Creating a Fractal Tree in Swift

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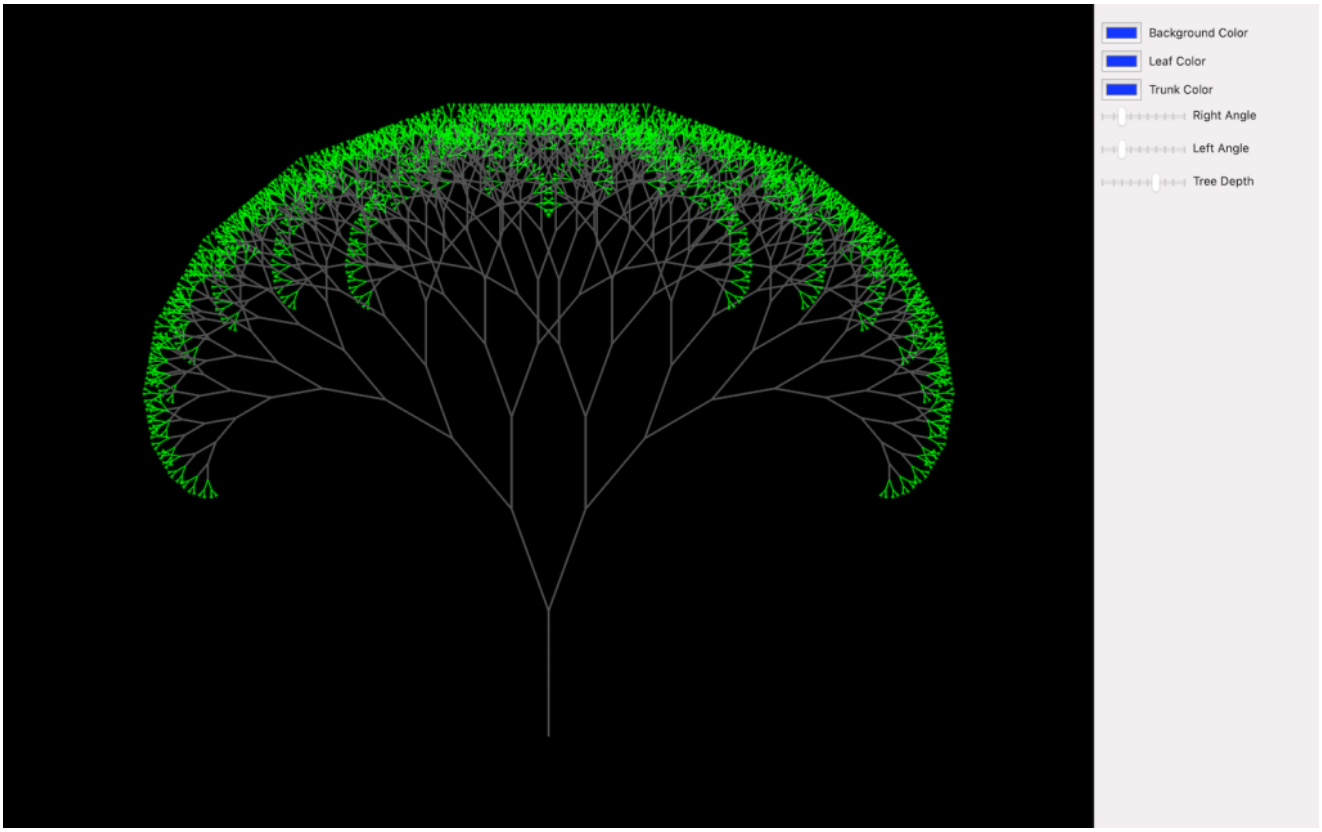
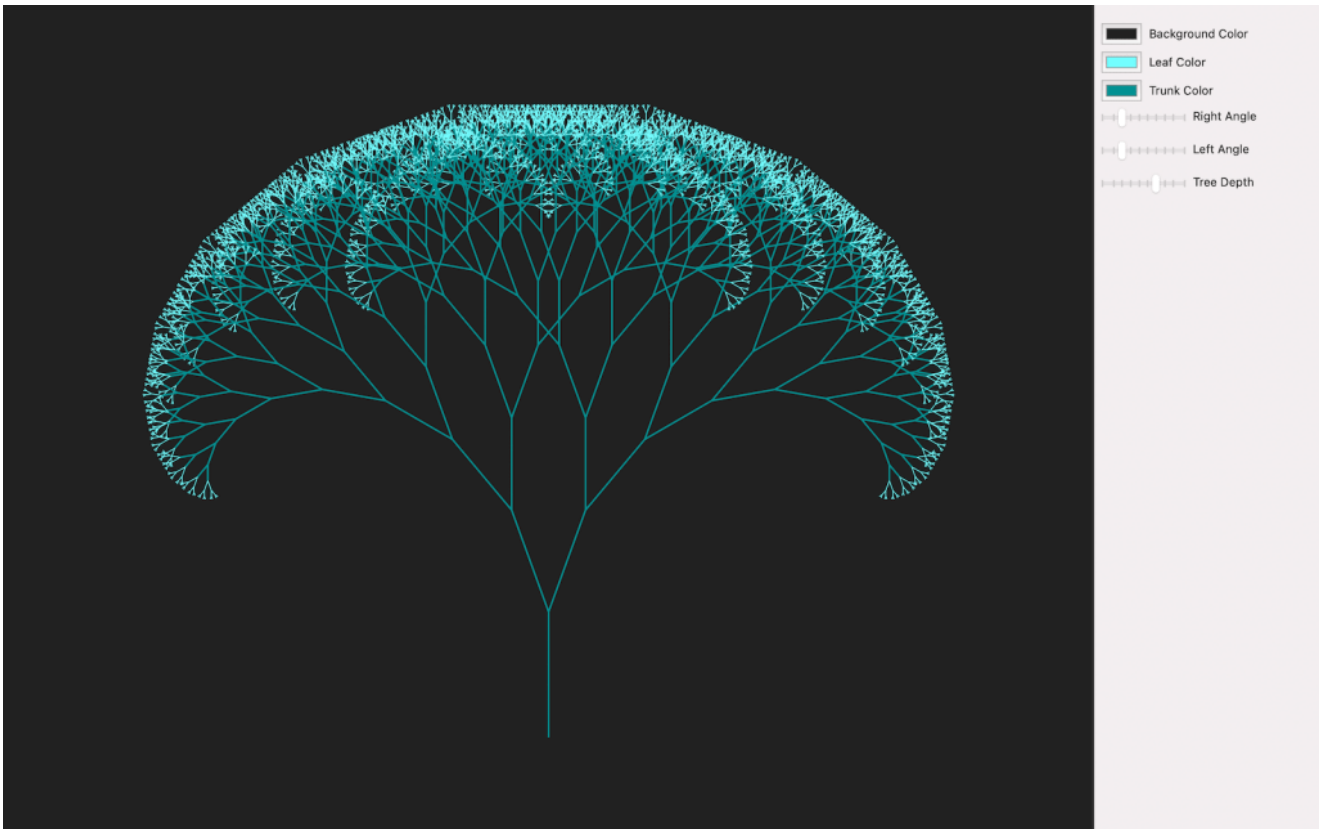
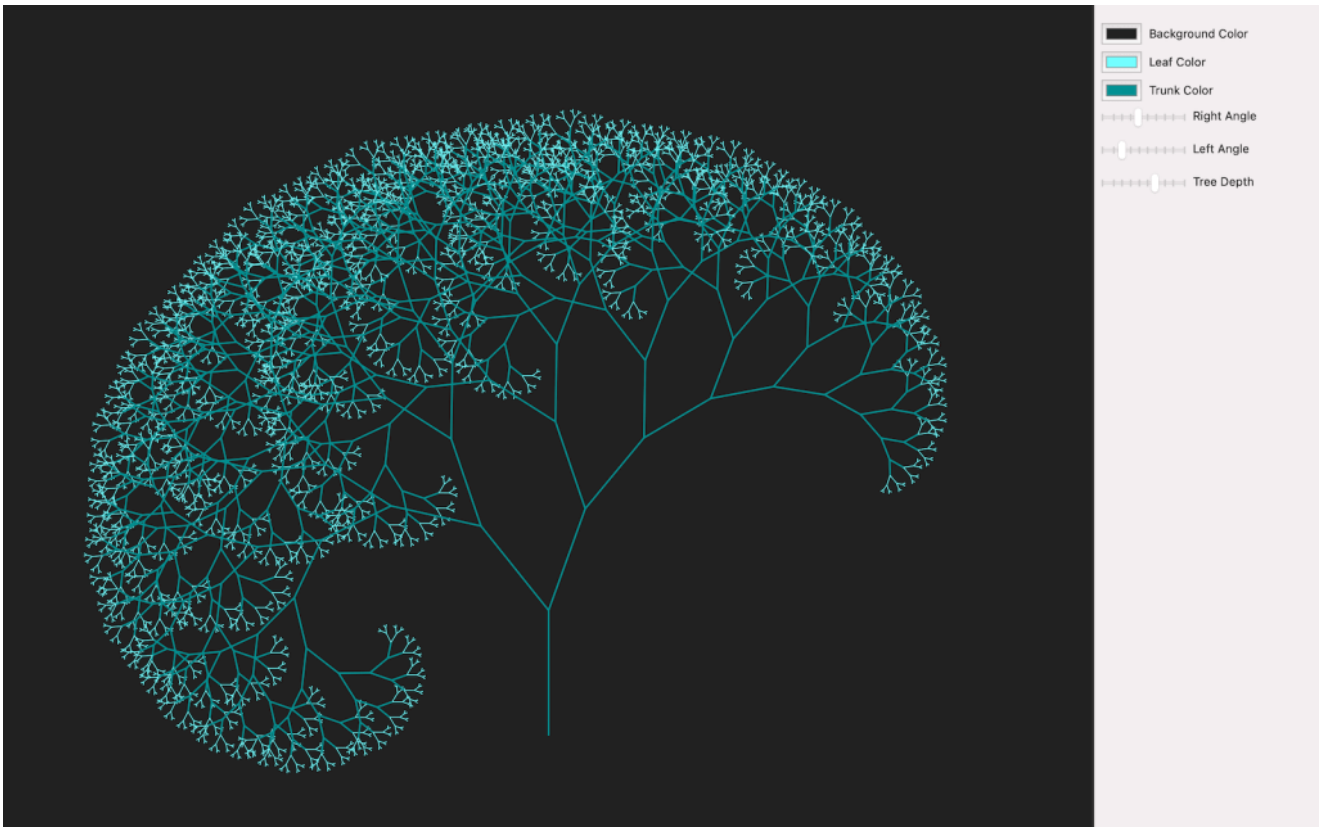
In this post we will create a sample application to draw a fractal tree in swift and customize the branch color, leaf color and angle of left and right branches and the tree depth. The outcome will have the below appearance



```
//  FractalTreeView.swift
//  SwiftFractalTree
//  Created by Debasis Das on 6/11/22.

import Cocoa

class FractalTreeView: NSView {
    let PI = 3.14156
    var leftAngle:Double = 20
    var rightAngle:Double = 20
    var treeDepth:Float = 12
    var backgroundColor:NSColor = NSColor.black
    var leafColor:NSColor = NSColor(calibratedRed: 0, green: 30, blue: 0, alpha: 1.0)
    var trunkColor:NSColor = NSColor.darkGray

    @IBOutlet weak var backgroundColorWell: NSColorWell!
    @IBOutlet weak var trunkColorWell: NSColorWell!
    @IBOutlet weak var leafColorWell: NSColorWell!

    @IBOutlet weak var leftAngleSlider: NSSlider!
    @IBOutlet weak var rightAngleSlider: NSSlider!
    @IBOutlet weak var treeDepthSlider: NSSlider!

    override class func awakeFromNib() {
        Swift.print("Awake From Nib")
    }


       @IBAction func changeDepth(sender:AnyObject){
           self.treeDepth = Float(sender.intValue)
           self.needsDisplay = true
       }

       @IBAction func changeLeftAngle(sender:AnyObject){
           self.leftAngle = sender.doubleValue
           self.needsDisplay = true
       }

       @IBAction func changeRightAngle(sender:AnyObject){
           self.rightAngle = sender.doubleValue
           self.needsDisplay = true
       }

       @IBAction func changeBackgroundColor(sender:AnyObject){
           self.backgroundColor = ((sender as? NSColorWell)?.color)!
           self.needsDisplay = true
       }

       @IBAction func changeLeafColor(sender:AnyObject){
           self.leafColor = ((sender as? NSColorWell)?.color)!
           self.needsDisplay = true
       }
```

```
       @IBAction func changeTrunkColor(sender:AnyObject){
           self.trunkColor = ((sender as? NSColorWell)?.color)!
           self.needsDisplay = true
       }

    override func draw(_ dirtyRect: NSRect) {
        super.draw(dirtyRect)
        self.backgroundColor.setFill()
        dirtyRect.fill()
        self.drawBranch(x1: Float(self.frame.size.width/2), y1: 100.0, angle: 90.0,
depth: self.treeDepth)
       }

       func drawBranch(x1:Float, y1:Float, angle:Double,depth:Float){
           var branchArmLength = depth
           if depth > 0 && depth < 3{             branchArmLength = depth * 0.7
}         else if depth > 3 && depth < 7{
               branchArmLength = depth * 0.7
           }
           else{
               branchArmLength = depth*0.7
           }
           if depth != 0{
               let x2 = x1 + (Float(cos(angle * PI/180)) * depth * branchArmLength)
               let y2 = y1 + (Float(sin(angle * PI/180)) * depth * branchArmLength)
            drawLine(lineWidth: depth, fromPoint: NSMakePoint(CGFloat(x1),
CGFloat(y1)), toPoint: NSMakePoint(CGFloat(x2), CGFloat(y2)))
            drawBranch(x1: x2, y1: y2, angle: angle - self.leftAngle, depth: depth-1)
            drawBranch(x1: x2, y1: y2, angle: angle + self.rightAngle, depth: depth-
1)
           }
       }

       func drawLine(lineWidth:Float, fromPoint:NSPoint, toPoint:NSPoint){
           let path = NSBezierPath()
           if (lineWidth < 5){
               self.leafColor.set()
               path.lineWidth = 1.0//CGFloat(lineWidth*0.2)
           }
           else{
               self.trunkColor.set()
               path.lineWidth = 2.0//CGFloat(lineWidth*0.5)
           }
        path.move(to: fromPoint)
        path.line(to: toPoint)
        path.stroke()
       }

}
```


Background Color
Leaf Color
Trunk Color
Right Angle
Left Angle
Tree Depth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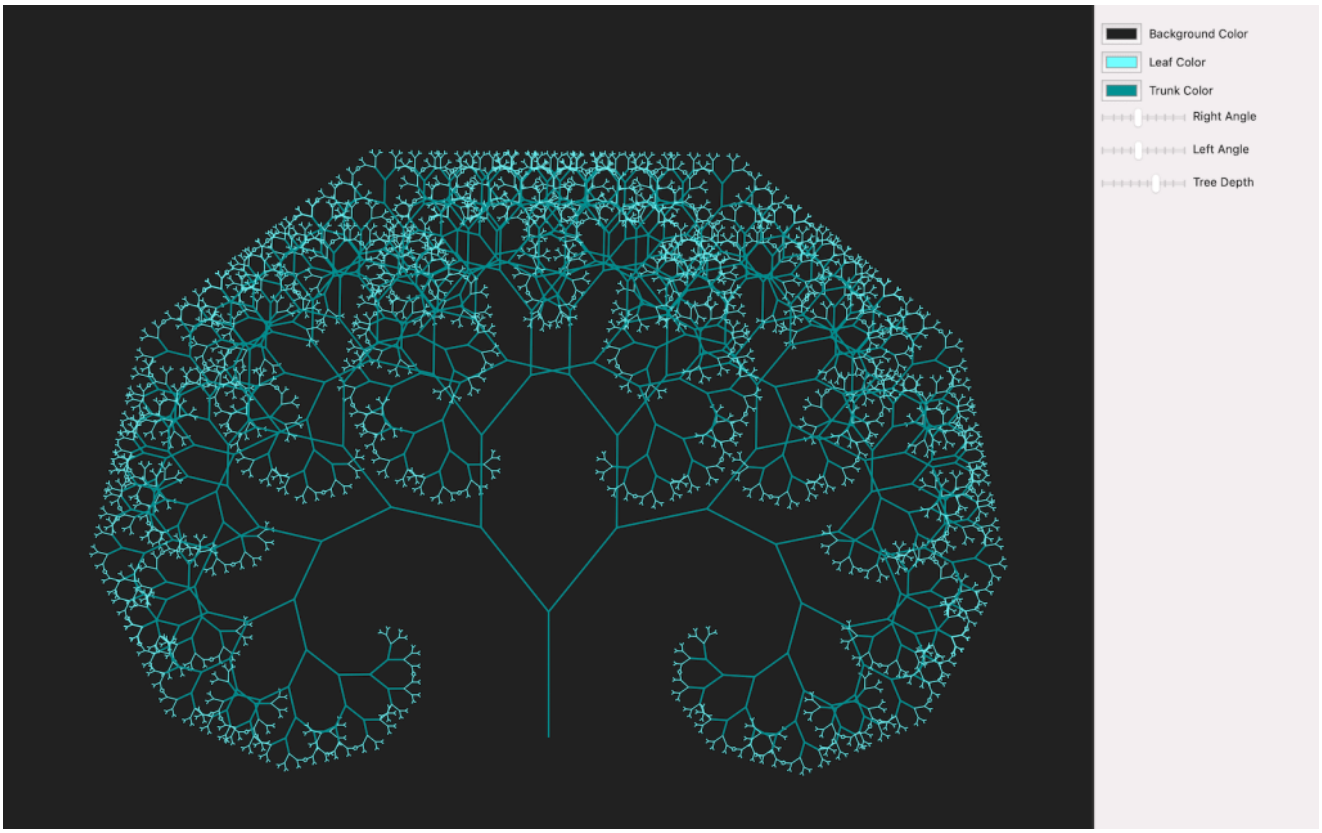

You can check the Fractal tree implementation in HTML here