# Assignment 1 - Task 2: Fall.R Customization (Winter Theme)

The Fall.R script, adapted from Fronkonstin, uses L-systems to generate fractal-like plant art. By default, the script is styled with a fall-inspired color palette ("burlywood3"), evoking the warmth and tones of autumn leaves. To customize the plot, I changed the color scheme to a winter theme by replacing the fall palette with cooler tones. Specifically, I used the color 'skyblue' to reflect the crisp and icy feel of winter. This demonstrates how small modifications in visualization choices, such as colors, can significantly alter the thematic interpretation of the same underlying data. While the original conveys warmth and seasonal change, the customized version conveys a sense of coldness and tranquility, consistent with a winter aesthetic.

## R Code (Winter Version)

# Title: Winter color (based on Fall.R)  
# Credit: https://fronkonstin.com  
  
# Install packages if not already installed  
# install.packages("gsubfn")  
# install.packages("tidyverse")  
  
library(gsubfn)  
library(tidyverse)  
  
# Define elements in plant art  
axiom="X"  
rules=list("X"="F-[[X]+X]+F[+FX]-X", "F"="FF")  
angle=22.5  
depth=6  
  
# Generate string from axiom  
for (i in 1:depth) axiom=gsubfn(".", rules, axiom)  
  
actions=str\_extract\_all(axiom, "\\d\*\\+|\\d\*\\-|F|L|R|\\[|\\]|\\|") %>% unlist  
  
status=data.frame(x=numeric(0), y=numeric(0), alfa=numeric(0))  
points=data.frame(x1 = 0, y1 = 0, x2 = NA, y2 = NA, alfa=90, depth=1)  
  
# Generate plant structure  
for (action in actions)  
{  
 if (action=="F")  
 {  
 x=points[1, "x1"]+cos(points[1, "alfa"]\*(pi/180))  
 y=points[1, "y1"]+sin(points[1, "alfa"]\*(pi/180))  
 points[1,"x2"]=x  
 points[1,"y2"]=y  
 data.frame(x1 = x, y1 = y, x2 = NA, y2 = NA,  
 alfa=points[1, "alfa"],  
 depth=points[1,"depth"]) %>% rbind(points)->points  
 }  
 if (action %in% c("+", "-")){  
 alfa=points[1, "alfa"]  
 points[1, "alfa"]=eval(parse(text=paste0("alfa",action, angle)))  
 }  
 if(action=="["){  
 data.frame(x=points[1, "x1"], y=points[1, "y1"], alfa=points[1, "alfa"]) %>%   
 rbind(status) -> status  
 points[1, "depth"]=points[1, "depth"]+1  
 }  
 if(action=="]"){  
 depth=points[1, "depth"]  
 points[-1,]->points  
 data.frame(x1=status[1, "x"], y1=status[1, "y"], x2=NA, y2=NA,  
 alfa=status[1, "alfa"],  
 depth=depth-1) %>%   
 rbind(points) -> points  
 status[-1,]->status  
 }  
}  
  
# Plot in winter colors  
ggplot() +  
 geom\_segment(aes(x = x1, y = y1, xend = x2, yend = y2),  
 lineend = "round",  
 color="skyblue", # Changed to winter color  
 data=na.omit(points)) +  
 coord\_fixed(ratio = 1) +  
 theme\_void()  
  
# Save image to file  
ggsave("Winter\_leaf.png", width = 8, height = 8, dpi = 300)

## Winter Leaf Plot

