Project11

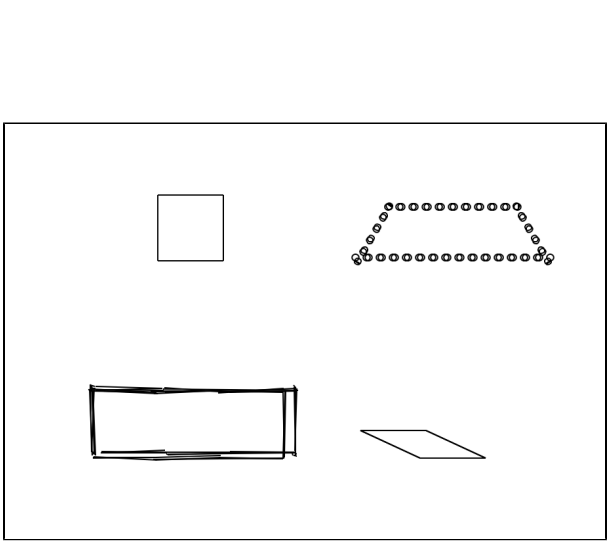
In this lab, we used a completely new sector of Python turtle called 3D turtle. With this 3D turtle package, we were asked to draw 3D shapes and scenes. We had to do a little learning before attempting this lab. First, we had to understand the uses of different 3-dimensional movements like roll, pitch, and yaw, all of which moved the turtle in a specific direction in three dimensional space. The first part of the lab was to demonstrate a simple understanding of 3D turtle by building some shapes. After that, we had to use our 3D shapes to create a 3D shape. Then, we had to improve our scene or make a better one. Also, three dimensional Lsystem trees were incorporated into this lab. Overall, this lab was a basic understanding of 3D turtle.

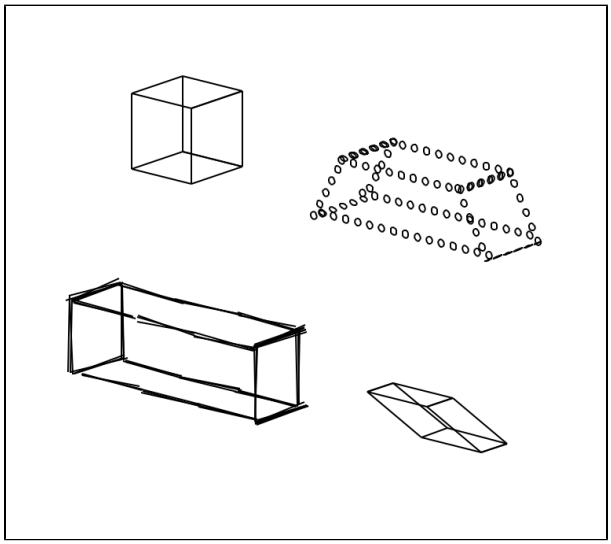
Task 1. This goal of this task was to design at least four shapes using 3D turtle. I decided to make a square, a diamond, a rectangle, and a trapezoid. Here is a snippet of the code for my simple shapes:

```
class Cube(Shape):
    def __init__(self, distance=100, color=(0, 0, 0) ):
        Shape.__init__(self, distance, 90, color, '[F-F-F-F-F^F^F^F-F-F-F^F^F-F^^F^^^F]')

class Rectangle(Shape):
    def __init__(self, distance=100, color=(0, 0, 0) ):
        Shape.__init__(self, distance, 90, color, '-[FFF+F+FFF+F^F^F^F^^F+FFF+F--F&F&F&&F-FFF]')

class Trapezoid(Shape):
    def __init__(self, distance=100, color=(0, 0, 0) ):
        Shape.__init__(self, distance, 90, color, '[-FFF(120)+F(60)+FF(60)+F^F^F^F^^F^(60)+FF^F^^F^(
```

Here is a collection of my first four 3D shapes:

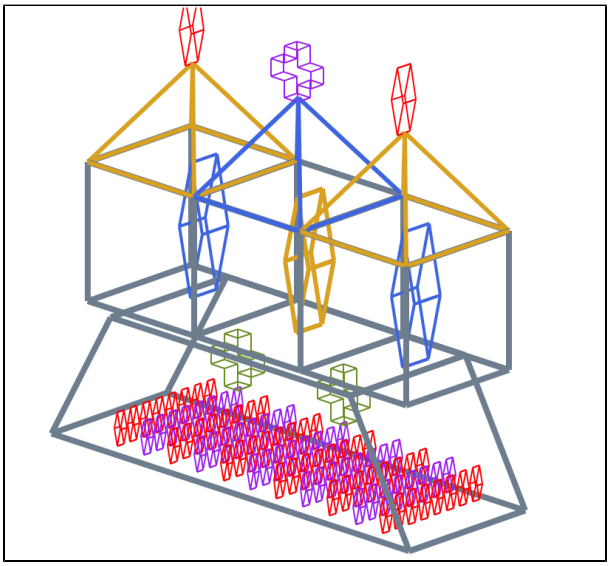
Required Image 1:

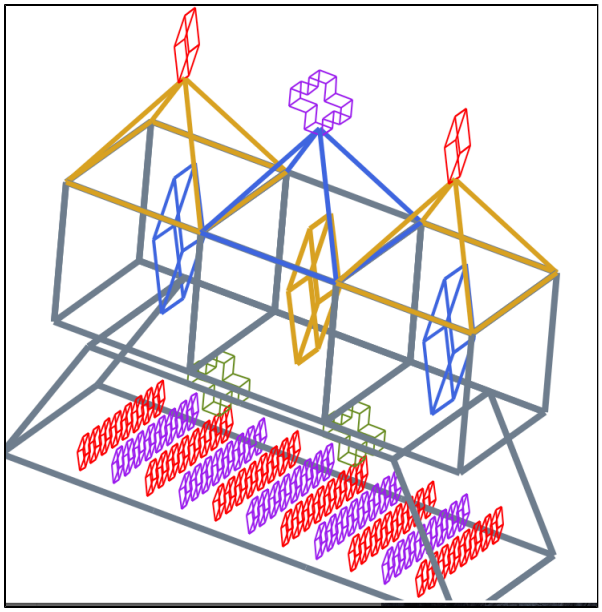


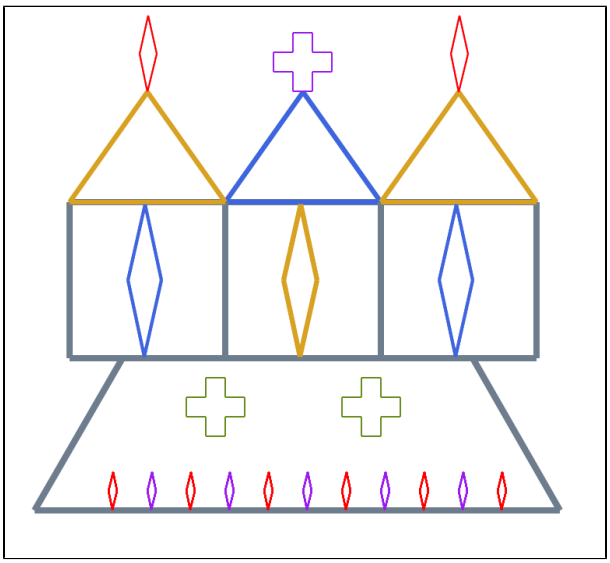


Task 2. The next task asked us to create a 3D scene incorporating some of our simple 3D shapes. I decided to make a Castle with a King and Queens and their loyal soldiers. I used two other simple shapes that I didn't not personally program in this scene. I used a 3D pyramid shape and got that code from one of the class notes from Stephanie. Also, I used a 3D cross shape which I received help with from Julia Saul. I created this scene in a file called "3dscene.py.' Here is my 3D scene:

Required Image 2 and 3:

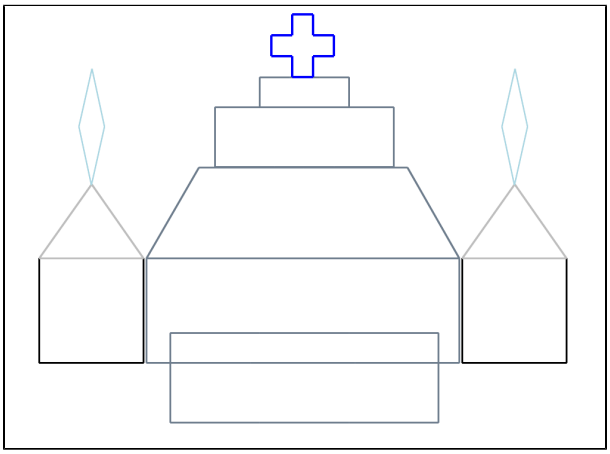


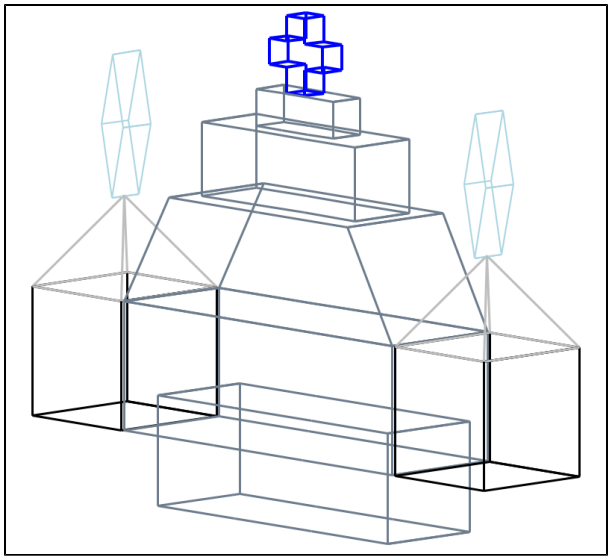




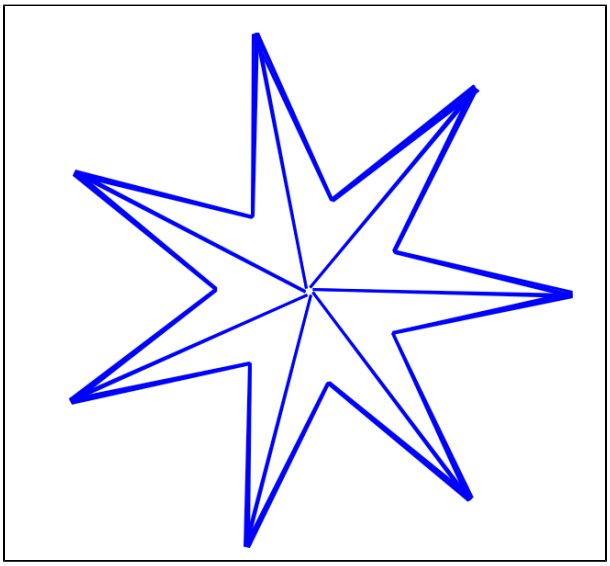
Task 3. This task basically asked us to improve out scene or create a new one altogether. I decided to create a new scene. I named the file Miller3d.py and design a three dimensional version of Miller library. Here is the 3D miller scene:

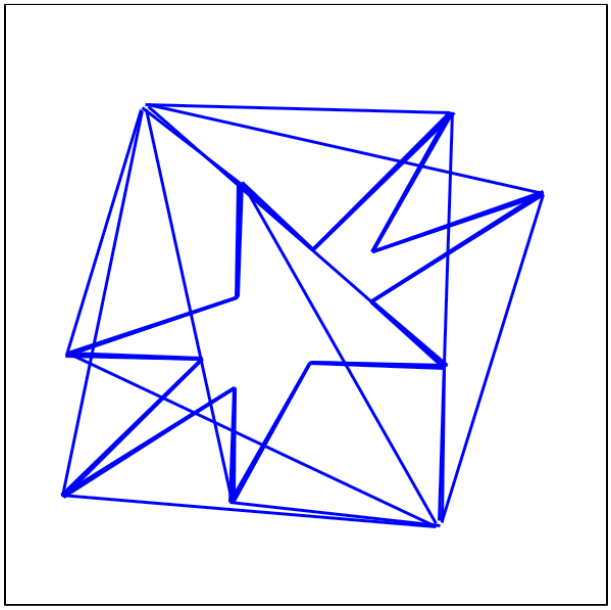
Required Image 4:

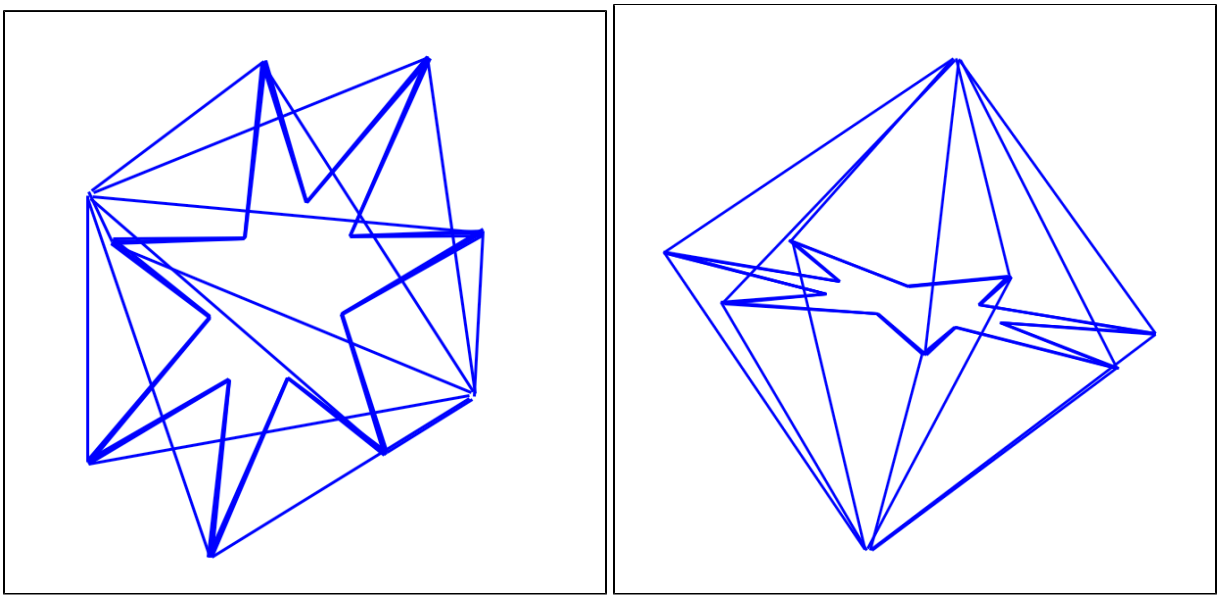




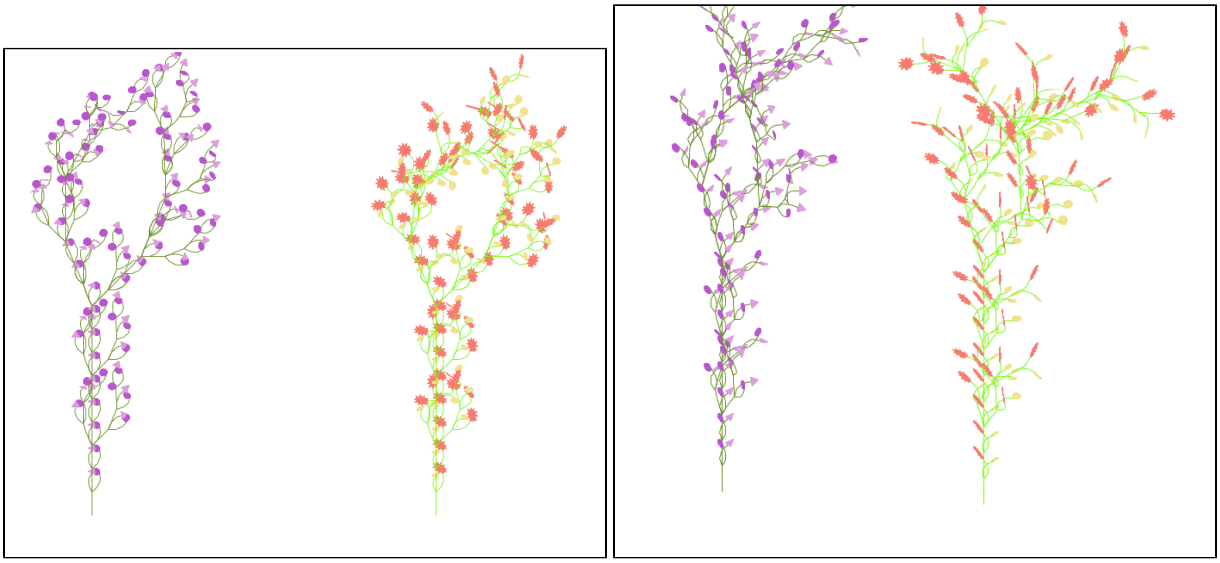
After completing the required tasks, I completed three extensions with this project. **Extension 1** was sort of completed throughout the project. During task one, I wanted to create a 3D star, but couldn't quite get it because of the complexity. So, I held off and got help to finish it for an extension. Here is the star!:



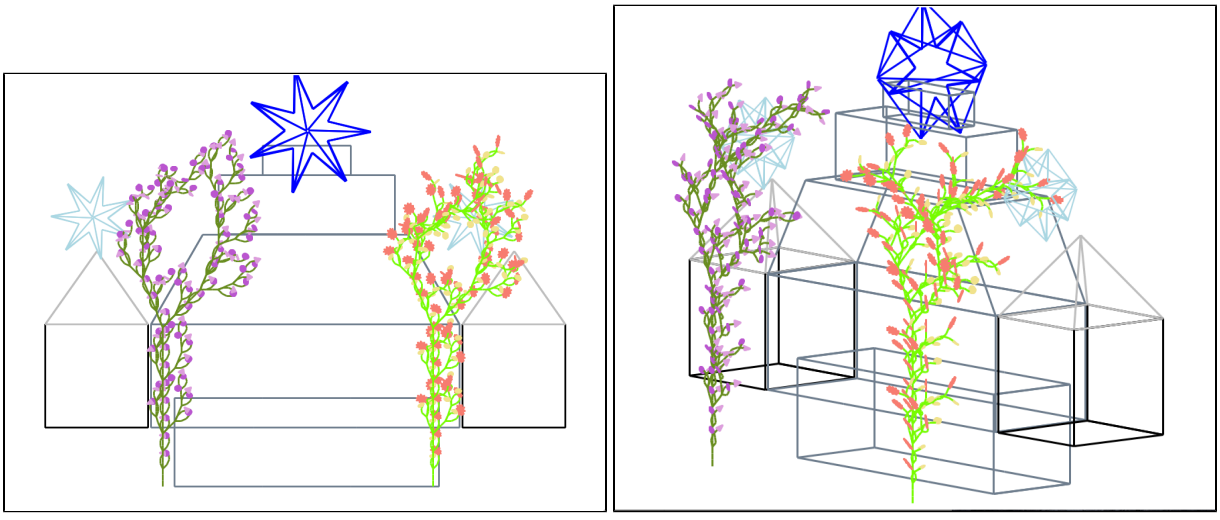




Extension 2. I completed one of the recommended extensions and created 2 3D L-system trees! They are in the text files "project11extension2a.txt" and "project11extension2b.txt" I used my own "project11lsystemtest.py" file to run them. Here are the 3D trees!:



Extension 3. For this extension, I put my first two extensions together and into the 3D miller library scene. Here is what I got:



What I learned. I really got a better understanding of 3D turtle. At first, I had no idea how to visualize the 3D objects while coding them, but practice in this project really helped me gain experience. I know feel comfortable designing 3D shapes and 3D images. I also got some very solid practice with Lsystems and I learned how to make 3D lsystems. Overall, a strong understanding of 3D turtle is what I learned.

Who helped me. I received help from Prof. Bruce Maxwell, Prof. Stephanie Taylor, and Julia Saul.