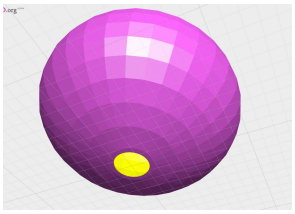
1.Modeling

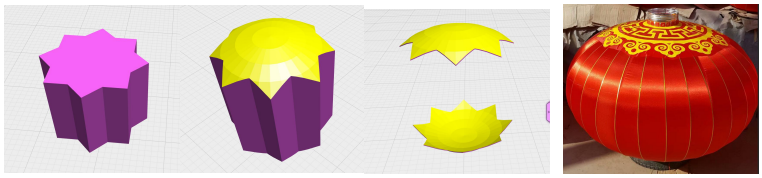
As shown below, to model the lantern, the skin of the lattern can be made by using the Difference operation. After that, a hole at the bottom is needed to place the light source.



```
difference(
    difference(
        sphere({r:10}).translate([0,0,10]).scale([1,1,0.80]),
        sphere({r:9.9}).translate([0,0,10]).scale([1,1,0.80]),
    ),cylinder({r:1.5,h:3}).translate([0,0,-1])
),
```

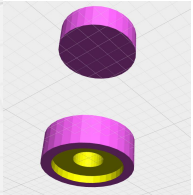
The decoration on the outside of the lantern is based on the actual lantern. The following image is the reference image, the code that implements this model and the process that achieve this model by using difference, intersection, and union operation.

```
difference(
    intersection(
            union(
                    cube({size:10,center:true}),
                    cube({size:10,center:true}).rotateZ(45)
                ).scale([1,1,10]).translate([0,0,10]),
            sphere({r:10.1}).translate([0,0,10]).scale([1,1,0.8])
        ),
    sphere({r:10}).translate([0,0,10]).scale([1,1,0.80])
)
```

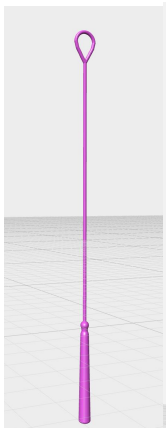


Then there are two metal rings used to fix the lantern, and the difference treatment is also done on the bottom.

```
cylinder({r:4.5,h:3}).translate([0,0,14]),
difference(
    difference(
        cylinder({r:4.5,h:3}).translate([0,0,-1]),
        cylinder({r:3.5,h:0.8}).translate([0,0,-1])
    ),
    cylinder({r:1.5,h:3}).translate([0,0,-1])
)
```

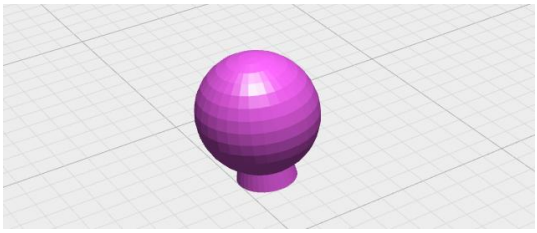


After that there is a line that runs through the lantern. The more difficult part is the arc above. rotate_extrude is used to make a half-coil effect, and then four cylinders are used for transition connection.



```
union(
difference(
    rotate_extrude(translate([1.175, 0, 0], circle({r: 0.2, fn: 30, center: true})))),
    cube({size:10}).translate([-5,0,-5])
).rotateX(-90).translate([0,0,23.04]),


cylinder({r:0.2,h:2,center:true}).rotateY(-30).translate([-0.5,0,21.5]),
cylinder({r:0.2,h:2,center:true}).rotateY(30).translate([0.5,0,21.5]),

cylinder({r:0.2,h:0.8,center:true}).rotateY(-15).translate([-1.08,0,22.7]),
cylinder({r:0.2,h:0.8,center:true}).rotateY(15).translate([1.08,0,22.7]),


cylinder({r:0.2,h:2}).translate([0,0,19])

),



cylinder({r:0.2,h:30}).translate([0,0,-10]),

sphere({r:0.5}).translate([0,0,-10]),

cylinder({r2:0.4,r1:0.35,h:0.5}).translate([0,0,-10.8]),

sphere({r:0.5}).scale([1,1,1.5]).translate([0,0,-11.2]),
cylinder({r2:0.5,r1:0.7,h:10}).translate([0,0,-21.2]),
sphere({r:0.7}).scale([1,1,0.5]).translate([0,0,-21.2])
)
```

After adding this small decoration to complete the whole lantern.



```
sphere({r:1}).translate([0,0,18.2]),

cylinder({r2:0.4,r1:0.5,h:0.5}).translate([0,0,17])
```

The final modeling of the entire lantern is complete. As shown in the figure below, this is the final effect of the modeling of the entire lantern.