

## Assignment - 10

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Performance Date:  
Submission Date:

Problem statement:

Write C++ program to generate fractal patterns using Koch curves.

### Theory

Koch fractal:

It can be built in a sequence of stages. The first stage is an eq.  $\Delta$ , and each successive stage is formed by adding outward bends to each side of previous step, making smaller eq.  $\Delta$ .

### Algorithm :

Koch curves:

$$\text{Head angle} = 60 \times \pi / 180.$$

Calculate inner points.

$$x_3 = (2x_1 + x_2)/3;$$

$$y_3 = (2y_1 + y_2)/3;$$

$$x_4 = (2x_3 + x_1)/3;$$

$$y_4 = (2y_3 + y_1)/3;$$

For open:

$$x = x_3 + (x_4 - x_3) \cos(\text{angle}) + (y_4 - y_3) \sin(\text{angle});$$

$$y = y_3 - (x_4 - x_3) \sin(\text{angle}) + (y_4 - y_3) \cos(\text{angle});$$

If (iter > 1)

koch ( $x_1, y_1, x_3, y_3, \text{iter} - 1$ )

koch ( $x_3, y_3, x_1, y_1, \text{iter} - 1$ )

koch ( $x_1, y_1, x_4, y_4, \text{iter} - 1$ )

koch ( $x_1, y_1, x_2, y_2, \text{iter} - 1$ )

Draw lines req. using DDALine.

Test case:

$$1. 100 = x_1, 200 = y_1,$$

$$300 = x_2, 200 = y_2$$

Drawn successfully pass

$$2. 50 = x_1, 200 = y_1,$$

$$300 = x_2, 250 = y_2$$

Drawn successfully pass

Colour = green.

Conclusion:

We learnt to draw koch fractals.