

COSC 4370 – Homework 2

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1 Problem

This assignment requires us to create 4 images. The first image requires a circle of teapots with a certain distance and rotation away from origin. The second image requires a set of stairs made by cubes. The third image requires a pyramid of teapots. The fourth image is open ended as long as you incorporate nested glpushmatrix and a triangle

2 Method

The method for the first problem is that we would calculate the coordinates of where a teapot would be using $\cos()$ and $\sin()$ for x and y. We would use the fact that these teapots are equally space so that means that $360 \text{ degrees} / 10 \text{ teapots} = 36\text{-degree rotation away from origin}$. The method for the second problem is that we would loop 20 times a loop using the outer loop to translate to the right create a row of cubes. Then translate up and to the right the same amount as the row and since the inner loop depends on the outer there will be less cubes. The method for the third problem is that we create we would do something similar to the second problem by looping 6 times a loop, using the outer loop to translate to the right create a row of cubes. Then translate up and to the right a smaller amount as the row and since the inner loop depends on the outer there will be less teapots. The method for the fourth problem is that we create a nested glpushmatrix of cubes by having an inner loop moving a distance away from the center and creating a group of circles similar to the first problem and rotating them, so they overlap. We then loop through this for 3π which is slightly more than the circumference for a circle and angle it 45 degrees for the next group of circles. We then create a triangle at the origin.

3 Implementation

The implementation for the first problem is that we would loop 10 times and pushmatrix, translate it exactly 1 distance by and 36 degree rotation away from origin by translating (x,y) by getting the $(\cos(\text{radians of } 36*i), \sin(\text{radians of } 36*i))$ and $\text{glRotatef}(i*36, 0, 0, 1)$, we then create the teapot and rest with pop. The implementation for the second problem is that we would loop 20 times and then loop inside to create a row of cubes by translating right 1 then $\text{glTranslatef } 1$ which is the same as the row right and 0.5 up. The implementation for the third problem is that we would loop 6 times and then loop inside to create a row of cubes by translating right 4 then $\text{glTranslatef } 2$ right which is half of the row and 3 up. The implementation for the fourth problem is that we create a nested glpushmatrix of cubes by having an inner loop moving 1 distance away from the center and rotating by 45 degrees and placing a cube then loop until they overlap. We then loop through this for 3π which is slightly more than the circumference for a circle and angle it 45 degrees for the next group of circles. We then create a triangle at the origin with vertices at 0.25, 0, -0.25 ; 0.25, 0, -0.25 ; 0, 0.25, -0.25.

4 Results

The result for the first problem is an image of 10 teapots with 1 distance and 36 degree rotation away from origin. The result for the second problem is an image of a set of stairs made by 20 rows of decreasing amount of cubes, making up 20 steps. The result for the third problem is an image of a pyramid of teapots of 6 rows of decreasing amount of teapots. The result for the fourth problem is an image of a cog created by a nested glpushmatrix of cubes making a cog with a triangle in the middle.



