

National University of Singapore
School of Computing
CS1101S: Programming Methodology (JavaScript)
Semester I, 2012/2013

Mission Sidequest 6-1
Kochize

Start date: 01 September 2012

Due: 07 September 2012, 23:59

Readings:

- Textbook Sections 1.3.2

As a JFDI Disciple, it is important to be at one with Nature. Nature hides many beauties, and one of these, as you have seen, are fractals. Grandmaster Martin now invites you to use your new-found skills to conjure up an image that is not quite so simple: the snowflake fractal, more commonly known as the Koch snowflake.

Upon successful completion of this side quest, you will earn the “Snowflake Catcher” achievement.

This side quest consists of **two** tasks.

Task 1:

We begin by drawing only part of the snowflake.

Figure 1 shows the first few approximations to the Koch curve, where we stop after a certain number of levels: a level-0 curve is simply a straight line; a level-1 curve consists of four level-0 curves; a level-2 curve consists of four level-1 curves, and so on. The figure also illustrates a recursive strategy for making the next level of approximation: a level- n curve consist of three parts. The first part is a level- $(n - 1)$ curve. The second part is two level- $(n - 1)$ curves, one is rotated by $\pi/3$ and the other is rotated by $-\pi/3$. The last part is another level- $(n - 1)$ curve.

Define a function `show_connected_koch` such that the evaluation of

```
show_connected_koch(level, number_of_points);
```

will show `number_of_points` connected points of the level `level` koch curve starting with a `unit_line`.

Task Files

- lib/list.js
- lib/misc.js
- lib/graphics.js
- lib/hi_graph_ce.js
- sidequest_6-1_1.html
- **sidequest_6-1_1.js**

Task 2:

By completing **Task 1**, you have one third of your snowflake in hand. Now construct your complete snowflakes using a level-5 Koch curve and tools you have learned in previous missions. Precisely, define `snowflake` such that `((draw_connected_full_view_proportional(10000))(snowflake))` displays your snowflake within the viewport.

[Note: `draw_connected_full_view_proportional` scales proportionally and translates your curve to the center.]

An example is shown in Figure 2.

Task Files

- lib/list.js
- lib/misc.js
- lib/graphics.js
- lib/hi_graph_ce.js
- sidequest_6-1_2.html
- **sidequest_6-1_2.js**

Submission

To submit your work to the Academy, copy the contents from the template file(s) into the box that says "Your submission" on the mission page, click "Save Code", then click "Finalize Submission". Note that submission is final and that any mistakes in submission requires extra effort from a tutor or the lecturer himself to fix.

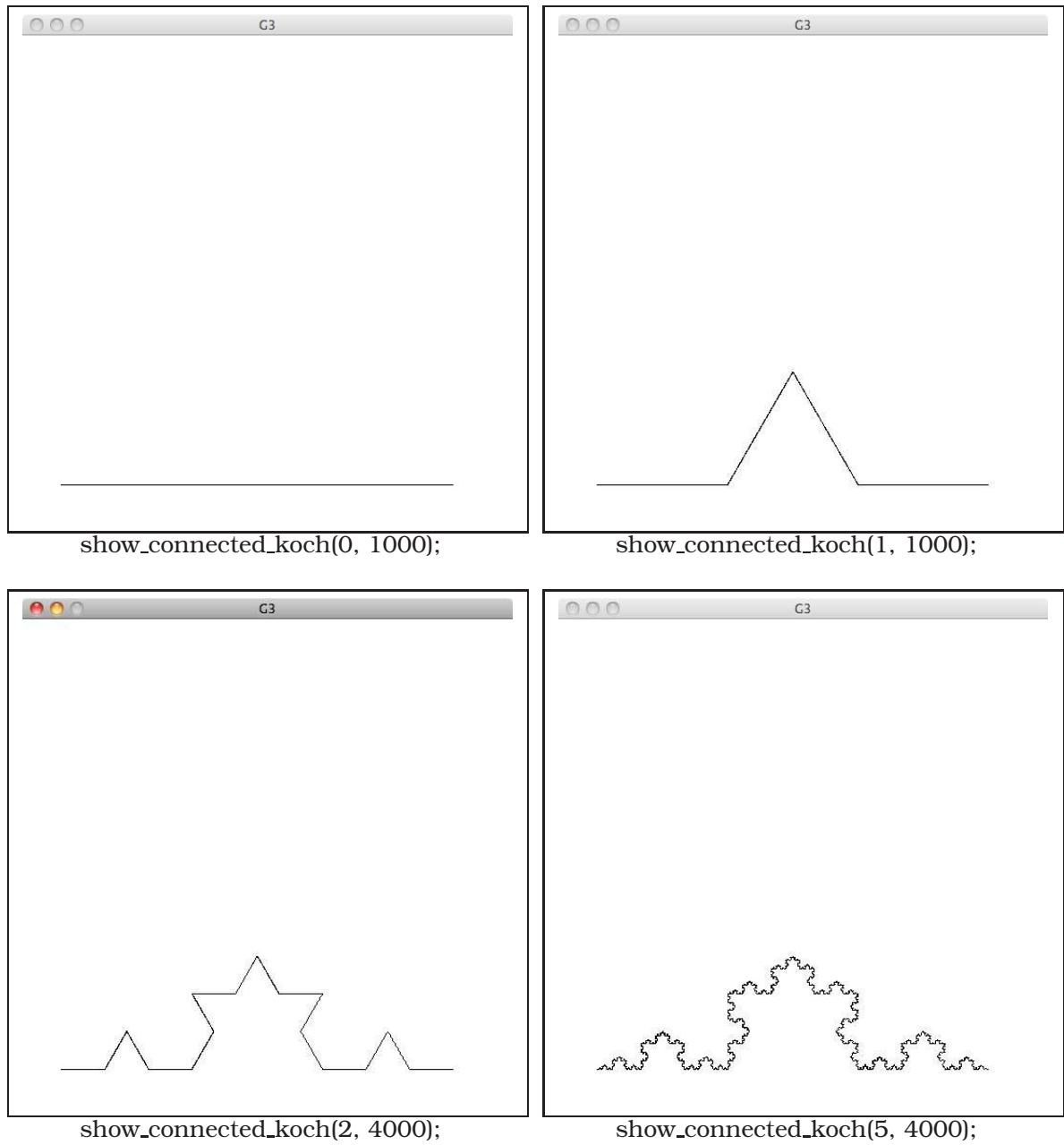


Figure 1: Samples for Koch Curve.

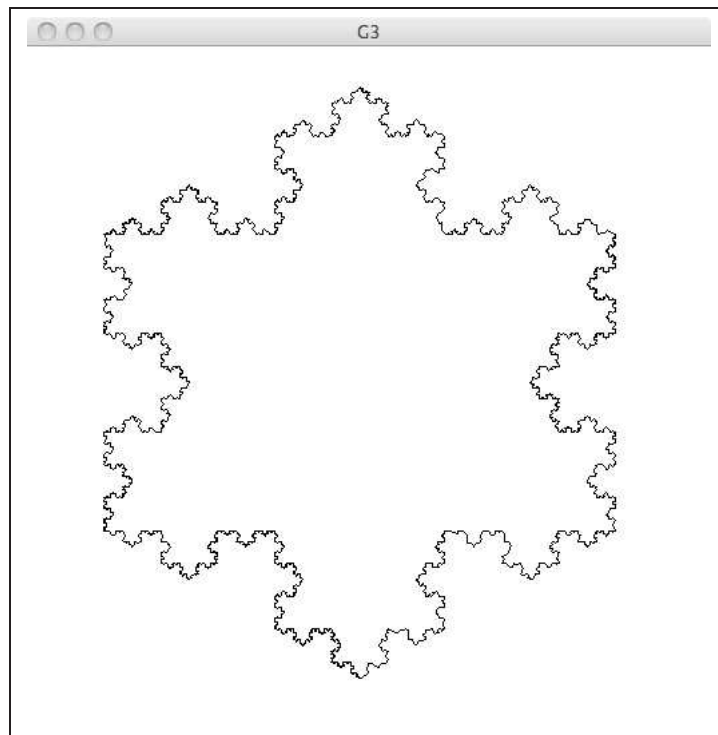


Figure 2: `draw_connected_full_view_proportional(10000)(snowflake)` displays the snowflake above.