IDC School of Design
अभिकल्प विद्यालय

DEP 403:
Design Exploration Seminar

Patterns in Nature

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Approval

The Design Exploration Seminar project titled "**Online lecture on Patterns in Nature**" by Medhavi Parasar, Roll Number 18U130017, is approved, in partial fulfilment of the Bachelor in Design Degree at the IDC School of Design, Indian Institute of Technology Bombay.

Project Guide: Prof. B K. Chakravarthy

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Declaration

I declare that this written document represents my ideas in my own words, and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated, or falsified any idea/data/fact/ source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been adequately cited or from whom proper permission has not been taken when needed.

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Acknowledgements

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My classmates and roommates have also been extremely helpful. I would like to thank them as well for helping me learn video editing and for their undying support.

Introduction

The purpose of this project is to create an easy-to-grasp video lecture on the topic “Patterns in Nature”. Considering that there are many different patterns, the focus of the video is on the ones most often used or thought of while designing things: **Symmetries**, **Spirals**, and **Tessellations**.

The lecture explains these topics by showing natural objects as examples of the patterns and notes the visual effects each of them has from a design perspective.

To further illustrate the point, examples of real-world designs implementing the patterns are also shown. To make the content more engaging, there are in-video exercises, and post-lecture assignments based on the topics taught.

Target Demographic:

- ★ High school students learning design fundamentals.

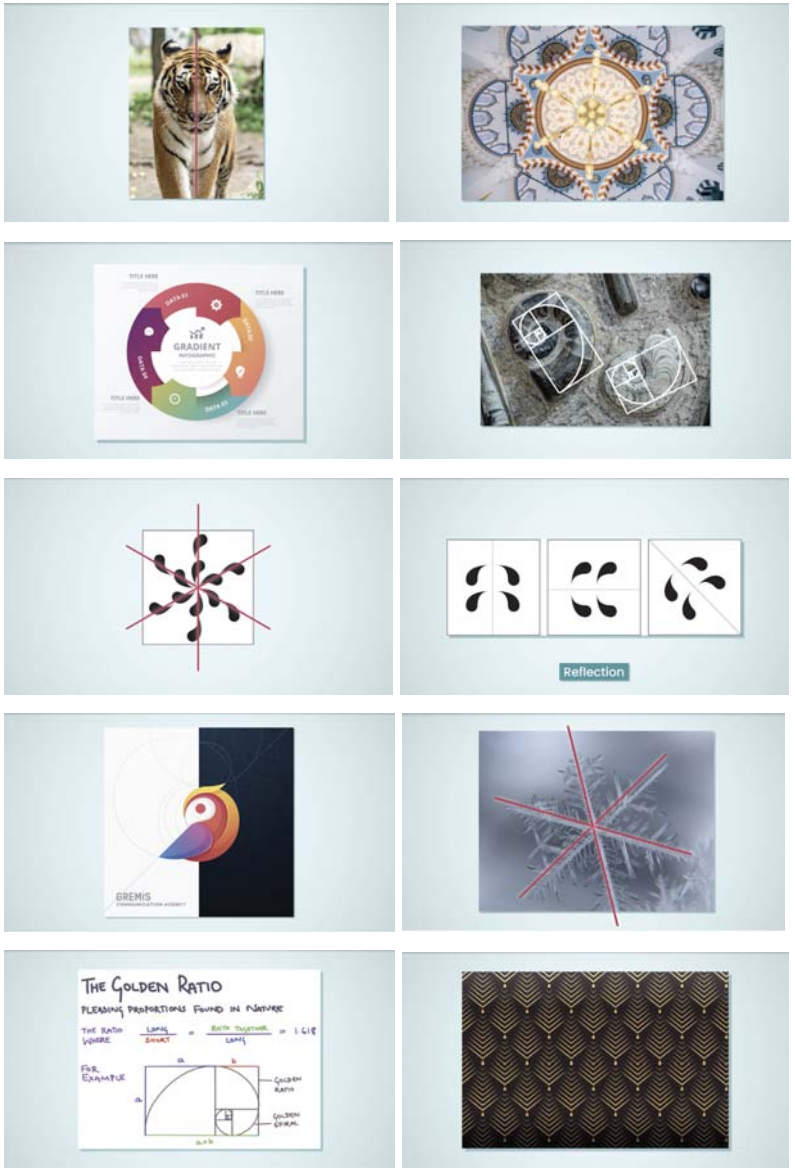
Process

Research & Focus Area

I started my research by going through educational content on the broad subject area and identifying the main topics to explore. I chose to expand on three topics (Symmetries, Spirals, and Tessellations) out of around nine patterns in nature.

Lecture Topics Breakdown

After identifying the main topics, I identified key sub-topics, design principles, and real-world designs that reflected these natural patterns.



Script & Storyboard

Having a rough idea of the main content and visual examples needed, I worked on the script while simultaneously visualising and noting the images to go with the flow.

Script

Patterns in nature

Patterns in nature are visible regularities of form found in the natural world.

Natural patterns include symmetries, spirals, meanders, tessellations, waves, foams, cracks and stripes. Today we'll be taking a look at **symmetry, spirals,** and **tessellations.** We'll also take a look at examples of how nature has inspired designs around the world.

Symmetry

So let's start with symmetry. Symmetry is when visual elements, objects or its representations have the exact shape or form when they are on the opposite sides of a dividing line or plane or about a centre or an axis.

It creates balance, and balance in design creates harmony, order, and aesthetically pleasing results. This is why it's found everywhere in nature and we can see many examples of symmetry in man-made objects.

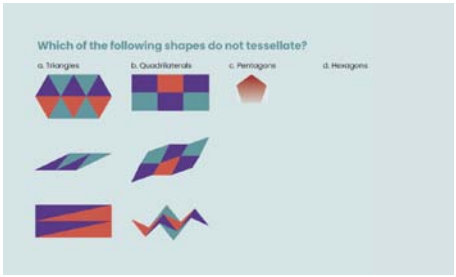
There are three ways to classify symmetry: **Reflection, rotational, translational**.

Reflection Symmetry

Reflection-based symmetry, also known as the mirror effect, occurs when

Exercises & Assignments

To increase the interaction between the video and the audience, I created small in-video exercises for each of the main topics based on questions I myself had when first learning about these topics. To further the learners' understanding, post-lecture assignments based on assignments I have done in classes were created.



STEP 2: Using butter paper, redraw the design. And then, on one side, make a design using the original's mirror reflection, as shown below.

STEP 3: Using the same square created in step I, create an asymmetrical design like below.

Final Outcome

Video Lecture

The video explains the three types of symmetry as well as asymmetry, spirals and the golden ratio as well as golden spiral, and tessellations. After each topic, there is a small exercise, and the post-lecture assignments explore each topic as well.

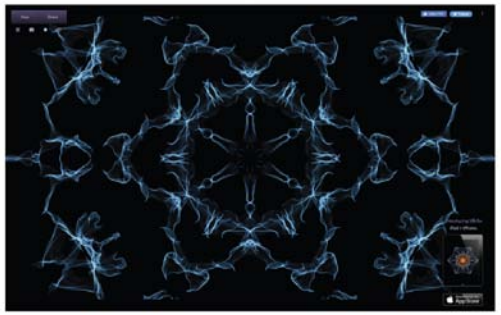
Link to video, assignments & poster:

Patterns in Nature Assignments

Symmetry & Asymmetry

EXPLORING SYMMETRY

Go to http://weaveslik.com and use the controls to create designs in all modes (no symmetry, two-fold to six-fold). E.g.:



Exercises

After Symmetry

Find designed objects around you which have no type of symmetry.

Reasoning: *most designed objects are symmetrical*

After Tessellations

Which of the following shapes do not tessellate?

a. *Triangles*
b. *Quadrilaterals*
c. *Pentagons*
d. *Hexagons*

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