Final Project: Mathematics from Visual Arts 1130

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Project Overview

In this project, I would like to explore the concept of angles as they contribute to art in tessellations. In this particular assignment, I have taken a look at the case in which there are 14 slots around a circle and various tiles of integer values 1-6 will fill up those 14 slots to complete a 360 degree circle. I have split this project into two pieces, the first being a program to visualize various combinations of these tiles, and the second being a program that counts the total number of possible combinations that add up to 360 degree circle containing a sum of 14 of these corner values. The outcome of this project has demonstrated how math can be apparent in various patterns in art formed by these tessellations.

Project Part 1

Number of Combinations

In this portion of the project, I created a program to get an idea of how many possible combinations of tiles would add up to 360 degrees. The program for this determined that there are a total of 7617 possible combinations. This program was built using a 14X nested for-loop to test all the way to the case in which there are 14 1-length tiles around in a circle. This algorithm was tested to work with lower numbered max tiles in comparison to the ones done by hand, and the algorithm gave the correct answer. Considering how there are over 7000 possible combinations, it would not be very practical to test if this is the correct number by hand.

Project Part 2

Tile Visualization Program

In this portion of the project, I created a program that visualizes the tiles connected at a single vertex in the middle of the screen. The user is capable of creating their own pattern by inputting the numbers 1-6 to add a tile to the tessellation. The user can also clear the screen and start a new pattern by pressing the spacebar. This program demonstrates how math is present in various patterns across tessellations, and how the math can lead to easier ways at creating and understanding patterns. This visualization is useful in demonstrating the aspects of the first part of project 1 as well as being a fun way to make patterns.

Project Summary

Through this project I was able to explore the concept of patterns and math through the artistic representation of tessellations. I hope that others might find use of this program in the future in addition to having newfound understanding of the mathematics behind tessellations.