Heighway Dragon

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imported the pyplot function in python.

function string(N)
input: N = the number of iterations that will be run
output: Returns a string that will be turned into the coordinates for the graph
variable a = the string that will replace 'a' in the code
variable b = the string that will replace 'b' in the code
variable D0 = the initial string
for a number from 1 to N
for another number in the range of the length of the string D0 -1
if the number position in the string = a, then add the string a to the end of the original string and run the iteration to the next piece of the string
elif the number position in the string = b, then add the string b to the end of the original string and run the iteration to he next piece of the string
return D0

function coords(s)
input: s = the string that was computed in the above function (D0)
output: the coordinates of x and y
variable p = initial position
variable x = [0] is a list of zeros
variable y = [0] is a list of zeros
for a string in the list s
if the string is equal to a or b then move to the next part of the string
elif the string is equal to L, R, or F then the bug will either turn left, right or go forward.
if the string is equal to F, then the string will move forward in the direction that it is facing.
return lists x and y

function norm(x)
input: p = where the function is facing at the current time
output: x = a complete rotation to help normalize the function to get a working graph
while x is greater than 360, 360 will be subtracted while x is less than 0, 360

will be added
return the normalized variable

function plot(coord)
input: x,y strings
output: heighway dragon graph
plt.plot takes the strings from the coordinates function and plots them on a graph
plt.title gives the graph a title
plt.xlabel labels the x axis
plt.ylabel labels the y axis
plt.show prints out the graph

main code
variable N = 10 gives the number of iterations that will be used in the code
(coords(string(N))) takes N and runs it through the string function, then takes the output of the string function and runs it through the coords function, and finally takes the output of the coords function and runs it through the plot function

The function coords is how I was able to keep up with the stirng and the translation from letters to coordinates. The function takes the string of letters and translates them to the proper coordinate based on the letter and positioning within the string. Any letters that were a or b were passed over and any letters F, R, and L were translated into a specific type of movement that changes how the coordinates were formed. They were then stored in a list which became the final coordinates when matched up in the plot function

Question 1:
Does changing the strings in variable 'a' and 'b' change the outcome of the heighway dragon completely?

Answer:
Changing the string variables 'a' and 'b' will result in a completely different heighway dragon. One way I tested this was by adding another F and R to the end of the 'a' string and adding two L to the 'b' string. The outcome of that heighway dragon was a pyramid type graph instead of the typical heighway dragon graph.

Question 2:
How does the string addition and replacement work in the code?

Answer:
The code begins with the initial value D0 = Fa. This becomes the first part of the string. The code then takes this string and looks for either an 'a' or a 'b'. Once that letter is found, the new string is added onto the original string in

that position. After, the string is sent to another function that translates the letters into numbers. When the function comes across an 'a' or 'b' it skips that letter and moves onto the next letter. Those letters that are translated into coordinates correspond to how the bug moves across the screen.