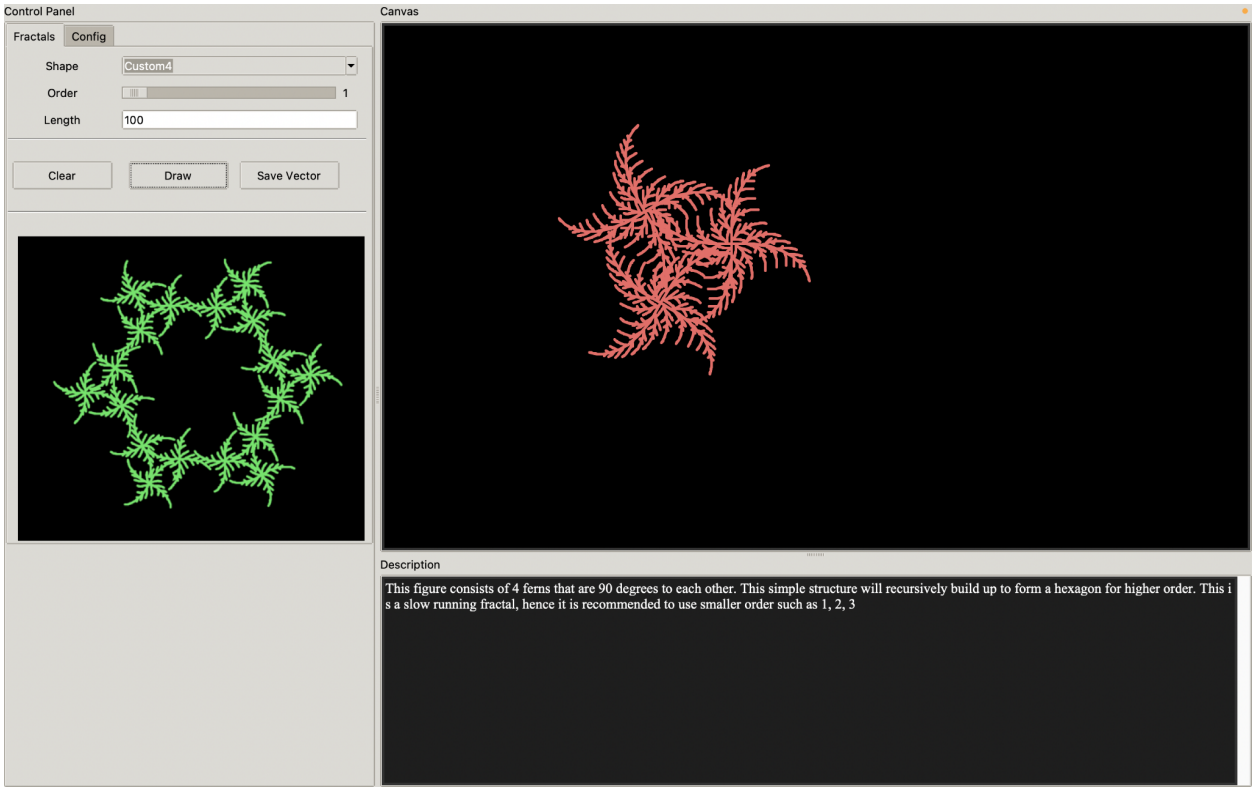
Turtle Fractal Interface

This is a interface developed in Python using Tkinter library. It consists of 3 sections, Control Panel, Canvas area and Description Area. The Control Panel allows use to customise the sketch that you wish to draw. The shape selected in the control panel will be drawn in the canvas area. The Description section displays a brief description about the fractal shape that is currently selected

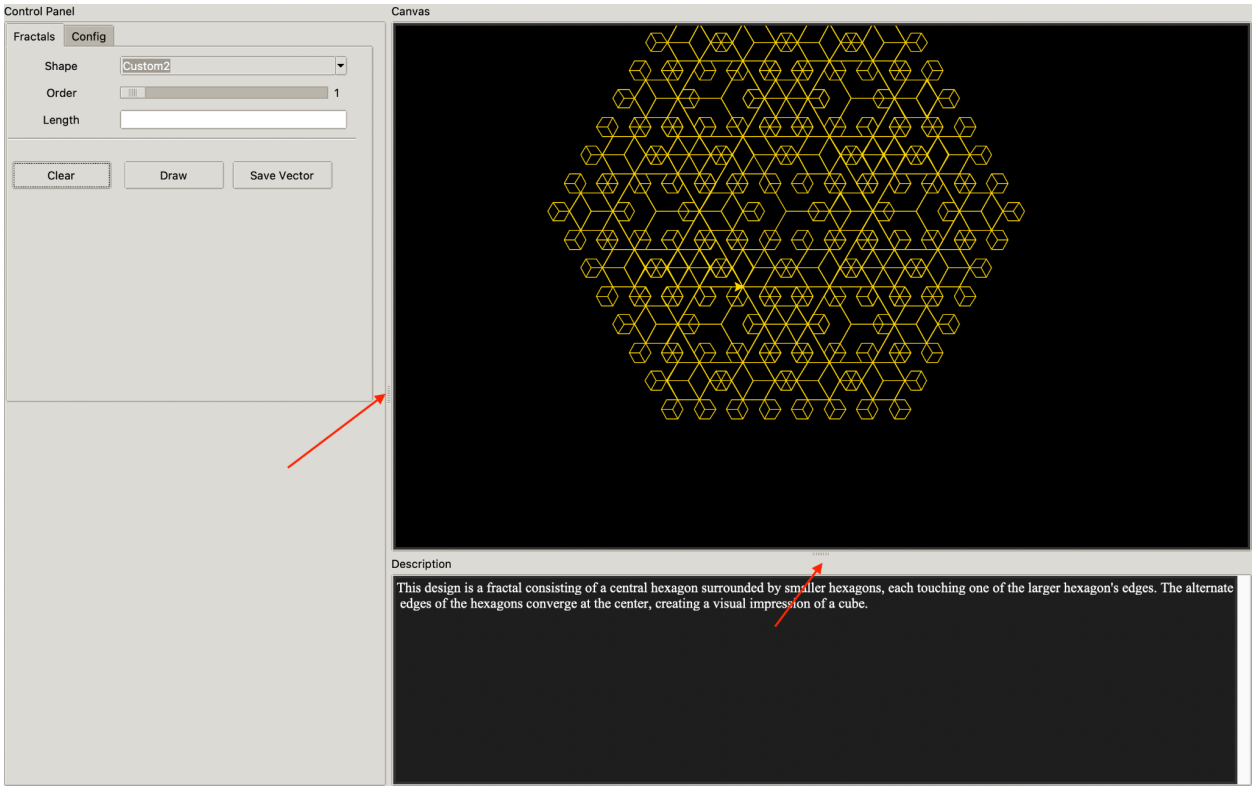


The following widgets are used in the interface:-

- PanedWindow
- Notebook
- Entry widget
- Scrolled Text
- Scale
- Color picker
- Message box
- Option Menu
- Combobox
- Button
- Separator
- Radio Button
- Checkbox

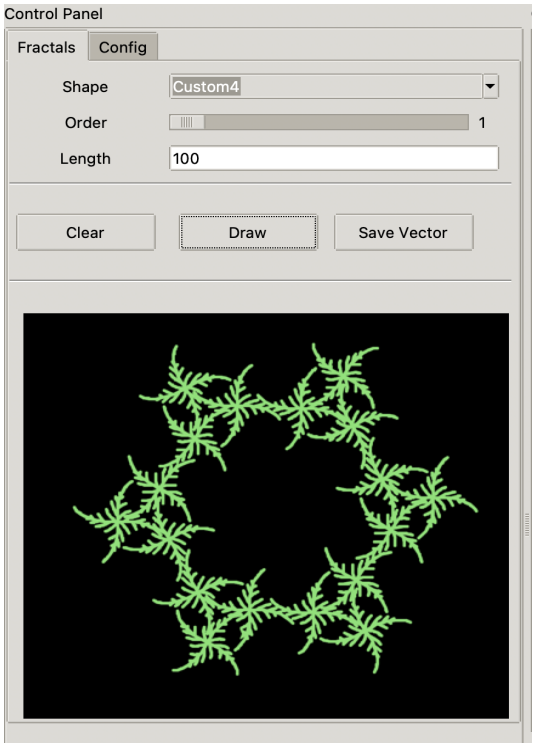
PanedWindow

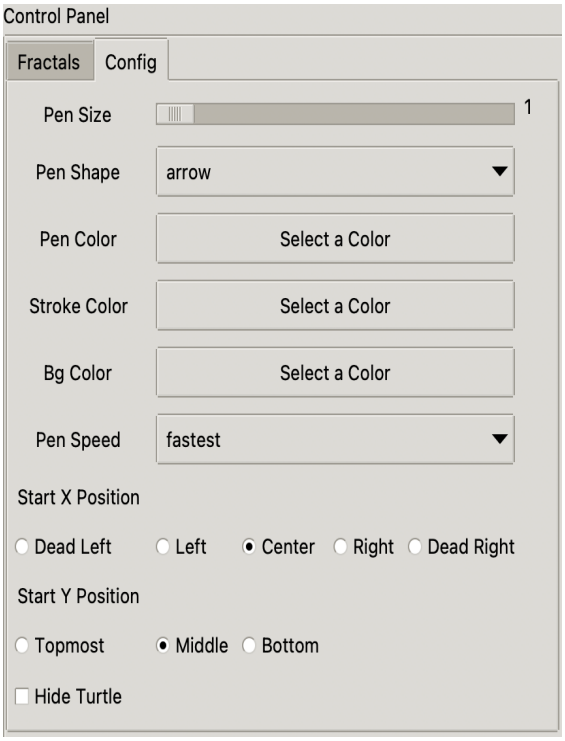
This widget is used for making resizable panes. I have used this widget to make all the sections resizable. Hence control panel, canvas and description area can be resized by dragging along its edges.



Notebook

This widget is used for making Tabs. This interface consists of two tabs: Fractals and Config. Fractal tab consists of basic features to control the shape, size and order of the fractal drawing. Config tab consists of all the properties of the pen and screen that can be customised.

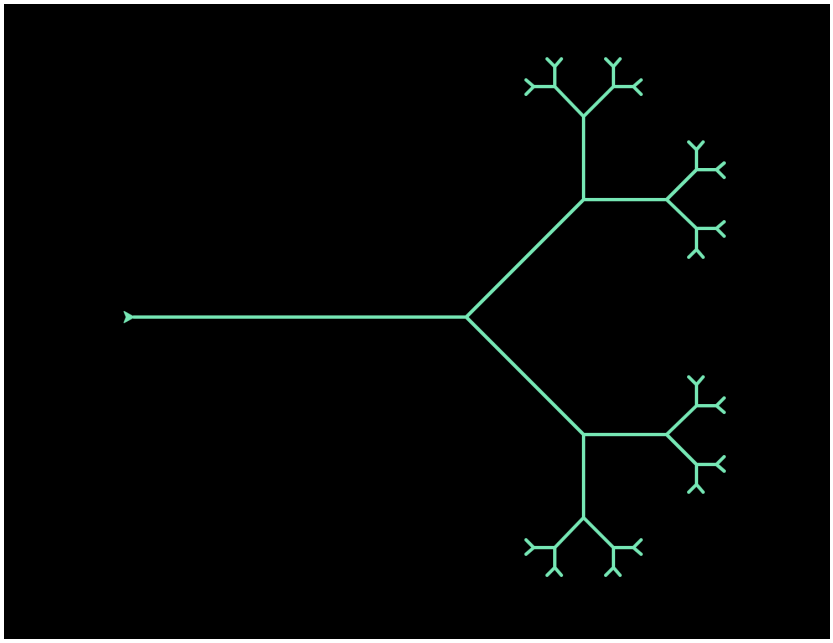




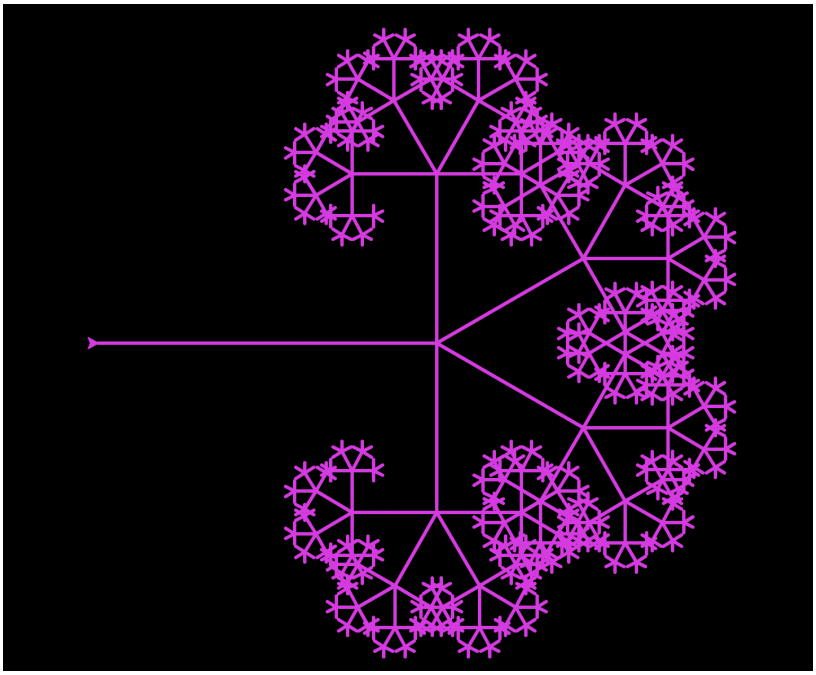
Entry Widget
Entry Widget is used for accepting user entry. I have used this component for getting the order from the user. Validations are setup on this to accept only numbers.
Scrolled Text
Scrolled Text widget can be used for creating a scrollable text area. I have used this widget for making the description section scrollable.
Scale
Scale widget is used for used for accepting user entry in the form of sliders. I have used this widget for controlling the order of the shape and pen size
Color Picker
I have used the colour picker widget for allowing the user to select custom colours for the pen, pen stroke and canvas background
Message box
This widget is used for showing pop ups to the users. I have used this widget for making validations in the order entry, showing confirmation pop up on clear button, for informing the users whether saving image is successful or not and also asking if the user wants a random colour.
Option Menu
This widget provides a set of options in the form of a dropdown menu. This widget has been used in this interface for selecting the pen shape and speed
Combo box
This widget allows the users to type as well as select an option similar to option menu. I have made this read only and have used it for getting the shape selection from the user.
Button
This widget has been used for displaying Clear, Draw and Save button on the Fractals tab as well as for choosing colours on the config tab.
Separator
This widget is used for drawing a horizontal line. I have used this widget for separating the buttons from other widgets in Fractals tab
Radio Button
This widget can be used for presenting the users with multiple choices at the same time restricting the number of selections to one. I have used this widget for controlling the pen position in horizontal and vertical axis
Checkbox
Checkboxes are used for accepting boolean inputs from the users. I have used this widget for showing and hiding the turtle.
Fractals
The following fractal figures can be drawn using this interface:

- Binary Tree
- Dandelion
- Fern
- Koch
- Anti Flake
- Flake
- Triangle Gasket
- Square Gasket
- Nine Squares
- Hexagons
- Two Circles
- Three Circles
- Four Circles
- Custom1
- Custom2
- Custom3
- Custom4

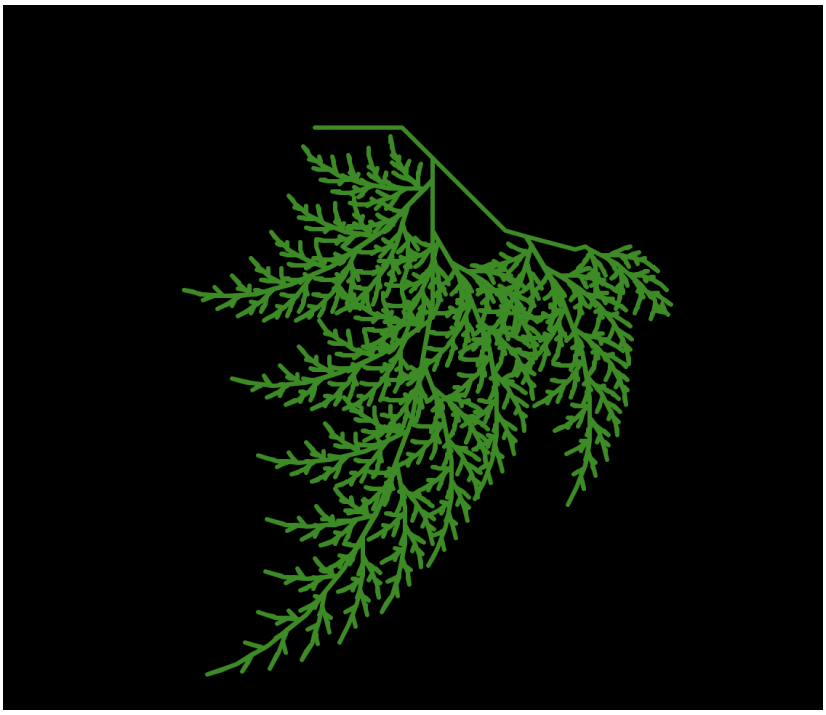
Binary Tree
A binary tree is a tree-type fractal which is created by recursively travelling forward and turning left by 45 degrees



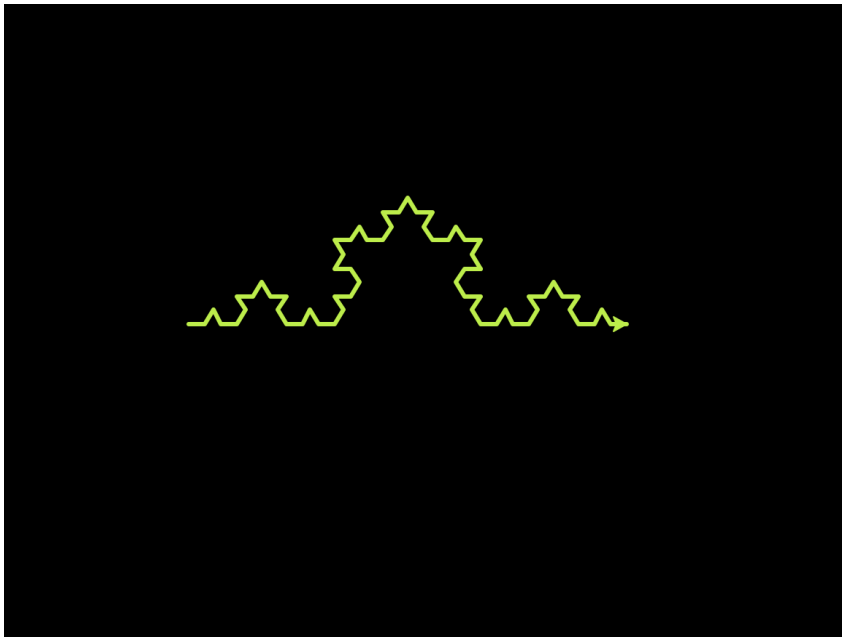
Dandelion
This is a fractal in the shape of a dandelion



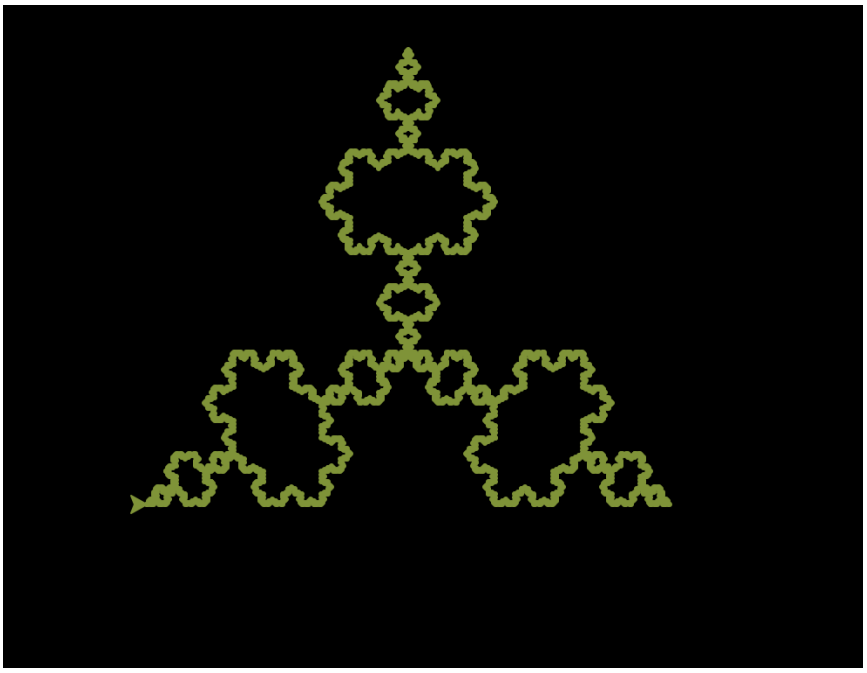
Fern
This is a fractal in the shape of a fern



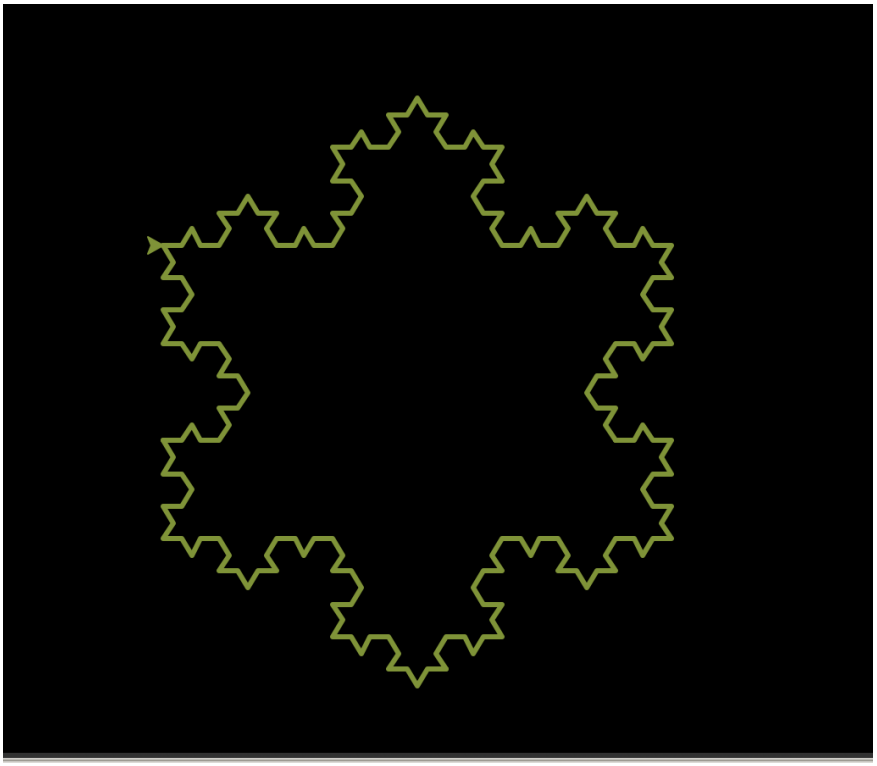
Koch
This is a Koch curve which can be used to draw a snow flake



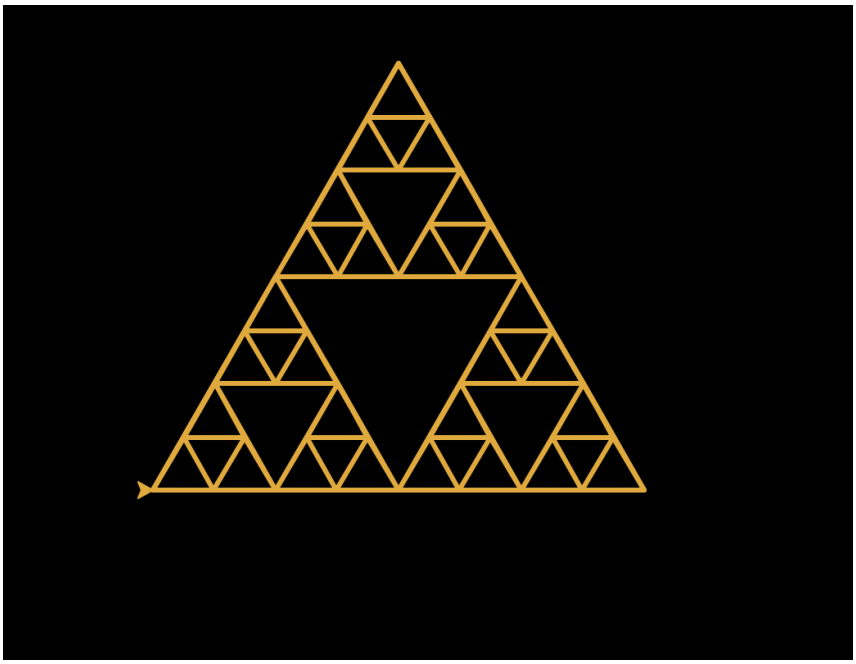
Anti Flake
This is a fractal figure which uses Koch curve to form a anti flake



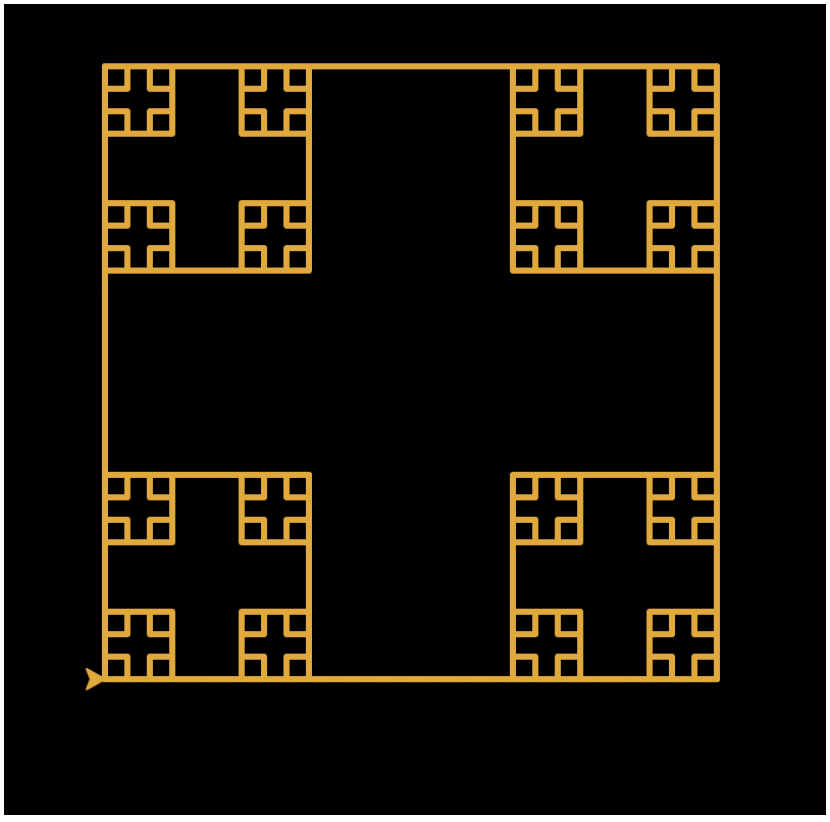
Flake
This is a fractal figure which uses Koch curve to form a snow flake



Triangle Gasket
The Triangle Gasket, also known as the Sierpinski Triangle, is formed by recursively subdividing an equilateral triangle into smaller triangles, with each iteration creating more intricate and detailed patterns.

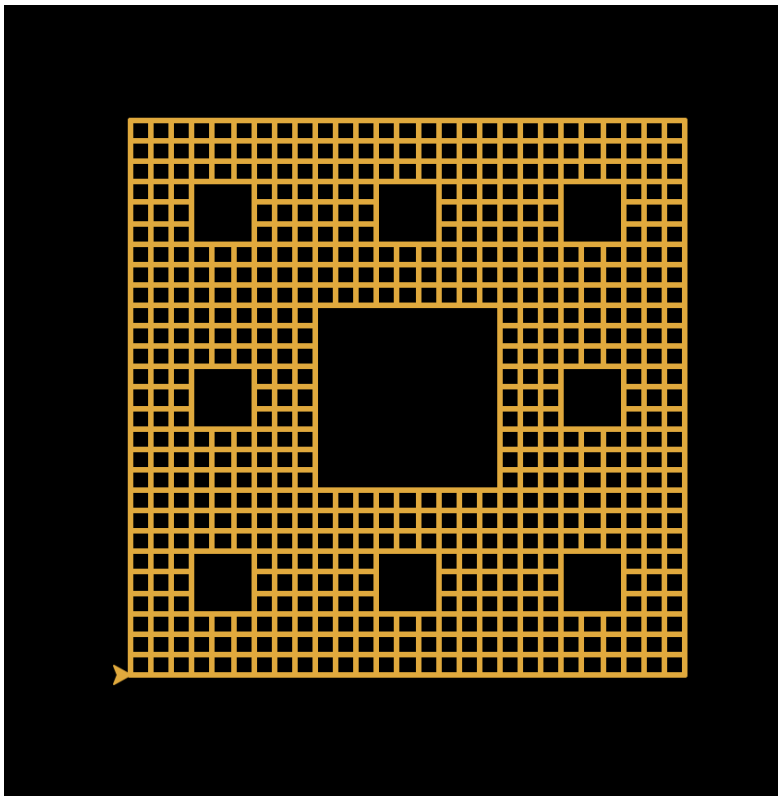


Square Gasket
This fractal consists of a larger square which encloses 4 smaller squares that are quarter the size of the larger square



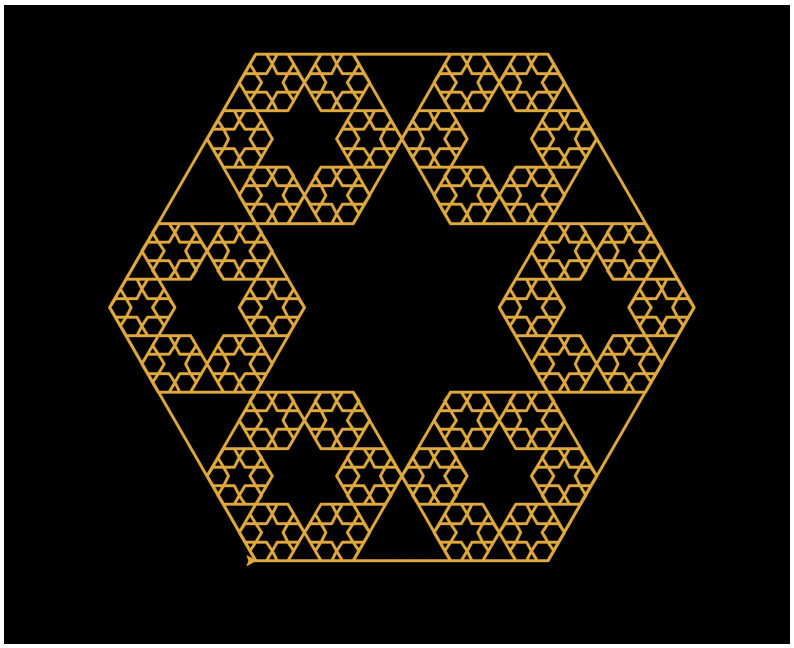
Nine Squares

This also known as the Menger Sponge, is a three-dimensional fractal. It's constructed by repeatedly removing smaller cubes from a larger cube in a self-similar pattern. The result is a highly porous, sponge-like structure with intricate, repeating patterns at multiple scales.



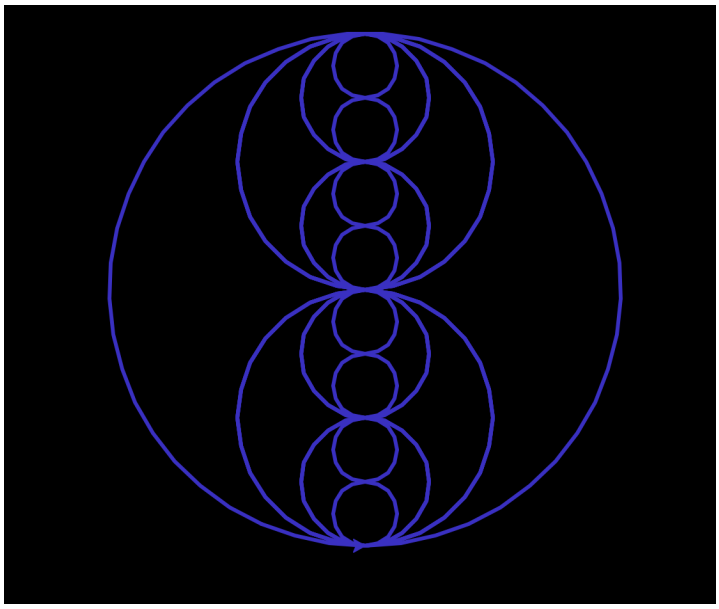
Hexagons

This fractal consists of a larger hexagon which encloses 6 smaller hexagons that are quarter the size of the larger hexagon



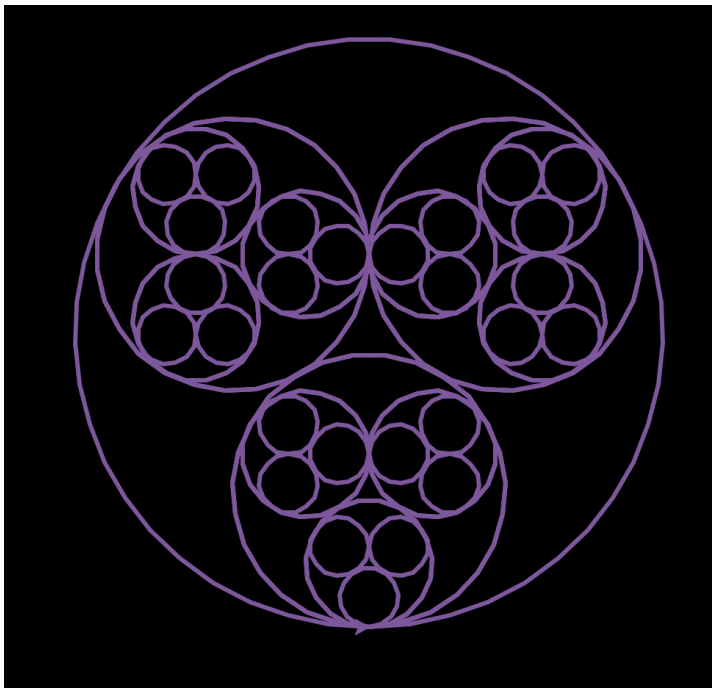
Two Circles

This structure is a fractal composed of a larger circle enclosing two smaller circles. These smaller circles are half the size of the larger one and are positioned in a way that they touch each other and the surrounding larger circle.



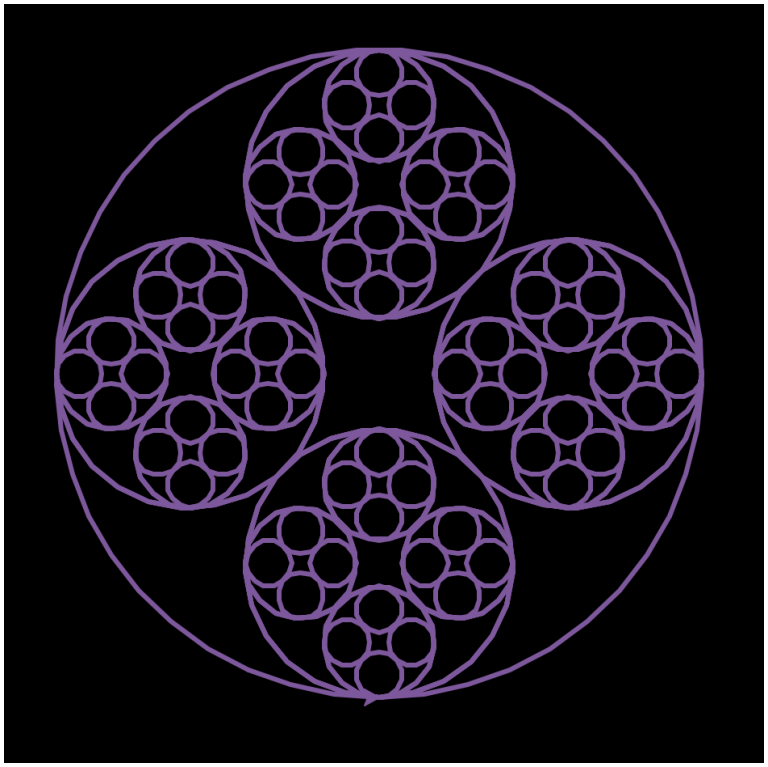
Three Circles

This structure is a fractal composed of a larger circle enclosing three smaller circles. These smaller circles are positioned in a way that they touch each other and the surrounding larger circle.



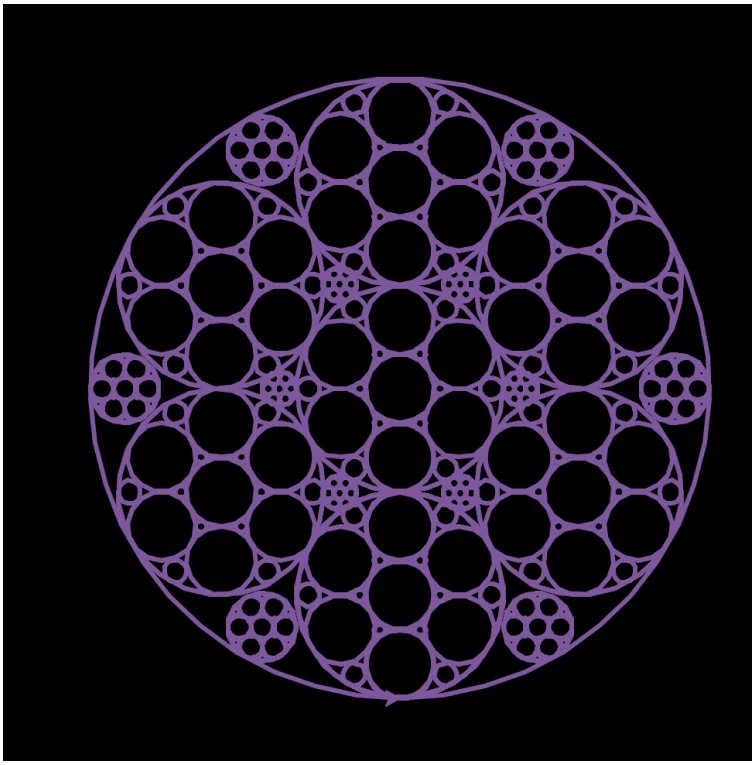
Four Circles

This structure is a fractal composed of a larger circle enclosing four smaller circles. These smaller circles are positioned in a way that they touch each other and the surrounding larger circle.



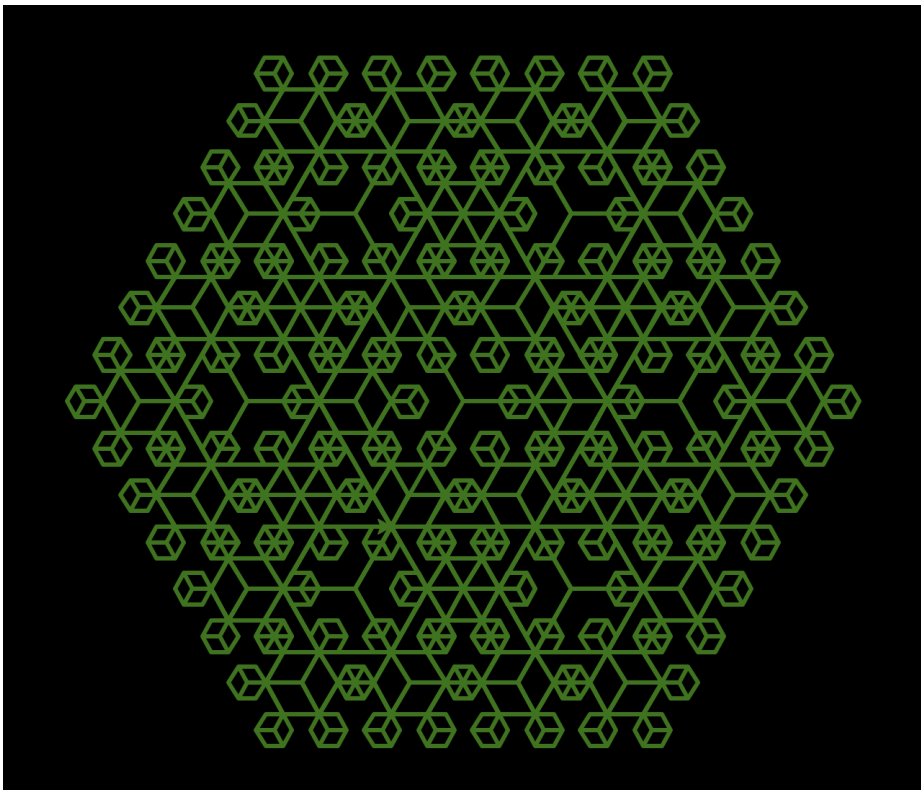
Custom1

This forms a fractal pattern featuring a larger circle that encompasses five smaller circles. These smaller circles are a quarter of the size of the larger one. Additionally, there are five more circles that are 1/9th the size of the larger circle, as well as another five circles that are 1/18th the size of the larger circle. This resembles a little bit with the Apollonian fractal



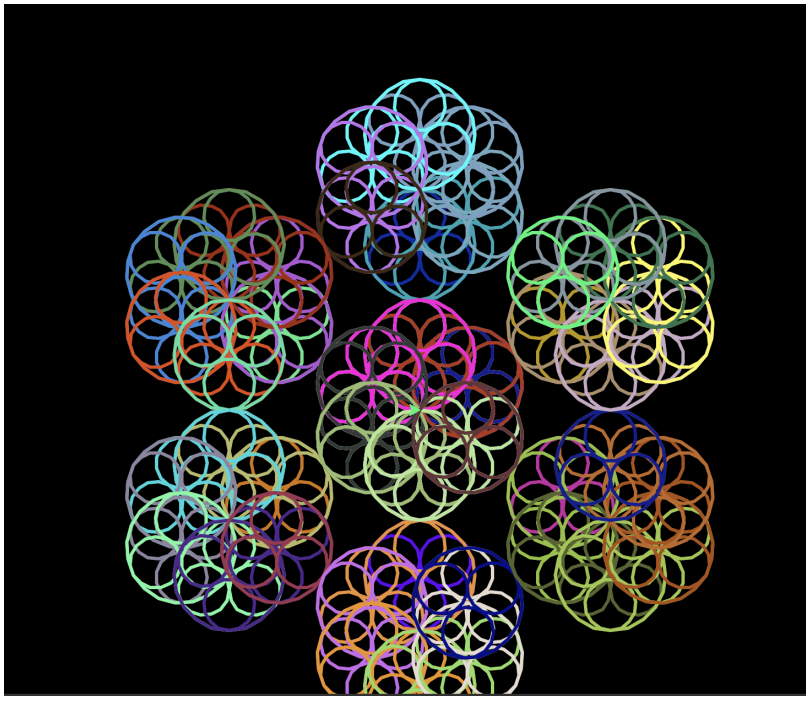
Custom2

This design is a fractal consisting of a central hexagon surrounded by smaller hexagons, each touching one of the larger hexagon's edges. The alternate edges of the hexagons converge at the centre, creating a visual impression of a cube.



Custom3

This fractal figure consists of 2 sets of three circle figure which overlap at an angle so that it resembles a flower within a circle. This pattern is then repeated iteratively to form a hexagon. This is a slow running fractal, hence it is recommended to use smaller order such as 1, 2, 3.



Custom4

This figure consists of 4 ferns that are 90 degrees to each other. This simple structure will recursively build up to form a hexagon for higher order. This is a slow running fractal, hence it is recommended to use smaller order such as 1, 2, 3