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Project: Street Drawing "Arcos en Arbol"

Place: Evanston, Illinois, Terrain Biennial

Process: Following the directions of the artist, a team of students or other volunteers makes a drawing on a street, sidewalk, or wall. The composition of the drawing can be distilled into a "recursive algorithm," a table of simple instructions that is applied to the drawing step by step up to a determined stopping point.

Execution: The drawing can be done with chalk for a temporary drawing or with paint for a longer lasting image. The initial drawing can be drawn with chalk, aided by a straight edge and an simple compass made with string, or by free hand.

Concept: The result of the process is at once a model of plant growth and a visualization of the Fibonacci series, a mathematical structure with considerable application in the history of mathematics, architecture and art. For participants, the project offers practical knowledge about a mathematical structure and the implementation of an algorithm and the basic techniques of drawing a large-scale image.
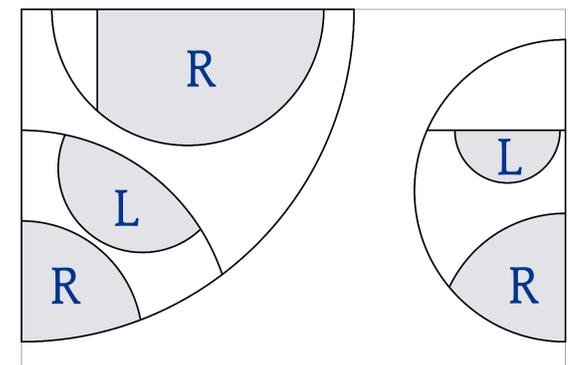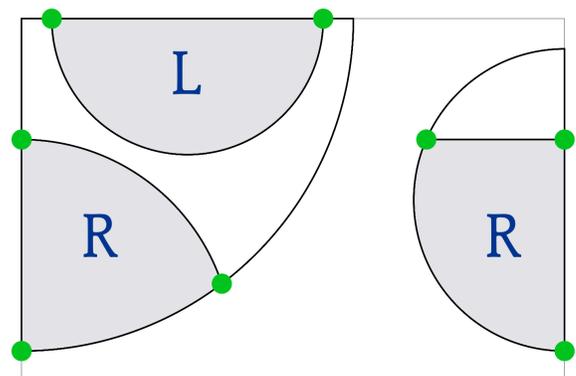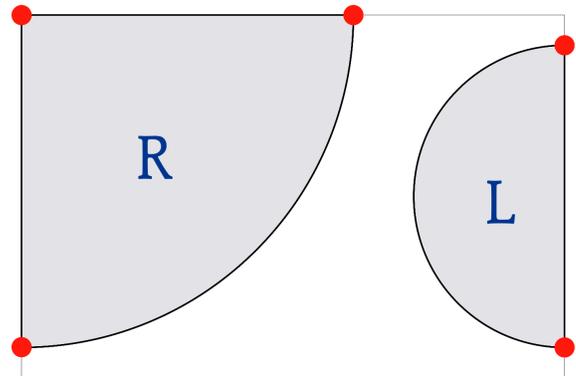
Drawing Process

Initial State

The drawing consists of a series of arcs that are made on a rectangular surface. There are two kinds of arcs: corner arcs (R) with three key points and side arcs (L) with two key points. In the first step of the algorithm, an arc of each type is drawn to divide the rectangle into three parts. There are several ways to do this, which you can select at the time you start.

Rules of the Process

1. Each corner arc in the drawing is divided into three sectors. A corner arc that includes a point of the original arch and adds two new points marks off one sector. A side arc that adds two new points marks off another. The third sector consists of the area from the previous arc (here in white).

2. Each side arc in the drawing is divided into two sectors by a line that creates two unequal parts. The larger of the two sectors is a new corner arc with one point from the original side arc and two new points.

Recursive subdivision

The process of subdivision is repeated with the arcs of the previous step. Each corner arc produces two arcs, one of each type. Each side arc produces a corner arc that will produce two arcs in the next generation. Counting the arcs in each generation we get to the Fibonacci series: 1, 1, 2, 3, 5, 8, 13, etc. When the number of arcs reaches a certain limit, the process is ended.

The arcs of each generation of subdivisions are given a different color, which can be done at the end or during the process. The drawing can be done with a simple compass (a string and a pencil) and straight edge, or freehand, as the sketch below.