

# COSC 4370 Homework 2 Report

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## 1 Introduction

The assignment tasks me with recreating three scenes from the prompt and creating fourth scene using the glut shapes and the transformation functions provided.

## 2 Method

I come up with a general idea of each scene. After I get a result that is similar to the scene that I need to recreate, I tweak the values for transformation function so that it can look as close to the images on the prompt. For problem 4, I combined a method I used for problem 1 to create a double helix.

## 3 Implementation

### 31 Problem 1

There are 10 tea pots arranged in a circle in the scene, and there are 1 teapot at (radius, 0). This means that the first teapot can be positioned by using  $x = \cos(0) * \text{radius}$ ,  $y = \sin(0) * \text{radius}$ . We can calculate the position of other teapots by dividing  $2\pi$  into 10 section, and passing these angles into  $\cos()$  and  $\sin()$  functions to find the x and y translation. Then I rotate the teapot according the angle it is at.

### 32 Problem 2

The scene comprised of 15 `glutSolidCubes` that's scaled on the y axis exponentially. I used the formula  $0.001x^2$  to scale the cubes. Using a for loop, I feed the index into the formula to get the y component of the scaling transformation. After I finish scaling, I translate the cubes in the y direction by the amount of `scaleY` divided by 4.

### 33 Problem 3

The scene is comprised of pyramid of teapots. I have two for loops to render these teapots. One loop for the rows with even number of teapots and one for odd number of teapots. Each loop renders the largest number of teapot for its type (6 for even, 5 for odd). After the teapot is drawn and translated to the correct y position and centering. The loop then decrement to the next digit( $-2$ ) to render the next rows until the loops end.

### 34 Problem 4

This is the scene that I can create. Using the for loop in problem I increase the number degree from  $2\pi$  to  $6\pi$  drawing 3 circles at every step of the loop I also translate the cube in the z direction 0.25 units from the last cube. This result in one strand of the double helix. To draw the other strand. I draw a second cube at each step of the loop but by adding  $\pi$  radiant to the current angle I get the position that is oppose from the first cube that is drawn.

## 4 Result



