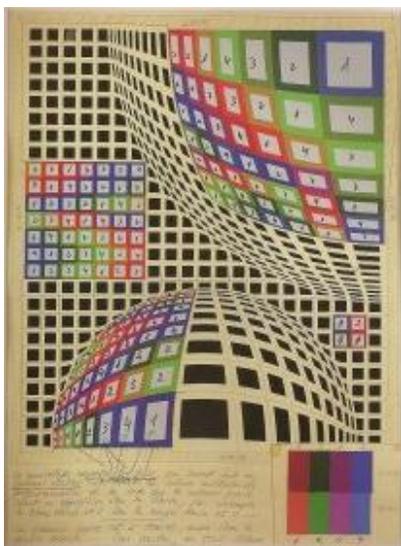


Figure 1: *Untitled* - c.1978

The “playing around” was done by Vasarely according to a conscious plan, motivated to explore the possibilities of expression and effect. Possibly he wanted to explore what happens if we change the color palette, the basic forms, their size, the division of the plane and the arrangement of the elements. This involved the tedious and systematic work of making many variations – in color, in composition and/or materials – inspired by a single idea. His way of working was similar to that of a researcher. He himself created the domain and language of his explorations. The most well-known example of this is his alphabet of form and color: 15 forms, derived from circle, square and triangle by cutting or rotating them, and seven colors used in 20 hues. He dedicated series such as the Plastic Alphabet in the 1960s, to experiment with placing the forms in different colors and positions on a colored square grid. In later periods he pursued similar ideas, albeit on different planar or 3D forms.

“What Vasarely in effect created was an art programming language that allowed for endless permutations of forms and colors to create individual and unique works.” [1] Though he did not work with computers, he used the term “program” for coding his works in terms of the above (or other, well-defined) units as alphabet. Figure 1 gives an idea of what such a program looked like, including the definition of the alphabet, and the placement of the characters on a grid, either regular or distorted.

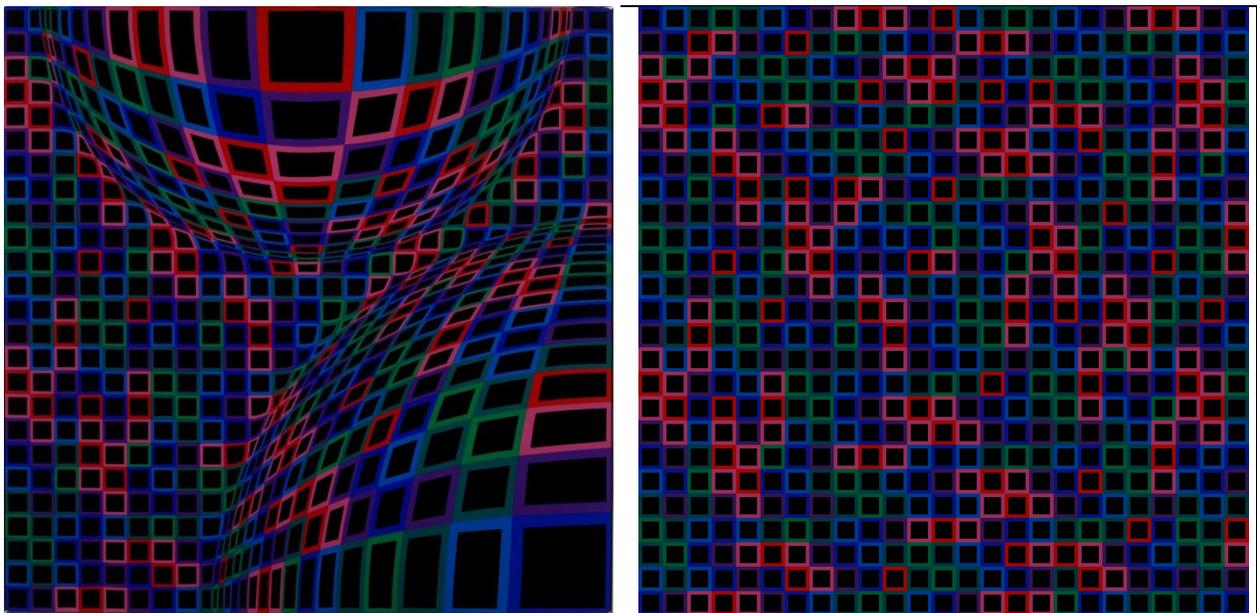
First he himself created the paintings on the basis of these codes, but from 1965 onwards he used assistants. He was in favor of spreading and reproducing his ideas. So the analogue of computer programming to his programs can be justified on three levels:

- a coding is a conscious definition of a (visual) output, and the usage of a coding language allows one to separate the creative design stage from the (tedious, repetitive) production stage;
- a coding gives a framework for systematic investigations;
- a coded “piece of art” can be spread: once the code is known, it can be used as means of reproduction, with modifications made to suit different communal or individual purposes (e.g. decoration of walls of flats in living blocks, as Vasarely himself envisioned).

The fact that his programs – sometimes consisting of hundreds of “instructions”, each for a specific location – were executed by humans, gives rise to mistakes. It could happen that an assistant overlooked an “instruction”, and the mistake was not spotted by Vasarely. This issue is relevant when we try to find out the principle behind the programs.

### Color Patterns in Bull

In this paper we only study the coloring of his painting “Bull”, one of the many works from the Vega period (1968-1984). For this purpose, we “flatten” the original painting, that is, create a 25x25 grid of squares with the coloring of the corresponding squares in the original painting, see Figure 2.



**Figure 2:** *Bull* by Vasarely (left). A “flattened” version created by computer is shown (right), allowing to see the color pattern better.

At the first site, red and pink squares in Bull shine out from the surrounding of green, blue and purple ones (better visible in the color version on the CD). A more systematic scan of the flattened image gives rise to observations such as:

- squares appear in front of the black background in seven colors: light and dark green, light and dark blue, purple, pink and red;
- only a few red squares appear “individually”, that is, non-adjacent to another red or pink square, whereas the rest appear in patches, each consisting of 2, 3, 5, 6 or 7 red or pink squares;
- the light green squares seem to mostly appear in pairs, joined by a single vertex, and aligned in the direction of one of the diagonals of the square painting.

This is about where the observations stop, and give place to ask questions, such as:

1. Is there something systematic in using the colors? How about patterns in other colors?
2. How do these – albeit hidden – patterns contribute to the overall perception?
3. What was Vasarely’s “program” in producing the color patterns?
4. What is the most frequent color? What is the distribution of colors?
5. What if the role of colors is changed: colors are swapped, or a different palette (e.g. from another work by Vasarely) is used?

We wrote an interactive program to switch on and off each color one by one – see Figure 2. Our idea was to show that Vasarely must have had some principle in mind for placing the colors. The dark blue squares seem to appear mostly in a formation of triples and the light blue ones in pairs aligned parallel to one of the diagonals. As for dark green squares, transformed instances of two kinds of “islands” of five pieces dominate, while for light green single ones and pairs are aligned to one of the diagonals. Moreover, pink and dark green, and red, purple and light green show similarities in the pattern of placement – see Figure 3. (From now on, we discard of the black background, to increase visibility of the patterns in black and white. On the CD, the images in original colors can be found.) In Figure 4 we can see how patterns emerge if we choose pairs of colors from similar patterns, that is columns three and four from Figure 3.

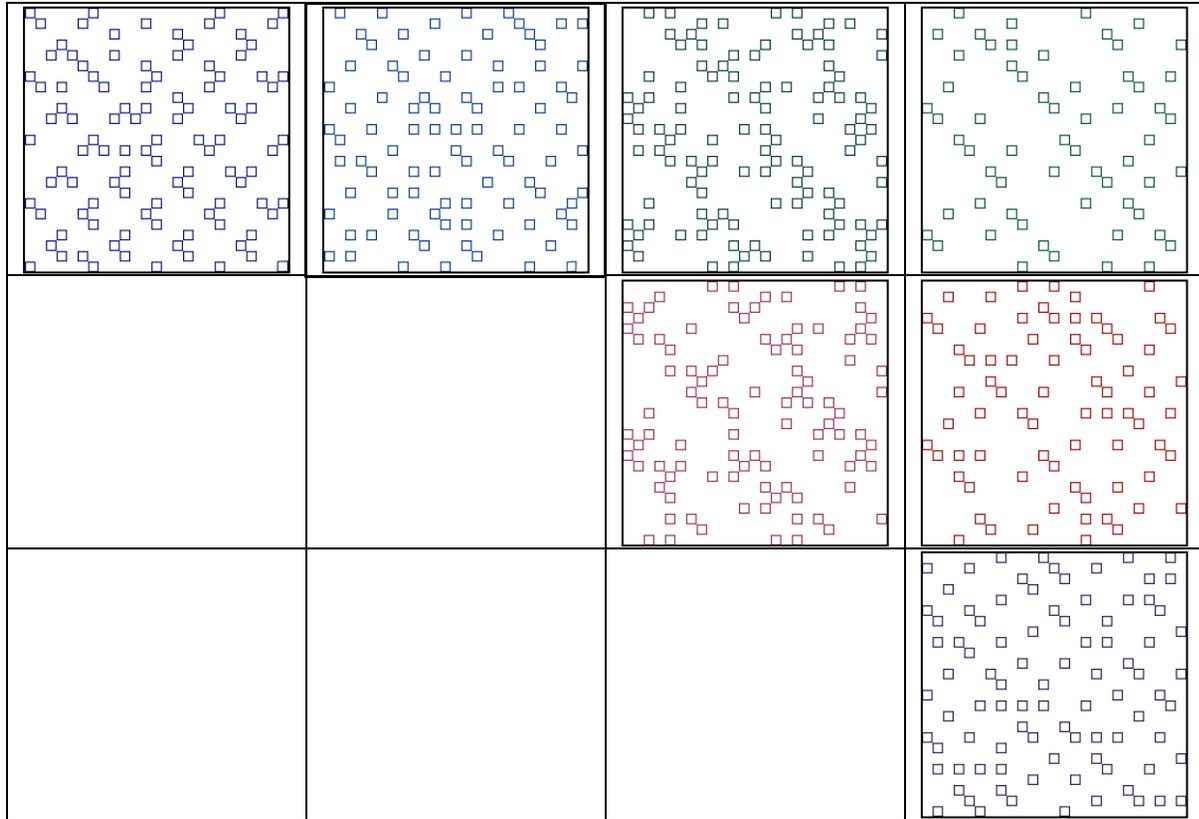
In Figure 5 we can see how four colors produce an almost regular grid of squares: there are only two red squares which are extra. For perfect regularity, they should be of one of the non-used colors: dark green, pink or dark blue. Though we could not trace any evidence for the reason for these two extra red squares, it is likely that the choice of red for the one in the top row was a conscious one, as this square is the biggest and closest one, in the precise middle of the row. Vasarely probably wanted to use a prominent color for this square – and red is better for this than dark green, pink or dark blue.

### Further Investigations

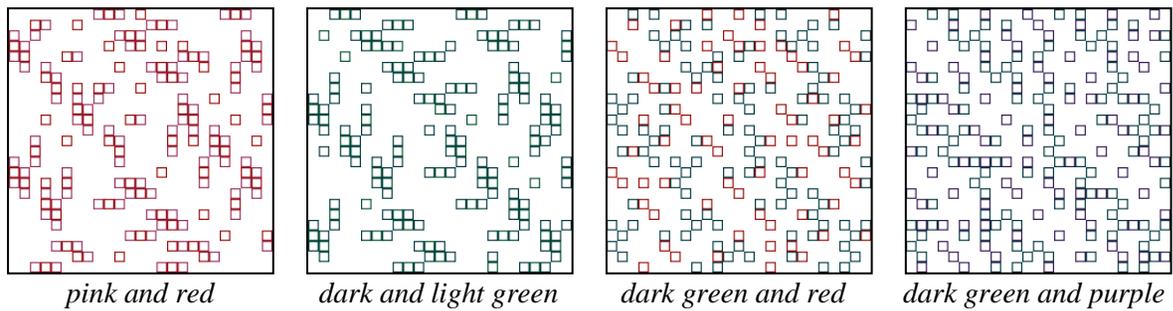
The interactive program we created allows further investigations, such as to see the original painting with random coloring with the same colors (Attachment 1 on CD), and by using a different color palette according to the original scheme (Attachment 2 on CD) or in a random way (Attachment 3 on CD). Currently we are incorporating the program into an educational application to explore how Vasarely worked. We keep searching for the “program” by Vasarely for Bull, and the cause for the non-regularity in it.

### References

- [1] <http://www.op-art.co.uk/victor-vasarely/> (as of April 22, 2013).
- [2] <http://www.vasarely.com/> (as of April 22, 2013).
- [3] J-L. Ferrier: Entretiens avec Victor Vasarely, Editions Pierre Belfond, Paris, 1969.



**Figure 3:** Squares in each of the seven colors. Patterns in a column show similarities.



**Figure 4:** Patterns formed by squares in two colors.



**Figure 5:** An almost regular grid formed by the light blue, purple, red and light green squares (on the left). If we look at the squares in the other three colors, it is easy to spot the two squares where the regularity breaks.