

Project7

In this project, we started a new topic that uses a lot of things we did earlier in the semester. For project 7, we are supposed to use our newly learned skills involving L-Systems and along with that, bring back our python turtle skills from the first few projects. The goal in this project is to gain experience using L-systems to create images and scenes. We starts off making abstract objects and then end with a scene putting different pieces together. Overall, L-systems and python turtle were used the most in this project.

Task 1 asked for us to make a file titled abstract.py. This file is to contain a function that can create an image by reading a L-system. First, I created three new .txt documents that contained my new L-systems. These are titled mysystem1, 2, and 3. Inside these text documents are the base and rule for L-system writing. Next, I created a function on my abstract.py file that was able to take a large number of command line arguments and create a single image with all three abstract lsystem images. Here is a snippet of code that I used to set up my function:

```
# assign lsys_filenames to command line filename arguments
lsys_filename1 = argv[1]
lsys_filename2 = argv[2]
lsys_filename3 = argv[3]

# create the lsystems from a file
lsys1 = ls.createLsystemFromFile( lsys_filename1 )
lsys2 = ls.createLsystemFromFile( lsys_filename2 )
lsys3 = ls.createLsystemFromFile( lsys_filename3 )
print lsys1
print lsys2
print lsys3

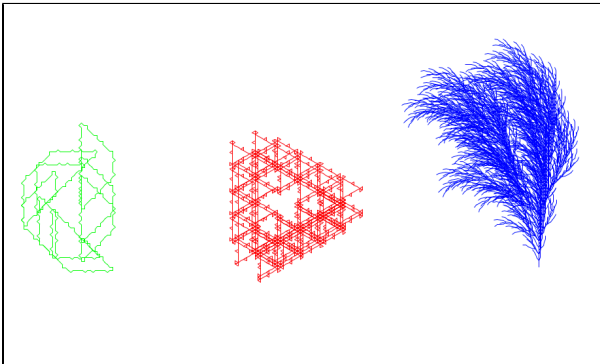
# assign num_interations to command line number arguments
num_iter1 = int( argv[4] )
num_iter2 = int( argv[5] )
num_iter3 = int( argv[6] )

# build the lsystem string with given number of iterations
s1 = ls.buildString( lsys1, num_iter1 )
s2 = ls.buildString( lsys2, num_iter2 )
s3 = ls.buildString( lsys3, num_iter3 )
```

The command line in my terminal was as follows: "python abstract.py mysystem1.txt mysystem2.txt mysystem3.txt 3 5 4 5 45 120 20"

When ran, my abstract.py file created this:

Required Image 1:

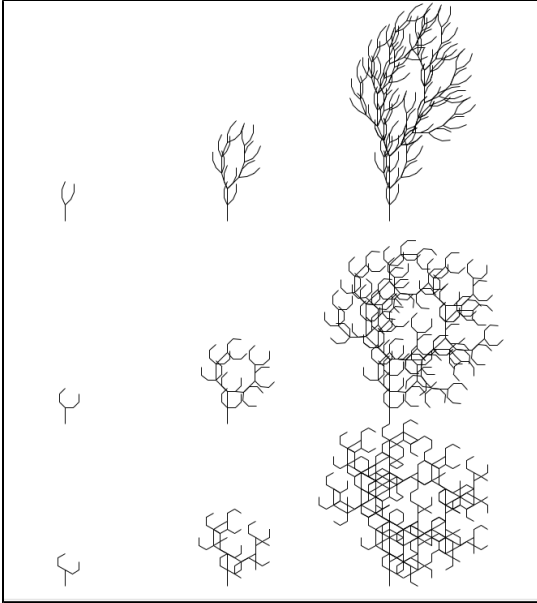


Task 2 asked me to make a file called grid.py. The goal of this file was to make a 3x3 grid of 9 trees that have different numbers of iterations depending on column and a different value of angles depending on rows. The project asked for 1, 2, and 3 iterations from left to right and then angles 22, 46, 60 moving from top to bottom. To do this I used a double for loop. Here is a snippet of my code:

```
x = [-200, 0, 200]
y = [100, -150, -350]
iters = [1, 2, 3]
angles = [22, 46, 60]
dist = 10
for c in range( len(iters)):
    for r in range( len(angles)):
        turtle.up()
        turtle.speed(300)
        turtle.goto(x[c], y[r])
        turtle.setheading(0)
        turtle.left(90)
        s = ls.buildString( lsys, iters[c] )
        turtle.down()
        it.drawString( s, dist, angles[r] )
```

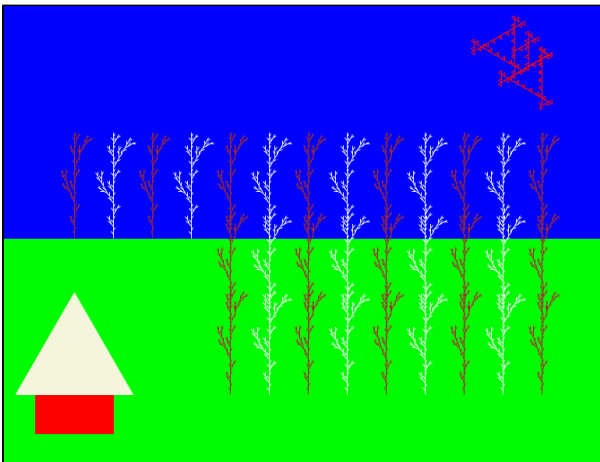
Here is a picture of my grid.py file:

Required Image 2:



Task 3 asked me to make a new file called scene.py that makes a non-abstract scene using python turtle commands and at least two L-systems. I created a very simple barn and then used three L-systems. One of my own, and two from the ABOP online book. I used two different tree L-systems from the online ABOP source provided for us. And I used one of my abstract images from task 1 as a triangular sun. Here is my scene:

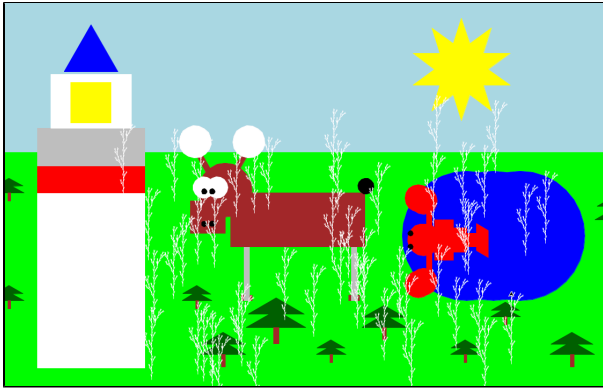
Required Image 3:



Extensions. After I finished the required tasks I did one extra extension. First off though, during the project I completed one of the extensions. In task 1, I created my own personal L-system text documents. This was one of the suggested extensions. I created three of my own L-systems, so I completed this extensions a few times in the project. Second, for my main extension, "project7extension.py" I decided to do one of the suggested extensions and place a bunch of random trees from an L-system onto one of my scenes from Project 2. To do this, I imported a few files from Project 2/3 and drew the scene with a bunch of trees randomly placed all over the scene. Here is the main calling code from this extension:

```
myscene2(0,0,1)
for i in range(50):
    turtle.up()
    turtle.goto(0,0)
    turtle.setheading(0)
    turtle.left(90)
    turtle.down
    tree1(sys.argv, random.randint(-400,400), random.randint(-400, 50))
```

Here is what the resulting image looked like:



What I learned. This project really helped my become better at juggling using multiple files together to create a single outcome. Using L-systems and L-system text documents made me use different documents and sharpened my command-line `sys.argv` skills. I became much more comfortable with using L-systems. Also, in my extension, I became better at importing old documents and successfully using old and new files together. Overall, I gained experience with L-systems and sharped my existing skills with imports, parameters, python turtle, and for loops.

Help. I received help from TA Mike with multiple things, mainly task 2. I worked alongside Kylie Simpson, Nick Rhodes, and Stefan Kohli throughout the project.