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Experiment with Fractals

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Julia 2D



Iterations



Bass Strength



Treble Strength



Primary Color



Secondary Color

☐ Rainbow mode

Julia Set

-0.4 - 0.59i



Julia Info

About Julia Sets:

Julia sets are 2D fractals derived from the Mandelbrot set. Each Julia set is generated by fixing a complex constant c and iterating the formula $z_{n+1} = z_n^2 + c$ for every pixel. While the Mandelbrot set varies c per pixel, a Julia

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Mandelbrot 2D ▾

Iterations



Bass Strength



Primary Color



Secondary Color

☐ Rainbow mode

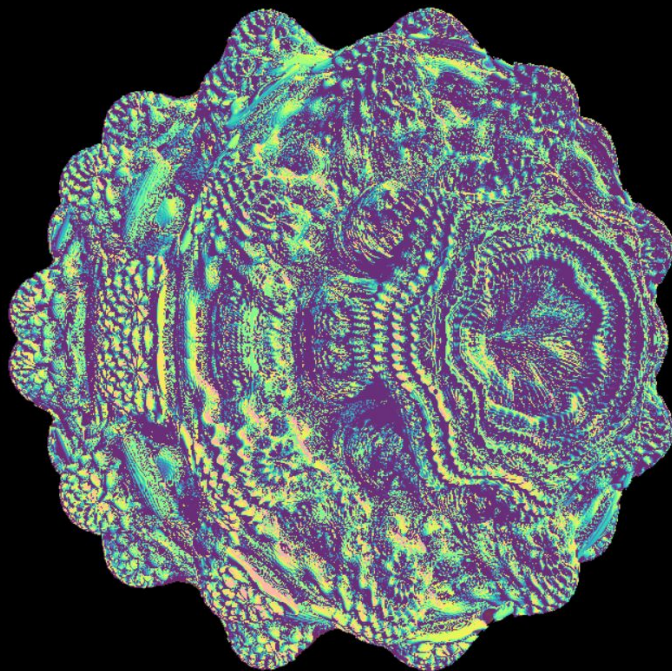
Mandelbrot Info

About Mandelbrot Sets:

The Mandelbrot set is a famous 2D fractal defined by iterating the formula $z_{n+1} = z_n^2 + c$ for each pixel, where $z_0 = 0$ and c represents the complex coordinate of that pixel. Points that remain bounded after many iterations are part of the set; others escape to infinity. The resulting shape exhibits intricate, self-similar patterns at all scales.

Parameters:

• **Iterations:** Number of iterations applied

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Mandelbulb 3D



Ray Steps

Bass Strength

Treble Strength

Rotation Speed

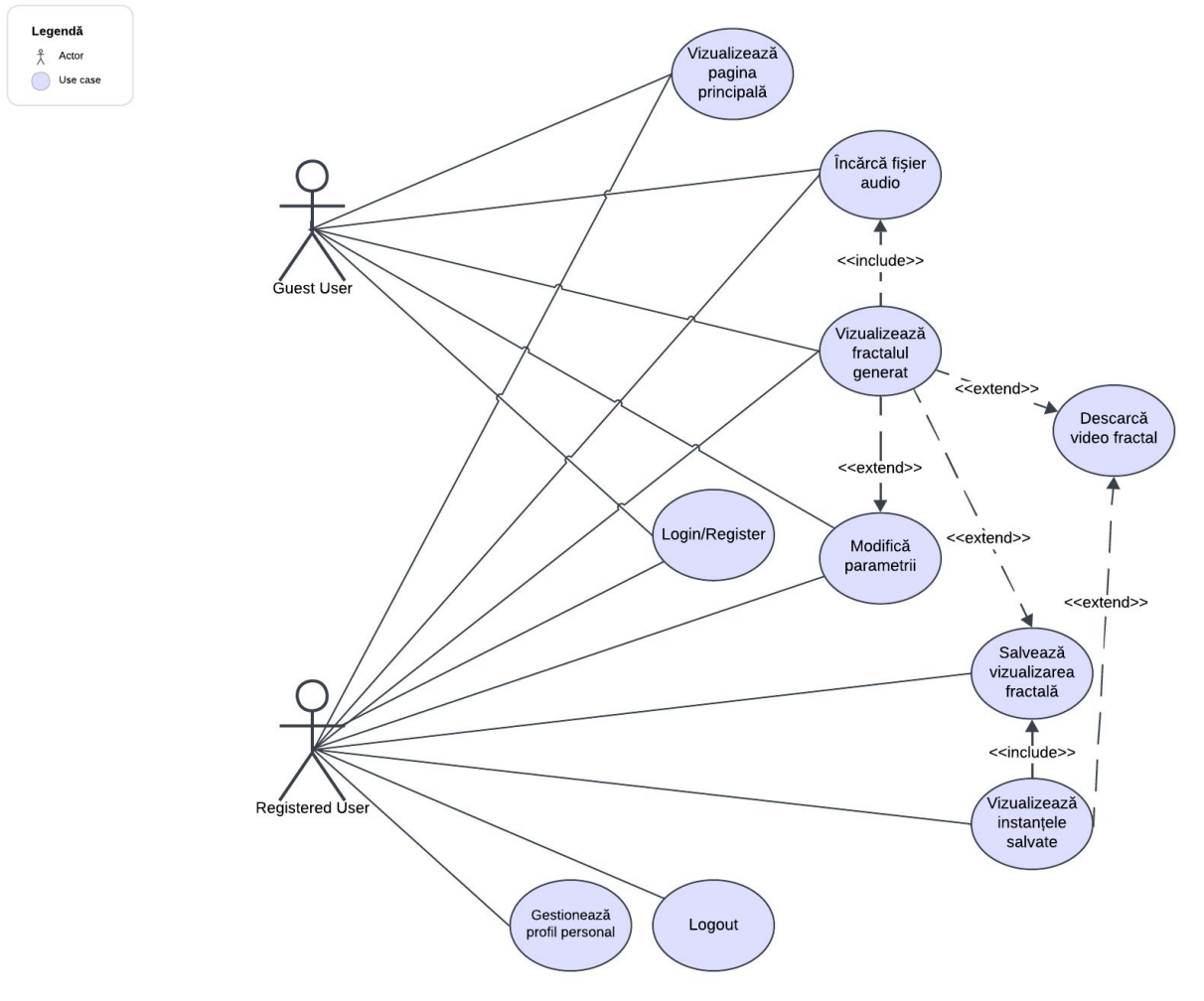
Zoom Pulse

Primary Color

Secondary Color

☒ Rainbow mode[Mandelbulb Info](#)

Use Case Diagram





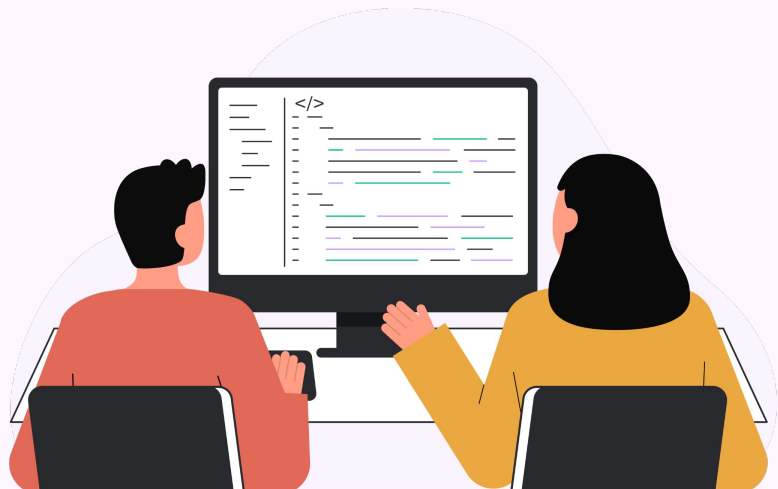
Playwright

Test-Driven Development

✕Unit.net



coverlet



Pair Programming

Test-Driven Development

Follow **Red** → **Green** → Refactor

PROS

- Helped clarify expected behavior early
- Safer refactoring because existing tests immediately detected mistakes

CONS

- Only applied to C# logic
- Difficult for complex JavaScript logic
- Fractal logic evolved frequently, making early tests unstable

Pair Programming

Roles: **Driver** & **Navigator**

PROS

- When working with complex logic
- Instant feedback
- Knowledge sharing
- Continue work when one person is stuck

CONS

- Effectiveness depends on the compatibility of the two developers
- Requires good communication and similar coding styles

Test Coverage

```
(base) PS C:\Users\bianc\Desktop\Synesthesia-Web-App\Synesthesia.Web.Tests> ./run-coverage.bat
Restore complete (0.8s)
  Synesthesia.Web succeeded (0.6s) → C:\Users\bianc\Desktop\Synesthesia-Web-App\Synesthesia.Web\bin\Debug\net8.0\Synesthesia.Web.dll
  Synesthesia.Web.Tests succeeded (0.5s) → bin\Debug\net8.0\Synesthesia.Web.Tests.dll
[xUnit.net 00:00:00.00] xUnit.net VSTest Adapter v2.5.3.1+6b60a9e56a (64-bit .NET 8.0.22)
[xUnit.net 00:00:00.19]   Discovering: Synesthesia.Web.Tests
[xUnit.net 00:00:00.22]   Discovered: Synesthesia.Web.Tests
[xUnit.net 00:00:00.22]   Starting: Synesthesia.Web.Tests
[xUnit.net 00:00:00.96]   Finished: Synesthesia.Web.Tests

  Synesthesia.Web.Tests                                     Testing (2.2s)

  Synesthesia.Web.Tests                                     GenerateCoverageResult (2.2s)
  Generating report '.\TestResults\coverage.cobertura.xml'

                                                                    (2.3s)

+-----+-----+-----+-----+
| Module      | Line  | Branch | Method |
+-----+-----+-----+-----+
| Synesthesia.Web | 98.24% | 50%    | 92.85% |
+-----+-----+-----+-----+

+-----+-----+-----+-----+
|          | Line  | Branch | Method |
+-----+-----+-----+-----+
| Total    | 98.24% | 50%    | 92.85% |
+-----+-----+-----+-----+
| Average  | 98.24% | 50%    | 92.85% |
+-----+-----+-----+-----+

  Synesthesia.Web.Tests test succeeded (2.3s)

Test summary: total: 22, failed: 0, succeeded: 22, skipped: 0, duration: 1.7s
Build succeeded in 4.7s

Generating HTML report...
2026-01-13T02:24:35: Arguments
2026-01-13T02:24:35: -reports:.\TestResults\coverage.cobertura.xml
2026-01-13T02:24:35: -targetdir:.\TestResults\CoverageReport
2026-01-13T02:24:35: -reporttypes:Html
```

Test Coverage

Summary

♥ Sponsor

★ Star

Information

Parser: Cobertura
Assemblies: 1
Classes: 7
Files: 7
Coverage date: 1/13/2026 - 2:24:35 AM

Line coverage

98%

Covered lines: 56
Uncovered lines: 1
Coverable lines: 57
Total lines: 505
Line coverage: 98.2%

Branch coverage

50%

Covered branches: 3
Total branches: 6
Branch coverage: 50%

Method coverage

Feature is only available for sponsors

Upgrade to PRO version

Name	Covered	Uncovered	Coverable	Total	Percentage	Covered	Total	Percentage
— Synesthesia.Web	56	1	57	505	98.2%	3	6	50%
Synesthesia.Web.Data.ApplicationDbContext	15	0	15	34	100%	0	0	
Synesthesia.Web.Models.BaseEntity	8	0	8	27	100%	0	0	
Synesthesia.Web.Pages.ErrorModel	8	0	8	28	100%	3	4	75%
Synesthesia.Web.Pages.IndexModel	6	0	6	20	100%	0	0	
Synesthesia.Web.Pages.PrivacyModel	6	0	6	20	100%	0	0	
Synesthesia.Web.Pages.ProfileModel	8	0	8	202	100%	0	0	
Synesthesia.Web.Pages.StudioModel	5	1	6	174	83.3%	0	2	0%

Project Management and Issue Tracking

The screenshot displays a Trello workspace for a project named "Synesthesia". The interface includes a top navigation bar with a search bar, a "Create" button, and user avatars. The main area shows a Kanban board with five columns: "To Do", "Doing", "Done - Sprint 1", "Done - Sprint 2", and "Done - Sprint 3". Each column contains cards representing tasks or user stories. The "To Do" and "Doing" columns have a "+ Add a card" button. The "Done" columns have a "+ Add a card" button at the bottom. Each card includes a progress bar, a description, and user avatars.

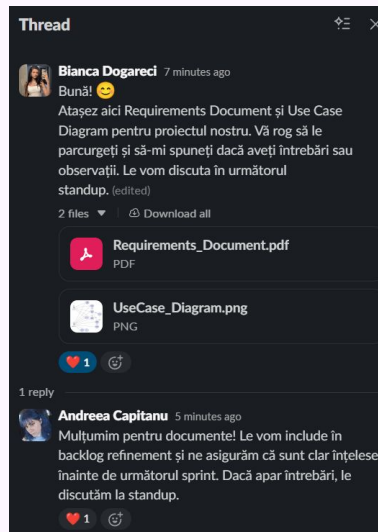
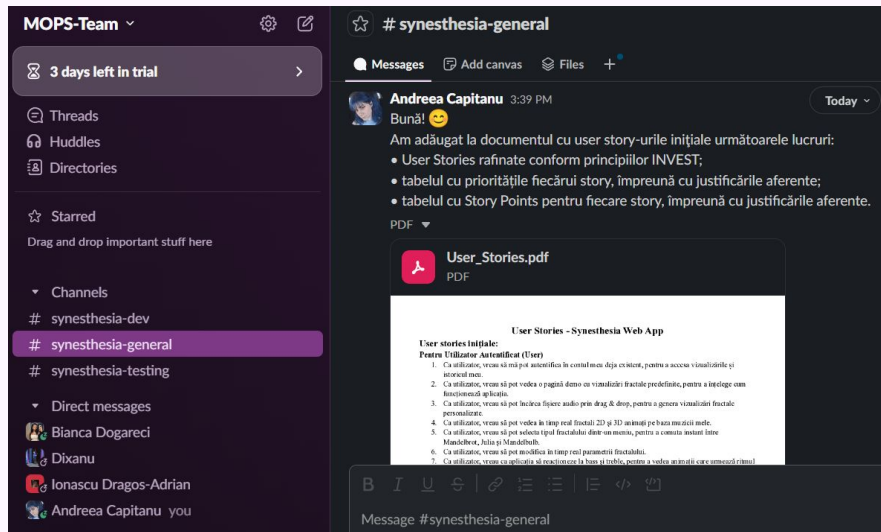
Columns and Cards:

- To Do:**
 - + Add a card
- Doing:**
 - + Add a card
- Done - Sprint 1:**
 - Ca utilizator, vreau să mă pot autentifica în contul meu deja existent, pentru a accesa vizualizările mele salvate.
 - Ca vizitator, vreau să îmi pot crea un cont, pentru a salva vizualizările mele preferate.
 - Ca vizitator, vreau să mă pot autentifica în contul creat, pentru a accesa funcțiile complete ale aplicației.
 - + Add a card
- Done - Sprint 2:**
 - Ca utilizator, vreau să văd în timp real fractali 2D/3D animați sincron cu ritmul și frecvențele piesei.
 - Ca utilizator, vreau să pot selecta tipul fractalului dintr-un meniu, pentru a comuta instant între Mandelbrot, Julia și Mandelbulb.
 - Ca utilizator, vreau ca aplicația să reacționeze la bass și treble, pentru a vedea animații care urmează ritmul
 - + Add a card
- Done - Sprint 3:**
 - Ca vizitator, vreau să am control de bază asupra vizualizării (pauză, schimbare culori), pentru a explora interactivitatea aplicației.
 - Ca utilizator, vreau să pot modifica în timp real zoom-ul, culorile, rotația și viteza fractalului.
 - Ca utilizator, vreau să pot salva vizualizarea generată, pentru a o accesa ulterior.
 - + Add a card

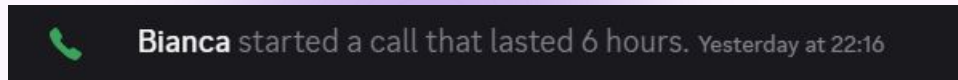
Bottom Navigation: Inbox, Planner, Board (selected), Switch boards

Communication

slack -> sharing docs etc.



Discord -> pair programming, meetings etc.



Impediments

- 01** Code coverage tool including files like: migrations, ApplicationDbContext.cs etc.
- 02** Recording video at a higher quality

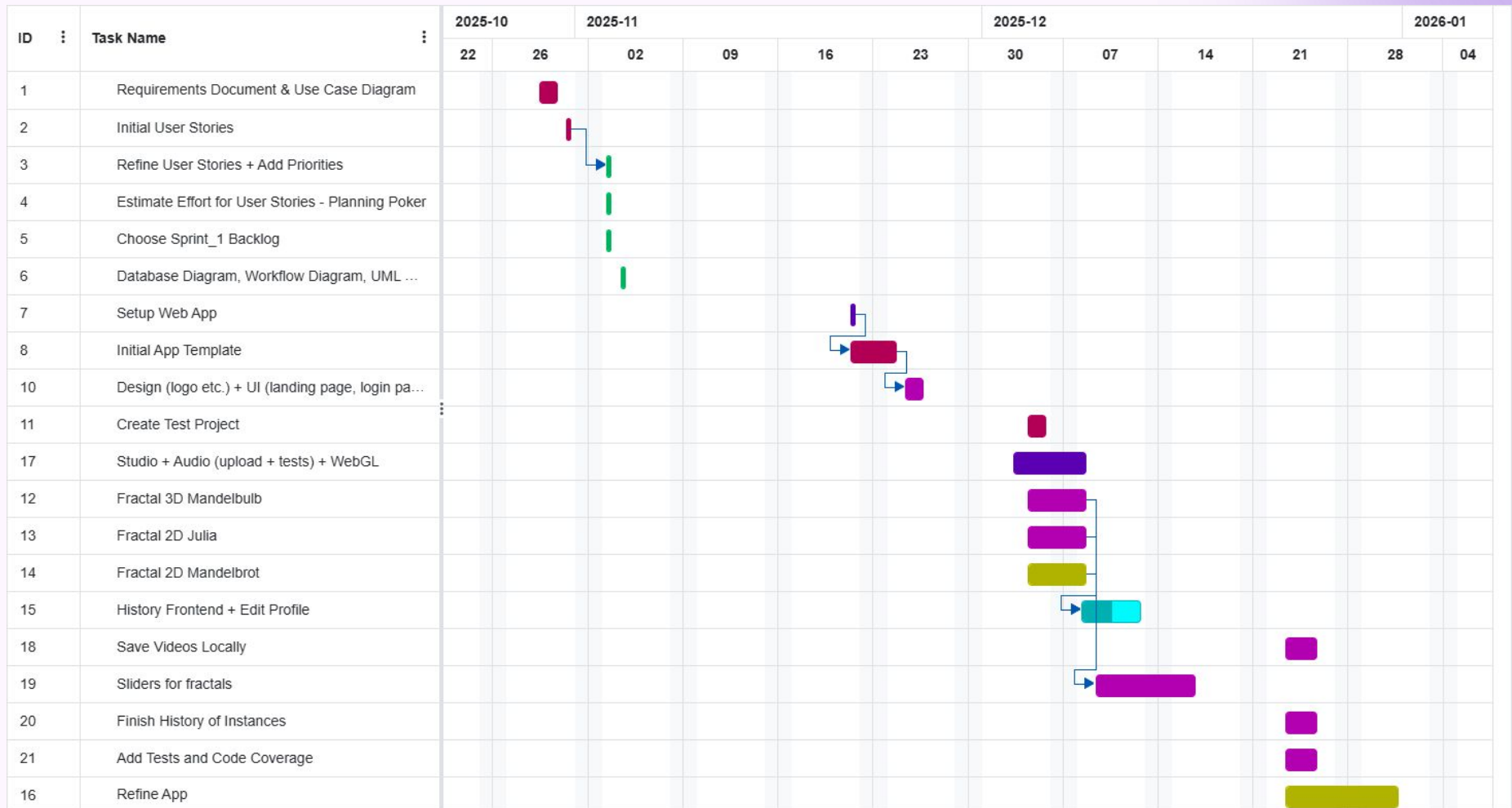
Version Control & Collaboration



[Link to our GitHub repository!](#)

Contribution of each member

- Căpitanu Andreea – **35%**
- Dogăreci Bianca–Alexandra – **35%**
- Ionașcu Dragoș–Adrian – **20%**
- Dițoiu Andrei–Adelin – **10%**





Thank you!