

Module 3: Realism and Performance

Lab Exercises for Week 9

(a) Fractals

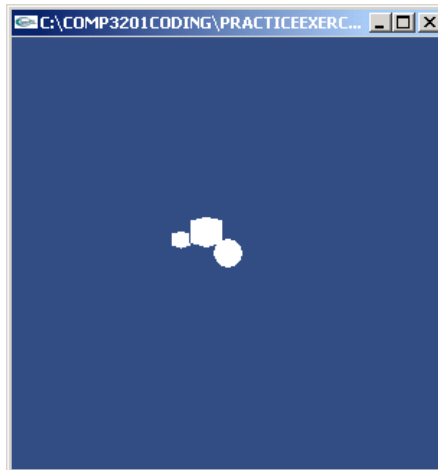
(a) Examining the Sierpinski gasket (Week 3) reveals that there are no points generated in the interior inverted triangle (in the centre of the original triangle). The Sierpinski gasket is self-similar and thus this observation hold at any level of magnification of the gasket. This observation leads us to the conclusion that the Sierpinski gasket can be also written as deterministic recursive function using polygons rather than points (see section 2.9 of Interactive Computer Graphics by Edward Angel for more details).

The recursive algorithm is as follows: for a given triangle, slice the triangle into the four subtriangles. Then repeat for each of the outer subtriangles. This should descend until a triangle takes up only one pixel of screen space.

Implement this recursive fractal generation.

(b) Picking

Create a simple scene with a few glut solid objects. Use OpenGL picking, in conjunction with the mouse, to pick the objects. Write the hit report to stdout – for example, clicking on the sphere below caused the output listed on stdout.



```
"C:\COMP3201CODING\PRACTICEEXERCISES\picking\Debug\picking.exe"
hits = 1
number of names for hit = 1
min depth = 0.952407    max depth = 0.961076
Names: 1
```

(c) Normals

Create a program that displays a set of axes, two vectors and the normal to plane defined by the two vectors. Do not explicitly set the normal but instead calculate it with a cross product.

