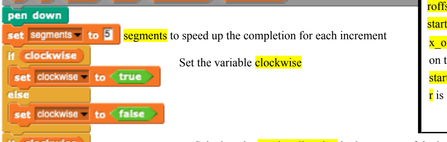
sweep that we entered in the block is replaced as endangle in this script

t: the relative angle we use to calculate radius
tinc: increment that each relative angle is changed by
roffset: the radius when relative angle is zero
start and end are the relative angles of the starting and ending point of drawing
x_origin and y-origin are the x and y values of the inner center of the spiral on the canvas
starting direction is the pointing direction at the starting point on the canvas
r is the radius at each different point of the spiral

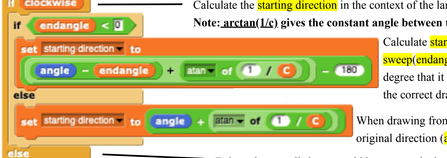


segments to speed up the completion for each increment

Set the variable clockwise

Calculate the starting direction in the context of the large canvas

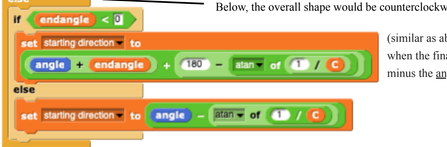
Note: arctan(1/c) gives the constant angle between the radial vector and the tangent line for log spiral at any point



Calculate starting direction with the original pointing direction (angle) of the pen. Because sweep(endangle) is the change of degrees of the spiral, we minus the endangle to reverse the degree that it has swept through to find the tangent line. Then, we minus 180 degrees to match the correct drawing direction. This is for drawing the spiral from outside to inside.

When drawing from inside to outside, the tangent angle = arctan(1/c). we only need to add the original direction (angle) to calculate starting direction

Below, the overall shape would be counterclockwise.

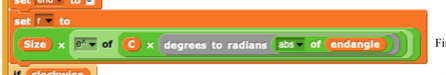


(similar as above) rotate the starting direction when drawing from outside to inside. Notice that when the final shape is counterclockwise, we add the endangle instead of minus it. We also minus the angle between the tangent and radial line instead of adding it.

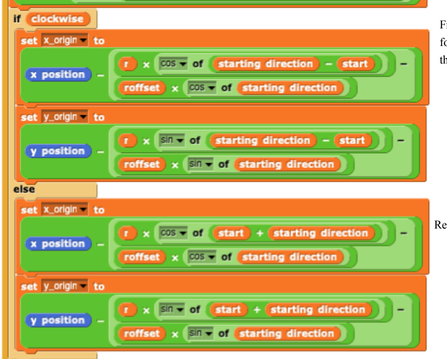
Calculate the size variable and use it for scaling in many other variables below. The size is scaled to accommodate more or less sweep(endangle) that user entered

roffset is the difference (or "**gap**") between the Cartesian origin for the spiral and its **inner center** on Cartesian grid (when the degree is 0)

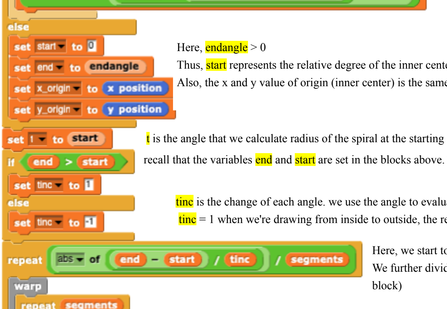
setting two "markers" to remember and record the process of drawing - two relative angles for a spiral in Cartesian grid. Here, start is more than end because we're drawing from outside to inside (under the condition endangle < 0)



Find out the radius at this point. which is the largest. (again, outside to inside)



From here to the next comment, we calculate the coordinates(x_origin and y-origin for the x and y values) of the origin. The origin identifies where the inner center of the spiral is on the canvas, including taking the gap into account.



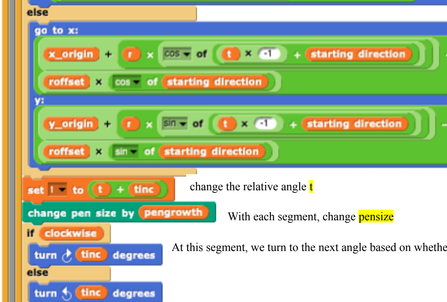
Repeating here to find the coordinates when the final shape is counterclockwise

Here, endangle > 0
Thus, start represents the relative degree of the inner center of a spiral.
Also, the x and y value of origin (inner center) is the same as x position and y position of the starting point.

t is the angle that we calculate radius of the spiral at the starting point, which is set to be the same as start - the recall that the variables end and start are set in the blocks above. When we're drawing from inside out, end > start

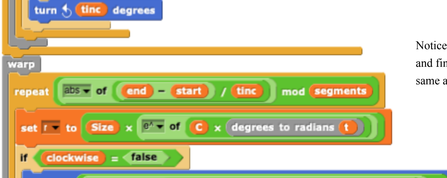
tinc is the change of each angle. we use the angle to evaluate each radius.
tinc = 1 when we're drawing from inside to outside, the relative angle thus increases in degrees; tinc = -1 when in the opposite situation.

Here, we start to draw the spiral in small increments.
We further divide the small increments in segments to speed up the drawing (through the wrap block)



Calculate the radius at the starting point as r.

Move the pen to the next location of the pen where the overall shape is counterclockwise.

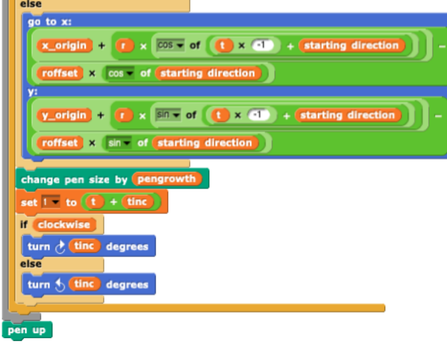


compare with the script above - now that when overall shape is clockwise, we flip the sign of t, so that the relative angle is changing to the other direction. Note that the other variables that we calculated above are automatically taking care of whether we draw from outside to inside or from inside to outside.

change the relative angle t

With each segment, change pensize

At this segment, we turn to the next angle based on whether the final shape would be clockwise or counterclockwise



Notice that we divided the change of relative angle (sweep) by segments, here we repeat and finish off the shape if there's any remainder from the division. The basic process is same as above