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## Fractals

The term fractal has many different definitions. Fractal is a set which has self-similar property. Fractal is an object which almost or exactly looks like itself.

First fractal geometry ideas appeared in nineteenth century. Kantor has made a set of unrelated points from a line by using a simple recursive procedure. He takes a line and copies it in under first line and divides it in three similar parts and gets rid of the middle one.

Fractals are often appeared in nature. Tree can be related to examples. There are smaller branches from a small branch as well as from the trunk tree and smaller and smaller. In other words, tree looks like itself in zooming. Hence, tree has a fractal structure.

The Sierpinski triangle.

It is named after the Polish mathematician Waclaw Sierpinski. There are two algorithms to build this triangle, namely iterative method and random method. Iterative method: the side middles of equilateral triangle are connected by lines. We have four new triangles. Remove the middle triangle from the source triangle. And repeat this endlessly. We have got the fractal, namely The Sierpinski triangle.

The Koch snowflake.

It is named after the Swedish mathematician Helge von Koch. The Koch snowflake can be constructed by starting with an equilateral triangle, then recursive altering each line segment as follows:

1. Divide the line into three segments of equal length;

2. Draw an equilateral triangle that has middle segment from step 1 as its base and points outward;

3. Remove the line segment that is the base of the triangle from step 2.

And while repeating this endlessly, we get the fractal, namely The Koch snowflake.

The Pythagoras tree

It is invented by the Dutch mathematics teacher Albert E. Bosman in 1942. It is named after the ancient Greek mathematician Pythagoras because each triple of touching squares encloses a right triangle, in a configuration traditionally used to depict the Pythagorean theorem. It is easy to construct this fractal. The construction begins with a square. Two squares are constructed upon this square, each scaled down by a linear factor $\sqrt{2}/2$. If we keep to do it endlessly then we get the Pythagoras tree.

Fractal has many practical uses. For examples, fractals help in producing realistic computer graphics, in computer file compression systems, in architecture of the networks.