CMSC427 fall 2017 Lab 4
Fan Yang

A double loop was used to create the cylinder. The outer loop decides the number of circles, and the inner loop decides the number of boxes in a circle. The glitches of the color interpolation at the end of the cylinder is due to the jump of the saturation parameter between the first and the second circle. It was easily cleaned up by simply setting the saturation to 100.

To create the new shape, I first rotated the boxes around the Y axis so that they sit head to head. This modification makes the circles look much more aesthetic. Then I decided to decrease the diameter of the circles and the size of the boxes as the parameter for the outer loop increases. The resulting shape looks like a parabolic cone, as mentioned in the lab description.

Below is the source code of Cylinder.pde:

```
// CMSC427 Lab 4 Fall 2017
// Cylinder.pde
// Draw a parametric cylinder in 3D
// R. Eastman & Fan Yang

void setup() {
size(600,600,P3D);
  // Use Hue Saturation Brightness (HSB)
  // to interpolate colors
  colorMode(HSB,360,100,100);
}

void draw() {
  background(0,0,0);
  // Position the helix for viewing
  translate(width/2,height/2);
  rotateY(mouseX*PI/width);
  rotateX(mouseY*PI/height);
  // Create the cylinder
  for(float s = 0; s < 10; s++)
    for (float t = 0; t < 2*PI; t += PI/15){
      float x = 100*cos(t);
      float y = 50*s;
      float z = 100*sin(t);
      // set the saturation parameter to 100 to avoid glitches of the color
interpolation
      fill(1.3*(x+100),100,100,128);
      // We push the matrix for each box so translations don't accumulate
      pushMatrix();
        translate(x,250-y,z);
        scale(1,1,2);
        box(10);
      popMatrix();
    }
}

void keyPressed() {
  save("boxes.jpg");
}
```

Below is the source code of NewShape.pde:

```
// CMSC427 Lab 4 Fall 2017
// NewShape.pde
// Draw a parametric new shape in 3D
// R. Eastman & Fan Yang

void setup() {
  size(600,600,P3D);
  // Use Hue Saturation Brightness (HSB)
  // to interpolate colors
  colorMode(HSB,360,100,100);
}

void draw() {
  background(0,0,0);
  // Position the helix for viewing
  translate(width/2,height/2);
  rotateY(mouseX*PI/width);
  rotateX(mouseY*PI/height);
  // Create the cylinder
  for (float t = 0; t < 2*PI; t += PI/15)
    for(float s = 0; s < 10; s++){
      // decrease the value of x and y as s increases
      float x = 100*cos(t)*(10-s)/10;
      float y = 50*s;
      float z = 100*sin(t)*(10-s)/10;
      // set the saturation parameter to 100 to avoid glitches of the color
interpolation
      fill(1.3*(x+100),100,100,128);
      // We push the matrix for each box so translations don't accumulate
      pushMatrix();
        translate(x,250-y,z);
        // rotate the boxes so that they sit head to head
        rotateY(-t);
        scale(1,1,2);
        // decrease the size of the boxes as s increases
        box(10-s);
      popMatrix();
    }
}

void keyPressed() {
  save("boxes.jpg");
}
```