

Personal Progression Project

Process and Research Document

Science and Technology Communication

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Content

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Primary Research_Initial Ideas

Tate Modern Exhibition: Electric Dreams

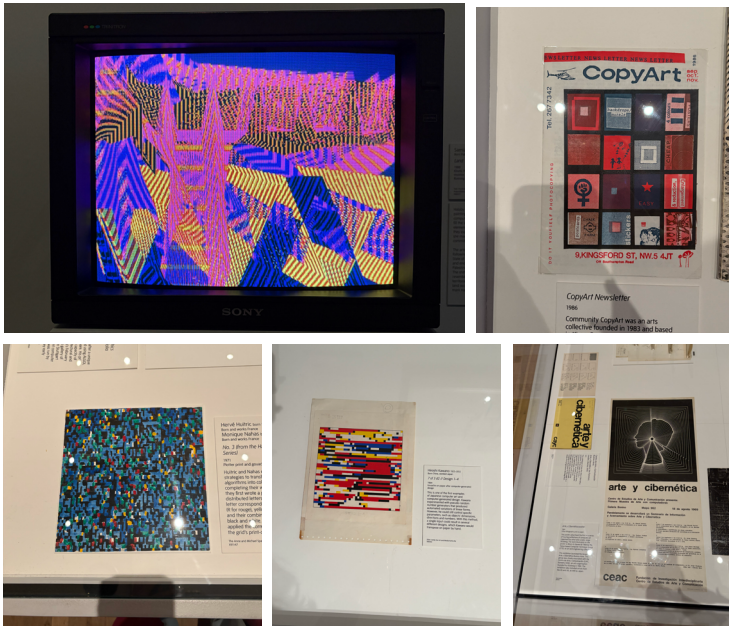


Fig.1-5 pictures of art works in the Electric Dreams, Tate Modern, took by author

In the first week of seeing the brief, I basically decided to **choose the topic of Science Communication and Technology**. But I still have no clue about exactly what to do. Coincidentally, Tate Modern is holding an exhibition called Electric Dreams. It sounds related to science. After the visit, I indeed found a lot of inspiration.

For instance, the artistic images and dynamic visuals generated by artists using mathematical formulas and codes in the early days have an overall effect that is highly visually striking, often blending order and chaos in fascinating ways. There was also the innovative use of mathematical transformations to create music, which left a deep impression on me with its unexpected harmony and structure. These works not only inspired me creatively but also fit well with the theme chosen for my project.

Radical Software_What I Gained



Fig.6-7 pictures of the cover page of Radical Software in the Electric Dreams, Tate Modern, took by author



Fig.8 screenshot of the Radical Software official website
Fig.9 cover page of the Radical Software 1970 Number 2

However, the works that had the deepest subsequent influence on me throughout the entire exhibition were still these two (Fig.6-7) magazine covers of Radical Software. The humorous and vivid pictures vividly demonstrated the charm of the combination of science and art. This also gave me the inspiration to start independently creating an art and science magazine. This has also become **one of the references for the layout design of my magazine covers**.

Primary Research_Initial Ideas

Electric Dreams_Vedio Shooting Experiment

In the studio class, we were required to shoot a short video related to our own topic. Because my theme is Science Communication and Technology, and inspired by the Electric Dreams exhibition in Tate Modern, I plan to extend this and do video shooting.

Storyboard/Moodboard

Meanwhile, I decided to choose mathematics and art as the subsequent development directions of the project. So, I **combined mathematical principles** such as the golden ratio, Fibonacci sequence and perspective and integrated them into the video.

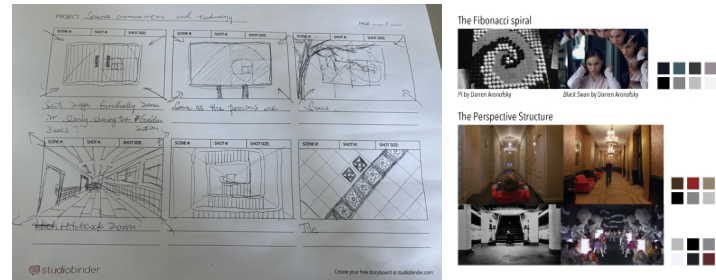


Fig.11-13 draft of the storyboard, drew by author
Fig.14 moodboard of different films, made by author

While designing the storyboard, I also investigated some scenes related to mathematics in the film and produced the mood board. This played **a significant role in the progress of my subsequent project**: it aroused my interest in the mathematical composition in the film. It also made me start to think about how logic and aesthetics can coexist in visual storytelling.

Video Shooting/Editing

After creating the storyboard, I began to shoot. I chose brick lane as the shooting location because it is full of urban characteristics and vitality.



Fig.15-18 video material, shoot in brick lane

Because the theme is related to digital art, but it is difficult to shoot the street scenes in real life with a sci-fi effect, I decided to put effort into post-processing. Adding glitching, flashback and AI-generated sound effects during editing gives people an electronic psychedelic feeling.

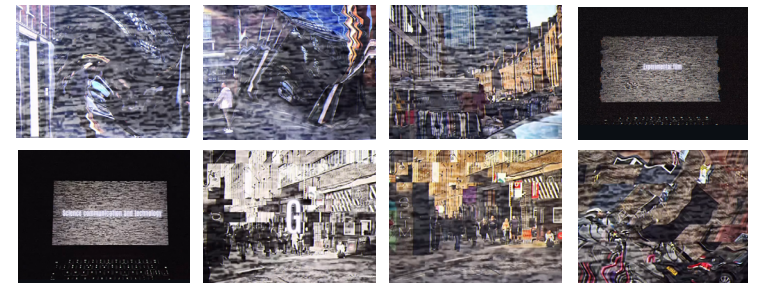


Fig.19-26 screenshots of the final video

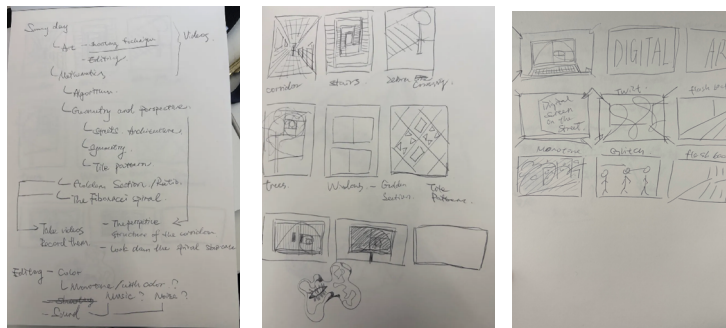
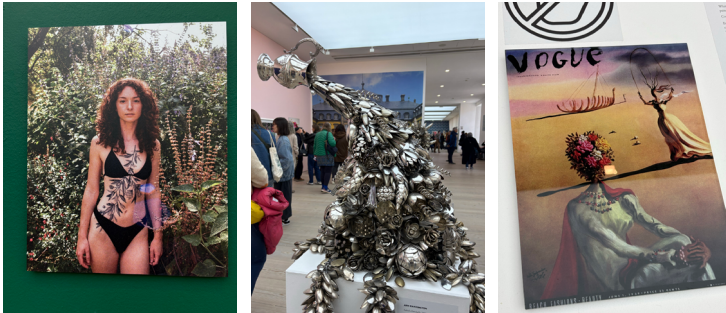


Fig.10 mindmap of the whole video shooting, wrote by author

Primary Research_Initial Ideas

Saatchi Gallery Exhibition: Flowers



A spray-painted work caught my attention, but compared to the macroscopic picture, the details brought by the spray painting are more intriguing. **The graininess is like the image noise on early electronic screens.** It gave me the inspiration to explore how texture can simulate digital aesthetics in print media.

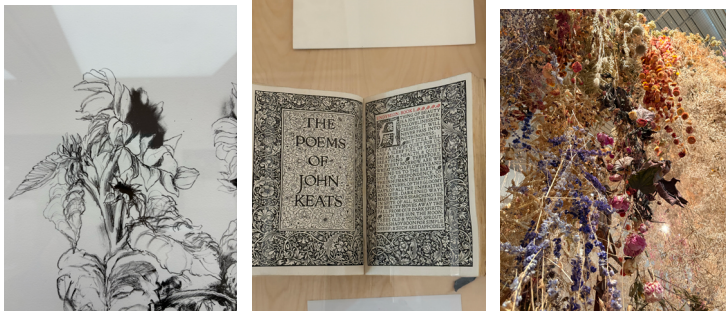


Fig.27-32 pictures of works in the exhibition, took by author

At the beginning stage of the project, my classmates and I also went to Saatchi Gallery to visit an exhibition called Flowers. Many works related to flowers are on display in the exhibition hall, involving various creative techniques such as photography, installation, painting and design. Several works have provided me with creative inspiration.

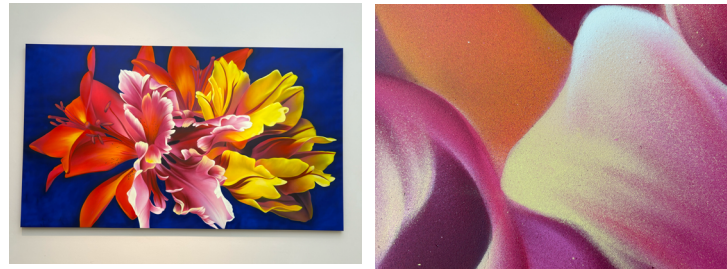


Fig.33-34 pictures of work in the exhibition, took by author

Another printed work also caught my eye. This is a screen printing work. The painter used different fluorescent pigments to stack and print layer by layer, giving people a visually disordered effect, as if they were looking at an electronic art piece. Throughout the entire viewing process, I was seeking the connection between these artworks and mathematical technology. These layered compositions made me think about how mathematical patterns and algorithms might have



Fig.35-36 pictures of work in the exhibition, took by author

shaped the artwork. The last one that influenced my artworks was also a screen-printed painting. Different from the previous one, the painter employed more overlapping printing techniques, which is similar to the style of riso graph. It gives people an artistic sense of **glitch malfunction.**



Fig.37-38 pictures of work in the exhibition, took by author

All in all, this exhibition has given me a lot of inspiration in terms of creative techniques and also provided me with new ideas like glitching.

Primary Research_Initial Ideas

Flowers_Glich Riso Graph Printing

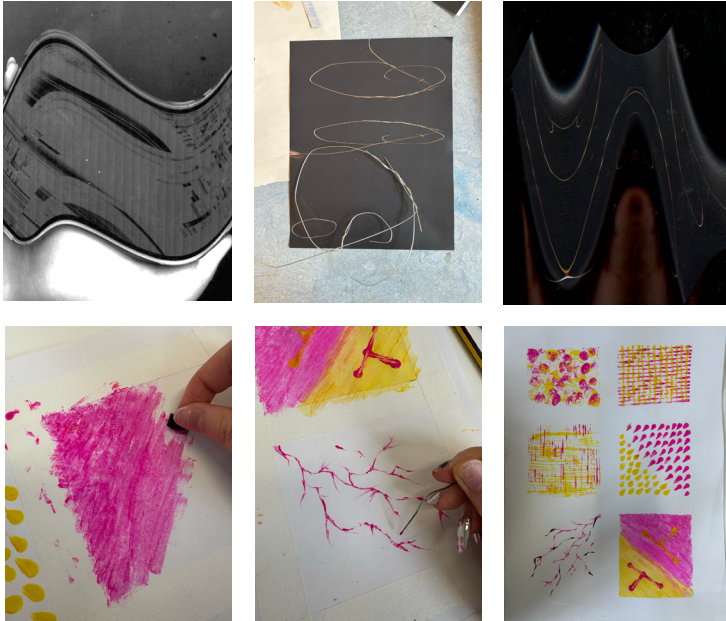


Fig.39-41 pictures of the scanning, took by author
 Fig.42-44 pictures of the process of making textures, took by author

After visiting the Flowers exhibition, we carried out the riso graph printing activity in the studio class. My inspiration theme is Code and Glich. Meanwhile, Gemma also taught us how to create interesting patterns with the scanner. I used a mobile phone and a steel wire, constantly shaking it during the scanning process, and the result was

very interesting. Meanwhile, in class, we also use different materials as painting tools and obtain different textures with pigments. Then create with these materials. Finally, we integrate these materials to create posters related to the theme, and finally carry out riso graph printing. This hands-on process helped me explore the visual possibilities of errors and randomness through both digital and physical means.

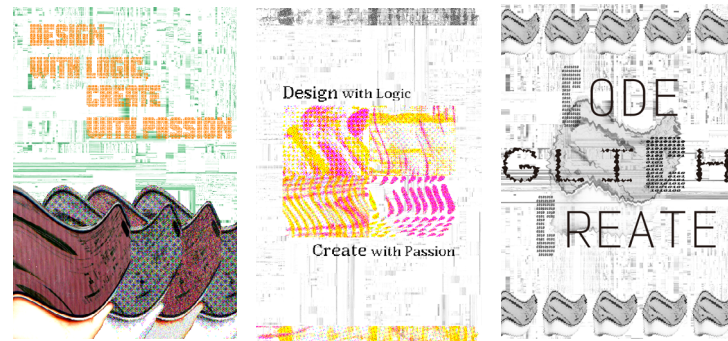


Fig. 45-47 different versions of posters, made by author

I created three different versions of posters, attempting to achieve the best effect. After deciding on the final version, we need to divide the poster into two layers to distinguish different colors when



Fig.48-51 pictures of the riso print process, took by author
 colors. The final result is good. This experience was also of great help to the digital print part in my subsequent project process.

Primary Research_Initial Ideas

Trip to British Museum

We also went to the British Museum in the studio class, hoping to seek inspiration there. My goal is to look for artworks related to mathematics. The first thing that caught my attention was the statue on the Parthenon (Fig.52). The overall form of the sculpture follows triangular geometry and the golden ratio, embodying the mathematics in

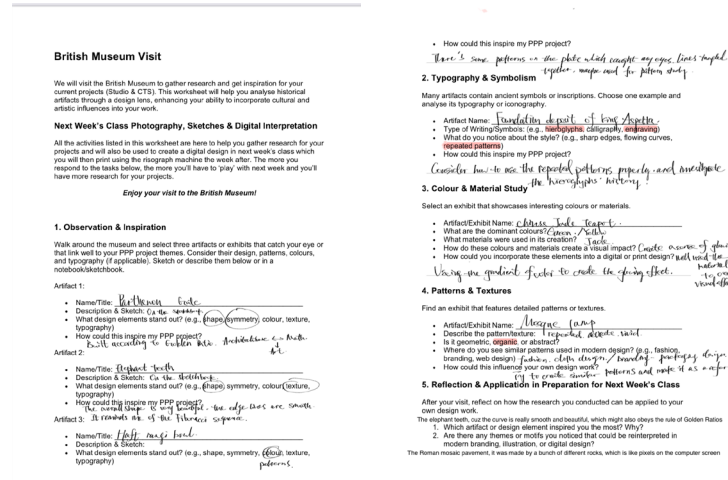


Fig.56-57 notes wrote by author

architecture. The second very interesting piece of art is a pair of ivory products. I found that the curvature of the ivory is very similar to the shape of the Fibonacci spiral. There are also some glass and ceramic utensils with regular patterns on them, which can be combined with mathematical logic. I find that mathematics and art are actually closely related. This view is very important for the development of my subsequent projects.



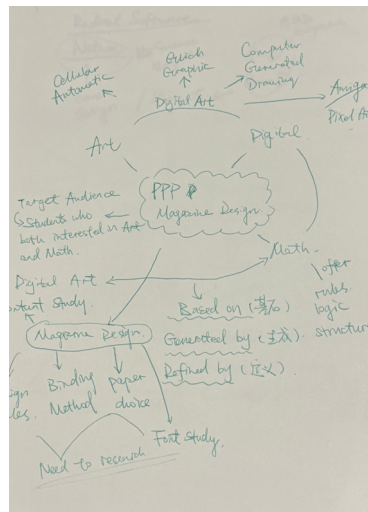
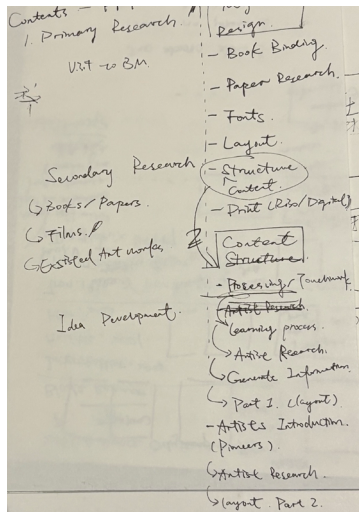
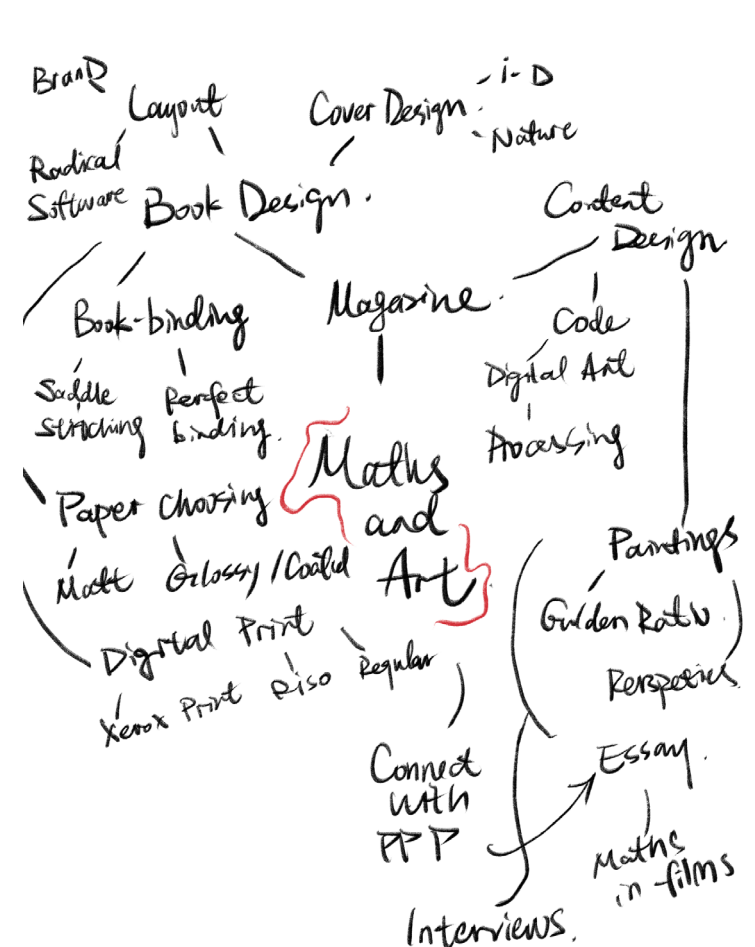
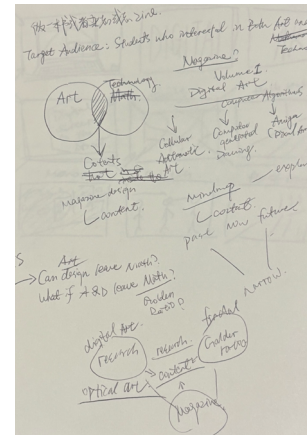
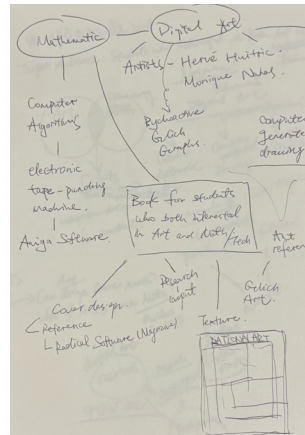
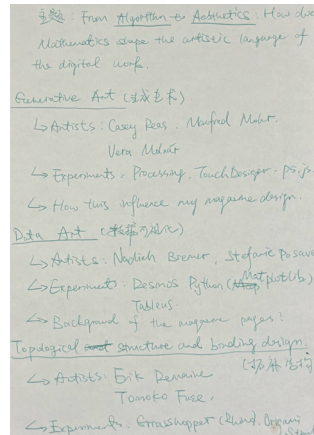
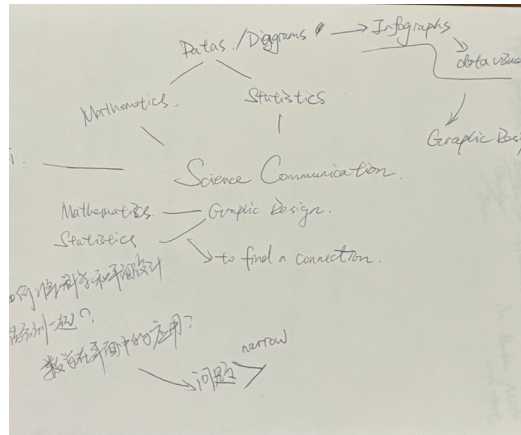
Fig.58-59 pictures of works in the British Museum, took by author

What I learned from the trip I realized that in fact, traditional works of art also have intricate connections with mathematics. In the subsequent project development, I added a section titled "Maths on Canvas" in the magazine to inform readers of this viewpoint.

Fig.52-55 pictures of works in the British Museum, took by author

Mindmap and Idea Generation

Mindmaps



After conducting some activities, I also clarified my thoughts and decided to design a magazine with the themes of art and mathematics as the final product. I **divided the creative process into two major parts**, content creation and book design, and then subdivided the tasks to be done under these two themes. I divided the content framework into four parts, corresponding to the **four columns** of the magazine, namely: Code and Electronic Art, Classical Painting and Mathematics, Virtual Dialogue with Artists and the Essay Column. The book design part includes: cover design, layout design, paper selection, printing, etc.

Fig.60-65 pictures of mindmaps, written by author

Fig.66 mindmap, written by author

Basic Information About the Magazine

Title

Since it is a magazine related to Art and Maths, so I think why don't I choose the word *smart* and bold the art part then it would be **smart**. In this way, the title appears **clear and easy to understand**.

Fig.77 Heading of the magazine

Target Audience

The target group of this magazine is students who are **interested in both mathematics and art**. Give them a medium through which they can learn the relevant knowledge.

Journal Theme

The theme of this issue of the magazine I created is **Axon, Action**. The reason is quite simple. axon represents the axon of a nerve cell. Humans have nerves, and so do computers. This seems like a profound connection. Connect technology with people. The pronunciations of "axon" and "action"

are also similar, like a pun.

Size of the Magazine

The size of the magazine is **210*285mm**. It is the same size as other mainstream magazines.

Four columns of the magazine

It is the same size as other mainstream magazines.

- 1. Code Create Art**
In this column, I mainly introduced to the readers how to create electronic art by using computer software and the java language.
- 2. Maths on Canvas**
Take specific examples to analyze the existing mathematics in classical oil paintings.
- 3. Stimulated Encounters**
Have a virtual dialogue with artists across time and space, and think about the practical application of art and mathematics.
- 4. Essay Column**
In collaboration with the cts project, explore the application of fractal mathematics in films.

Quote or Inspiration Source

“Pure mathematics is, in its way, the poetry of

logical ideas.”

— Albert Einstein

“The mathematics of rhythm and proportion are universal languages.”

— John Maeda

Visual Mock-up Preview

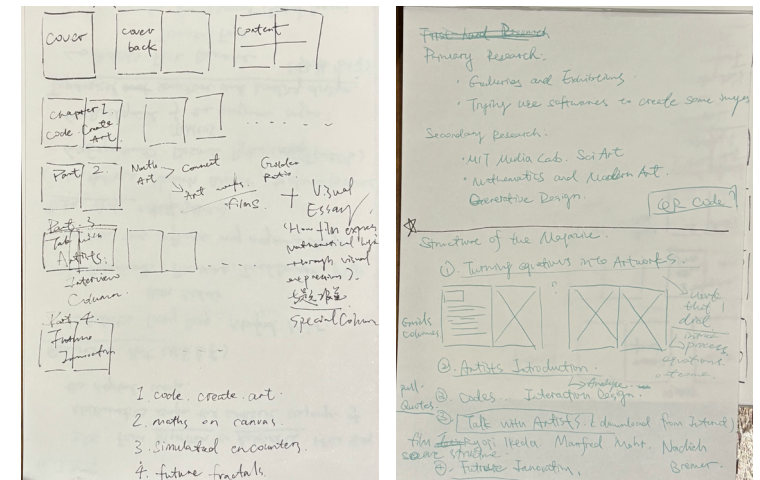


Fig.78-79 visual mock-up draft drew by author

Before specifically starting to produce the magazine, I drew the visual mock-up plan of the magazine, thought about and determined how the layout and its sequence should be arranged, as well as what each specific module should do.

Cover Page Layout Design_Secondary Research

Nature Cover Design Research



Fig.80-85 covers of nature

Since a magazine related to mathematics is to be created, it is a very good choice to refer to scientific research journals for cover design. nature, as one of the world's top scientific magazines, holds a

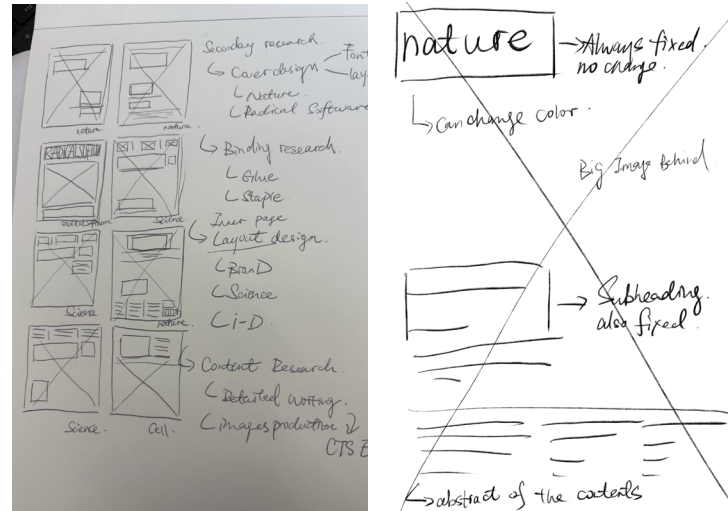


Fig.86-87 drafts of the layout, drew by author

significant position in the academic circle, and its cover design also has its own distinctive features. I drew some layout design sketches of nature and found that it is different from the artistry of other magazines. The typesetters of nature care more about the **continuity of tradition and readability, with clarity as the main focus**, instead of artistic.



Fig.88-89 tests based on nature cover, designed by author

After understanding the design rules of the cover of nature magazine, I tried to make the same cover by myself in photoshop. However, I think the overall layout of nature is still **too regular and traditional**. It lacks innovation and artistry, so it can only be used as a research reference and will not become the cover design of my real magazine.

Cover Page Layout Design_Secondary Research

i-D Cover Design Research

For the cover design, i first included I-D magazine as a reference target.

i-D is a British magazine focusing on youth culture, fashion, and art. Known for its iconic wink logo and experimental visuals, it celebrates individuality, creativity, and emerging voices in design, photography, and style. Since 1980, it has been a platform for cutting-edge cultural expression.

The magazine cover style of I-D is always unconventional and extremely design-oriented. i borrowed the book "I-D: I-D covers, 1980-2010" from the school library and conducted a secondary research.

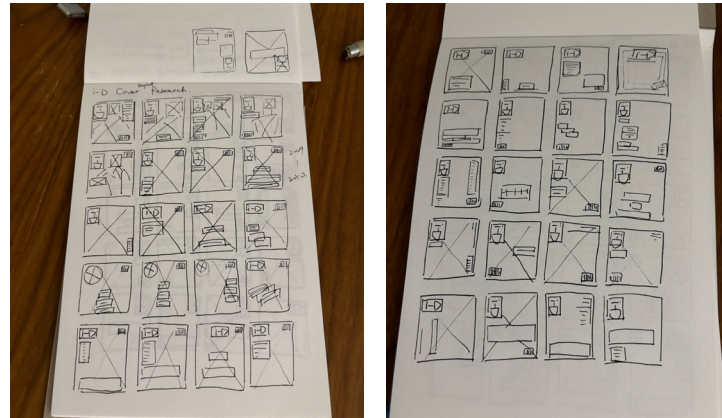


Fig.92-93 drafts of the layout, drew by author

During the reading process, I drew many layout draft diagrams, attempting to find some design rules from them.



Fig.94-96 pictures of the book, took by author

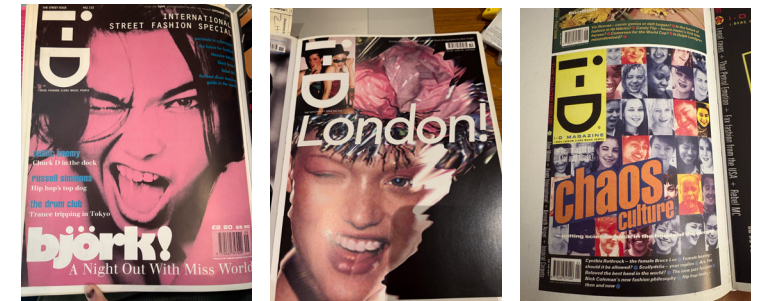


Fig.97-99 pictures of the book, took by author

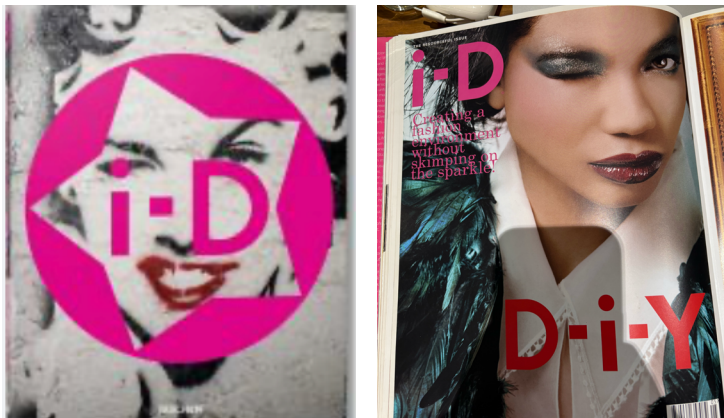


Fig.90-91 pictures of the book i-D: i-D covers, 1980-2010



Fig.100-101 tests based on i-D magazine, designed by author

Based on the above picture, I made an imitation attempt in photoshop.

Cover Page Layout Design_Secondary Research

i-D Cover Design Research



While conducting research for my cover design, I delved into the early issues of i-D magazine, particularly the first few editions published around 1980. I was struck by an unexpected discovery: unlike the current vertical layout that dominates most contemporary magazines, those early covers were **designed in a horizontal format**. This unconventional orientation immediately caught my attention—not only because of its rarity in mainstream editorial design, but also due to the distinctive **retro aesthetic** it evokes. The horizontal layout gave the magazine a cinematic, almost poster-like quality that felt bold and experimental, resonating with the spirit of that era.



Fig.100-101 covers of i-D back in 1980, took by author

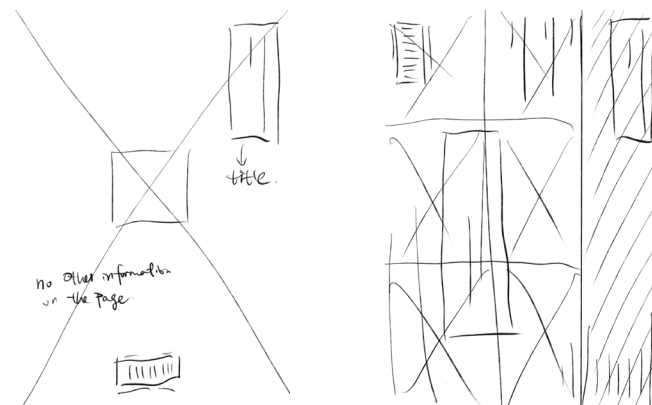


Fig.102-103 drafts of the layout design, dew by author

Tests



Fig.104-105 tests of the cover design,designed by author

I designed the cover of the magazine based on the sketches I drew. Using the pictures I generated in processing (which will be mentioned below) as materials, I designed two first drafts. However, I think the first one (Figure 104) does not highlight the theme of the magazine and is a more personal work; The second one (Figure 105) is more in line with the style of the entire magazine.

Content Layout Design_Secondary Research

Brand Layout Design Research



Fig.106-108 pictures of the layout of BrandD, took by author

BrandD, as a very famous design magazine in Asia, does an excellent job in layout design. It not only has **artistic innovation** but also an **inherent design logic**, making it very comfortable to

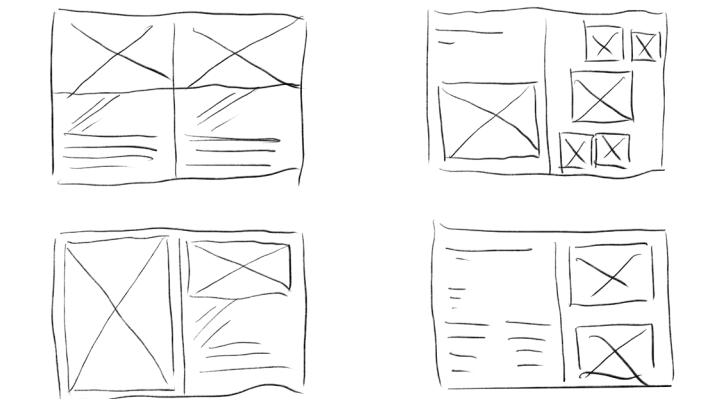


Fig.109-110 layout drafts drew by author

read. I took the BrandD magazine as a reference for layout design and drew a sketch. It will be applied in the subsequent content layout.

Radical Software Layout Design

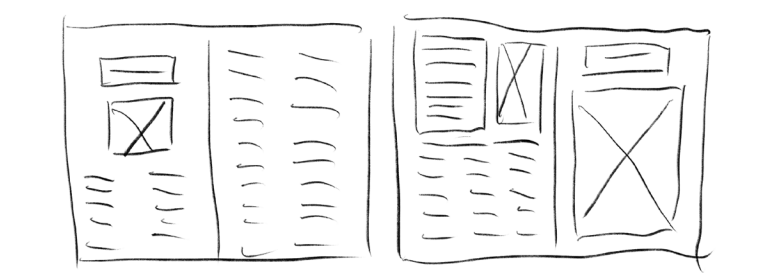
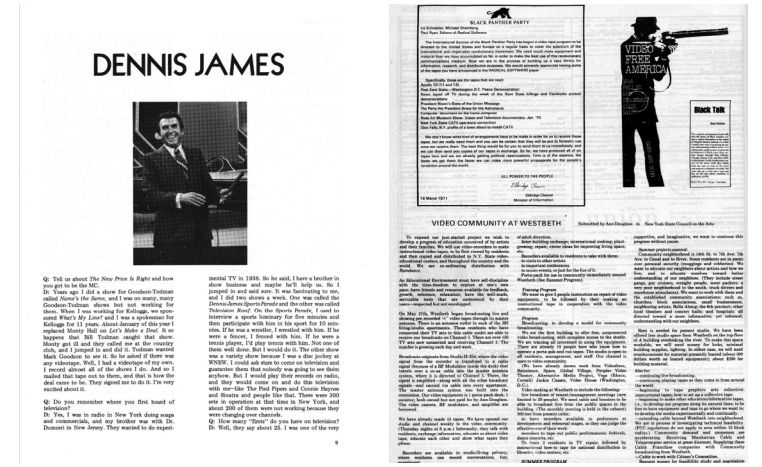


Fig.111-112 pictures of layout of Radical Software
Fig.113-114 layout drafts drew by author

Radical Software serves as the inspiration for my project and can also be used as a reference for layout. Because there is an interview section in my magazine, Figure 100 can be used as a reference.

Font Choosing

Font Choosing Rule

1. Readability First

Readability is the most important consideration in choosing a typeface for body text. Overly decorative or condensed fonts should be avoided for long passages. (Samara.T, 2014)

Thoughts: The main text of the magazine is recommended to use serif fonts or simple sans-serif fonts, depending on the style.

2. The font style should be consistent with the tone of the content

Typefaces have voices... A typeface should match the tone and content of the message. (Lupton.E, 2010)

Thoughts: Modern sans-serif fonts can be used for technology-related content. For cultural or literary content, traditional humanistic serif fonts can be chosen.

3. Control the number of fonts

Too many typefaces on one page can be confusing. Limit yourself to two or three fonts, and ensure they contrast well with each other. (Williams. R, 2015)

Thoughts: Use the variations in thickness and italics within the same family to create a sense of layering.

Visual Hierarchy

Visual hierarchy controls the delivery of messages: readers see what's most important first and navigate content based on contrast, scale, and spatial positioning. (Lupton.E, 2010)

Thoughts: The main title immediately attracts attention by enlarging the font size and bolding it, while the subtitle and the main text successively follow the information flow, making the reading experience smooth and clear.

Theme Font/ Section1

For the theme font and section1, I chose Source Code Pro for Number and Logic Monospace for Letters. Both of these fonts are used when actually writing code programs. Moreover, it is not a decorative font and has good readability. Meanwhile, this font also conforms to the theme of the first section (code create art).

Source Code Pro for Numbers:

1 2 3 4 5 6 7 8 9 0 // + =

Logic Monospace for Letters:

**Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj Kk
Ll Mm Nn Oo Pp Qq Rr Ss Tt Uu Vv
Ww Yy Zz**

Section2/ Section4

For the font selection of the second section, I chose Didot and Snell Roundhand. Both of these fonts are serif fonts, which are very elegant and classical. It particularly conforms to the atmosphere of oil painting and the Renaissance. Meanwhile, the fourth part is the thesis column, and the thesis titles also choose Didot as the font, which is in line with the literary tone.

Didot:

**Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj Kk Ll Mm
Nn Oo Pp Qq Rr Ss Tt Uu Vv Ww Yy Zz**

Snell Roundhand:

*Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj Kk Ll Mm
Nn Oo Pp Qq Rr Ss Tt Uu Vv Ww Yy Zz*

Body Text/ Section3/ Section4

The main text mainly follows the principle of best readability, so Arial is undoubtedly the best choice. At the same time, the fourth part is the thesis column, and the thesis titles also choose Didot as the font, which is in line with the literary tone.

Arial:

**Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj Kk Ll Mm
Nn Oo Pp Qq Rr Ss Tt Uu Vv Ww Yy Zz**

Content design_Secondary Research

Section 1_Code Create Art

Introduction

This section explores how code can be used to make visual art. Through simple programming tools like Processing, shapes, patterns, and colors are created by mathematical rules. It shows how technology and creativity can work together to make something new and beautiful.

The mathematical knowledge I want to incorporate

1. Fractal Maths (Julia set and Mandelbrot set)

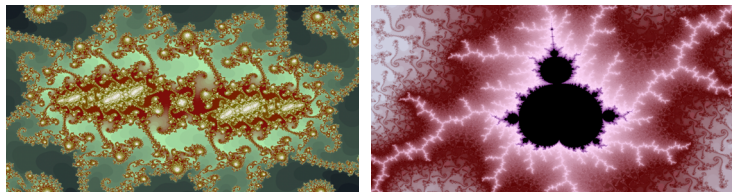


Fig.115-116 Picture of Julia Set and Mandelbrot Set by Yale University

Introduction: Julia sets and Mandelbrot sets come from iterating functions in the complex plane, revealing intricate patterns from simple rules. Named after Gaston Julia, they show how mathematics can create complex beauty through repetition of the formula $z^2 + c$. (Fergus.C, 2011)

Art works related to Fractal Maths:
 Three Overlaid Julia Sets by Miles Robertson
 Fractal Mandelbrot Set by Matthias Hauser
 I learned how to combine fractal mathematics and digital art in these two works, which are very good artistic references.

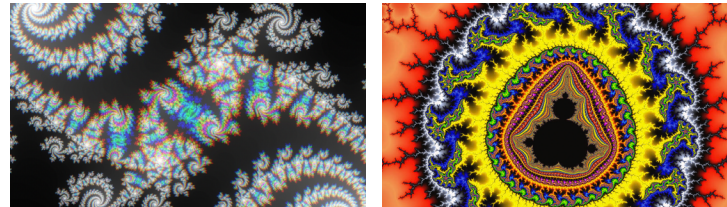


Fig.117 Picture of Julia Set by Miles Robertson
 Fig.118 Fractal Mandelbrot Set red yellow blue by Matthias Hauser

2. Polar Coordinates and Trigonometric Functions

Introduction: Polar coordinates and trigonometric functions describe positions using angles and distances, forming periodic patterns with circular symmetry.

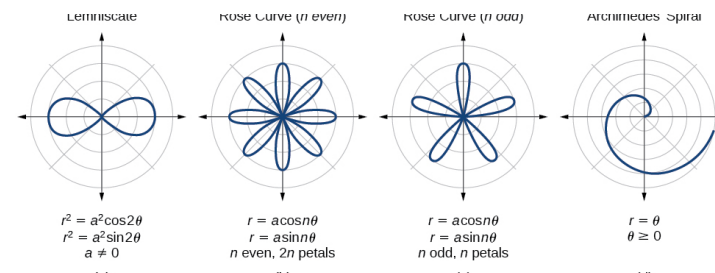


Fig.119 graph that demonstrate the concept

Art works related to Polar Coordinates and Trigonometric Functions:
 Chapter 10: Polar Coordinates by Yoshiwara Books
 Trigonometry by RobertLovesPi

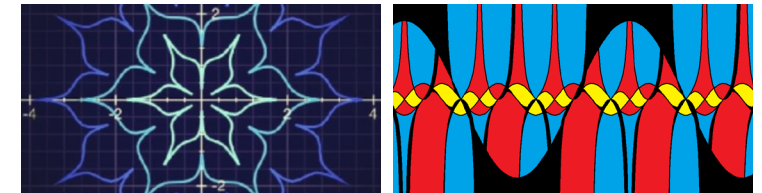


Fig.120 artwork by Yoshiwara Books
 Fig.121 artwork by RobertLovePi

3. Complex Function Transformation

Introduction: Complex function transformation maps complex numbers to new positions, revealing structure through iterative rules and geometric change.

Domain Coloring of Complex Functions by Lundmark, H. (2023) and Behold Modular Forms by Hartnett, K.(n.d.)

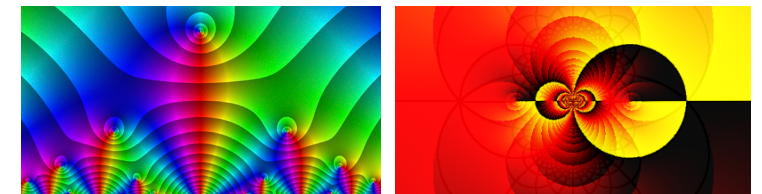


Fig.122 artwork by Lundmark, H.
 Fig.123 artwork by Harnett,K.

Content design_Secondary Research

Section 1_Code Create Art Processing and Java Language

Processing is a flexible software sketchbook and language built for visual arts, based on Java. It simplifies coding for graphics, animation, and interaction, making it accessible for artists and beginners. Java provides the underlying structure, allowing Processing to handle complex computations with ease and power.

Openprocessing

OpenProcessing is an online platform where users share interactive visual sketches made with Processing. It hosts a creative community of artists, coders, and educators. The "Trending" section showcases popular, innovative works that explore code-driven art, offering inspiration and learning opportunities through open-source code.

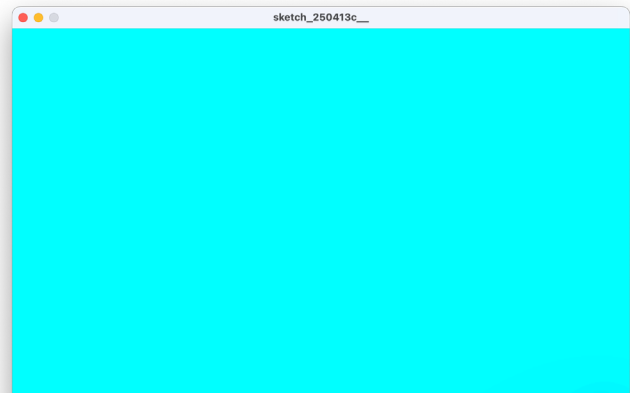
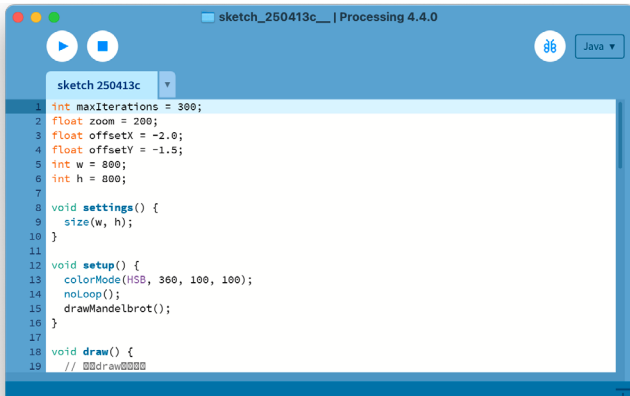


Fig.124 Screenshot of the processing window page, took by author
Fig.125 Screenshot of the processing outcome window page, took by author

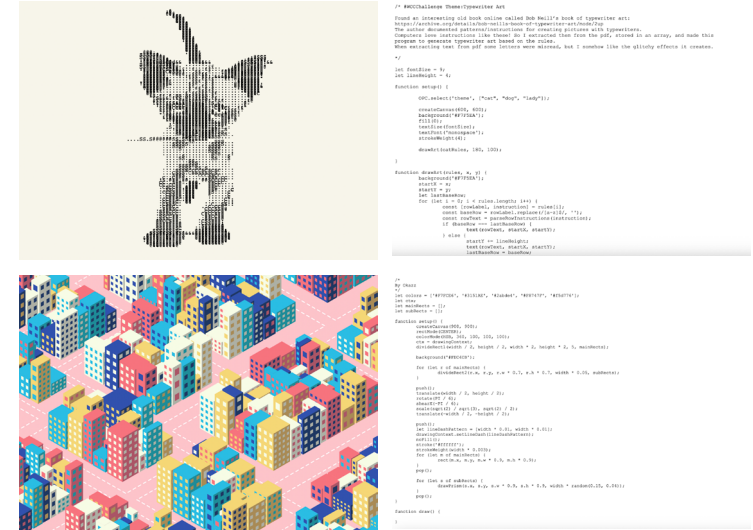


Fig.127 processing work from openprocessing generated by Sihan Zhang
Fig.128 code shared by Sihan Zhang
Fig.129 processing work from openprocessing generated by Okazz
Fig.130 code shared by Okazz

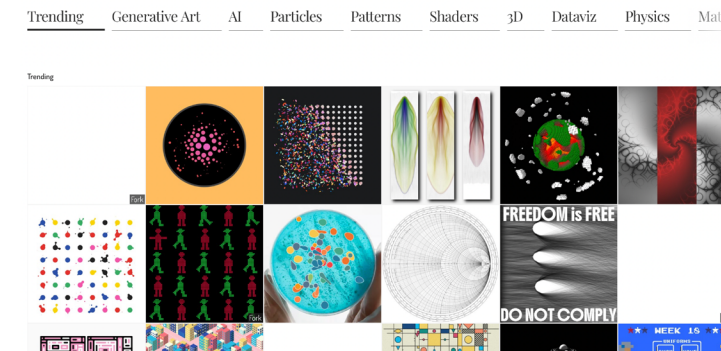


Fig.126 screenshot of the openprocessing webpage

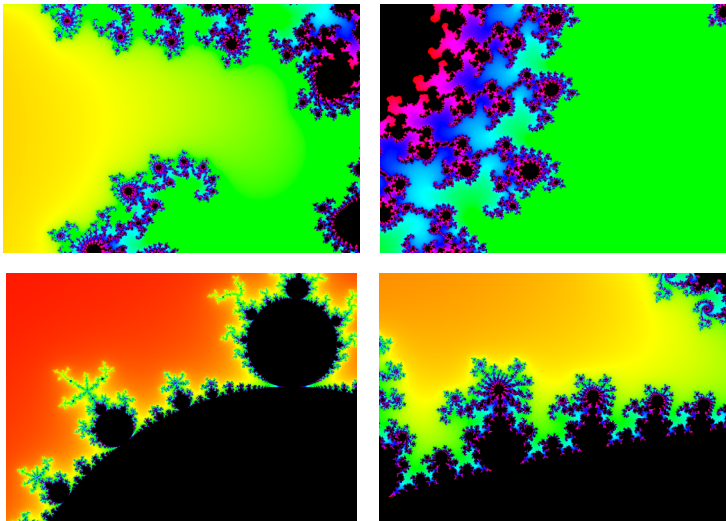
Users can remix existing sketches, explore various coding techniques, and build their own creative projects. It's a space where art meets algorithm, encouraging experimentation and collaboration.

In OpenProcessing, I can directly download my favorite works, java code, and thus learn their creative ideas. It is an excellent learning material and also a reference for my creation.

Content design_Production

Section 1_Code Create Art

Processing Tests



```

sketch 250411e
// Mandelbrot Set Fractal Art with Color Gradient
// Press 's' to save the image

float zoom = 1.0;
float offsetX = -0.5;
float offsetY = 0.0;
int maxIterations = 100;

void setup() {
  size(800, 800);
  colorMode(HSB, 360, 100, 100);
  noLoop();
}

void draw() {
  background(0);
  loadPixels();
  // Iterate over every pixel
}

sketch 250411d
void setup() {
  size(800, 800);
  colorMode(HSB, 360, 100, 100);
  noStroke();
  frameRate(30);
}

void draw() {
  background(0, 0, 5); // 00000005
  float t = millis() * 0.001; // 000000
  int grid = 50;
  for (int x = 0; x < width; x += grid) {
    for (int y = 0; y < height; y += grid) {
      float mx = (float)x / width;
      float my = (float)y / height;
      float r = dist(x, y, width/2, height/2) * 0.05;
    }
  }
}
    
```

Fig.131-134 Pictures that generated by processing
 Fig.135-136 Codes of the programmes in processing

After learning some java language, I combined

mathematical knowledge to create some visually impactful images. Combined with the assistance of chatgpt for optimization, the resulting effect is very good.

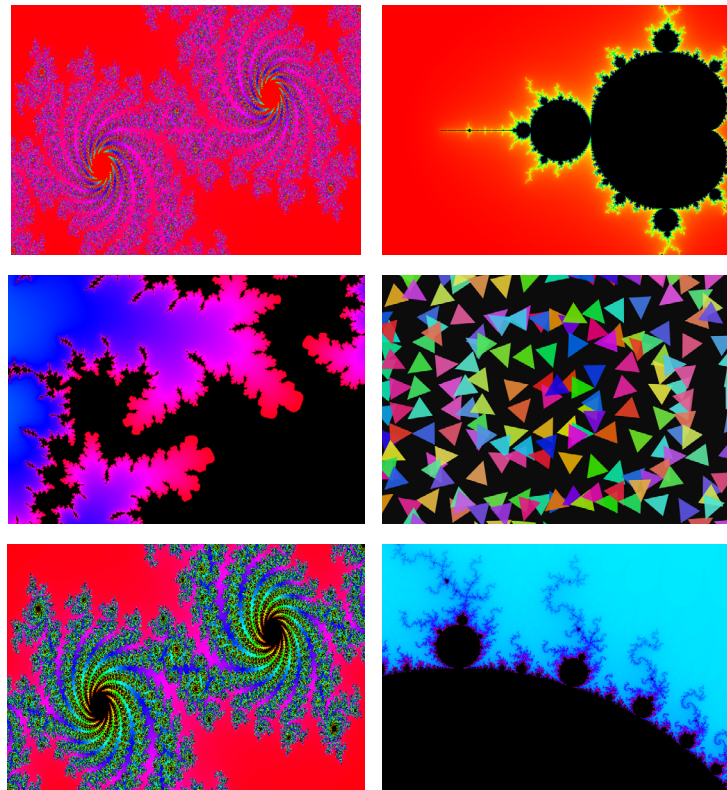


Fig.137-142 Pictures that generated by processing

Outcome

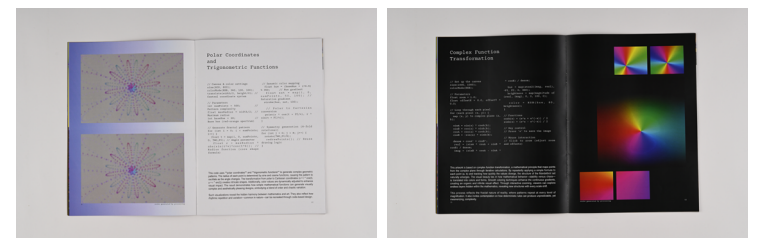
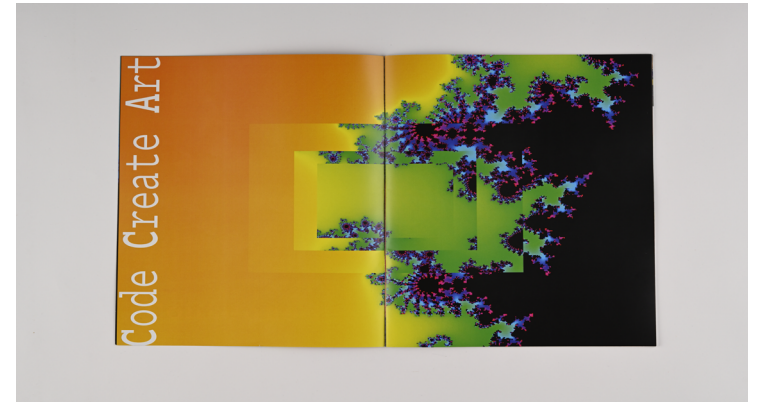


Fig.143-147 outcome of section1, took by author

Content design_Secondary Research

Section 2_Maths on Canvas

Introduction

This section explores how code can be used to make visual art. Through simple programming tools like Processing, shapes, patterns, and colors are created by mathematical rules. It shows how technology and creativity can work together to make something new and beautiful.

Trip to Louvre

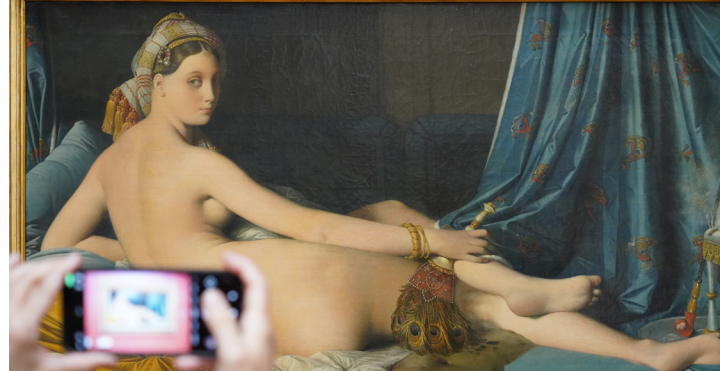


Fig.148 The Sleep of Endymion, took by author in Lourve
 Fig.149 The Intervention of the Sabine Wome, took by author in Lourve
 Fig.150 The Coronation of Napoleon, took by author in Lourve
 Fig.151 Plafond: Le Soleil. La Chute d'Icare, took by author in Lourve
 Fig.152 Grande Odalisque, took by author in Lourve

After deciding to do this section, I went to the Louvre during the spring break, hoping to find oil paintings related to mathematics there. I find that basically the shadow of mathematics can be found in every oil painting. For example, in this painting "The Sleep of Endymion", the light and shadow on the figures contain mathematical logic and can be analyzed from both angles and brightness.

Many paintings also employ the golden ratio, such as Grande Odalisque.

The mathematical knowledge I want to incorporate

After visiting the Louvre, I sorted out this information and conducted an analysis. I divided this section into four small blocks based on four paintings, and each painting represents a kind of mathematical knowledge combined with it.

1. Virgin of the Rock_Triangular Composition

In *Virgin of the Rocks*, Leonardo da Vinci uses triangular composition, placing the Virgin Mary at the apex to create balance and harmony. This structure stabilizes the scene and guides the viewer's gaze, reflecting the Renaissance blend of beauty and mathematical precision. Meanwhile, the three paintings, Baptism of Christ, Sistine Madona and Primavera, all employ the principle of triangular composition.

Content design_Secondary Research

Section 2_Maths on Canvas

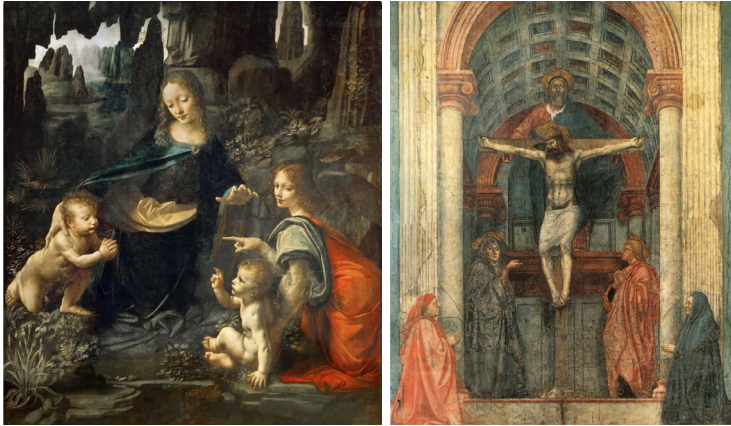


Fig.153 Virgin of the Rock
Fig.154 Baptism of Christ

2. Creazion di Adano_Golden Ratio and Symmetry

In Creation of Adam, Michelangelo masterfully balances proportion and space. God and Adam mirror each other symmetrically, their outstretched hands meeting at the golden ratio, emphasizing the divine spark. The flowing forms behind God—resembling both a brain and a womb—enhance themes of intellect and creation. Michelangelo’s precise geometry heightens both harmony and narrative power. Both La Grande Odalisque and A Sunday Afternoon on the Island of La Grande Jatte have used the golden ratio as well.

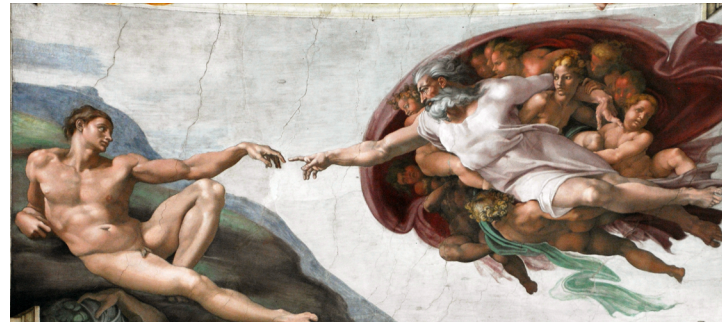


Fig.155 Creation of Adam

3. Delivery of the Keys_Linear Perspective

Perugino's *Delivery of the Keys* employs precise linear perspective, with converging lines drawing the eye to Christ and Saint Peter. The symmetrical architecture enhances balance, embodying Renaissance harmony and order.

The Arnolfini Portrait, The School of Athens and Oath of the Horatii all employ the composition technique of linear perspective.

4. Conversione di San Paolo_Light and Shaow

Caravaggio’s *The Conversion of Saint Paul* uses calculated chiaroscuro to heighten drama. A sharp, diagonal light spotlights Saul’s ecstatic collapse, while shadows swallow the scene—light obeying optical laws to amplify divine revelation. Here,

illumination isn’t just visual; it’s theological. Baroque intensity meets mathematical precision, turning physics into transcendence.



Fig.156 Delivery of the Keys
Fig.157 The Arnolfini Portrait



Outcome



Fig.158-159 outcome of section2, took by author

Content design_Secondary Research

Section 3_Stimulated Encounters

Introduction

In this section, I have selected three artists for Q&A, namely Caravaggio, Stanley Kubrick and Denis Villeneuve. There are two directors because this is actually also part of my CTS project research.

Artists Research

1. Michelangelo Merisi da Caravaggio



Fig.160 The Musicians
Fig.161 Narcissus



Fig.162 The Incredulity of Saint Thomas
Fig.163 Saint Jerome Writing
Fig.164 The Calling of Saint Matthew
Fig.165 The Taking of Christ

Caravaggio masterfully used light and shadow to create dramatic tension, a technique that aligns with mathematical principles of contrast and geometry. His compositions often employ the golden ratio, guiding the viewer's eye through precise spatial arrangements. The stark chiaroscuro not only highlights emotional intensity but also emphasizes depth through calculated illumination, making his work both visually and mathematically compelling.

2. Stanley Kubrick

Stanley Kubrick's film compositions reflect a deep understanding of mathematical precision. He frequently used one-point perspective and the golden ratio to create balanced, symmetrical frames that guide the viewer's focus. His calculated

use of geometry and spatial alignment enhances narrative tension and visual order, making each shot feel both aesthetically striking and intellectually controlled.



Fig.166-173 Stills from 2001: A Space Odyssey
Fig.174-175 Stills from A Clockwork Orange

Content design_Secondary Research

Section 3_Stimulated Encounters

3. Denis Villeneuve

Denis Villeneuve’s visual style often employs mathematical composition to convey atmosphere and meaning. He uses symmetry, grid-based framing, and negative space to create a sense of scale and isolation. In films like *Arrival* and *Dune*, his precise spatial arrangements and measured pacing reflect mathematical logic, turning each frame into a structured, almost architectural visual experience.



Fig.182-183 Stills from Dune

Questions for the Artists

1. Do you see any connection between mathematics and art?
2. What do you think mathematics can bring to artistic expression?
3. Your compositions often seem intensely calculated, despite their emotional ferocity. What are you hoping to convey with these structural choices?
4. Do you see symmetry as aesthetic or philosophical?
5. What would you say to modern artists working with code, AI, or algorithmic art?
6. Do you think order and chaos can coexist in art?
7. Do you think your use of perspective and composition was ahead of your time—and was it intentional?

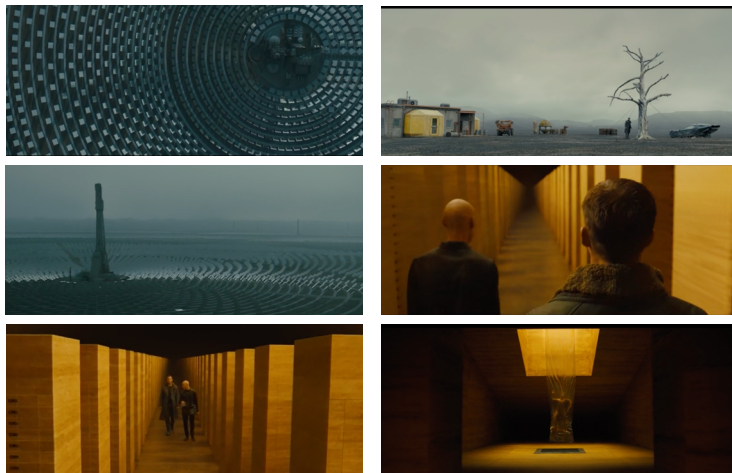


Fig.176-181 Stills from Blade Runner 2049

Outcome

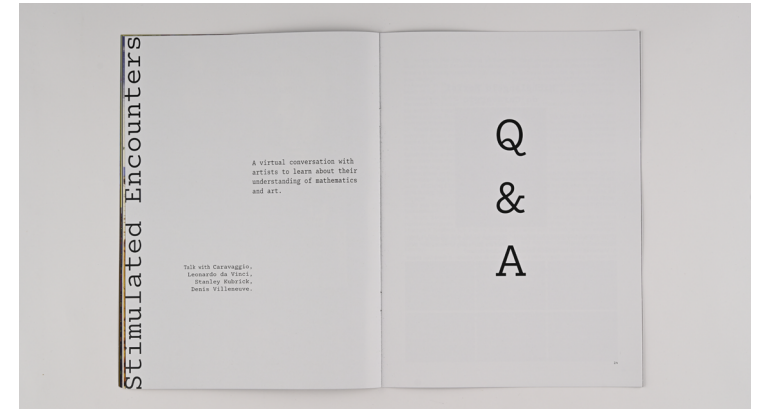


Fig.185-188 outcome of section3, took by author

Content design_Secondary Research

Section 4_Essay Column

Case Study



Fig.189 stills from Black Swan



Fig.190 stills from In the Mood for Love

The film employs mirrors—especially a recurring polyprism—to create fractal-like repetitions of scenes. Yet this visual recursion subverts mathematical fractals: while fractals imply infinite self-similarity, the fragmented reflections here expose emotional dislocation. The central subject remains intact, but its splintered edges reveal dissonance, turning the mirror from a tool of replication into one of rupture. Where fractals mathematically promise coherence, the film weaponizes their structure to show reality unraveling—each reflection a departure from truth, each recursion a step into fiction. The polyprism doesn't reflect; it refracts meaning.

Philosophical Analysis

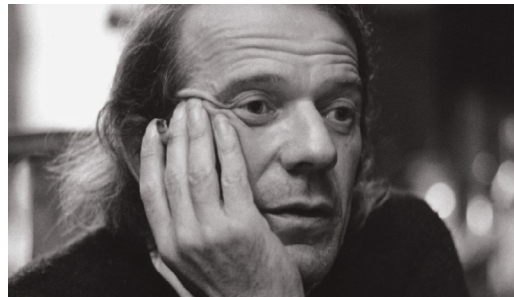


Fig.191 Picture of Gilles Deleuze

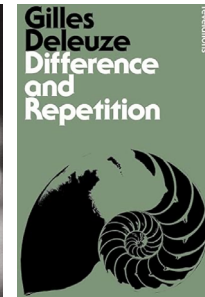


Fig.192 Book of Difference and Repetition

Black Swan uses mirrors not to reflect, but to fracture. Each recurrence shatters Nina's identity, generating unstable new selves—Deleuze's "repetition as difference" in action. The mirror scenes (like their fleeting embraces) visualize impossible longing, a non-Euclidean geometry of desire: proximity without union. Every reflection breeds fresh yearning, turning repetition into an engine of escalating obsession. The mirrors don't duplicate; they mutate, driving both her artistic perfection and psychological unraveling. Here, difference isn't deviation—it's the core of transformation.

Outcome



Fig.193-194 outcome of section3, took by author

Magazine Production_Paper Choosing

Paper Texture Research in Library

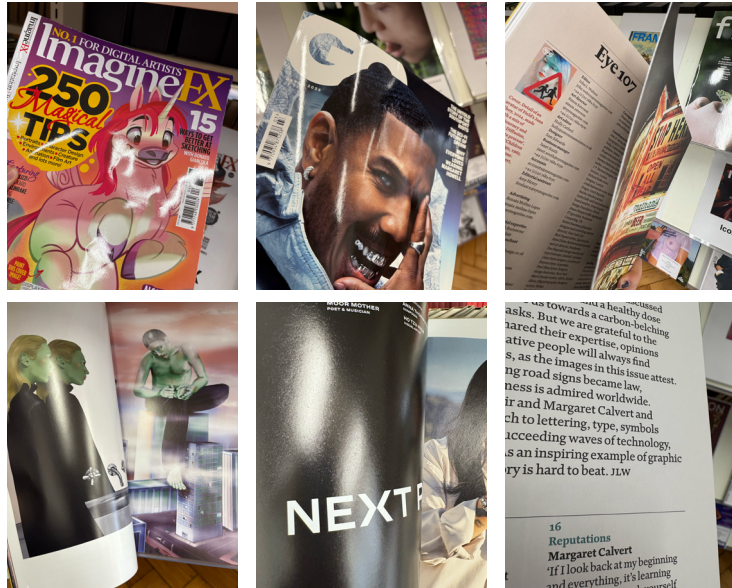


Fig.195-200 pictures of work in the exhibition, took by author

I went to the school library to conduct a research on the paper material of the magazine. I find that basically all magazines use coated paper because coated paper can show the colors of the pictures very well. There are also magazines that use matte white cardstock, but this is a very small number. There are also magazines that have integrated various types of paper. But for me, coated paper is still the best choice.

GF Smith Paper



Fig.201-202 pictures of work in the exhibition, took by author
Fig.203-204 pictures of work in the exhibition, took by author

I have borrowed the GF Smith Sample Book from school now and specifically studied the weight and material of the paper, etc. After comparison, I decided to choose paper with a weight of 140gsm. It is neither too thin nor too thick, easy to flip through and not easy to break. I reserved some samples of paper on the official website of GF Smith. But unfortunately, there is no coated paper. I ordered some art paper, originally thinking that a different effect could be achieved. However, after the tutorial with Gemma, I learned that after inkjet printing, the shimmer effect on the

paper would be covered and the color wouldn't be sprayed on, so it couldn't be used.

Xerox Glossy Paper

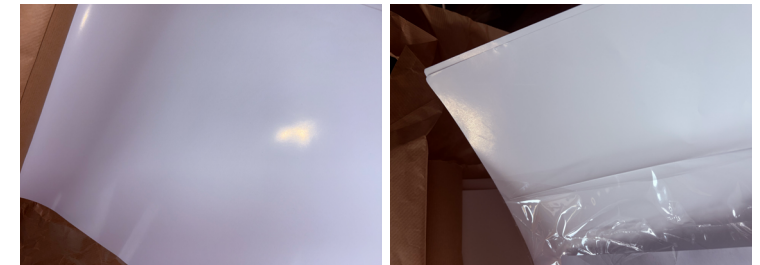


Fig.205-206 Xerox Glossy Paper, took by author

I went to Shepherds Inc. Fine Papers to look for coated Paper and found Xerox Glossy Paper, which perfectly met my requirements.

Paper Grain

There are two samples about paper grain in the store, which impressed me more deeply about the relevant knowledge I learned in the studio class.

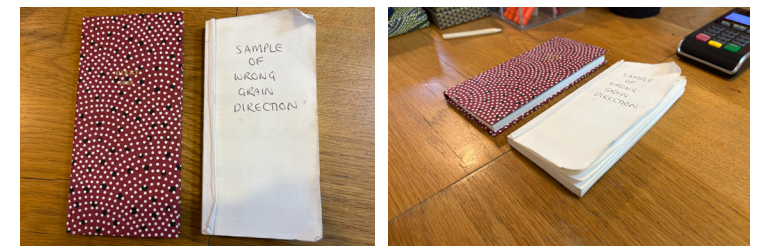
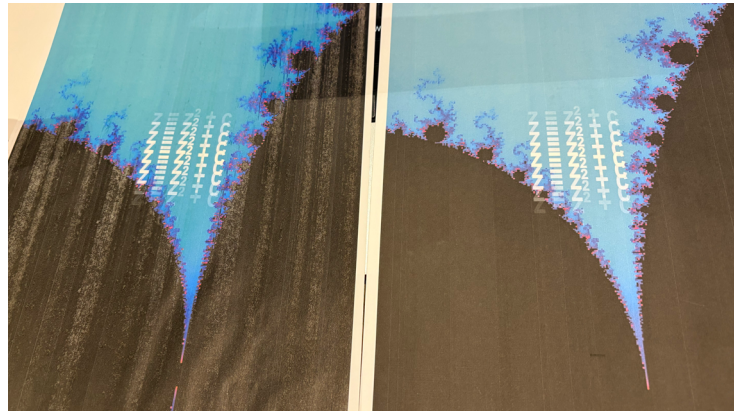


Fig.207-208 sample of books about grain, took by author

Magazine Production_Digital Print Method

Regular Printer

I tried putting two sheets of white paper of different weights into an ordinary printer, and I found that the effect was very poor.



If printed on 100gsm white paper, the ink cannot be absorbed into the paper quickly at all because there is too much ink. Moreover, there will be printing malfunctions, and the image will show white marks one by one (I'm not sure if it's the fault of the printer I'm using or if all the same type have this problem). If printed on 115gsm white paper, the ink can be absorbed by the back, but the color appears very dull and even a little grayish.

is that there are too many colors and pages in my magazine. riso printing would be particularly inconvenient and the colors are not what I want.

Xerox Digital Press



Fig.214-215 process of printing, took by author

Xerox Digital Press is particularly suitable for printing magazines. It can print on coated paper and print on both sides. Meanwhile, the color can also reproduce highly saturated colors very well.



Fig.209-211 tests of printing, took by author

Riso Print



Fig.212-213 riso print tests, took by author

At the early stage of the project, I tried riso printing and the visual effect was very good. However, the reason why it is not suitable for my project

Magazine Production_Book Binding

Book-Binding Workshop



Fig.216-224 process of making coptic stitch binding, took by author

We learned coptic stitch binding in the studio class

and the process was very interesting. However, I don't decide to adopt this method as the binding style of my final magazine, because the style with exposed lines is more retro and artistic, which doesn't conform to the avant-garde experimental nature of my art and science magazine.

Magazine Binding Research



Fig.225-230 different kinds of binding method, took bu author

I studied different bookbinding styles and found that most fashion magazines and novels use

perfect binding, while science magazines and thinner brochures use saddle-stitching. I guess this should be related to the number of pages of the paper. Because my project has a limited number of pages, I chose saddle-stitching as the binding style for my magazine.

Saddle-Stitching

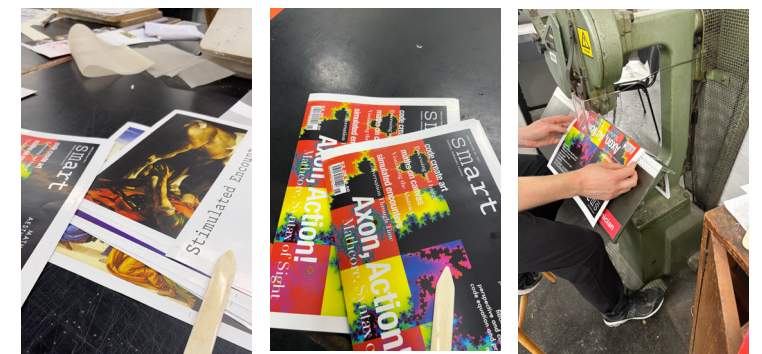


Fig.231-233 process of saddle-stitching, took by author

After the paper was printed, I went to the print finishing room, folded it in half and arranged it in order, then asked the staff to install the stitches.

Magazine Production_Final perfection

Print Finishing



Fig.234-235 process of cutting, took by author

In fact, before actually printing, I had no idea at all what the specific process was like. I didn't even know how indesign should set the format of the printed document. So after negotiating with the staff of LCC, they told me how to print a book correctly: First, a 3mm bleed line should be set for the document. Second, the binding method of the book should be decided first, and then the printing method should be considered. After the materials are printed, they should be folded first, sent for binding, and then trimmed. I learned a great deal of useful knowledge throughout the afternoon of printing the magazine

Artivive

When I was having a tutorial with Irene, she recommended a software called Artivive to me, which enables creators to conduct secondary interactive creation on static artworks. With just simple Settings, readers can scan the screen with their mobile phones to obtain VR interaction.

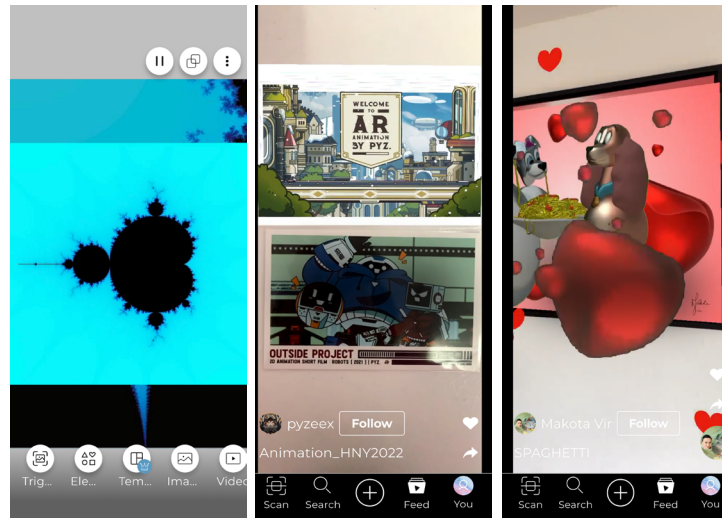


Fig.236 editing page of the Artivive APP
Fig.237-238 works that posted on the APP

The page in the magazine that enables interaction is the back of the cover. It is a fractal image generated by processing. After scanning it with a mobile phone, what appears is a constantly



Fig.239 effect drawing, took by author

enlarged video. I hope readers can better appreciate the charm of fractal mathematics. At the same time, make the design more interesting and interactive. Let my design be more than just a static magazine.

Interactive Video Link:

<https://youtu.be/ZRBCcqTOILc?si=kCzfrNToahBVUika>

Magazine Production_Image Shooting

Image Capture Studios

When making the first two projects, when it was time to shoot the final product, I always did it at home with my own camera. Although the picture quality was clear, the lighting and background were not professional, resulting in an unsatisfactory final effect. This time, after making the finished product, I made an appointment for the copy stand shooting room in the Image Capture Studios of LCC and used the provided equipment. The finished product images obtained were very professional.



Fig.241 outcome of section3, took by author



Fig.244-245 outcome of section3, took by author



Fig.240 outcome of section3, took by author

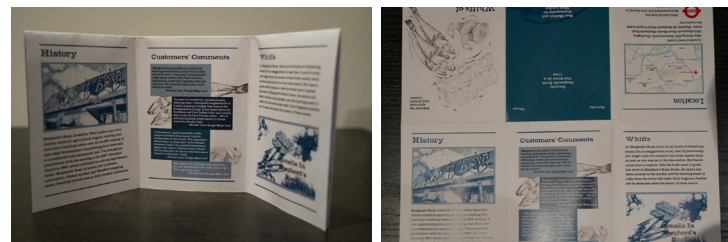


Fig.242-243 outcome of section3, took by author

Compared with the first project, I have grown a lot in all aspects.

Final Outcome

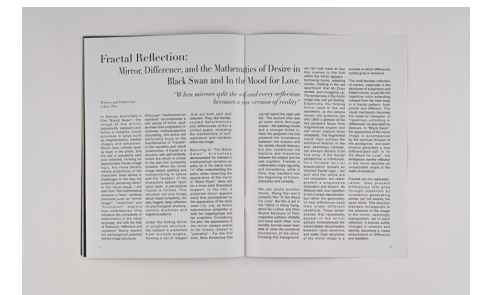


Fig.246-252 pictures of the final outcome, took by author

Link with CTS Project



Fig.253-254 Pictures of the PPP project by author

The essay featured in the fourth section of the magazine is in fact the written script of my Contextual and Theoretical Studies project. In this essay, I explored the application of fractal mathematics in cinema, focusing on how mathematical principles can shape both visual aesthetics and narrative structures. Specifically, I analyzed the films *Black Swan* and *In the Flowers of Youth*, examining their use of visual composition—such as recursive patterns, mirroring, and self-similarity—as well as the internal logic of their storytelling, which echoes the fragmented yet interconnected nature of fractals.

Fractal Reflection: Mirror, Difference, and the Mathematics of Desire in *Black Swan* and *In the Mood for Love*.

"When mirrors split the self and every reflection becomes a new version of reality"

Written and Edited by:
Luhui Zhu

In Darren Aronofsky's film *"Black Swan"*, the image of the mirror repeatedly appears and forms a complex visual structure in ways such as fragmentation, double images, and refraction. Nina's face outside layer by layer in the prism, and reflected, forming an approximate fractal image logic. Are these details merely projections of characters' inner selves or challenges to the way the audience perceiving them? In this visual essay, I will start from "the mathematical structure in films" combine elements such as "mirror images", "repetition" and "bifurcation", explore how contemporary films introduce the complexity of mathematics in the visual language, and with the help of Deleuze's "difference and repetition" theory, explore the philosophical potential behind image structures.

Although "mathematical structure" encompasses a rich variety of forms, such as linear time progression or nonlinear, multi-perspective storytelling, this article will particularly focus on the manifestation of "fractal" in film narrative and visual construction. A fractal is a structure with self-similarity, where the whole is similar to the part but constantly mutates. When the mirror image keeps splitting and reassembling in space and the "avatars" of the characters appear layer upon layer, a perceptual fractal is formed. This structure not only brings about visual complexity, but also triggers deep reflection on psychological structure, identity dilemmas, and cognitive patterns. Under the folding mirror or polyprism structure, the subject is presented from multiple angles, forming a set of images that are both split and nested deformations and differences within a limited space, revealing the mechanisms of self-replication and variation within the image.

Lily will spend the night with her. The second time was an even more thorough illusion - the painting moved and a stranger broke in. Here, the polyprism not only presents the consistency between the subject and the details (fractal feature), but also symbolizes the fracture and alienation between the subject and the real cognition. Fractals in mathematics imply regularity and consistency, while in films, they transform into the beginning of fiction, dislocation and unusual. We can study another movie, Wong Kar-wai's romantic film *"In the Mood for Love"*, the film is set in the 1960s in Hong Kong, about Su Li-Chen and Zhou Mu-yun because of their respective pattern of love and know each other, love secretly, but has never been able to cross the emotional boundaries of the story. Knowing the background, we can look back at four key scenes in the film where the mirror appears - borrowing books, adopting novels, chatting in the apartment that Mr. Zhou rented, and snuggling up. The tenderness in the mirror image was not yet feeling. Especially the folding mirror used in the red apartment, as the camera moves, the audience can only catch a glimpse of the two people's faces from fragmented angles and can never capture them completely. This fragmented visual logic echoes the emotional tension in the post-romantic intimacy, but also symbolizes the fracture and alienation between the subject and the real cognition. Fractals in mathematics imply regularity and consistency, while in films, they transform into the beginning of fiction, dislocation and unusual. As Deleuze said, true repetition is not a simple reproduction, but rather the generation of constantly generating the same forms. This structure time under different conditions. These tender scenes that repeatedly appear in the mirror, seemingly actual forward, yet in each reflection, it resolves subtle changes in emotion and between clean emotions, identity, becoming a visual abundance of difference and repetition.

In addition, I incorporated Gilles Deleuze's theory of difference and repetition, using it as a theoretical framework to reflect on the emotional and philosophical implications of repeating structures in film. I also introduced the concept of polyprisms and folding mirrors, discussing how these geometric and optical devices function metaphorically and spatially within cinematic language. Through this cross-disciplinary approach, the essay offers new insights into how mathematical forms can be used not only for visual experimentation, but also for expressing complex psychological states and nonlinear narrative logic in film.

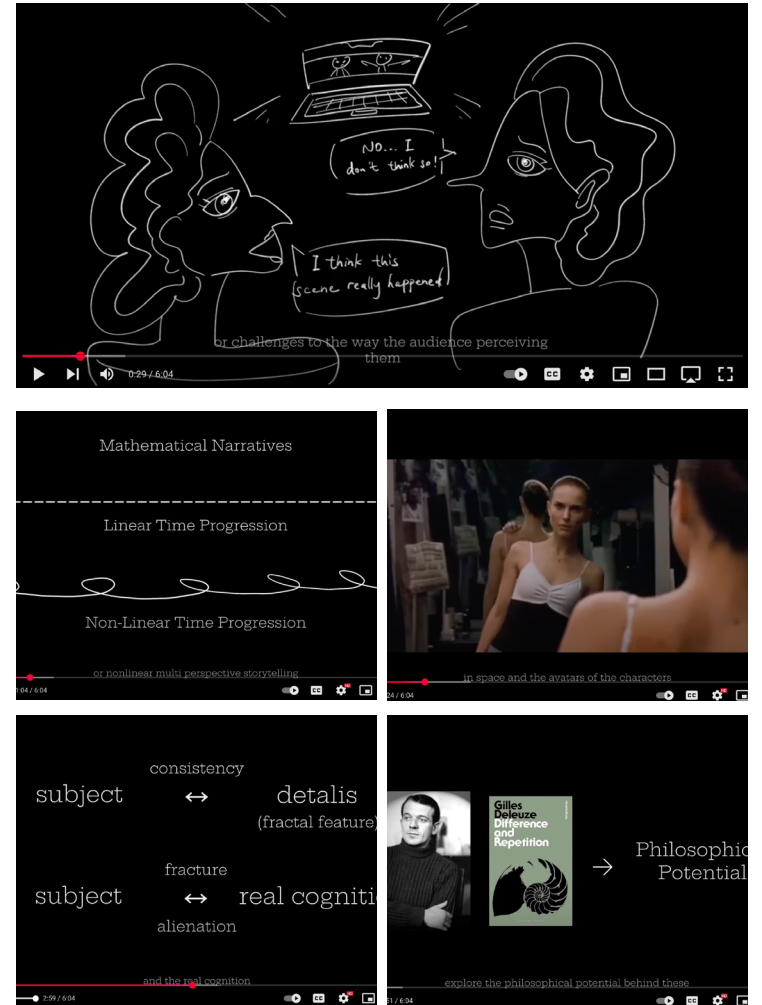


Fig.255-259 screenshots of CTS outcome

Reflection

Weakness

Several problems that emerged in the entire project were those that had not occurred in previous projects.

The first major issue is that during the printing process, one page of the indesign document's images went to the wrong layer, and no final check was conducted during the printing. As a result, it was only discovered after the printing was completed that there was no chance to make any modifications.

In addition, when I was printing, I was told that the Saddle-stitching document should be expanded in multiples of 4, so I deleted two pages directly in the print room, but forgot to change the page numbers and only found out after printing. This made me remember that I should check carefully and not be careless when printing later.

Secondly, I think the Artivive part was done too little. Only one interactive page was made. I think the reason is also that the time was not arranged reasonably. In the end, there was no extra energy left to improve this part.

When typesetting the content, I spent too much time adjusting the layout and font, resulting in not having much time to improve on the content part.

Strength

But overall, I am very proud of this project because I have greatly broken through myself. The content of making a magazine is actually very extensive, but I have completed all of it.

Moreover, I have done many things that I haven't done before, such as book binding, selecting paper, doing video interaction, learning code, writing movie reviews, and so on. I also spent a lot of time studying mathematics and philosophy, two fields that I had not delved deeply into before.

I really enjoy this process of continuous attempts. In this way, I know what I want and what I don't want. The overall logic will be very clear. Compared with the previous project, it appears more substantial. Plus, the progress of this project has also been very smooth. I have participated in every tutorial and received suggestions from the teachers, which has played a very significant role in my final product output.

In conclusion, this project challenged myself and enabled me to make a breakthrough. As the last project of the preparatory course, it also demonstrated my learning achievements of this year and brought a nice ending to it.

Future Improvement

When undertaking projects in the future, there are several points that need to be continuously noted. First of all, when exporting the file, you should check it carefully and not neglect the last step. Carefulness is very important.

Then time planning still needs to be emphasized. The process document should be organized as early as possible and not be completed in the last few days.

Keep learning how to use grids and columns. This is where I'm not good at and I need to study it well in the future.

The Primary research should be more abundant and lay the groundwork for the subsequent output. There should be no logical gaps in it.

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