Exploring Repeated Patterns

Madeline Turner, Tory Jensen, Wen-Jung Hsin
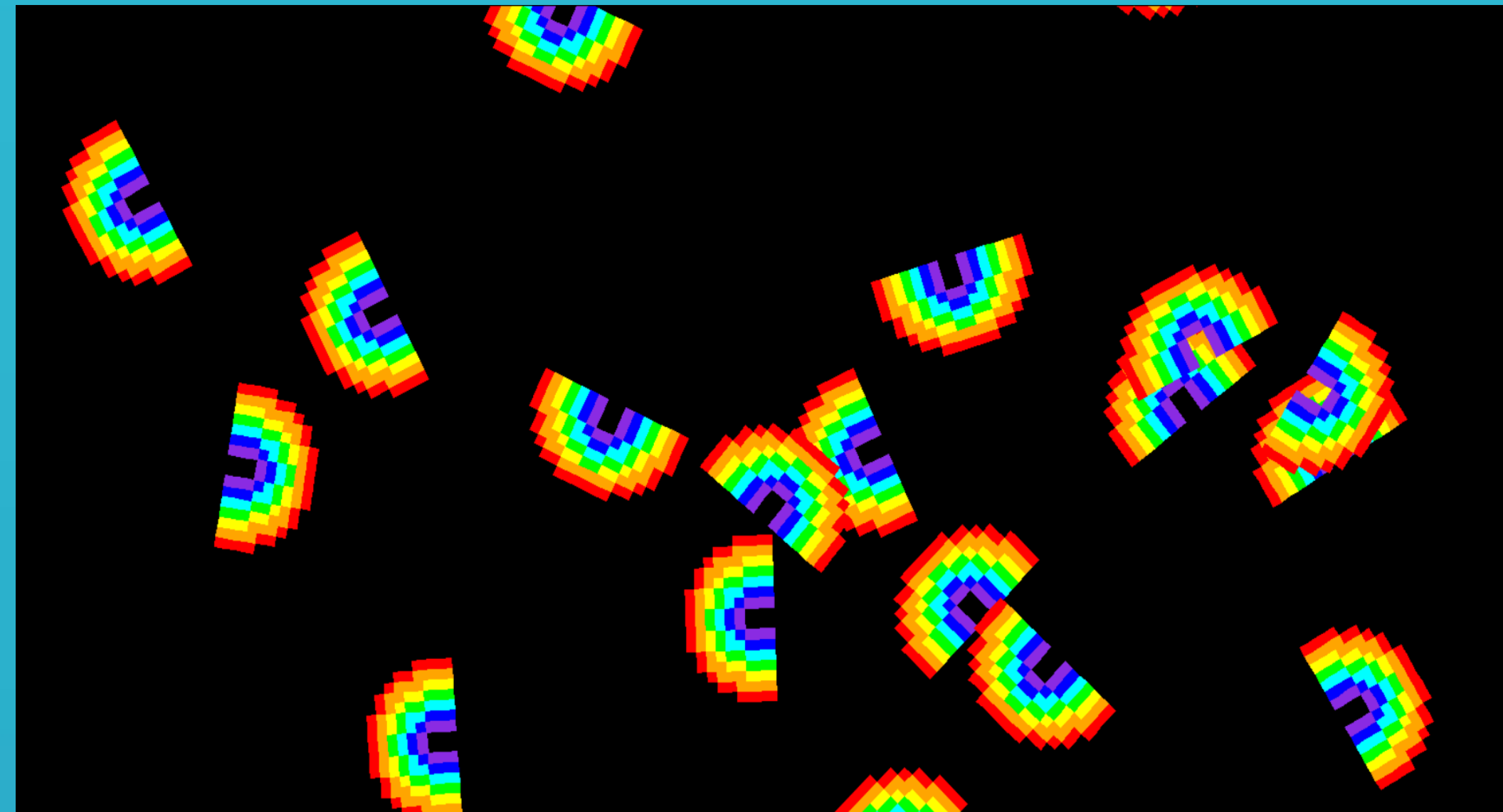## Computer Science and Information Systems

Rainbows – Madeline Turner

A pixel picture of multiple rainbows are randomly placed on a black background.
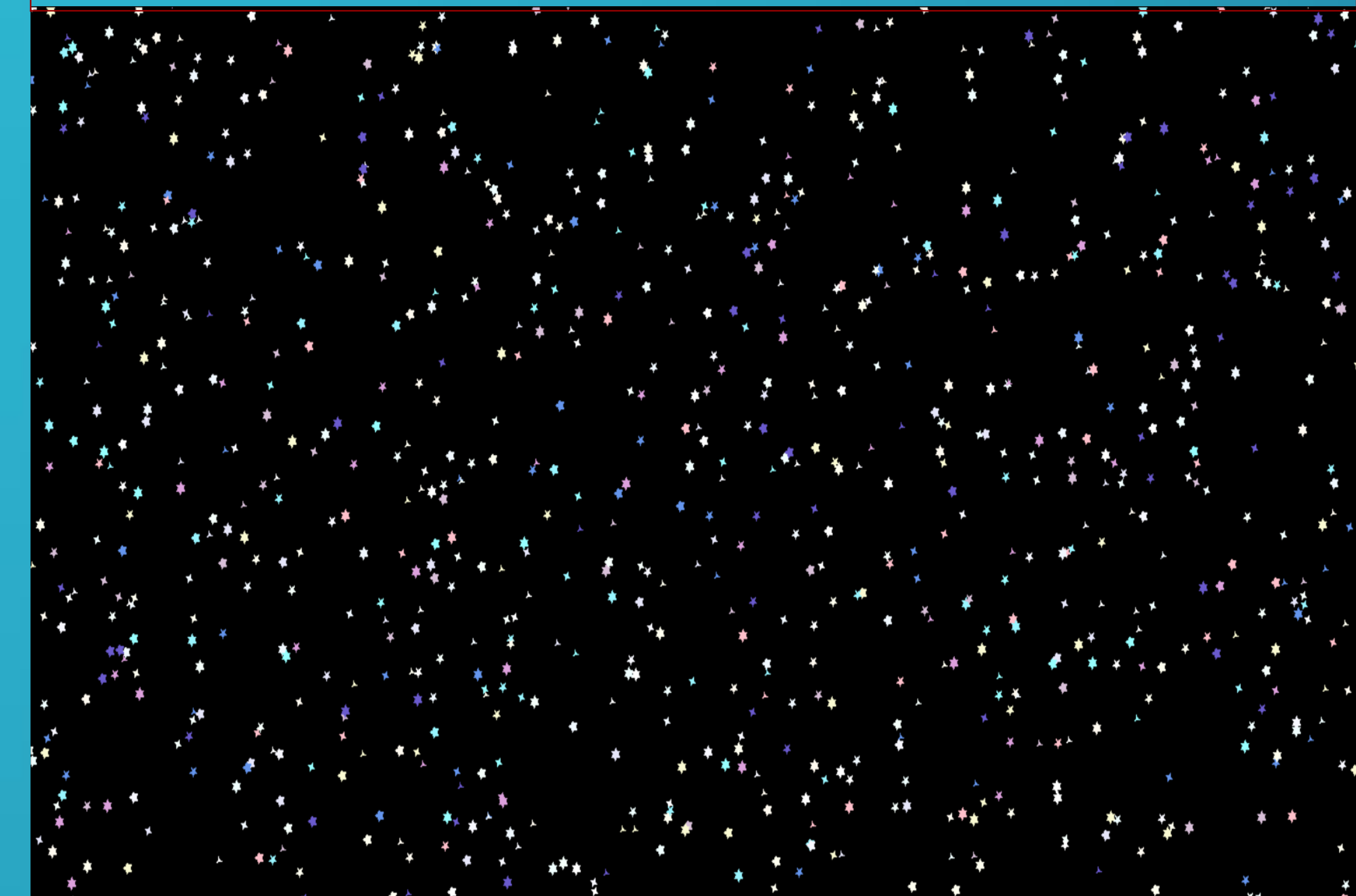

Abstract

During Spring 2025, in CS152 Introduction to Python Programming class, we learned how to handle repeated patterns. For example, a square is composed of 4 right-turn repeated pattern, as shown in the left side of Figure 1. Instead of writing 4 statements of turning right, we learned how to use a single *for* loop to accomplish this. Furthermore, by cleverly utilizing named constants, a simple change of their values, we can draw any n-side polygon, where n is an integer >= 3. Notice, as n's value approaches to a large number, the polygon is closer to a circle, as shown in the middle of Figure 1. Then, by adjusting the turning angles, we arrive at different shapes, as shown in the right side of Figure 1. From there, the instructor encourages us to design and develop different shapes involved repeated patterns. In this poster, we show various shapes that we created and implemented during this semester.

Starts in the Sky – Madeline Turner

Many stars of different sizes adorn a black background.
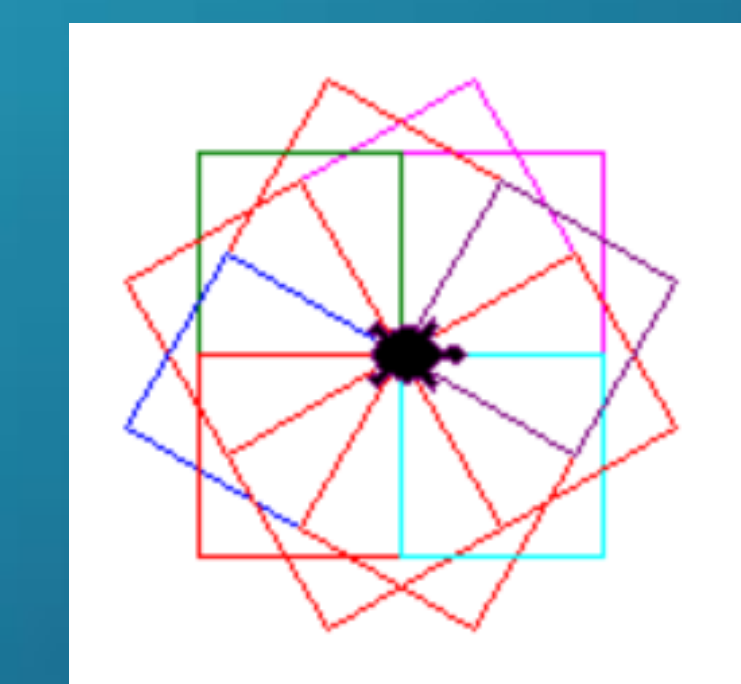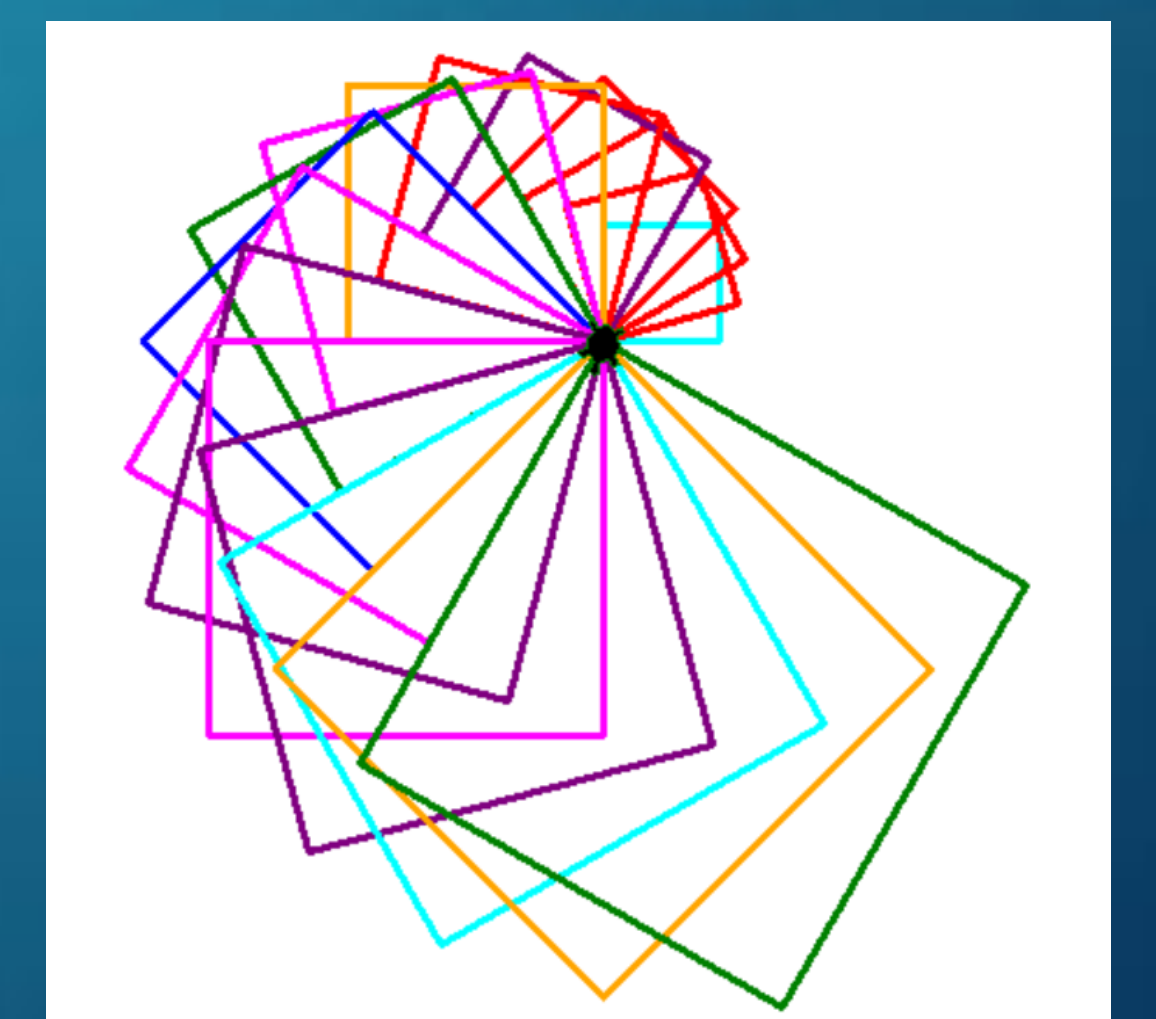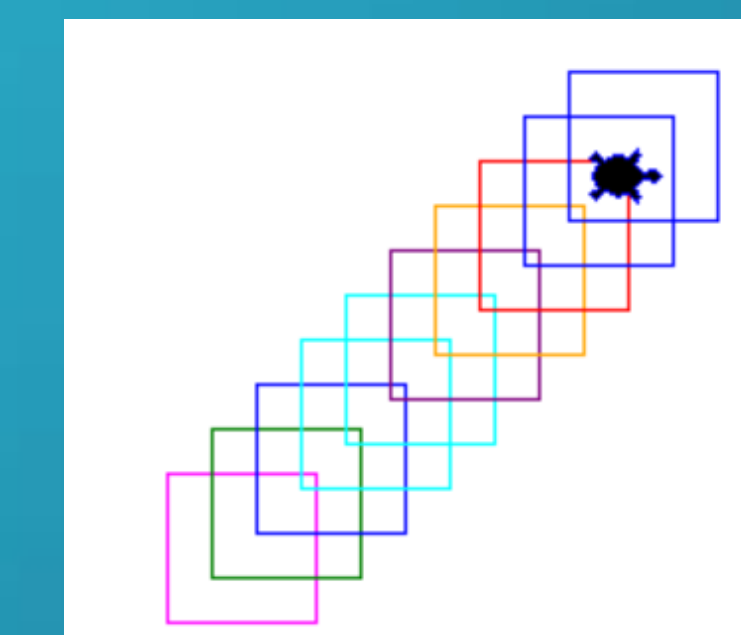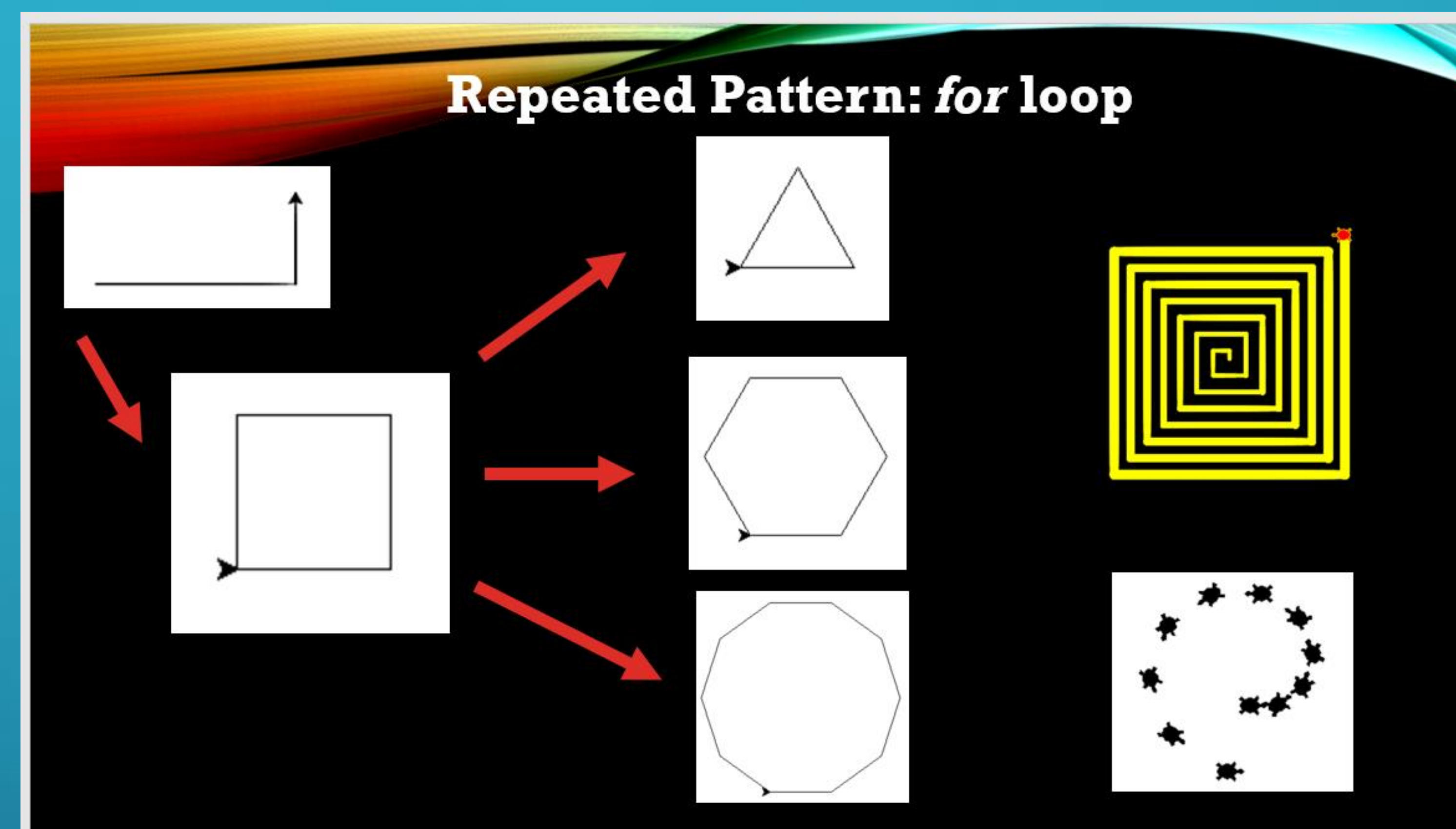

The Lucky Clovers – Tory Jensen

For the polygon coding project, I have chosen to create a clover leaf and reiterate the leaf into a field of clovers. Using the repeated patterns that we learned in class, I was able to create the full clover out of a single leaf. Then, using the random number generator, I decided to give the clovers a little more natural feel by varying the size of the leaves, along with the angle with which the leaves are pointing. I've also included the real-life chances of finding a four-leaf clover (1/10,000) to make this project into a fun observation game of finding the lucky clover.
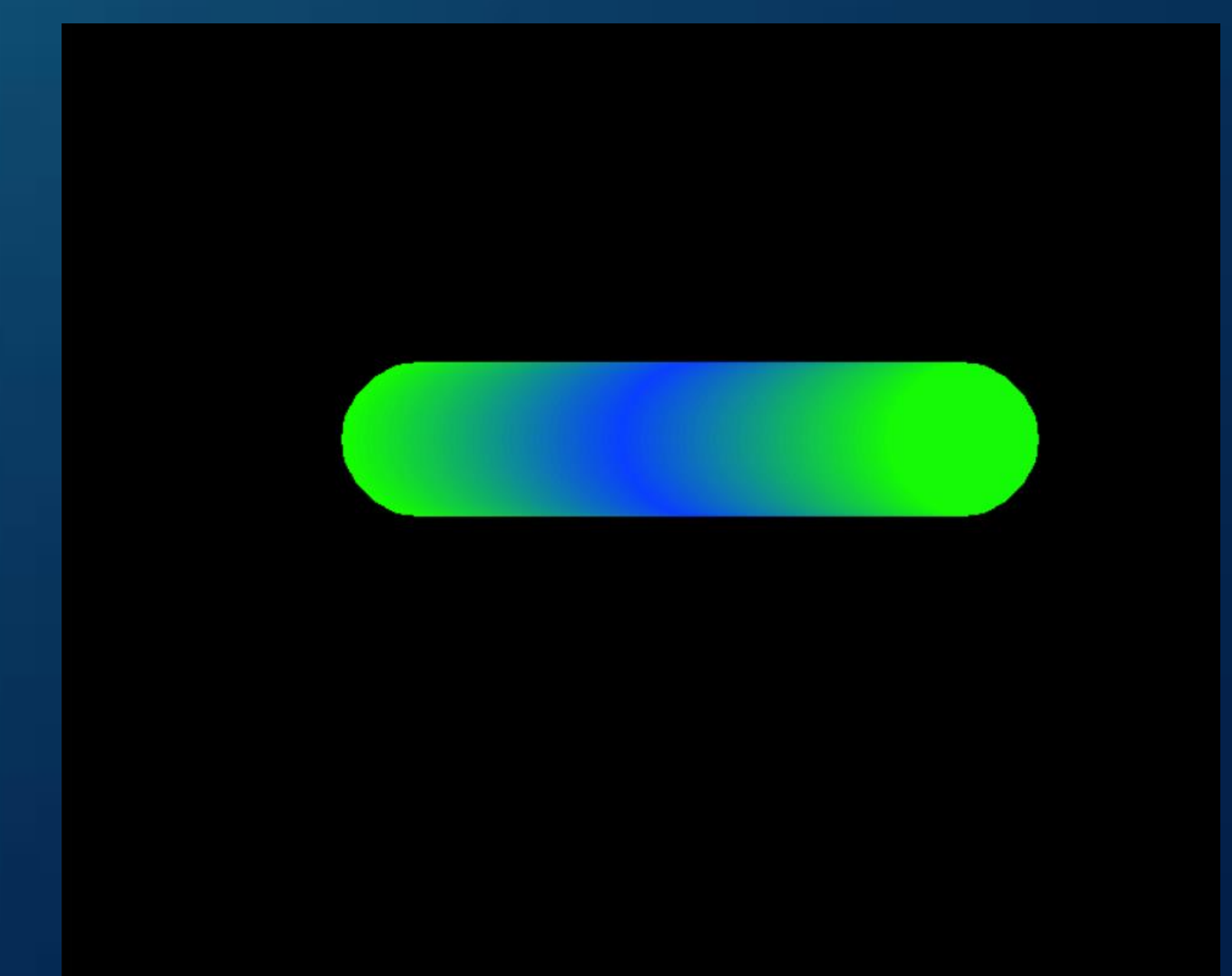

Figure 1. Polygons and Variations

Water & Earth -- Madeline Turner

A gradient runs across a black background, going from green to blue, then back to green.

Conclusion

This project was a blast! I was able to reinforce the lessons learned in class and learned how to integrate random number generation to add slight variation to a visual product, allowing for a more life-like representation.
– Tory Jensen

I had a lot of fun figuring out how to draw with the Python turtle. Each picture had its own difficulties but in the end I enjoyed the project as it allowed me to express my creativity in a different way.
– Madeline Turner

Reference
[1] How to Think Like a Computer Scientist: Interactive Edition. Runestone Academy.