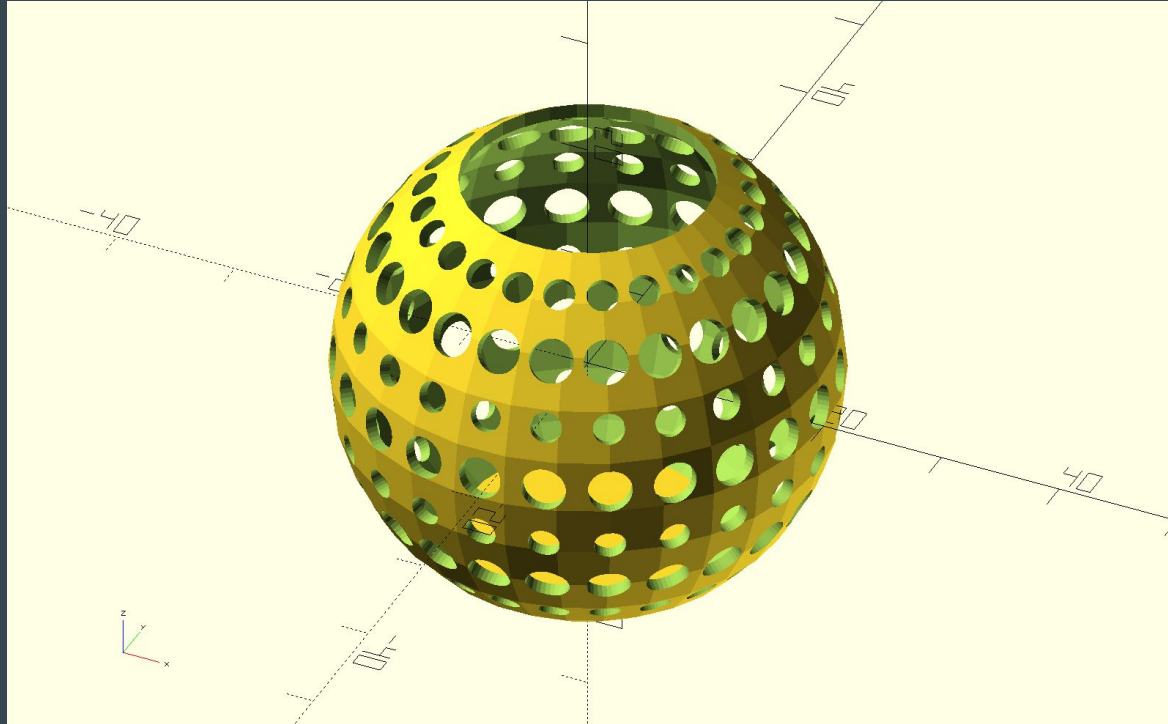


MECE4606 Digital Manufacturing Assignment 2 - Lampshade Lattice

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2/22/2023 19:00

Grace Hour: $96 + 105.5 = 201.5\text{h}$



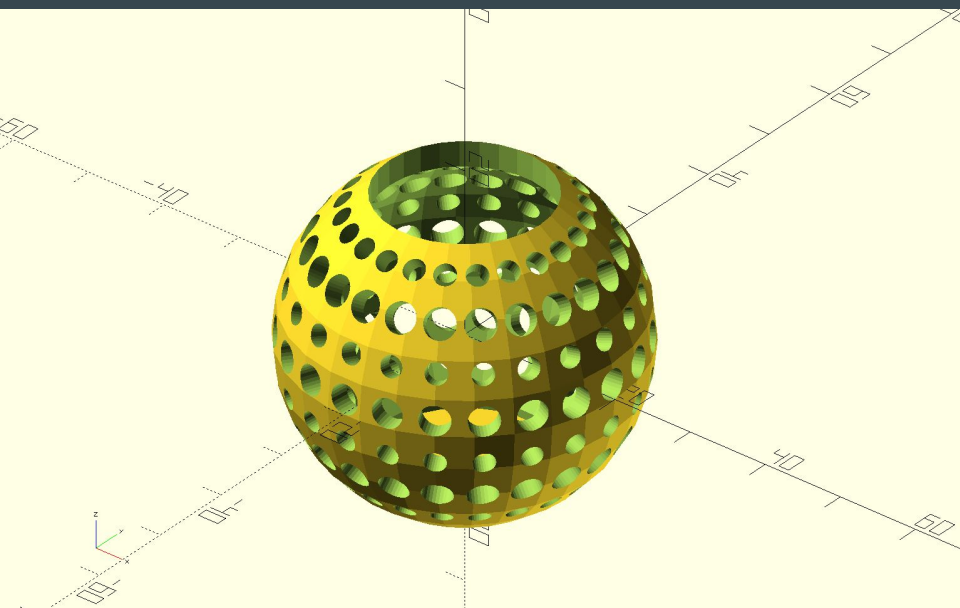
The idea is to create a shell with carvings on it so the light can shine through.

The first step is to create a shell, which we created two spheres with different diameters and then used “difference” command to leave an outer shell of the sphere as the main part of the design. Then created a cylinder to hollow both top and bottom, while creating another flat cylinder and “union” it with the bottom hole so that the tea light can be put into the shade and the shade is able to stand without any external help.

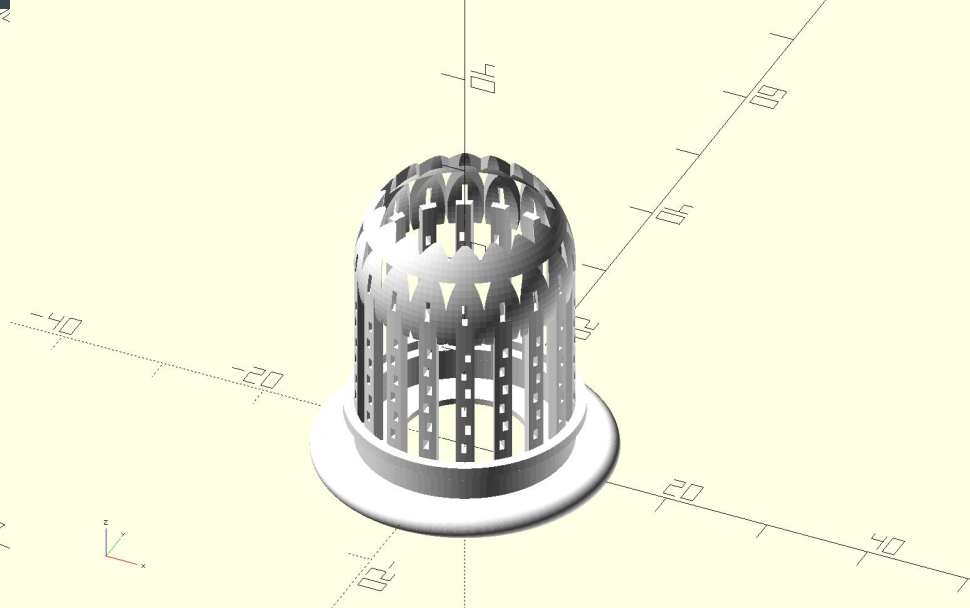
We made all carvings using what we have learned in the class of using long thin cylinders looping around a point to create multiple ones and lay them with certain degrees, then used “difference” to create holes on the shell surface. Unfortunately, we met a problem of not being able to evenly distribute all cylinders when we were doing rotations along Z axis, so we just make a loop for cylinders every 15 degrees from 40° to 130°. There we have made our design of our simple lampshade lattice.

Different Designs

Spherical Lampshade



Crown Lampshade



Spherical Lampshade won the election and eventually got printed out



X 4.72 Y 4.7 Z 4.09 IN RESIZE

Model Volume	5.77 inch ³
Machine Space	12.22 inch ³
Support Structure	37.9 inch ³
Parts Bounds Volume	90.82 inch ³
Part Count	1

Bring your product to life

Lampshade TOOLS

PA12 (SLS)[Versatile Plastic] CHANGE

Choose Options

COLOR

White

Black

+\$10.41

Pink

+\$12.61

Red

+\$12.61

Orange

+\$12.61

Blue

+\$12.61

Green

+\$12.61

Yellow

+\$12.61

Purple

+\$12.61

MATERIALS / FINISHES

Natural

This finish has a slightly textured surface and a matte finish.

Processed

+\$8.21

This finish removes some material to create a smoother surface.

Premium

+\$89.57

Using a mechanical process, ceramic media tumbling, this finish removes material to create a smooth surface, with good scratch resistance.

ADD TO CART QTY 1 \$74.25

Go to cart to see bulk pricing

Printed Products



Appendix: OpenSCAD Code

Spherical Lampshade

```
$fn=30;
union() {
  difference() {
    sphere(20);
    sphere(19);
    cylinder(50,10,10,center=true);
    for(i=[0:15:359]) {
      rotate(i,v=[0,0,1])
      rotate(40,v=[0,1,0])
      cylinder(30,1.25,1.25);
    }
  }
  for(i=[0:15:359]) {
    rotate(i,v=[0,0,1])
    rotate(55,v=[0,1,0])
    cylinder(30,1.75,1.75);
  }
  for(i=[0:15:359]) {
    rotate(i,v=[0,0,1])
    rotate(70,v=[0,1,0])
    cylinder(30,1.25,1.25);
  }
  for(i=[0:15:359]) {
    rotate(i,v=[0,0,1])
    rotate(85,v=[0,1,0])
    cylinder(30,1.75,1.75);
  }
  for(i=[0:15:359]) {
    rotate(i,v=[0,0,1])
    rotate(100,v=[0,1,0])
    cylinder(30,1.25,1.25);
  }
  for(i=[0:15:359]) {
    rotate(i,v=[0,0,1])
    rotate(115,v=[0,1,0])
    cylinder(30,1.75,1.75);
  }
  for(i=[0:15:359]) {
    rotate(i,v=[0,0,1])
    rotate(130,v=[0,1,0])
    cylinder(30,1.25,1.25);
  }
}
translate([0,0,-17.25]) cylinder(2,10,10);
}
```

Stem Lampshade

```
$fn=100;
color([1,1,1])
union() {
  union() {
    difference() {
      cylinder(r=10, h=20);
      translate([0,0,-1]) cylinder(r=9, h=22);

      translate([0,0,4.1]) for(i=[0:20:359]) {
        rotate(i,v=[0,0,1])
        cube([50,1.8,19]);
      }
      translate([0,0,14]) for(i=[13:20:359]) {
        rotate(i,v=[0,0,1])
        cube([50,0.5,1]);
      }
      translate([0,0,16]) for(i=[15:20:359]) {
        rotate(i,v=[0,0,1])
        cube([50,0.5,1]);
      }
      translate([0,0,12]) for(i=[15:20:359]) {
        rotate(i,v=[0,0,1])
        cube([50,0.5,1]);
      }
      translate([0,0,8]) for(i=[15:20:359]) {
        rotate(i,v=[0,0,1])
        cube([50,0.5,1]);
      }
      translate([0,0,10]) for(i=[13:20:359]) {
        rotate(i,v=[0,0,1])
        cube([50,0.5,1]);
      }
      translate([0,0,6]) for(i=[13:20:359]) {
        rotate(i,v=[0,0,1])
        cube([50,0.5,1]);
      }
    }
  }
  difference() {
    translate([0,0,4]) cylinder(r=11,h=1);
    translate([0,0,3]) cylinder(r=10,h=3);
  }
}
difference() {
  translate([0,0,20]) sphere(10);
  translate([0,0,20]) sphere(9);
  translate([0,0,19]) sphere(9.8);

  translate([0,0,24]) for(i=[0:20:359]) {
    rotate(i,v=[0,0,1])
    rotate(90,v=[0,1,0])
    cube(7);
  }
}
```

```
translate([0,0,27]) for(i=[0:20:359]) {
  rotate(i,v=[0,0,1])
  rotate(90,v=[0,1,0])
  cube(5.8);
}
translate([0,0,25]) sphere(7.5);
translate([0,0,20]) for(i=[13.5:20:359]) {
  rotate(i,v=[0,0,1])
  cube([50,0.5,2]);
}

union() {
  difference() {
    translate([0,0,0]) cylinder(r=13,h=1);
    translate([0,0,-0.3]) cylinder(r=12,h=0.7);
    translate([0,0,0]) cylinder(r=5.8,h=10);
  }
  rotate_extrude(convexity = 10)
  translate([13, 0, 0])
  circle(r = 1, $fn = 100);
}
}
```

Points Achieved (130Pts)

- 10pts Cover page correct and complete
- 10pts Report neatly organized and formatted
- 10pts Report with initial upload to Shapeways submitted a week before the deadline
- 10pts Program code listed in appendix
- 10pts rendering in Blender or OpenSCAD
- 10pts model complexity (based on number of elements, pattern)
- 10pts Screenshot of Shapeways page with product
- 10pts multiple variations of the design shown
- 10pts product is stable on flat surface
- 10pts product cost <\$100
- 10pts Dimension of CAD fits tea-light
- 10pts 3D Printed lampshade (show multiple shots)
- 10pts Glamour photo and video of printed lampshade with tealight, in dark