University of Calgary, CPSC453
Assignment 1
Fractal Shop

Release Date: Thursday September 23, 2010
Due Date: Sunday October 10, 2010 at 11:59 pm
**Weight of this assignment:** 25%
Total Marks: 100 Marks (extra 16 marks as bonus)
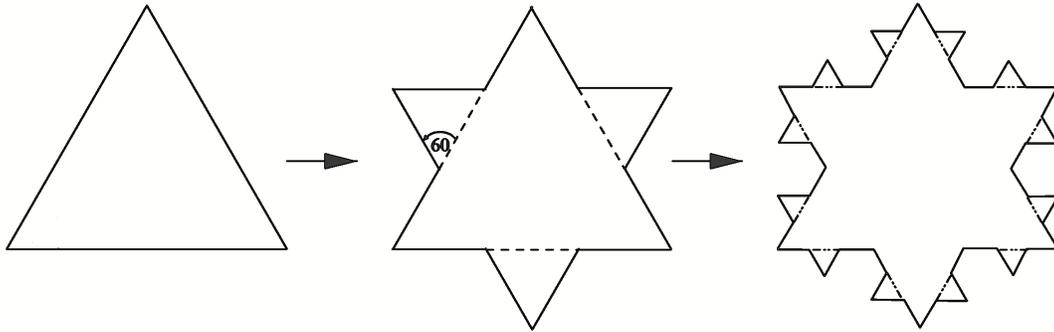
General Specification of the Assignment

The goal of this assignment is to write a program for creating the fractals below. You will be marked on both implementation and documentation.

Note: The dashed lines are only for suggestion and indicate lines that are from the previous state of the fractal.
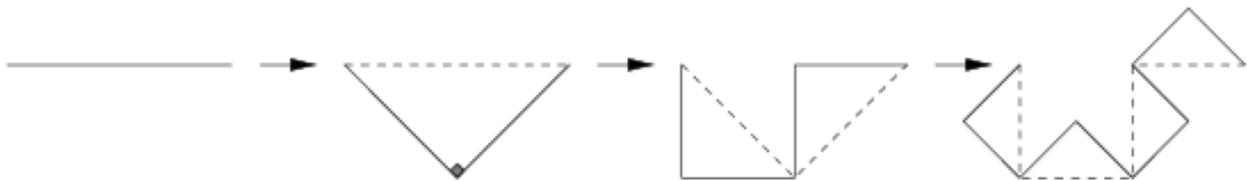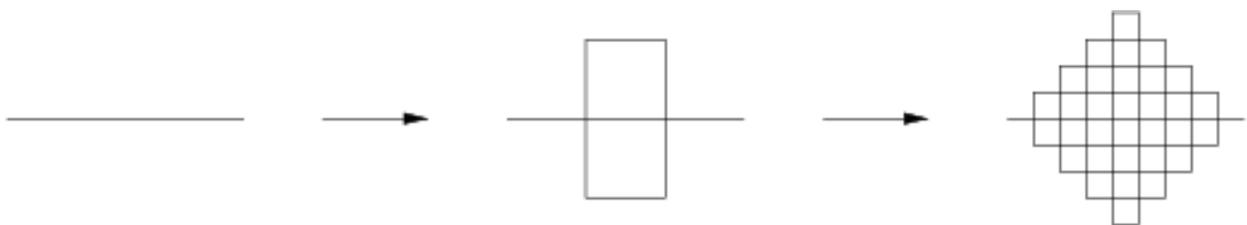
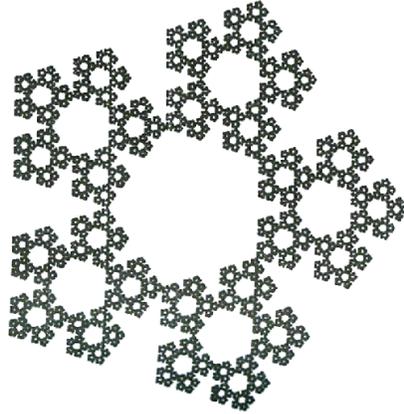## Sierpinski Triangle (5 Marks)
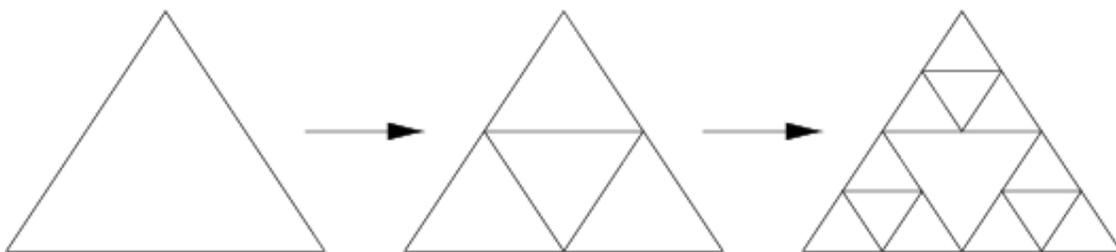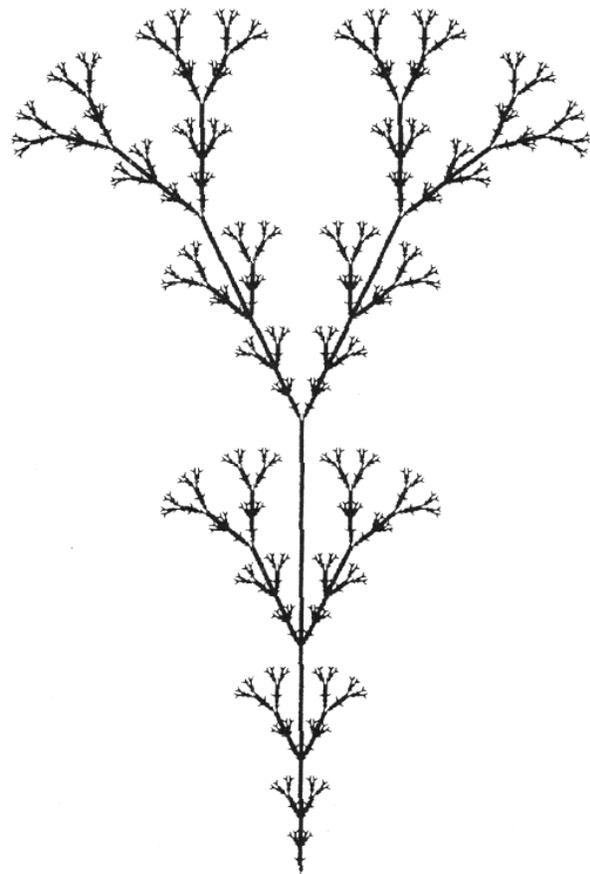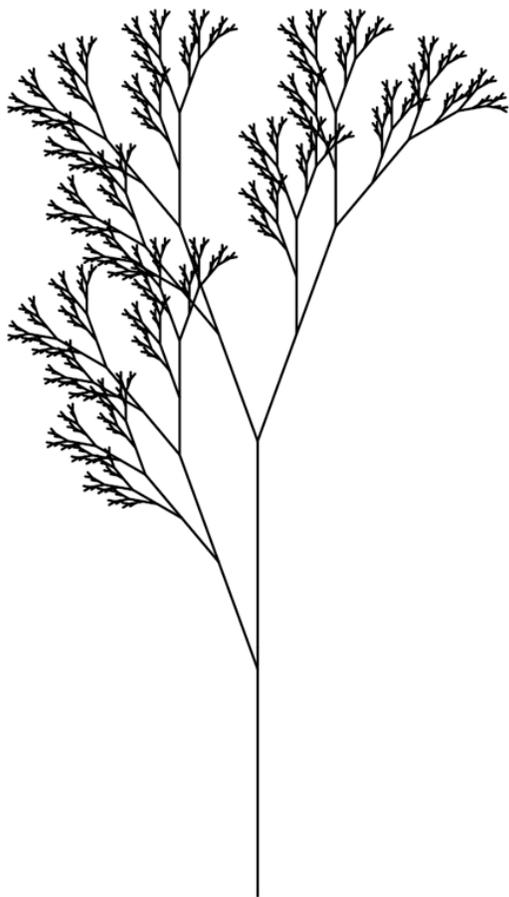
Koch Snowflake (10 Marks)

Dragon (15 Marks)

Peano's Space Filling Curve (15 Marks)

Pentagonal Crystal (15 Marks)

BONUS: Trees (16 Marks, 8 marks per each tree)

Non-functional Requirements (20 Marks)

Documentation

1. You must provide a **README** file (Preferably in Adobe PDF format).

2. Your README file should contain:

   (a) Your name and login id.
   (b) Short description of algorithm used to generate each type of fractal.
   (c) A brief description of the data-structures you used to implement the assignment.

Source Code

1. All your source code must be written in **C/C++** and properly commented. All graphics rendering must be done using **OpenGL**. All event handling and windowing must be performed via **GLUT** or **QT**. Your source code must compile on the lab machines in MS 239 without any special modifications. Your source code must be clear and well commented.

2. You will lose marks for inefficient and slow implementations.

3. The fractals must be generated algorithmically (not hard coded).

4. You may reuse source code:

   (a) which has been provided by the instructor for use in the course,
   (b) which has been written by you which implements basic data structures, such as linked lists or arrays,
   (c) which you have received permission from the instructor or one of the TAs of CPSC 453 prior to handing-in your assignment,

5. Any instances of code reuse by you for this assignment must be explicitly mentioned within the README.pdf file. Failure to do so will result in a zero in all the assignments. Please read the University of Calgary regulations regarding plagiarism `http://www.ucalgary.ca/honesty/plagiarism`.

Functional Requirements (20 Marks Total)

Windows (3 Marks)

1. Your program should open with a window. The position and size of the window are not important, as long all of the window can be seen comfortably.

2. If the view window is resized, the aspect ratio of the scene must remain constant.

Interaction (15 Marks)

The user should be able to

1. Select a fractal to be generated and, after selection, display the fractal's starting point (iteration 0).

2. Step through fractal generations.

3. Determine how many iterations the fractals are generated.

4. Zoom in and out of a fractal.

5. Get necessary feedback from the program.

Display (2 Marks)

1. Fractals should be rendered in attractive colours. A fractal may not have a single colour.

2. Fractals should be generated in a reasonable amount of time.

Presentation

You are required to give an approximately 5 minute live demo to your TA, a schedule will be posted and you can sign up for a time slot. It is your responsibility to arrange for a presentation with your TA. Failure to show up at the presentation will result in a zero in the assignment.