COSC 4370 - Homework 2
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Problem 1:
- Using the glRotate statement around the z-axis and the for loop to set the position of each teapot to rotate around the circle with 36 degrees (360/10 teapots).
- Using Push/Pop Matrix to set and release the transform after every time allocate the teapot.
- Using glTranslate to set the radius of the circle (how far from the origin to the teapot) which is 1.5 on the y-axis.
- Finally place the teapot at the new position with size of .2
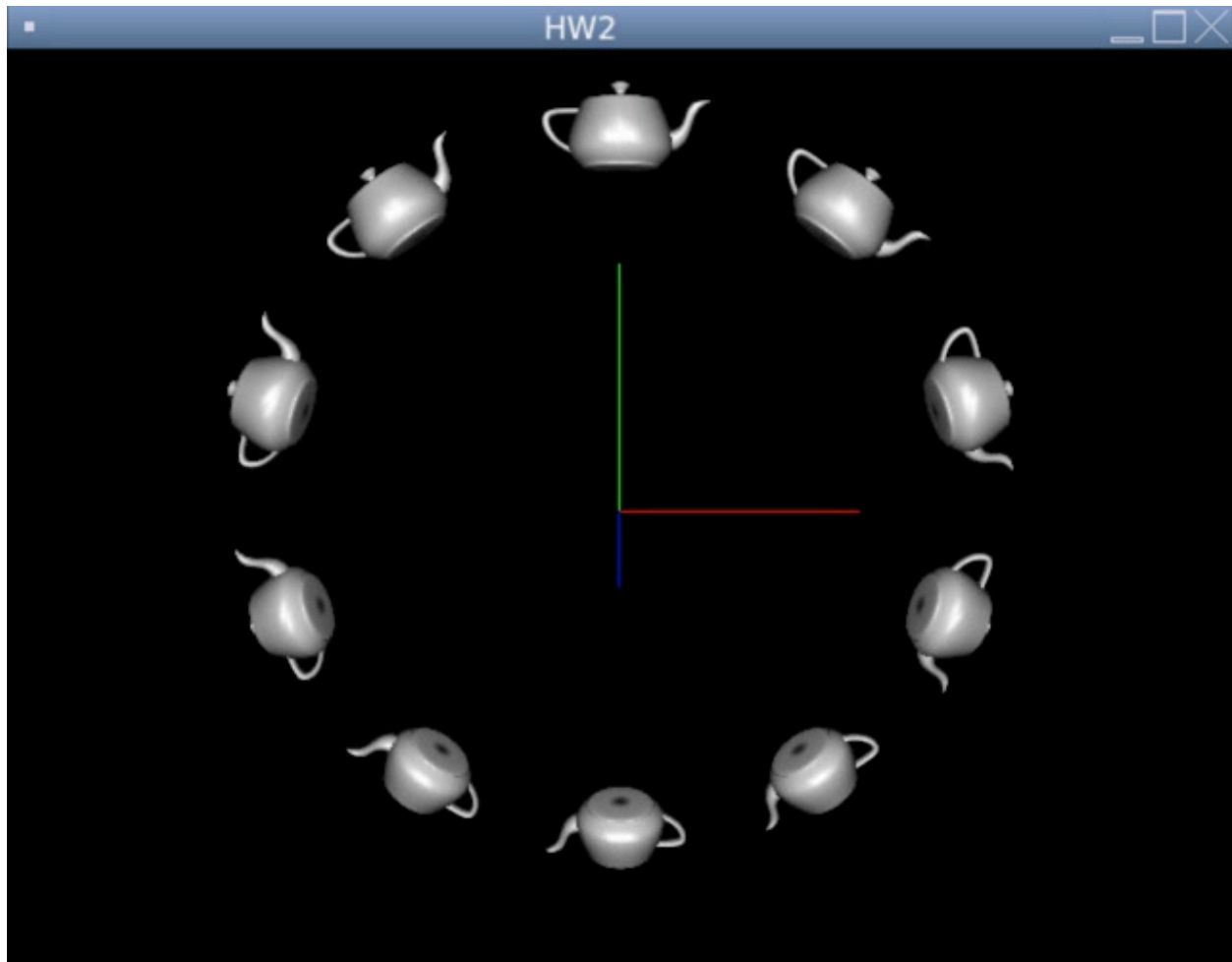


Problem 2:
- Part 1: Draw the base
• Using the nested for loop to set the x and y position for each cube.
• Each cube is in size of 0.1 and I want to place 3 layers of the base so I set the first for loop for y to increase 0.1 every time, and 0.3/0.1 = 3 layers so 0.3 is the max bound I set for y value (height of the base)
• Then I want the length of the base to be 3 so I have the inner for loop to run from -1.5 to 1.5.
• Using Push/Pop Matrix to release the transform after every time I place each cube.

- • Using Translate to set the desired position (x,y,0) since there will be no change in z coordinate.
- ⁃ Part 2: Draw the top
- • Starting by setting the initial y value to be at 0.3 since the height of the base is already 0.3
- • Using nested for loop again to create the 'stair effect' for the top.
- • The first for loop is used to set the value of a - the length of each layer, as the higher the y coordinate is, the shorter the length of the layer.
- • Instead of 0.1 I have the a value to decrease by 0.2 to have each layer decrease faster every time and thus top grow shorter (more similar to the model in the prompt)
- • The second for loop is used to set up the x-coordinate and build each layer (x always starts from -1.5 and bounded by the a-value)
- • Finally since the length is 3 which is much longer than the height of the 'stair', so I decided to scale the y axis by half to help balance out the ratio of x and y coordinate.
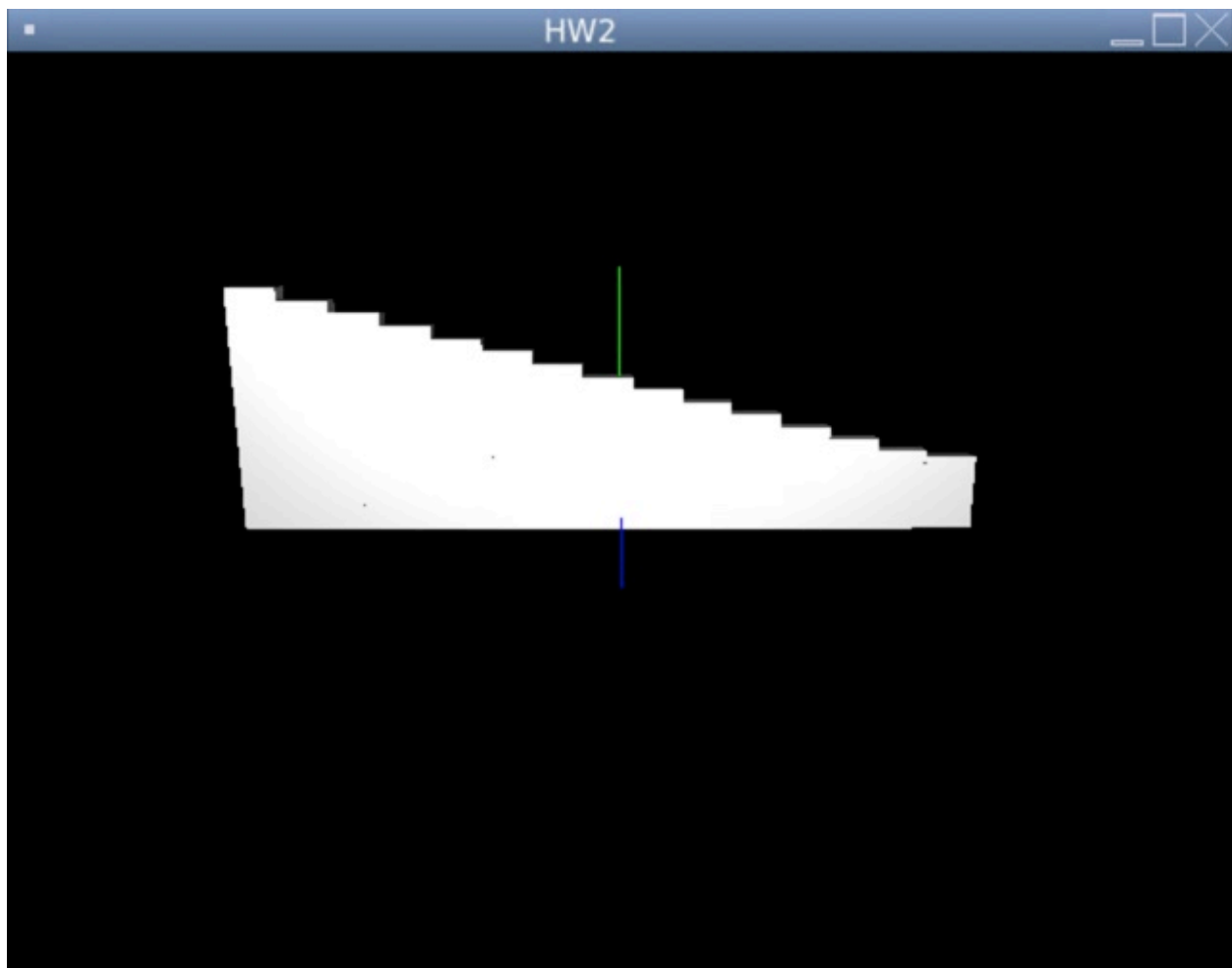


Problem 3:
- ⁃ This function is programmed to draw from the top down.
- ⁃ Since the most upper row has 6 teapots next to each other symmetric around the y-axis, and after I sampling different values, I found that for the size of 0.2, each teapot has the width of 0.6, therefore, the x-coordinate for the top left teapot should be -1.6
- ⁃ The next row below will start to get closer to the y-axis and distance around half of the teapot's width from the upper row, so 0.6/2 = 0.3 —> next row starting x-coordinate = upper row + 0.3

- I also notice that the distance from the first top row to the last teapot also equal and so I set the starting y-coordinate to be 1.2 so the last teapot y-coordinate should be -1.2.
- Then the below row y-coordinate should be upper row - 0.6.
- Notice that I have the first for loop to run up to >= -1.8 not -1.2 since if setting -1.2, the loop will program will stop after drawing the second to the last row.
- Inside the two nested loop, I use Push/Pop Matrix, flTranslate to allocate and release the position of each teapot after placing them in the correct order.
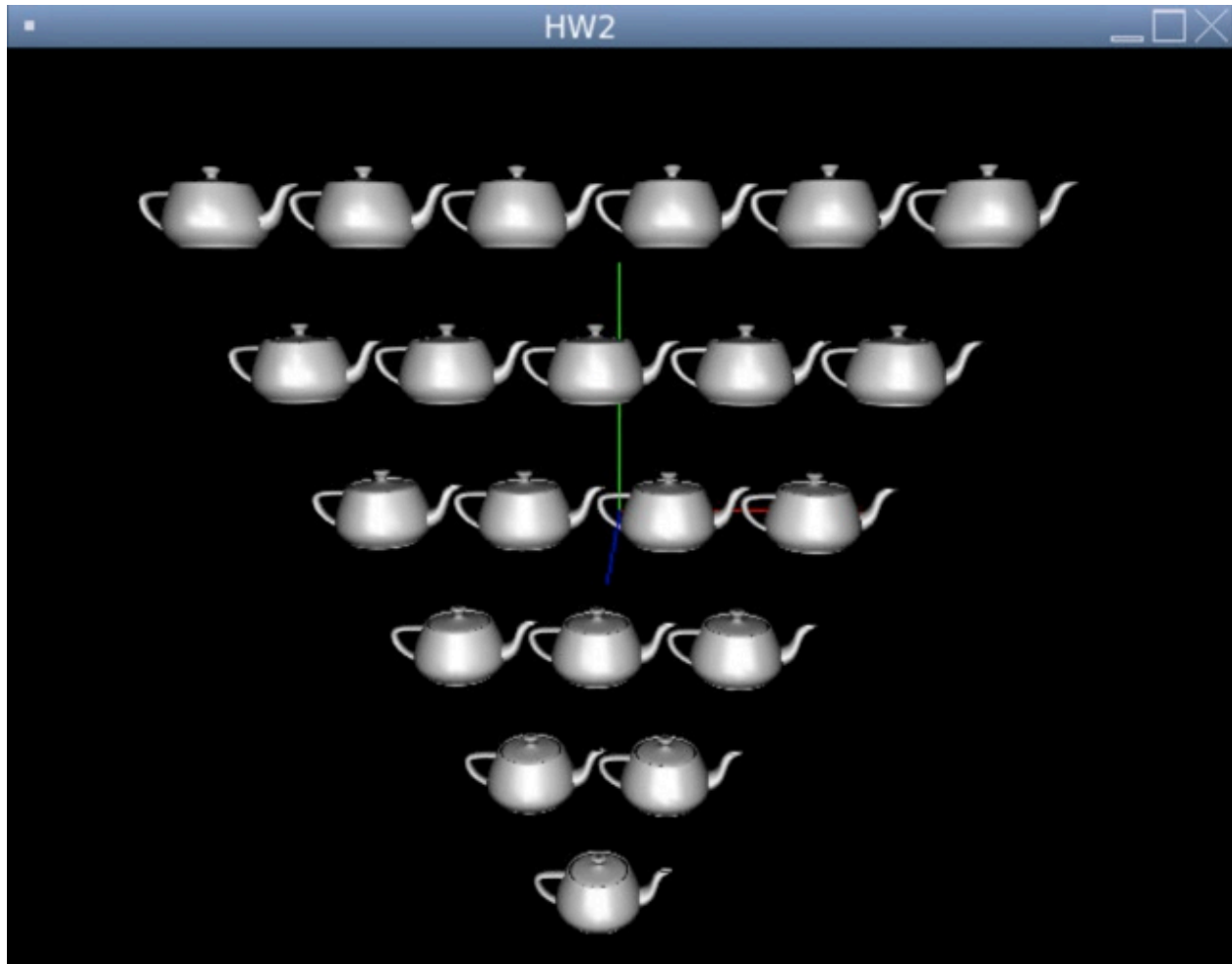


Part 4: For this part I built a 'building' with some glut geometric objects.
- Block 1: For the base, a solid cube with side (5,2,5) was built right under the axis system.
- Block 2:
• Starting from 0, and at every 90 degrees increase there is a cone facing up allocated (4 cones pointing up)
• Starting from 45 degree, and at every 90 degrees increase there is a cone facing down allocated (4 cones facing down)
• Above each cone, there are 8 spheres with radius of 0.3 placing at y-coordinate = 1.3 (1+0.3)
- Block 3:
• For the third floor, I used a solid cube again with size of 1 and placing at y-coordinate = 1+0.3*2+1/2 = 2.1
• I also scale the cube size to make it longer in width (4.5)

- Block 4:
- There are two tetrahedrons were places at y-coordinate = 3 and z-coordinate = ± 1.5 (symmetric).
- I also need to rotate the z-coordinate by 20 degree clockwise to make the tetrahedrons parallel to the z and a-axis.
- Block 5, 6:
- Finally, on top of the two tetrahedrons, a solid torus was allocated to make the base for the four teapots (each was placed 90 degrees from each others)