Python Project: Chaos Game

Concept

In this project you will create a python program that generates a random Sierpinski Triangle. This project challenges your programming knowledge about for loops, random integer generation, mathematical skills, and familiarity with PyGame.

Overall, the program should take fewer than 100 lines of code to complete, and should only require a single function to be written. The process for generating the Sierpinski Triangle will take several thousand generations, which should only take a few milliseconds per iteration at the most.

Instructions

1. Generate three points within a PyGame window to form a triangle.
2. Locate the center of the triangle.
3. Randomly selected one of the three vertex points that form the triangle.
4. Move halfway between your current point and the selected vertex.
5. Plot that point in the PyGame window.
6. Repeat from step 3.

Bonus Points:

A. Add Pause and Exit features to your game
   - Pause can be with Space, and Exit can be with Escape

B. Continue to generate new Sierpinski Triangles until the user closes the program

C. Colorize the points based off of which vertex is randomly selected
   - If you pick vertex 1, it's Red, vertex 2 is Green, and vertex 3 is Blue

Code

```
import random
import pygame

def chaosGame():

	# Initialize Pygame
	pygame.display.init()

	# Initialize the Clock
	clock = pygame.time.Clock()

	# Set the dimensions of the window
	windowWidth = 800
	windowHeight = 600
	window = pygame.display.set_mode((windowWidth, windowHeight))

	# Set the window captain and window color
	pygame.display.set_caption("Chaos Game")
	windowColor = [0, 0, 0]
	window.fill(windowColor)

	# Update the window
	pygame.display.update()

	"""Generate three random coordinate points p1, p2, and p3"""


	"""Draw the three random points onto the window"""


	"""Find the center of the triangle and draw that point onto the window"""


	"""Create a loop for several thousand iterations"""


	"""Pick a random vertex from the triangle"""


	"""Find the median between your current coordinate point and the coordinate of
the chosen vertex"""


	"""Update your current coordinate point to be the median point you generated"""


if __name__ == "__main__":
	chaosGame()
```