

Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

by

Prof. Ravi Poovaiah

IDC, IIT Bombay

Source:

<https://www.dsource.in/course/visual-syntactics-1-tessellations>



1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

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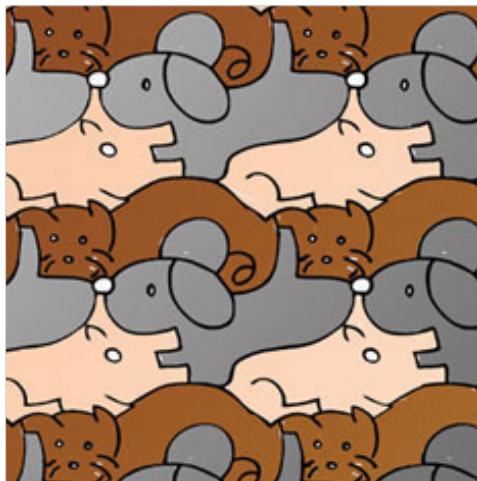
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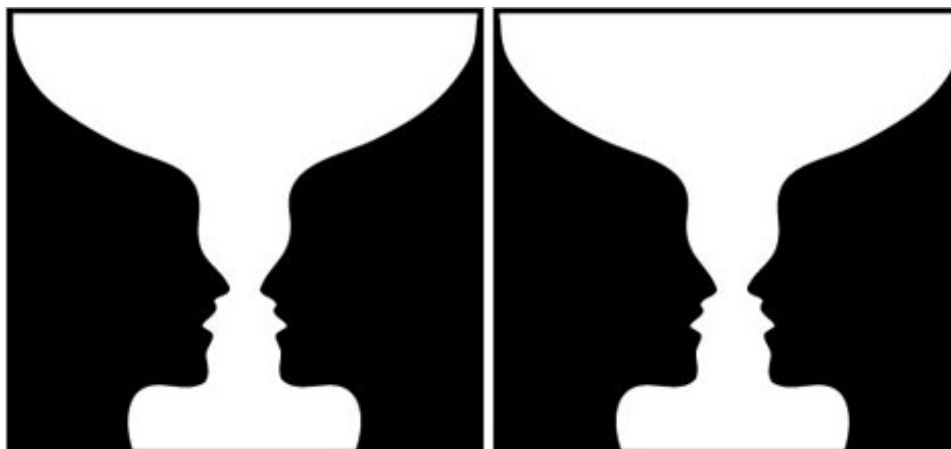
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Introduction

This is an exercise in exploring Figure and ground relationships. Tessellation can be thought of as figures that fills a plane surface with no overlaps and no gaps. We can also make a tessellation when figures are repeated alternately with ground (without overlapping).



We are able to see figure as distinct from the background. In a tessellation since the figures are repeated alternately with the background, we are able to see the background also as figures or the figures as background. In fact, you can switch between the figure and background. This is easily seen in this image below - two faces and the vase.



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The pictures have a double reality. They are objects in their own right (patterns on a flat sheet) and at the same time entirely different objects to the eye. Pictures are paradoxes. The retinal images do not have the double reality of external pictures. We do not see them as patterns and as representing something else. We read aspects of reality from the patterns in the eyes, but we do not also see our eyes's images.

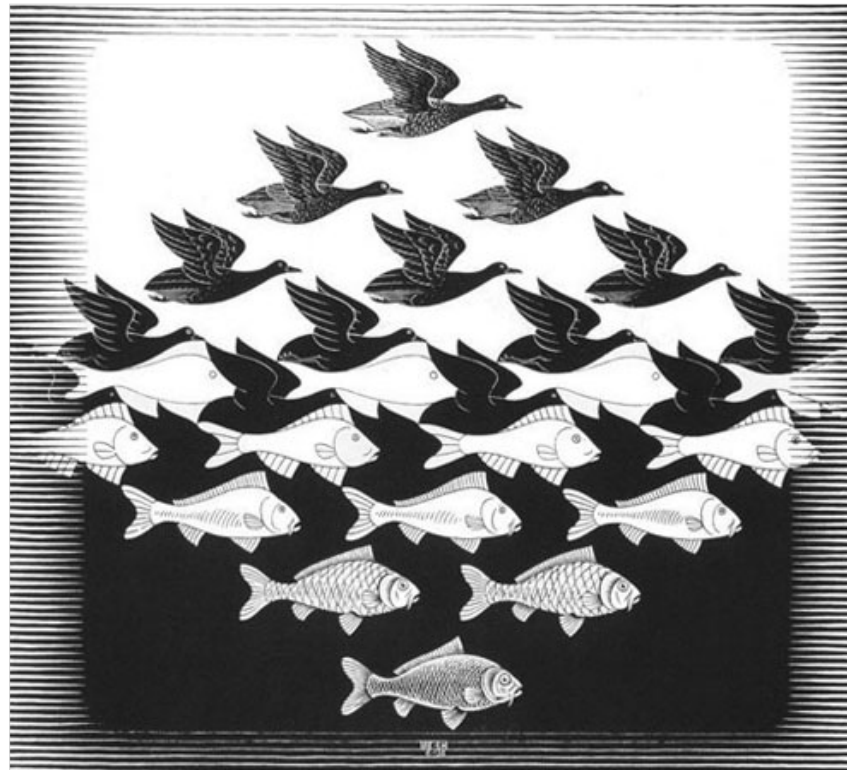
__by Gregory Richard L; *Visual Illusions, Scientifics America, November 1968*

Interpretation-hypothesis:

Perception may be search for the best possible interpretation of sensory information, based on our knowledge of object characteristics. In other words, a perceived object may be a hypothesis suggested by the sensory data. The perceptual system is active, this system does not merely receive input, but also searches for the percept that is most consistent with the sensory data.

__by Gregory Richard L; *the intelligent eye, McGraw hill, 1971*

The Dutch artist M C Escher (1898-1972) created some of the most interesting tessellations. Here is a woodcut depicting tessellation titled 'sky and water' by the artist:



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3. Figure and Background

4. Design Exercise

5. Further Links

6. Contact Details

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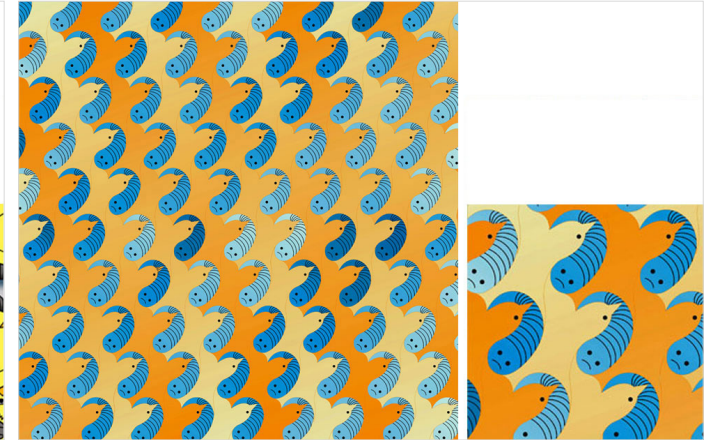
Tessellations

Examples:

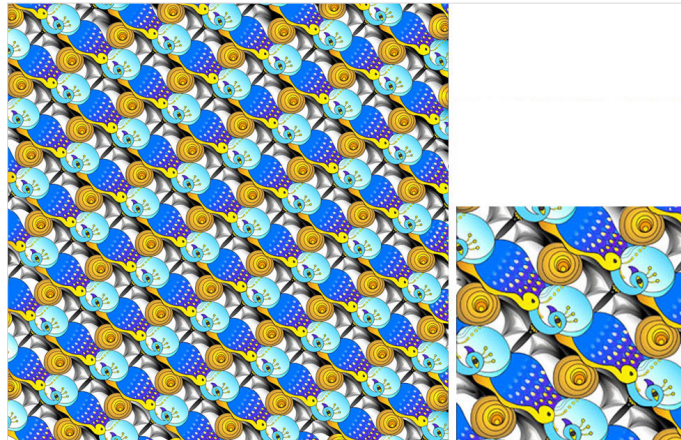
The exercises done by first year M. Des. Students at IDC, IIT Bombay are given below:



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5. Further Links
6. Contact Details

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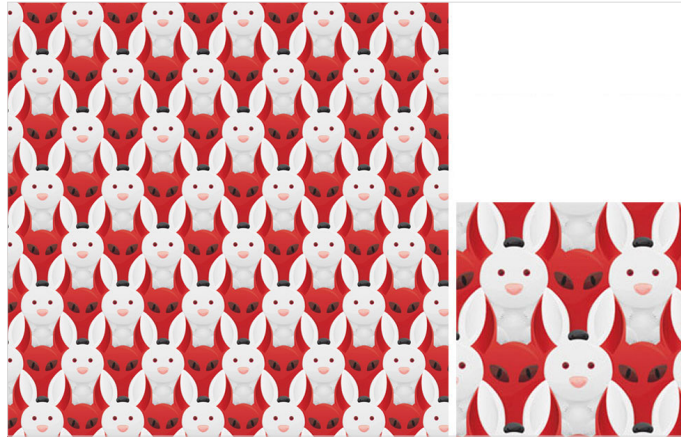
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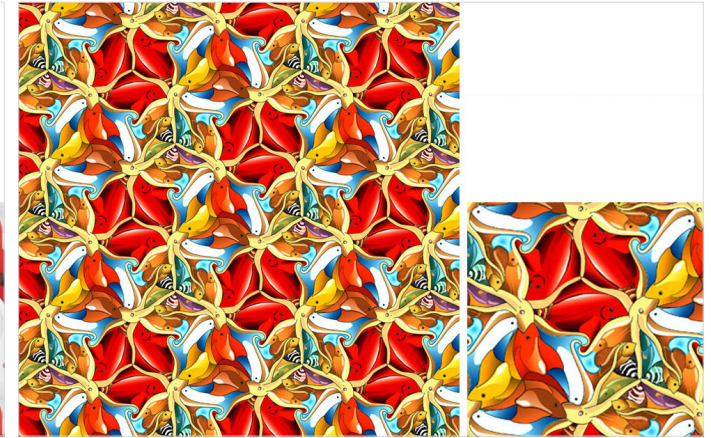
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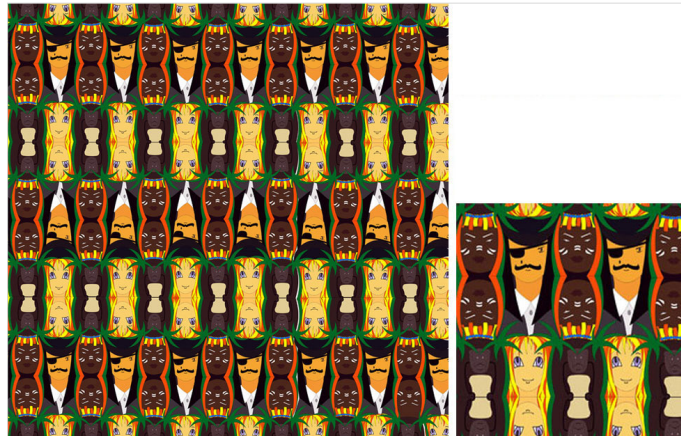
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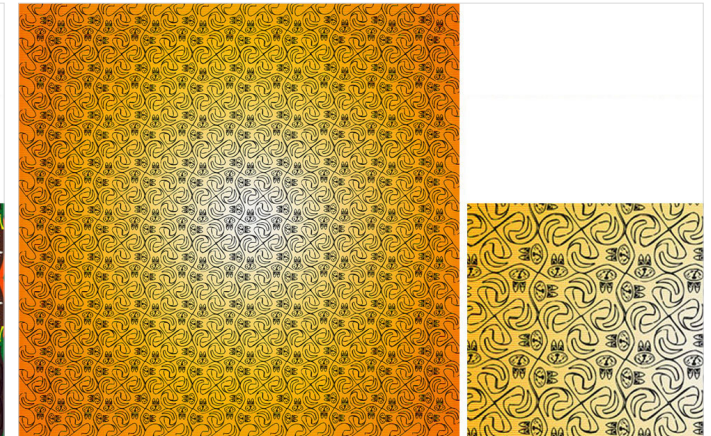
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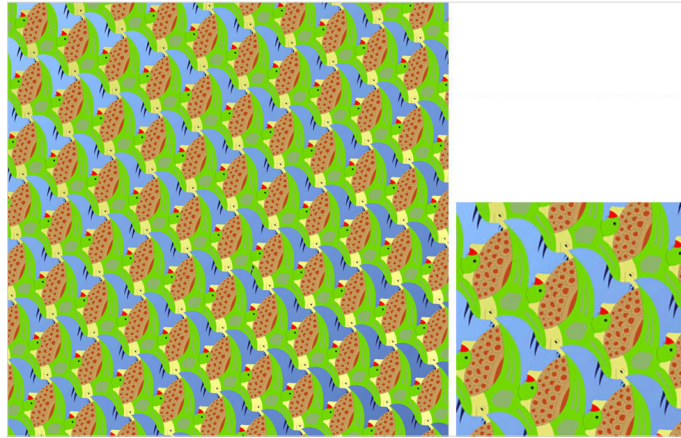
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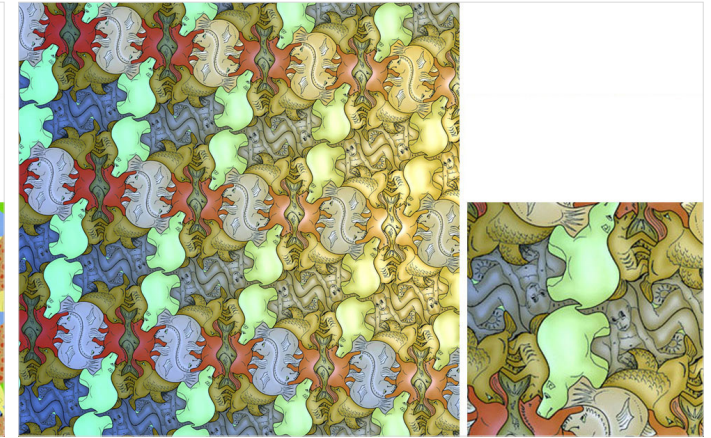
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2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



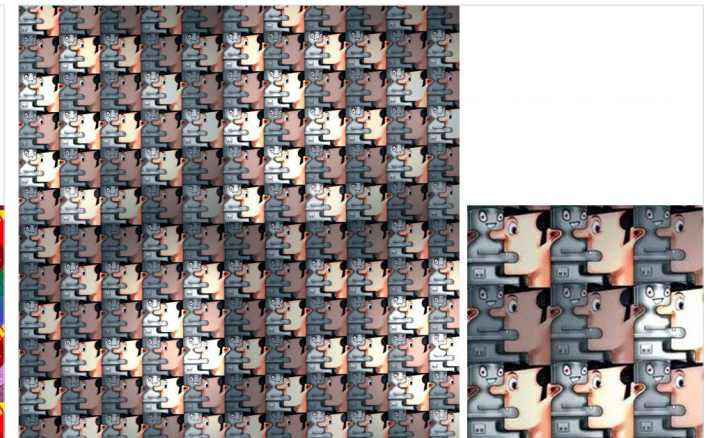
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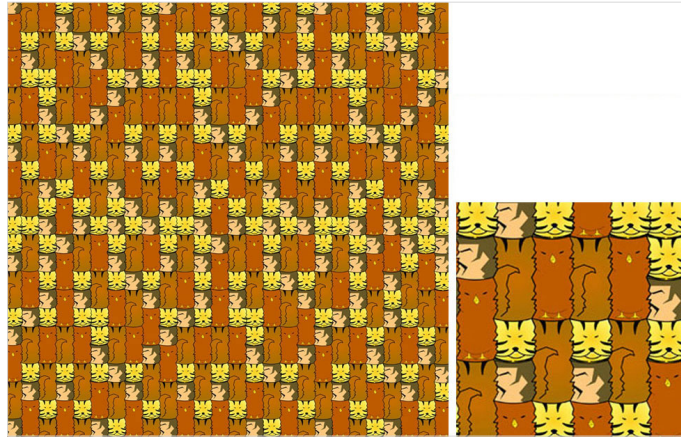
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3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



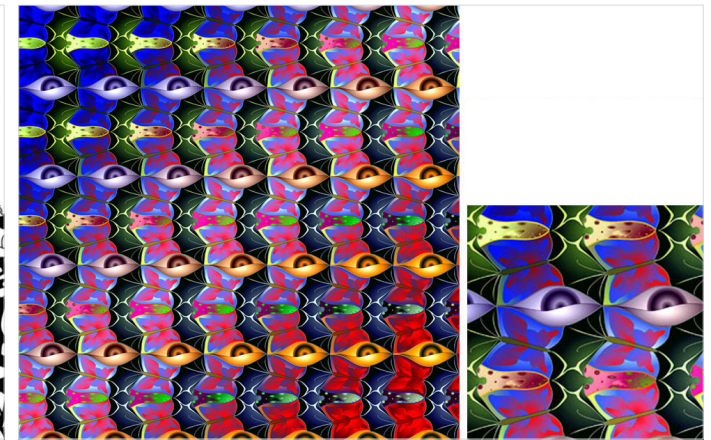
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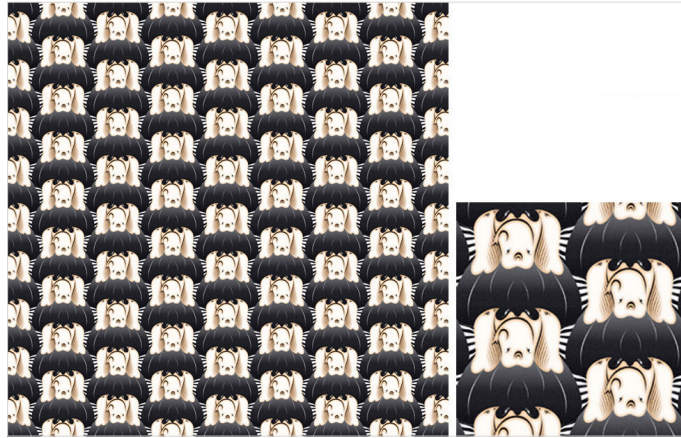
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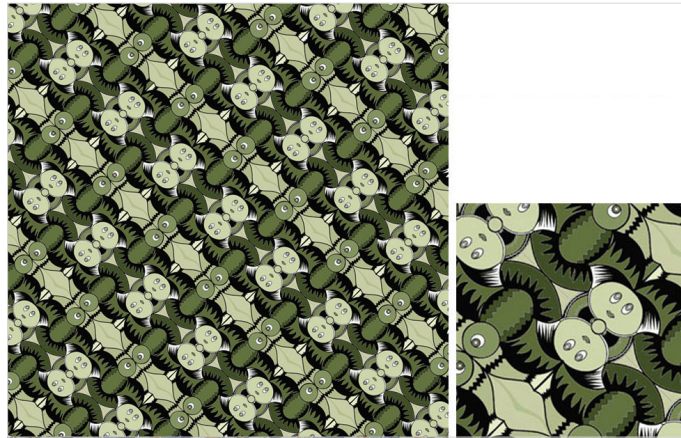
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2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



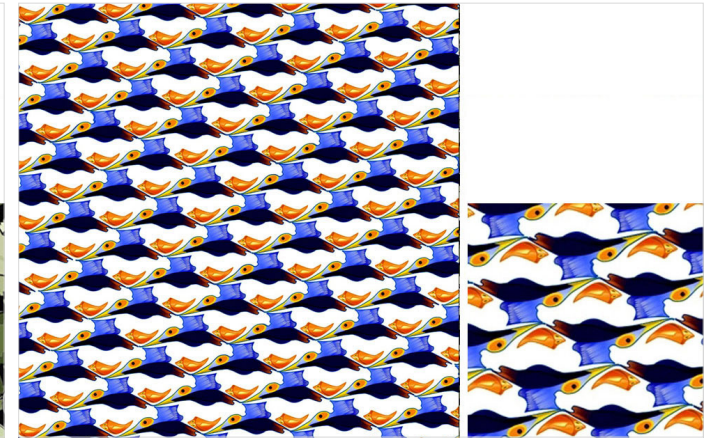
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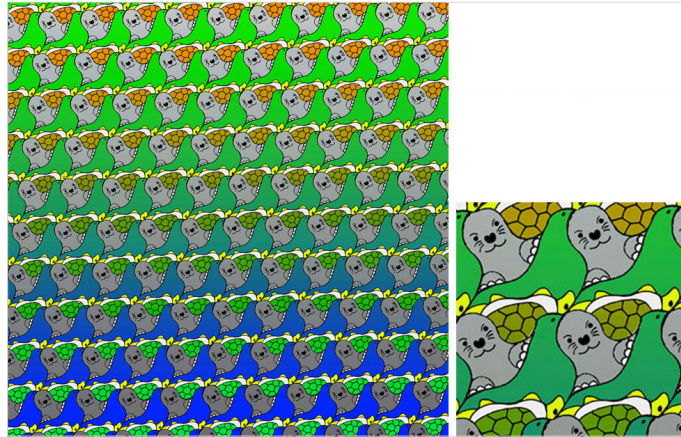
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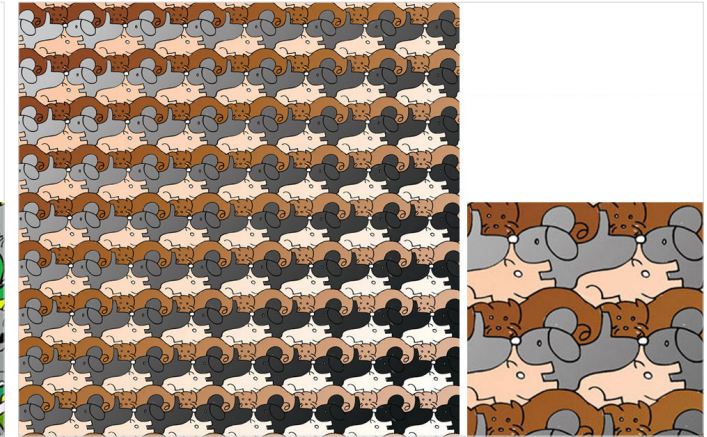
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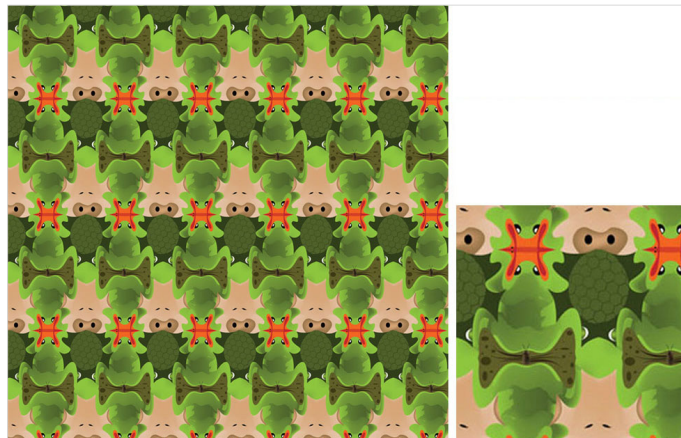
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2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



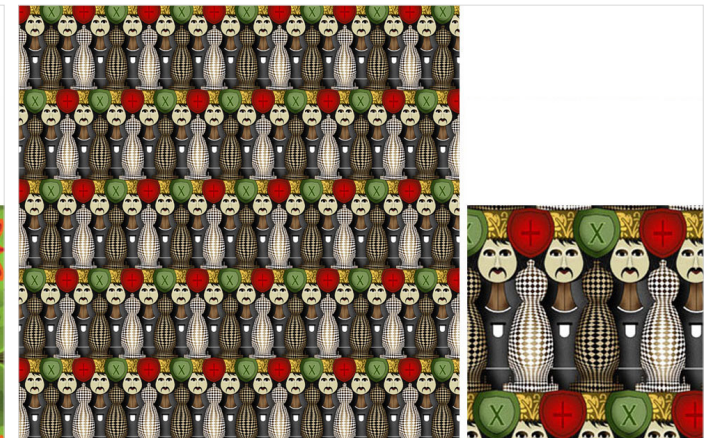
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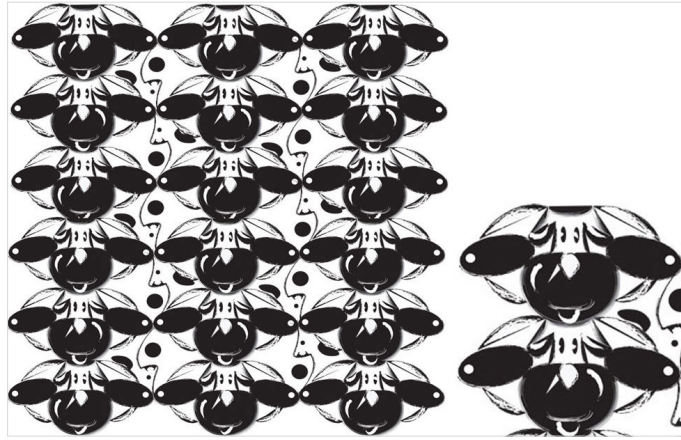
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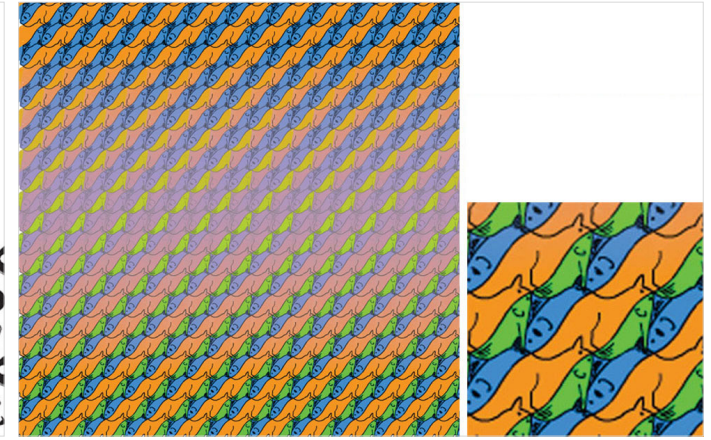
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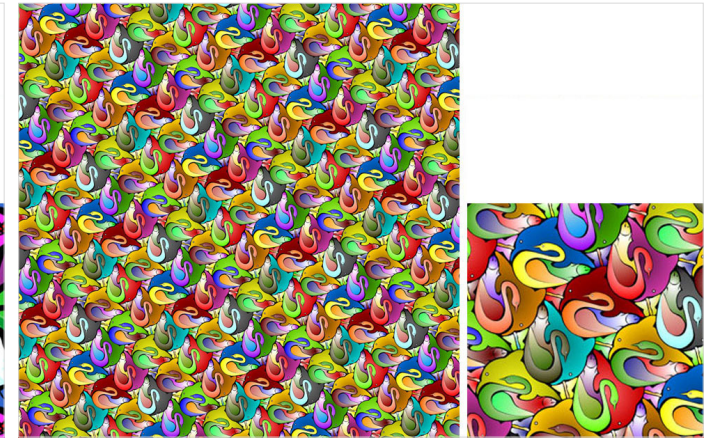
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4. Design Exercise
5. Further Links
6. Contact Details

Design Course

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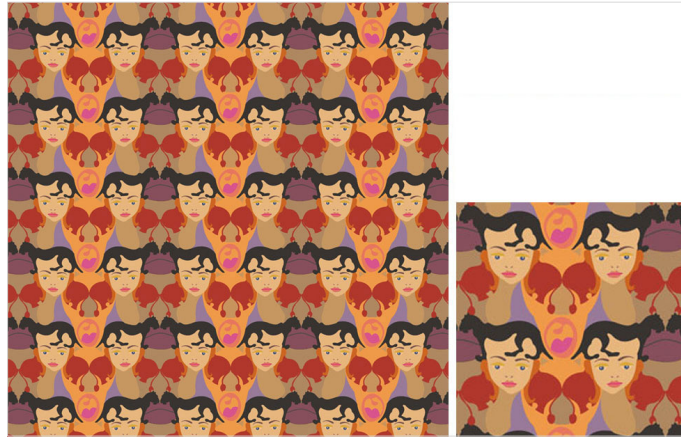
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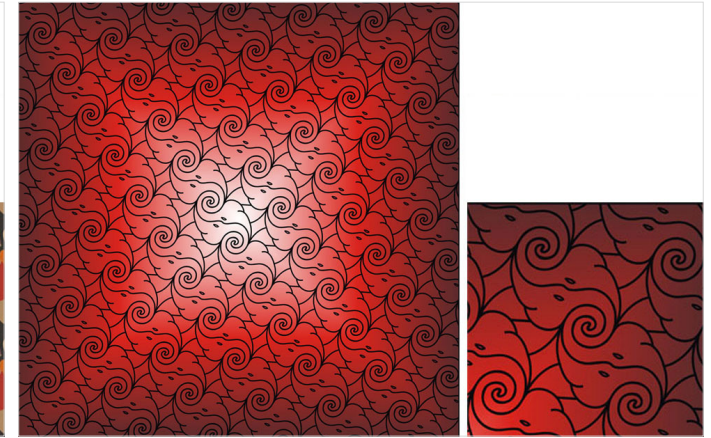
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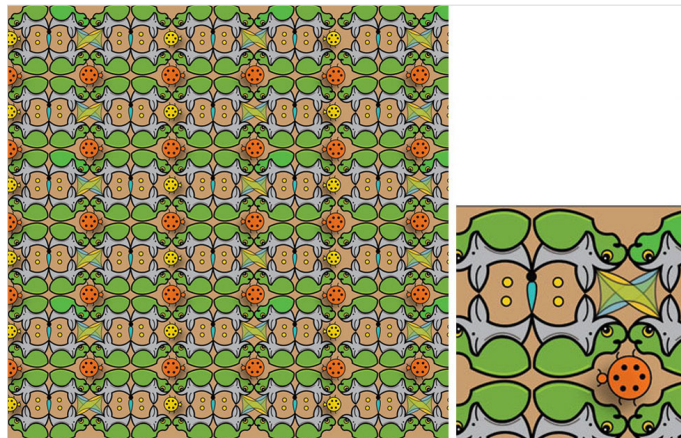
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2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



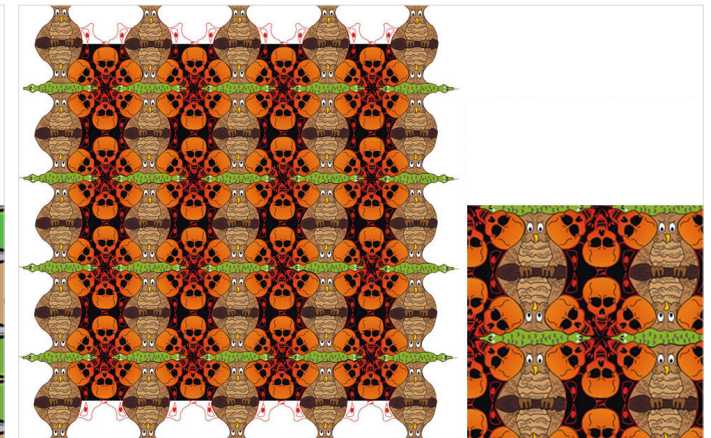
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Design Course

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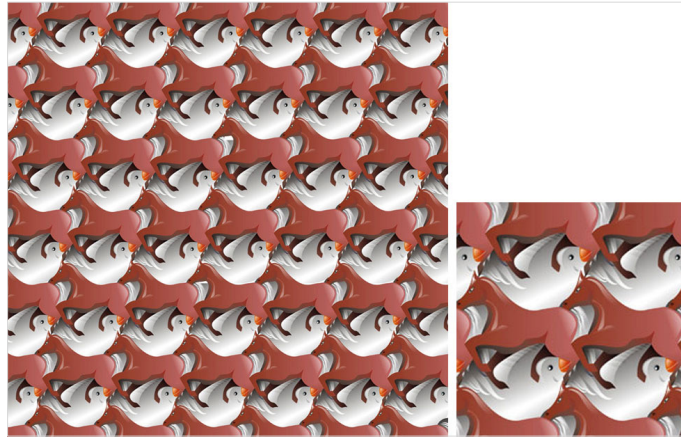
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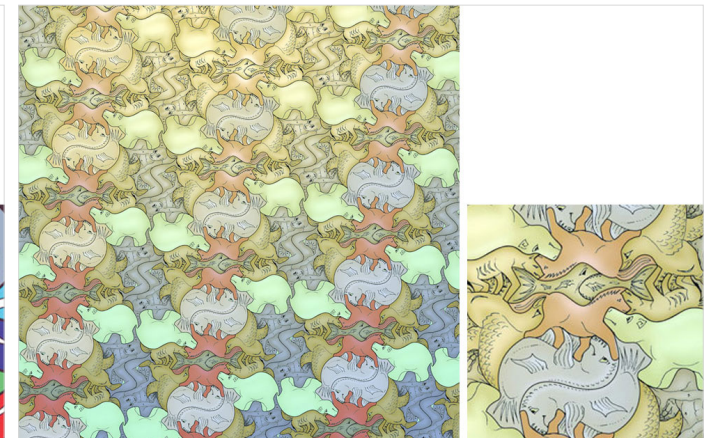
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2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

Design Course

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Understanding Visual Language

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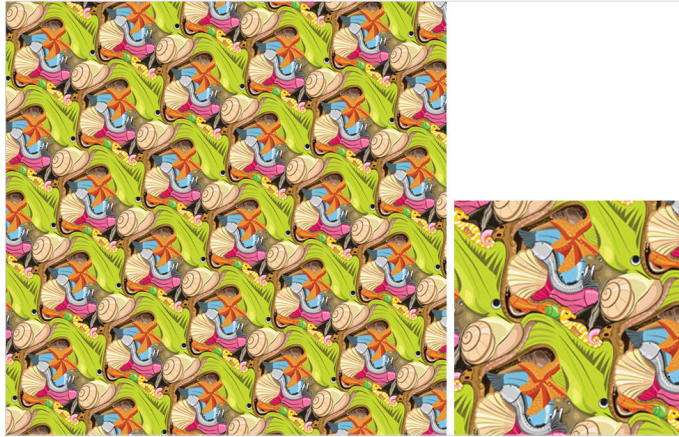
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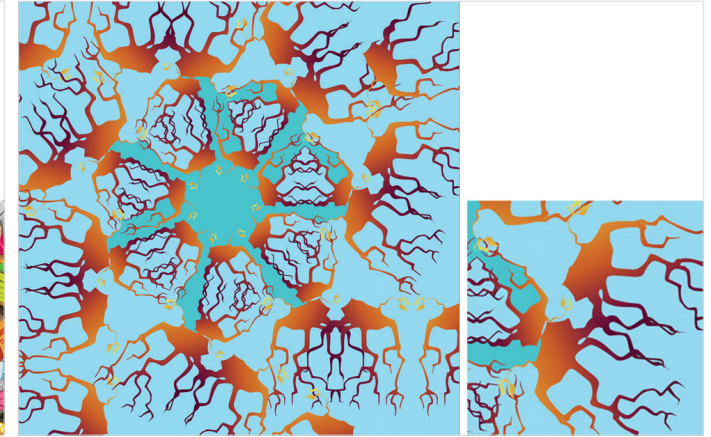
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2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



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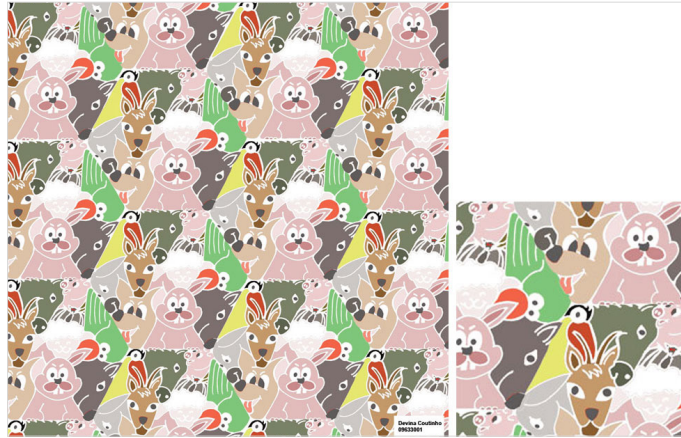
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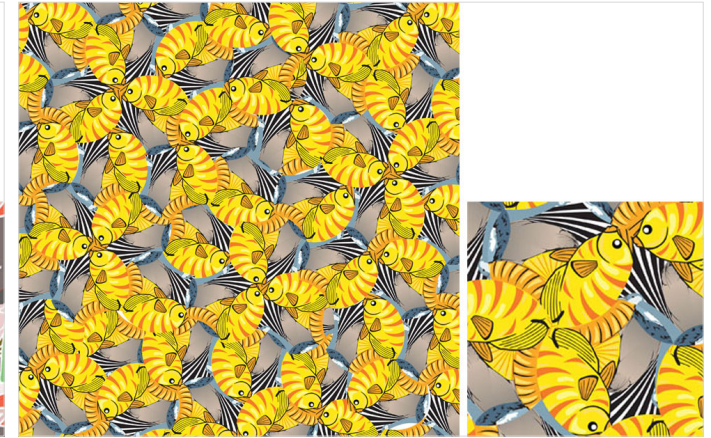
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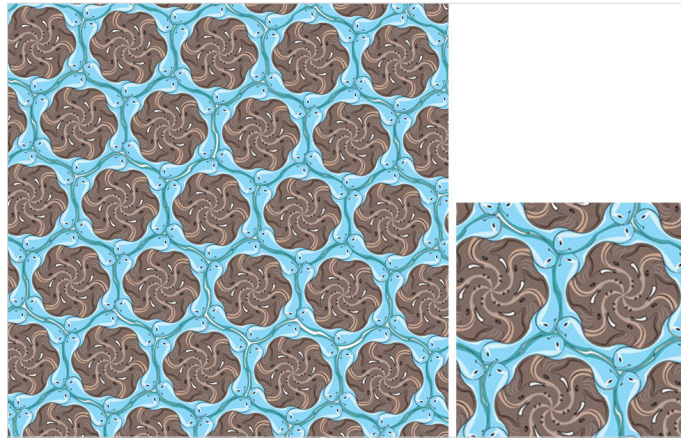
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2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



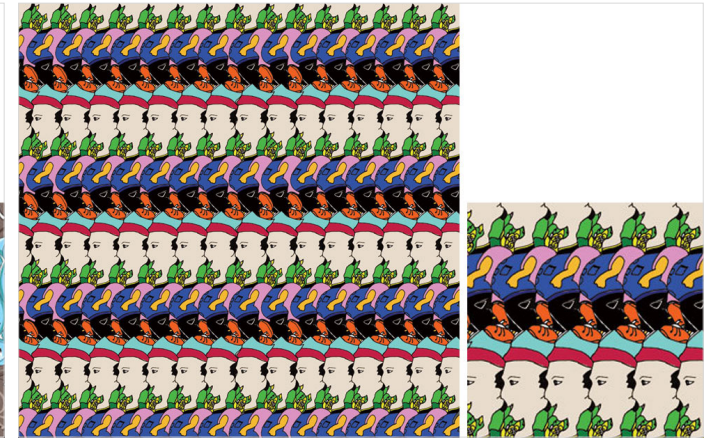
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Design Course

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Understanding Visual Language

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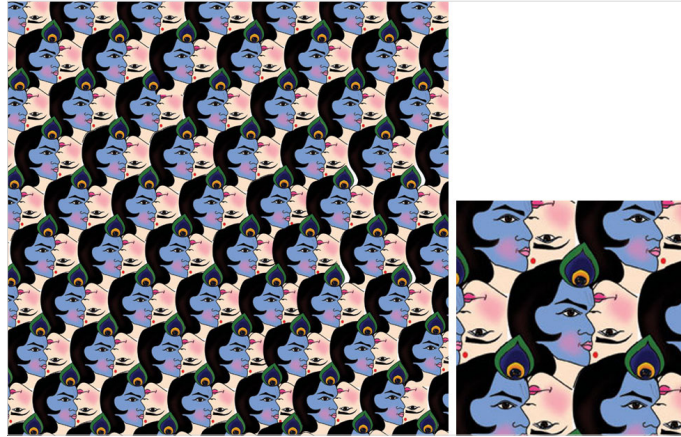
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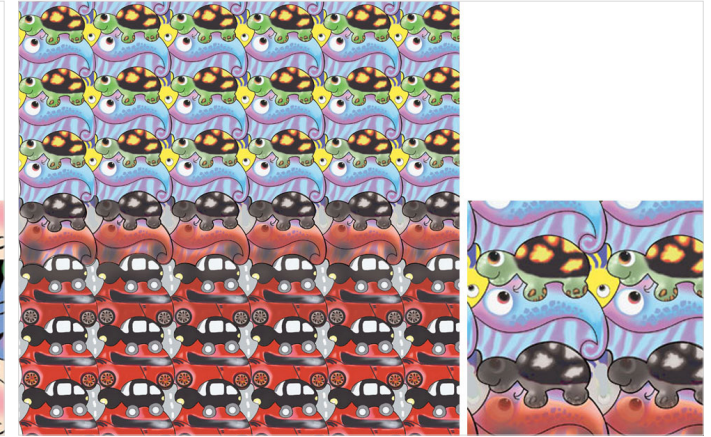
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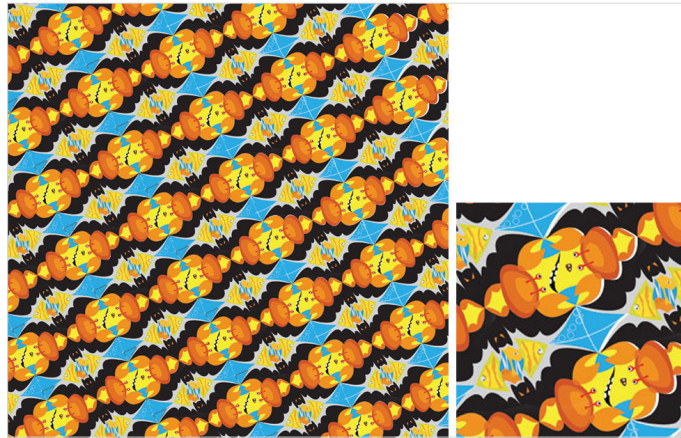
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2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



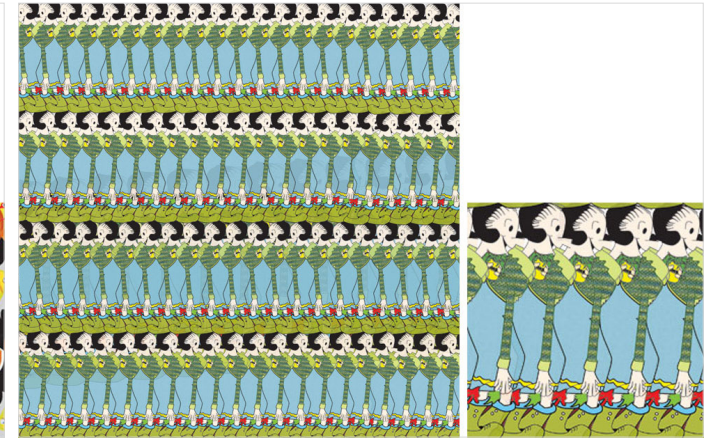
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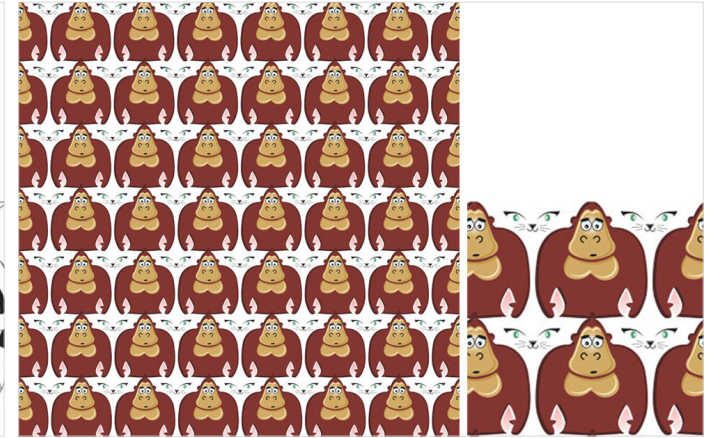
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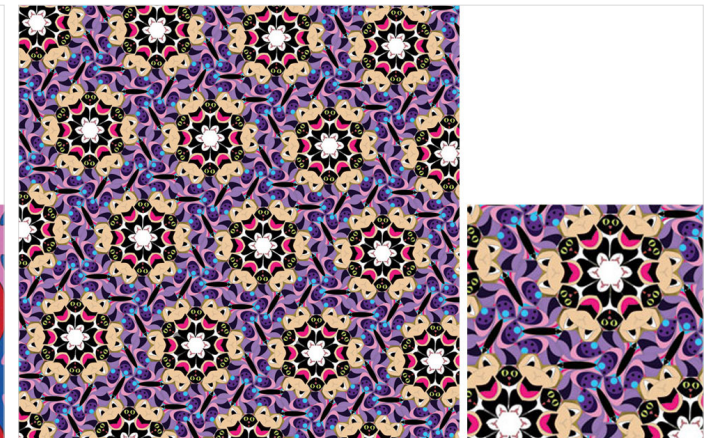
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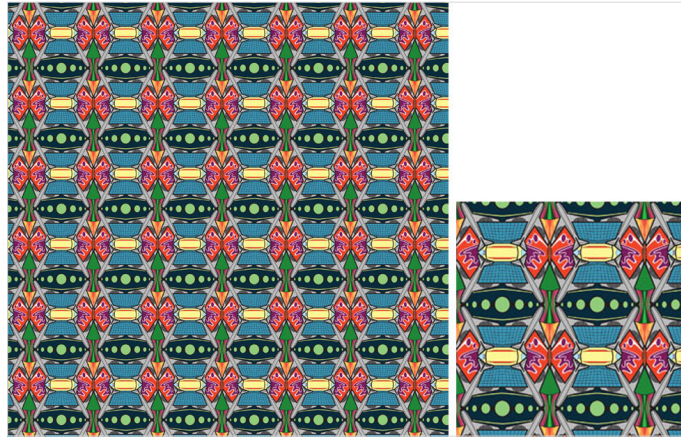
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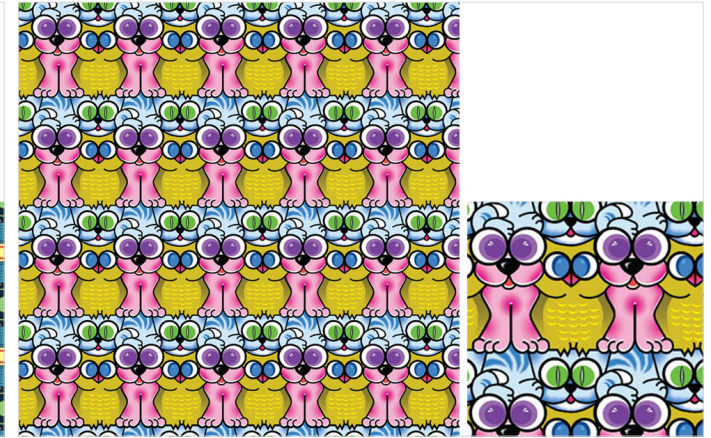
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3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



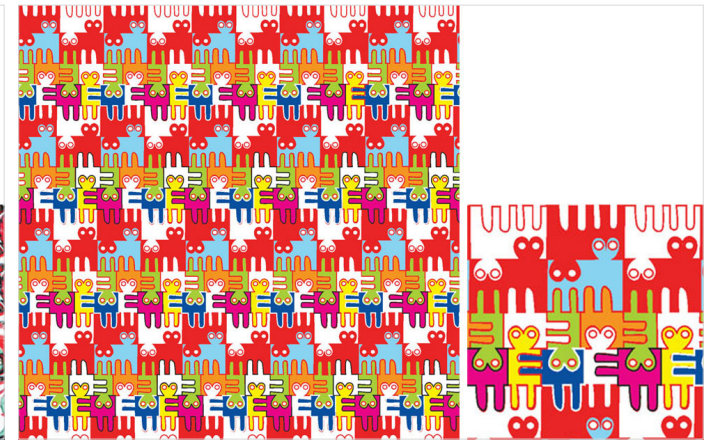
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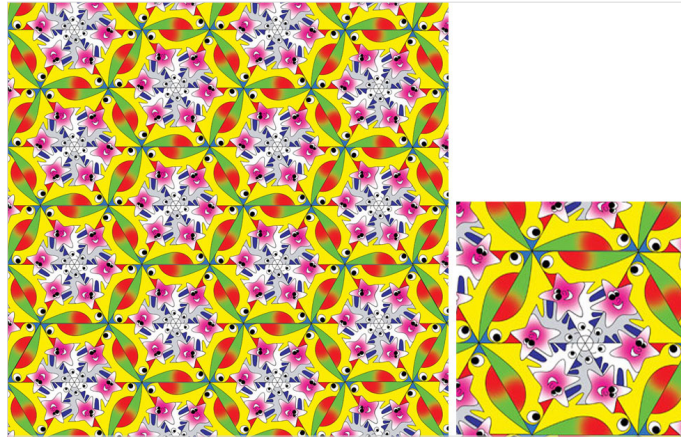
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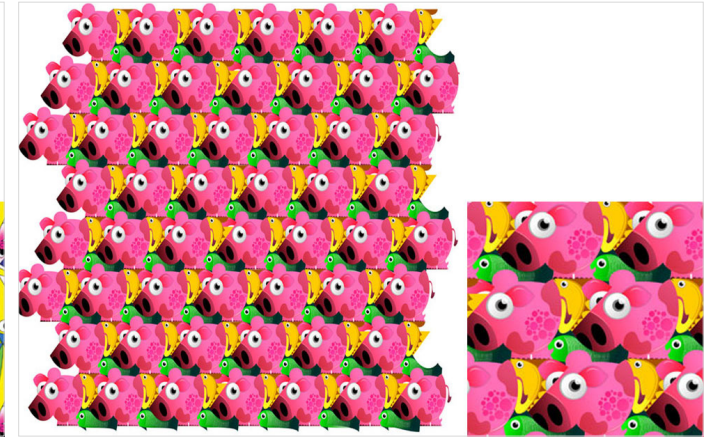
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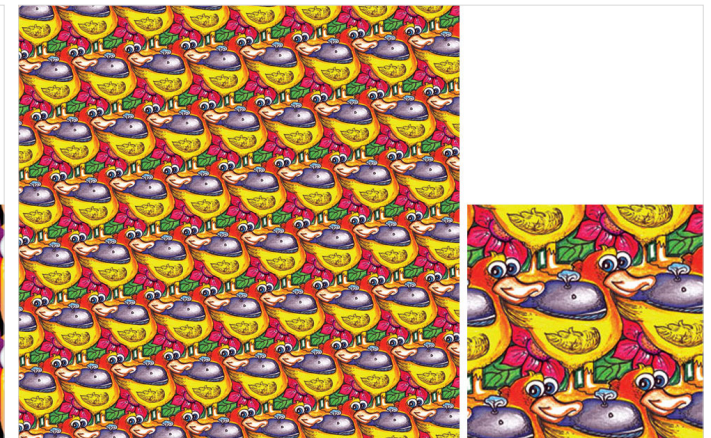
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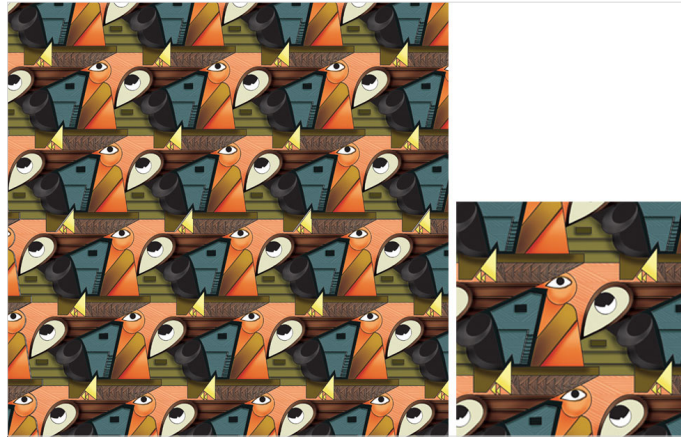
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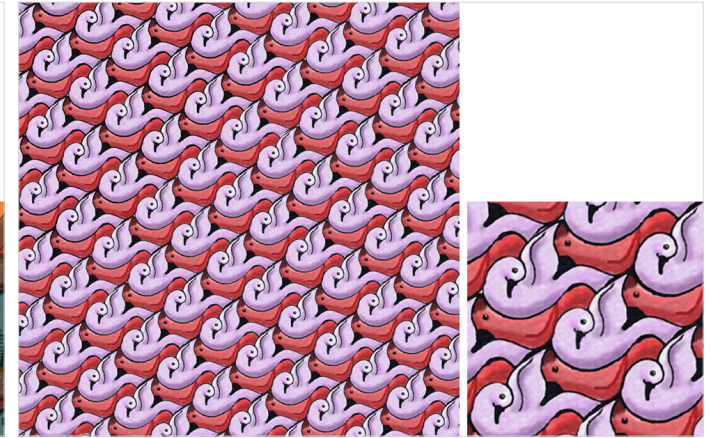
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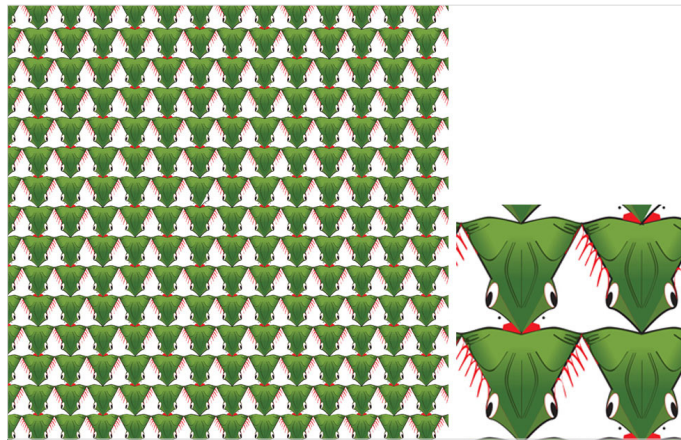
1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



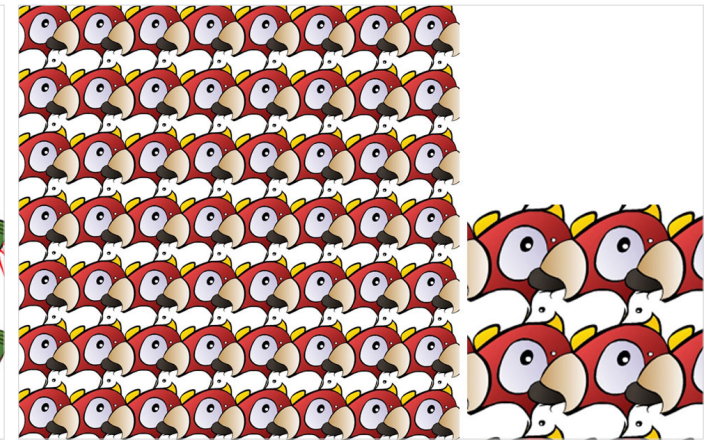
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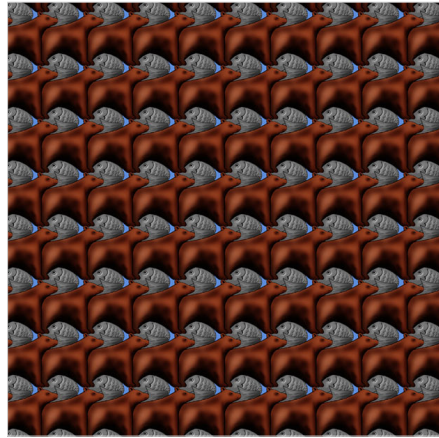
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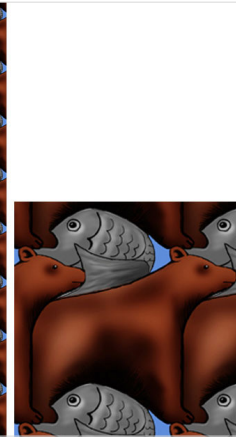
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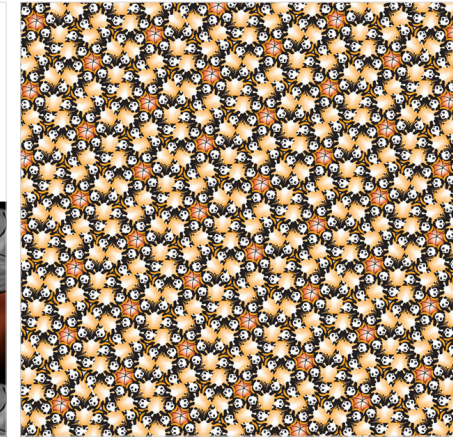
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2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



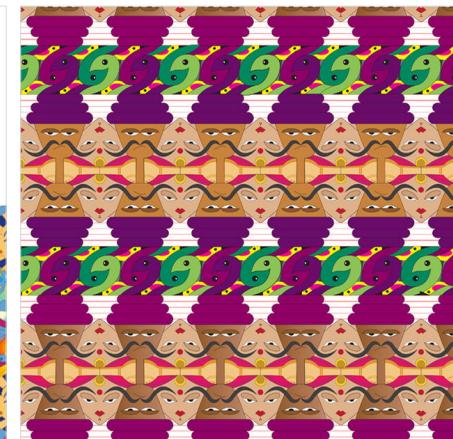
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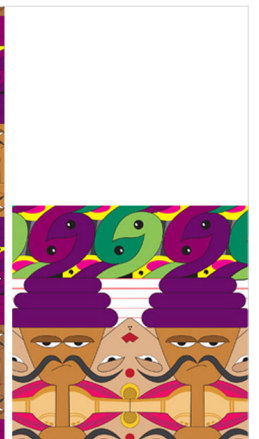
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Understanding Visual Language

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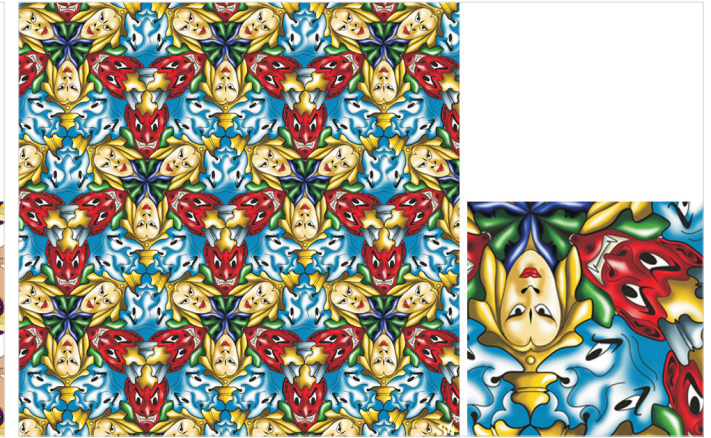
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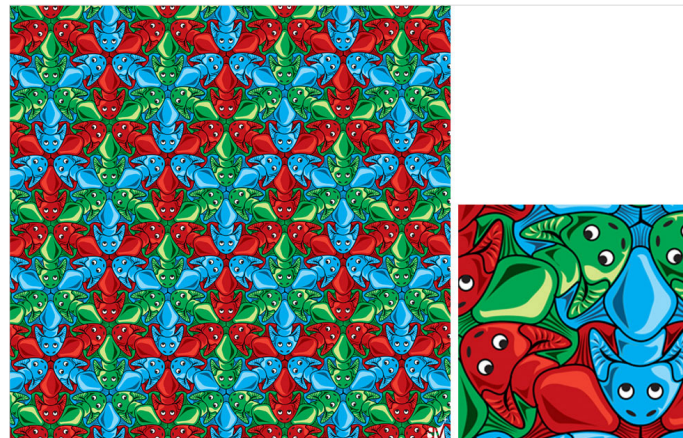
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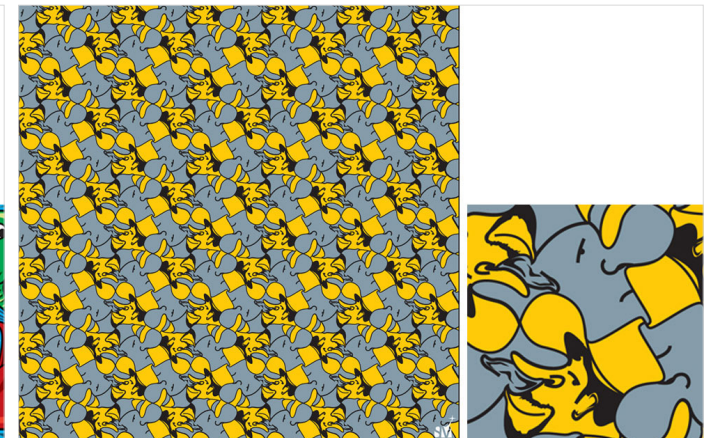
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1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

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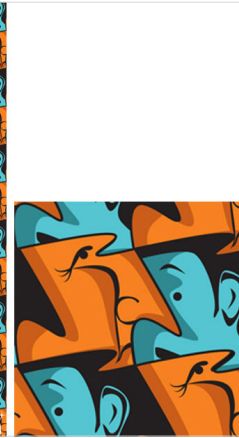
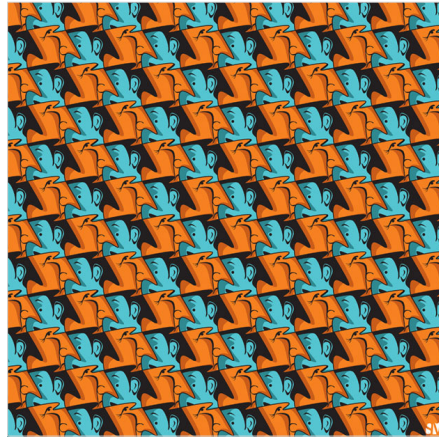
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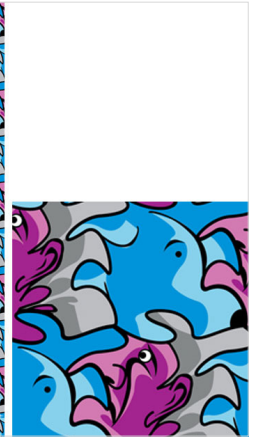
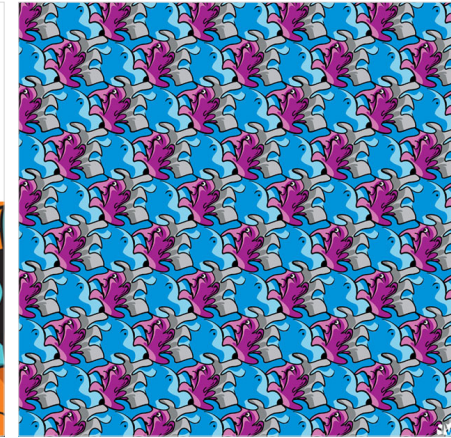
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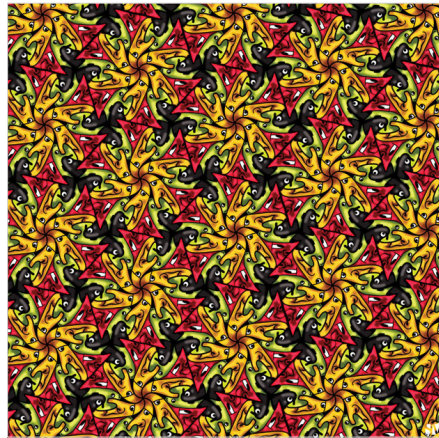
1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



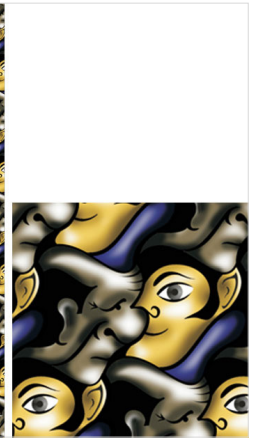
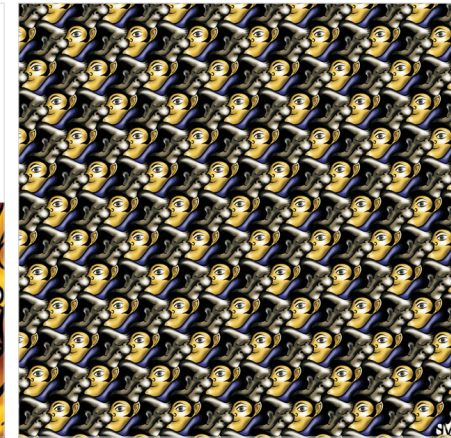
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Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

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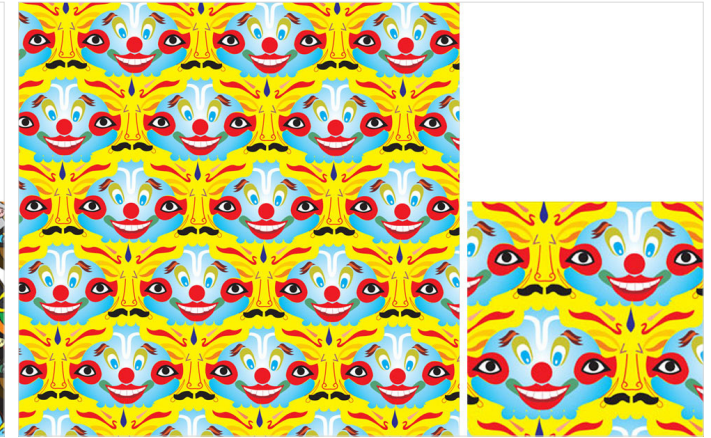
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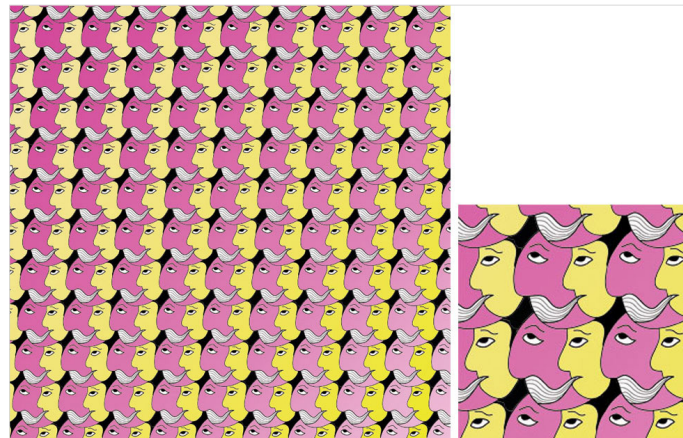
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1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

by

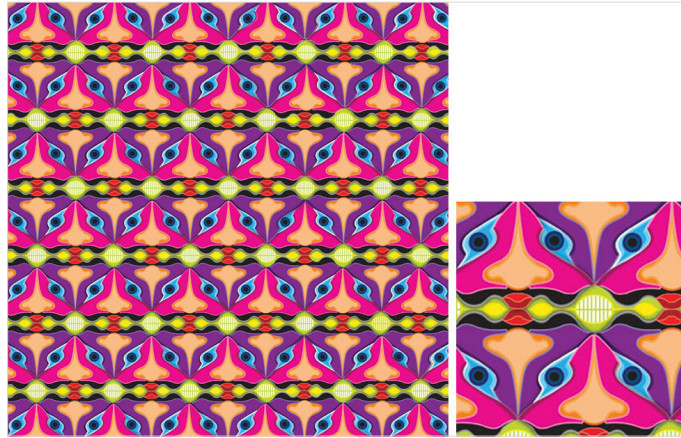
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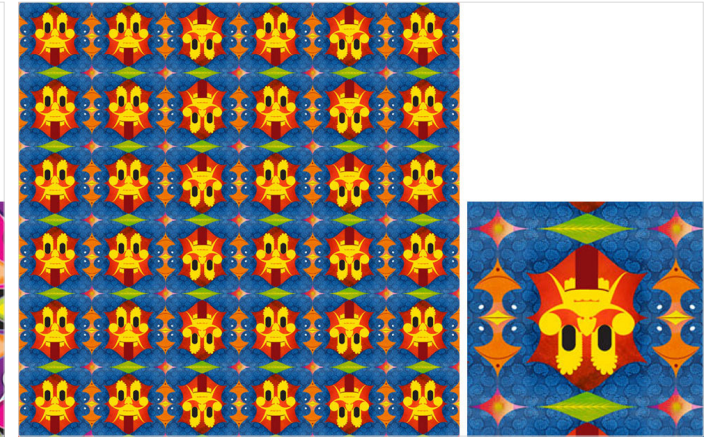
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1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



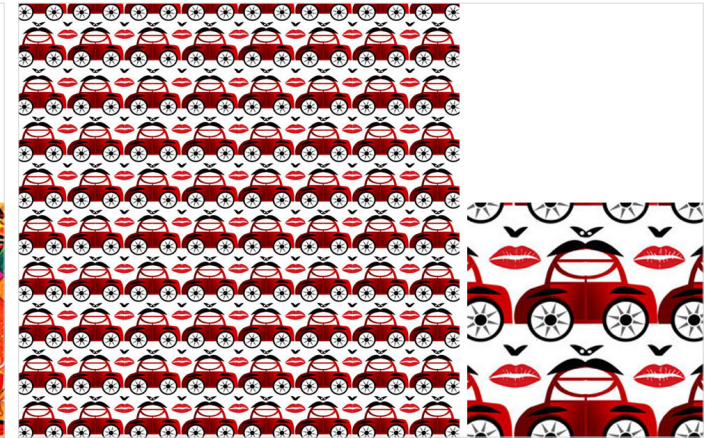
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Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

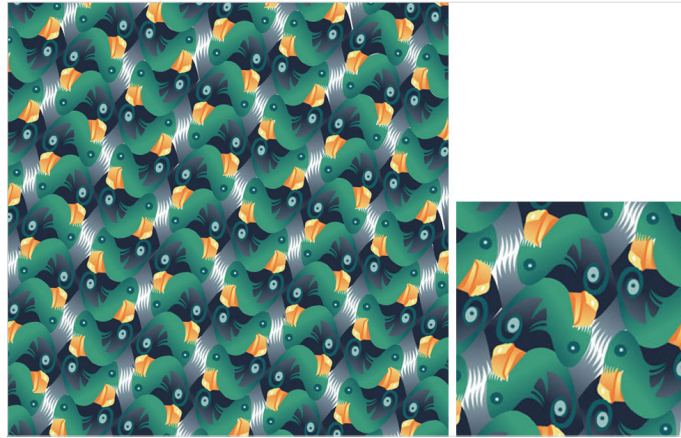
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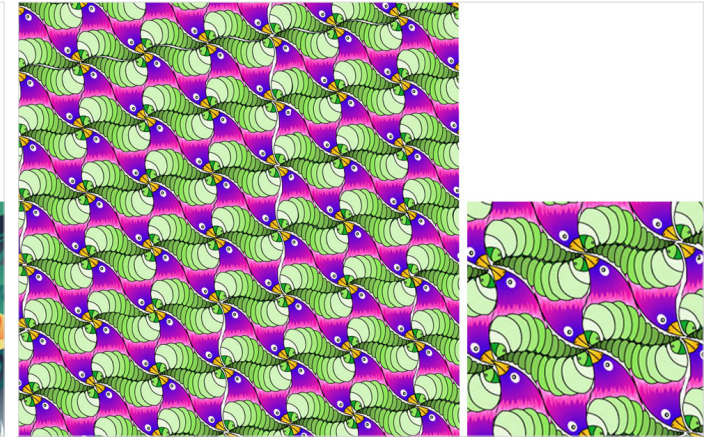
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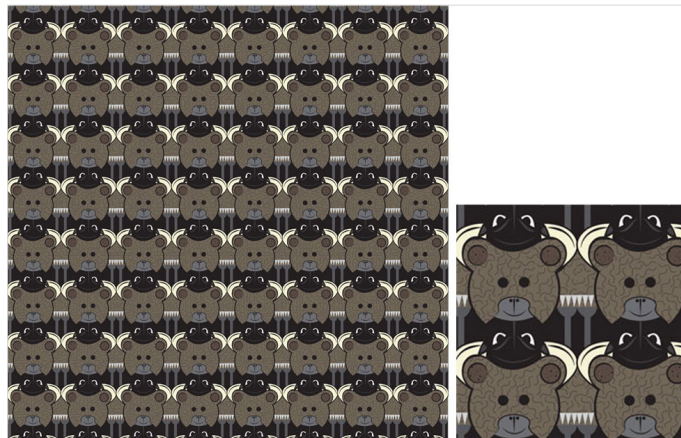
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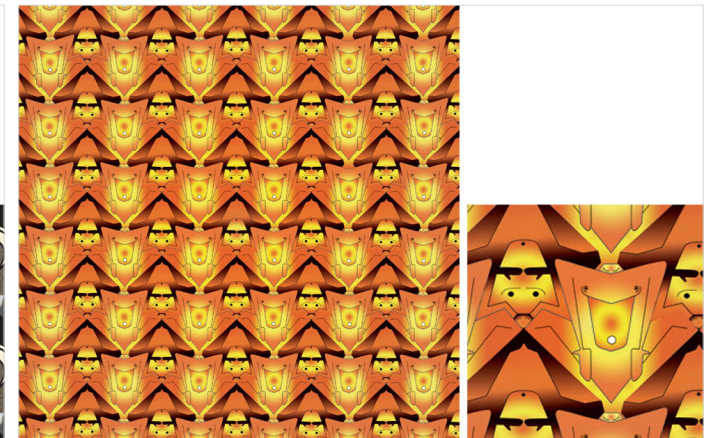
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1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

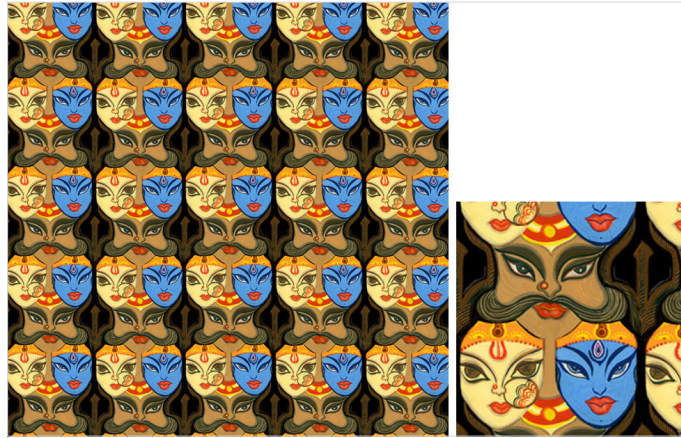
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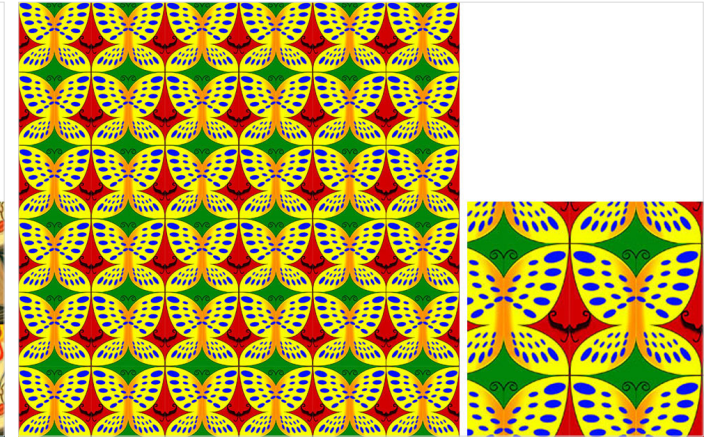
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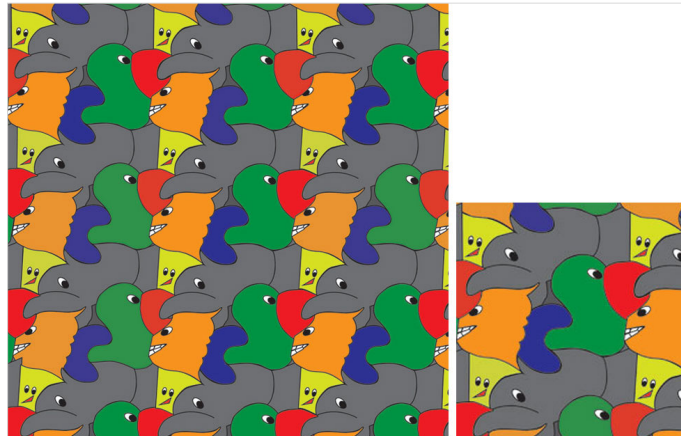
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1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

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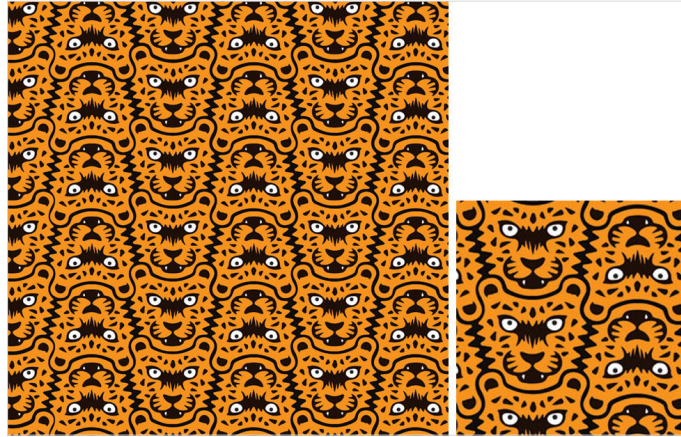
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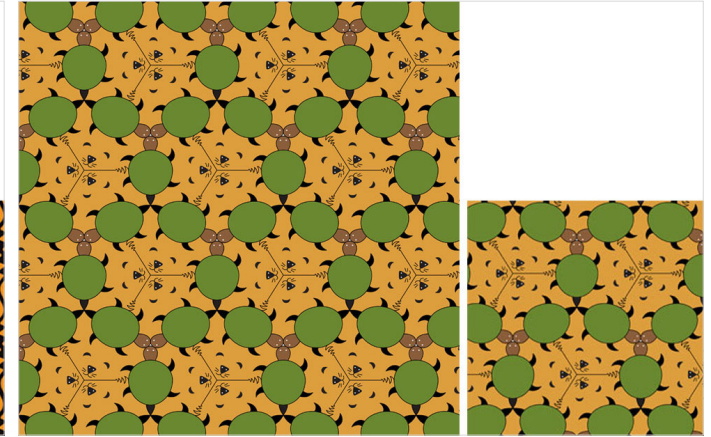
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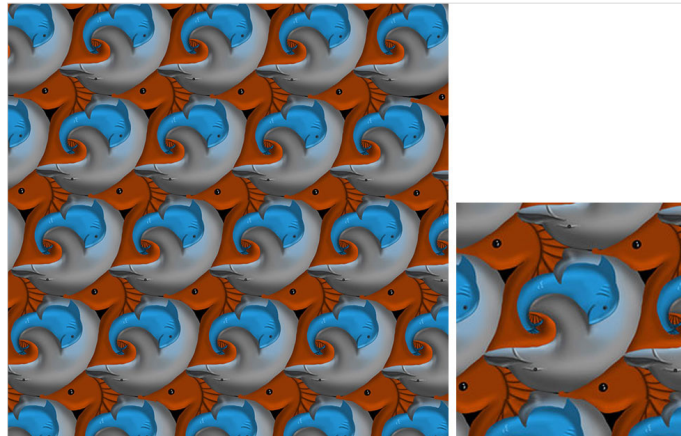
1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



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Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

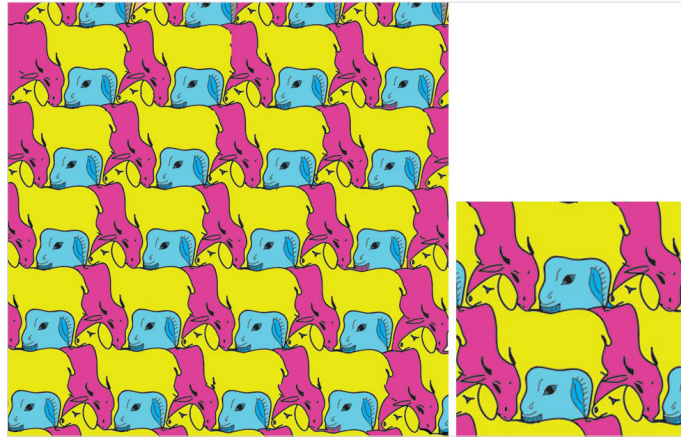
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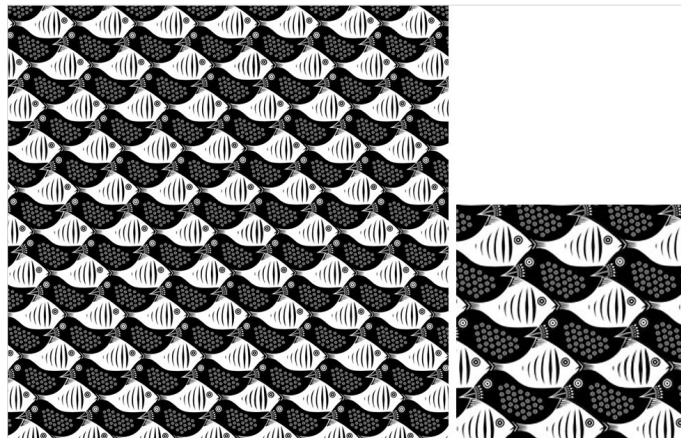
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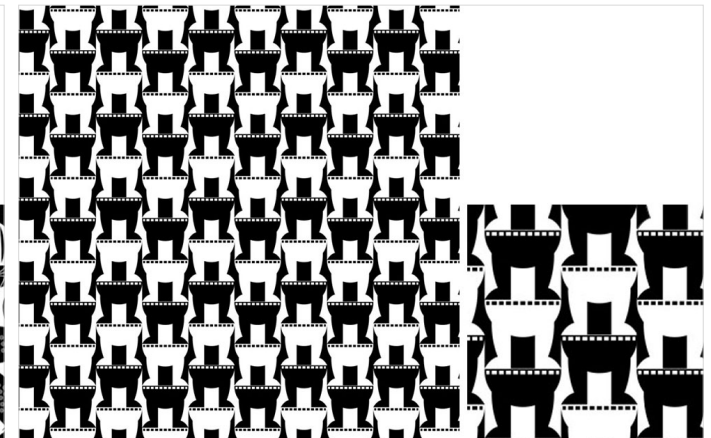
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1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

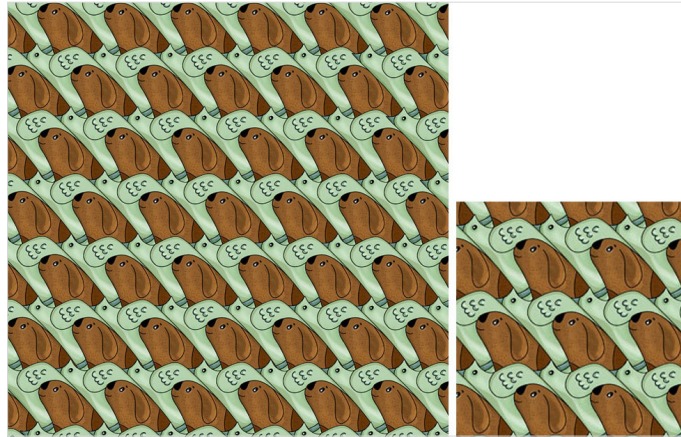
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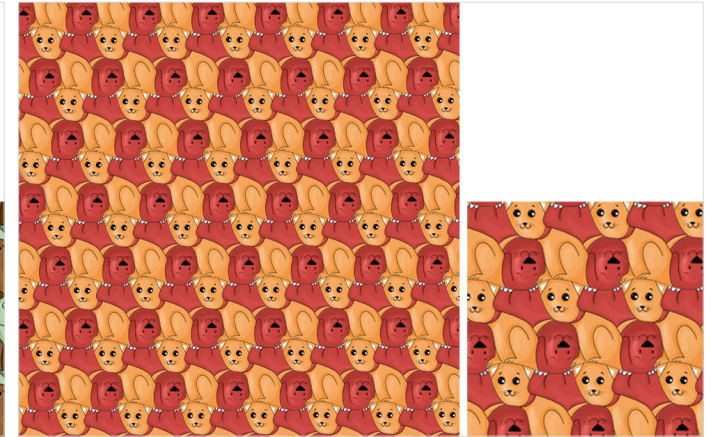
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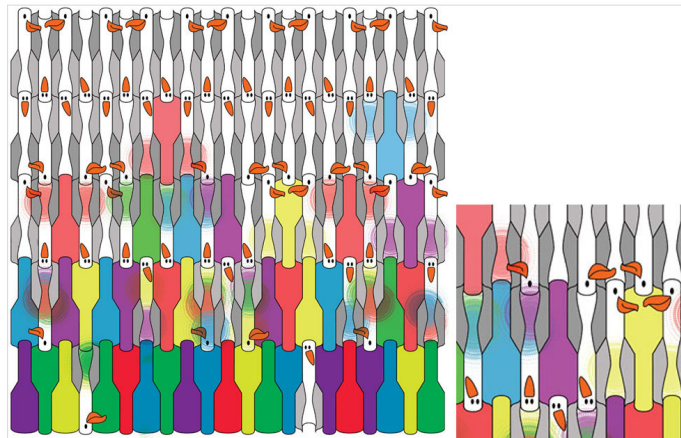
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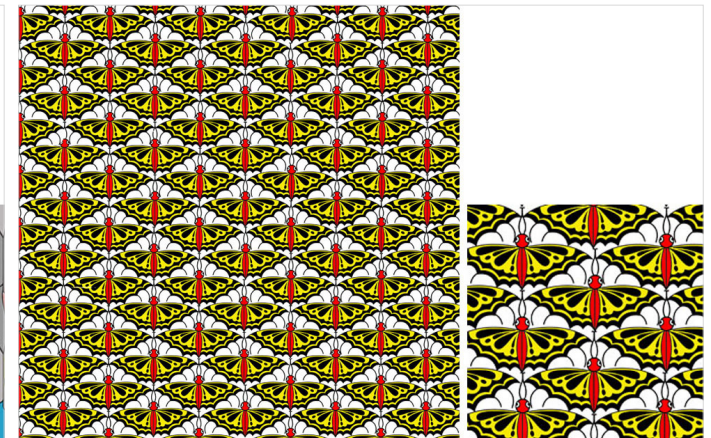
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1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

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1. Introduction

2. Tessellations

3. Figure and Background

4. Design Exercise

5. Further Links

6. Contact Details

Figure and Background

We are able to differentiate figures as distinct from the backgrounds. This means that we are able to distinguish that a pen or a coffee cup are separate entities which are different from the table upon which they rest.

We perceive some differences between the figure and ground:

- Figures tend to have more meaning than the background and are easily remembered.
- Figures appear closer to the ground.
- Figures shows more brightness contrast than the area perceived as ground.
- Figures seem to have a shape as opposed to the background, which is relatively formless.

Tessellations:

When figures are repeated alternately with ground (without overlapping) it is called a tessellation.

They are only three polygons that can tessellate a plane without being combined with other polygons. They are

- Equilateral Triangles
- Squares and
- Regular hexagons.

In addition to these, any triangle or quadrilateral will tessellate.

Tessellations can be created mainly by three kinds of transformations

- Translations (slides)
- Rotations (turns) and
- Reflections (flips).

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Visual Syntactics 1 - Tessellations

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Few examples are given below:



Tessellations using **Equilateral triangles**.



Tessellations using **Squares**.

1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

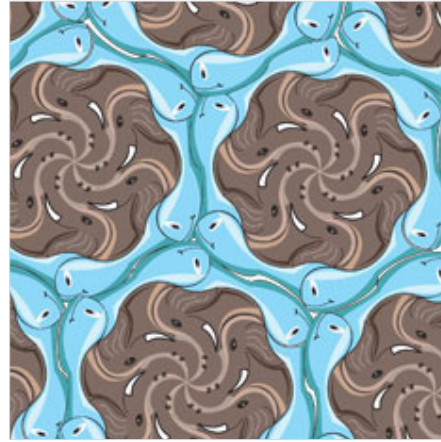
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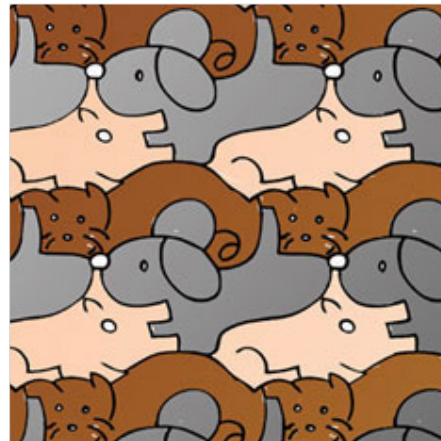
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Tessellations using Regular hexagons.



Tessellations by Translation (sliding).

1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

Design Course

Visual Syntactics 1 - Tessellations

Understanding Visual Language

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1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details



Tessellations by **Rotation**.



Tessellations by **Reflection**.

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Understanding Visual Language

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1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

Design Exercise

Exploring Tessellations:

Exercise:

- Create a tessellation with visual images that contradict each other.
- Create repeated tessellating images first by trying out geometric patterns and the final one by using iconic realistic images. These could be objects, animals, plants, nature etc.
- Try towards creating visually interesting (not simple) tessellations.
- The image could be in colour with gradational variations.
- Use tracing paper on top of the original image to try out form variations and to do your initial sketches.
- You could use illustration software application like Illustrator to draw your final solution.

Note:

While trying to do tessellation, one needs to try this out as alternatives on paper. It is also useful to use tracing paper or a backlit surface for this exercise.

Total Time Duration: 15 hours of studio time.

Submission:

- Submit both as soft copy as well as hard copy.
- Soft copy should be of 70dpi resolution of size 40 cm x 40 cm
- Take a printout measuring 40 cm x 40 cm without leaving any border on the paper. The hardcopy is useful for display and feedback.



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Visual Syntactics 1 - Tessellations

Understanding Visual Language

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Further Links

- [How to make your own tessellations at www.tessallations.org](http://www.tessallations.org)
- [Useful resource e-links related to 'Graphic Design' in India - includes Communication Design, Publication Design and Packaging Design](#)
- [International resource related to 'Graphic Design'](#)
- [Visual Communication Design at IDC IIT Bombay](#)



1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details

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1. Introduction
2. Tessellations
3. Figure and Background
4. Design Exercise
5. Further Links
6. Contact Details