

Lab 4

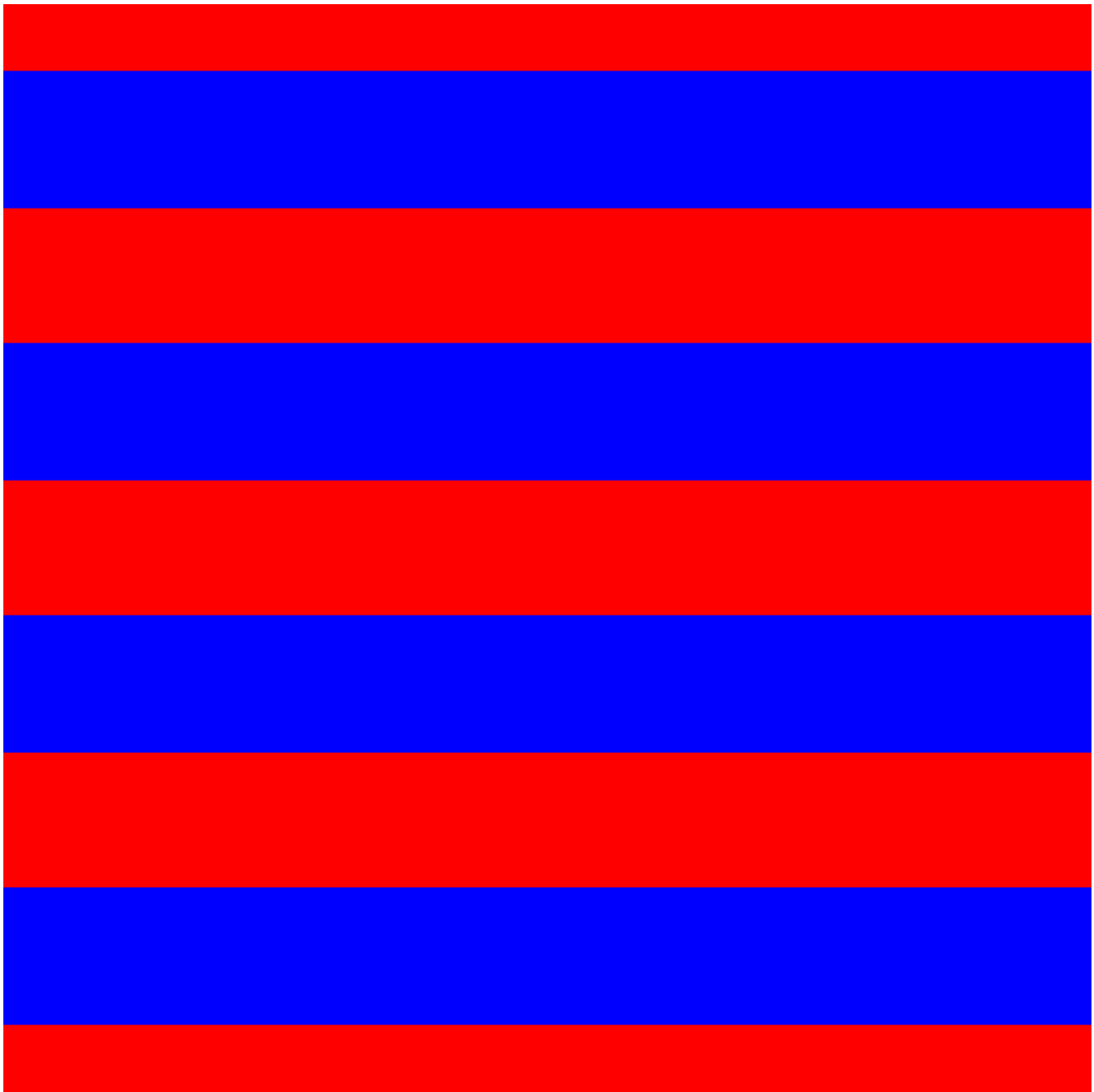
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Usage

- Install [Python 3](#).
- Install dependence by `pip3 install -r requirements.txt`.
- Edit files in directory `data` to change parameters.
 - file `camera.p`: camera parameters
 - file `display.p`: indicate window size
 - file `light.p`: light source parameters, Phong specular illumination model
 - file `shading.p`: indicate shading type (constant, Gouraud or Phong shading)
 - file `*.d`: vertices and polygons of a geometry
 - file `*.d.lay.p`: matrices of move, rotate and scale of a geometry, 3D local space \Leftrightarrow 3D world space
 - file `*.d.material.p`: surface material parameters of a geometry, Phong specular illumination model
- Execute `python3 main.py` to show.

Result

Texture

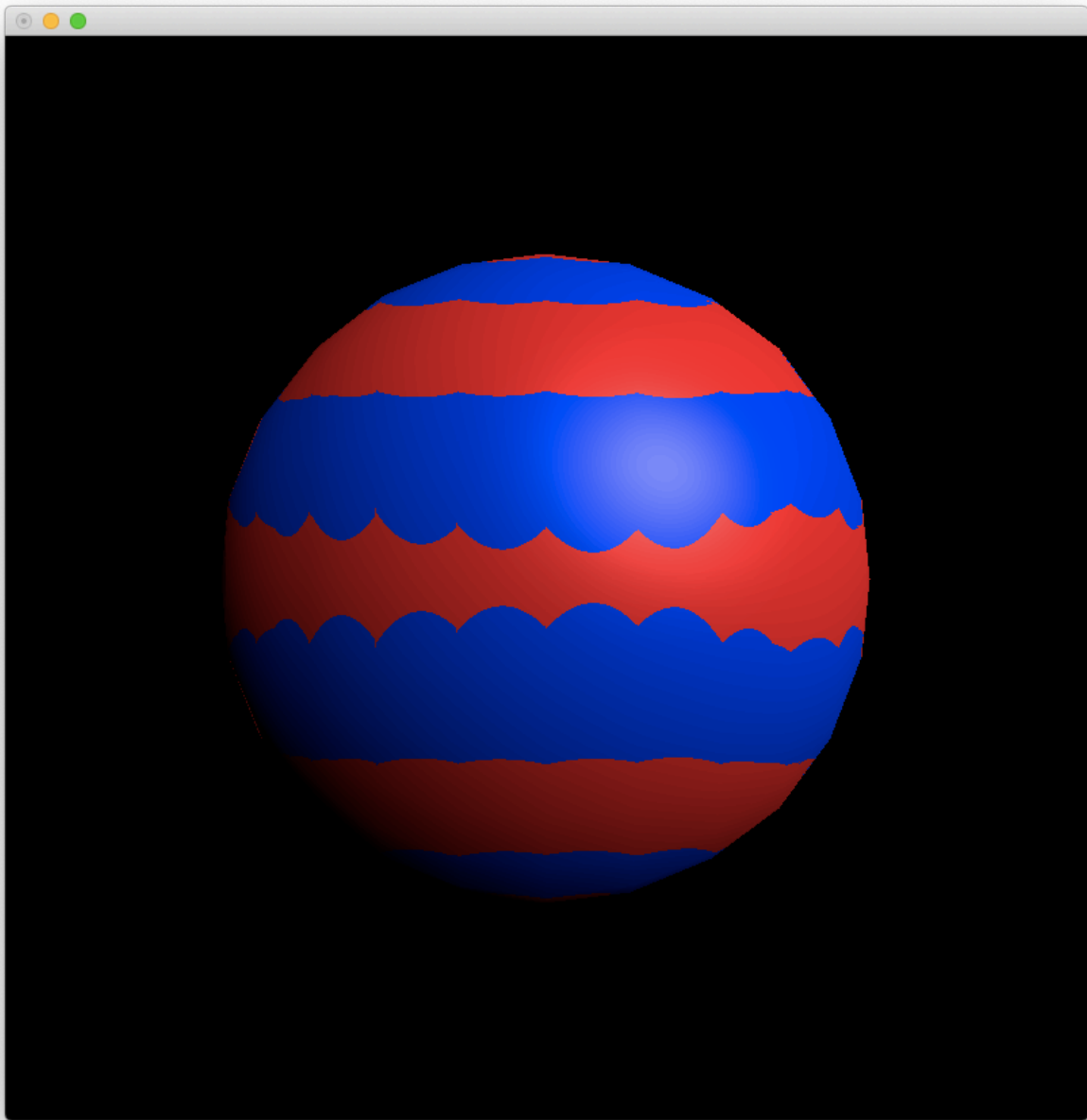


Mapping

1

```
# better-ball.d.lay.p
#
# y-axis rotate 0

move      1 0 0 0    0 1 0 0    0 0 1 0    0 0 0 1
rotate    1 0 0 0    0 1 0 0    0 0 1 0    0 0 0 1
scale     3 0 0 0    0 3 0 0    0 0 3 0    0 0 0 1
```

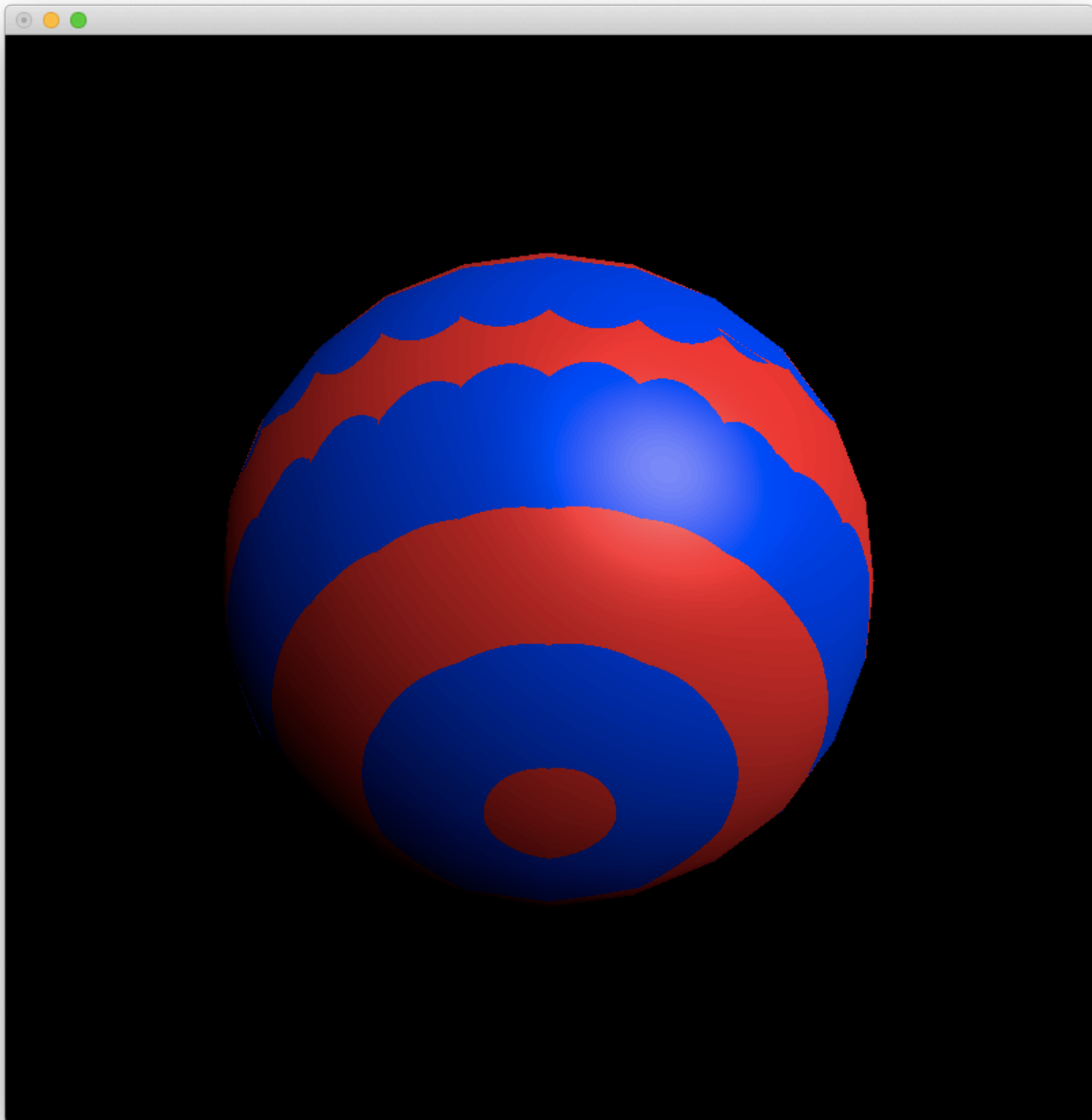


The boundary of red and blue area should be a straight line, but it seems not. Reasons are:

- error of roundness (pixel)
- error of interpolation

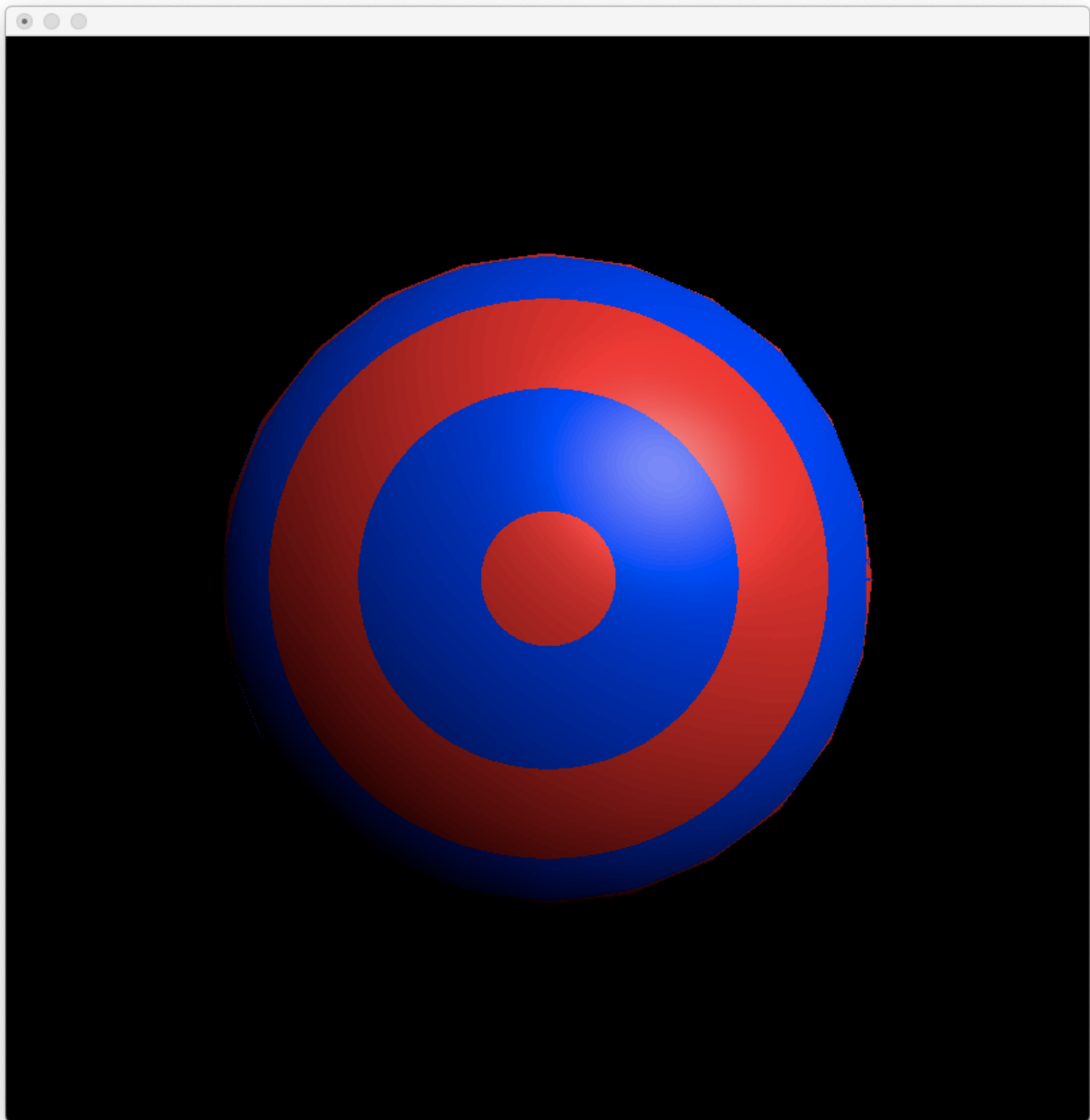
```
# better-ball.d.lay.p
#
# y-axiz rotate pi/4

move      1 0 0 0   0 1 0 0   0 0 1 0   0 0 0 1
rotate    0.7071067811865475 0 -0.7071067811865475 0   0 1 0 0
0.7071067811865475 0 0.7071067811865475 0   0 0 0 1
scale     3 0 0 0   0 3 0 0   0 0 3 0   0 0 0 1
```



```
# better-ball.d.lay.p
#
# y-axiz rotate pi/2

move      1 0 0 0   0 1 0 0   0 0 1 0   0 0 0 1
rotate    0 0 -1 0   0 1 0 0   1 0 0 0   0 0 0 1
scale     3 0 0 0   0 3 0 0   0 0 3 0   0 0 0 1
```



Console

Reading ...

Finish. (cost = 0:00:00.091338)

Calculating: transform ...

Finish. (cost = 0:00:00.056197)

Calculating: polygon ...

Finish. (cost = 0:00:00.564300)

Calculating: pixel ...

Finish. (cost = 0:00:54.415092)

Rendering ...

Finish. (cost = 0:00:04.700609)