


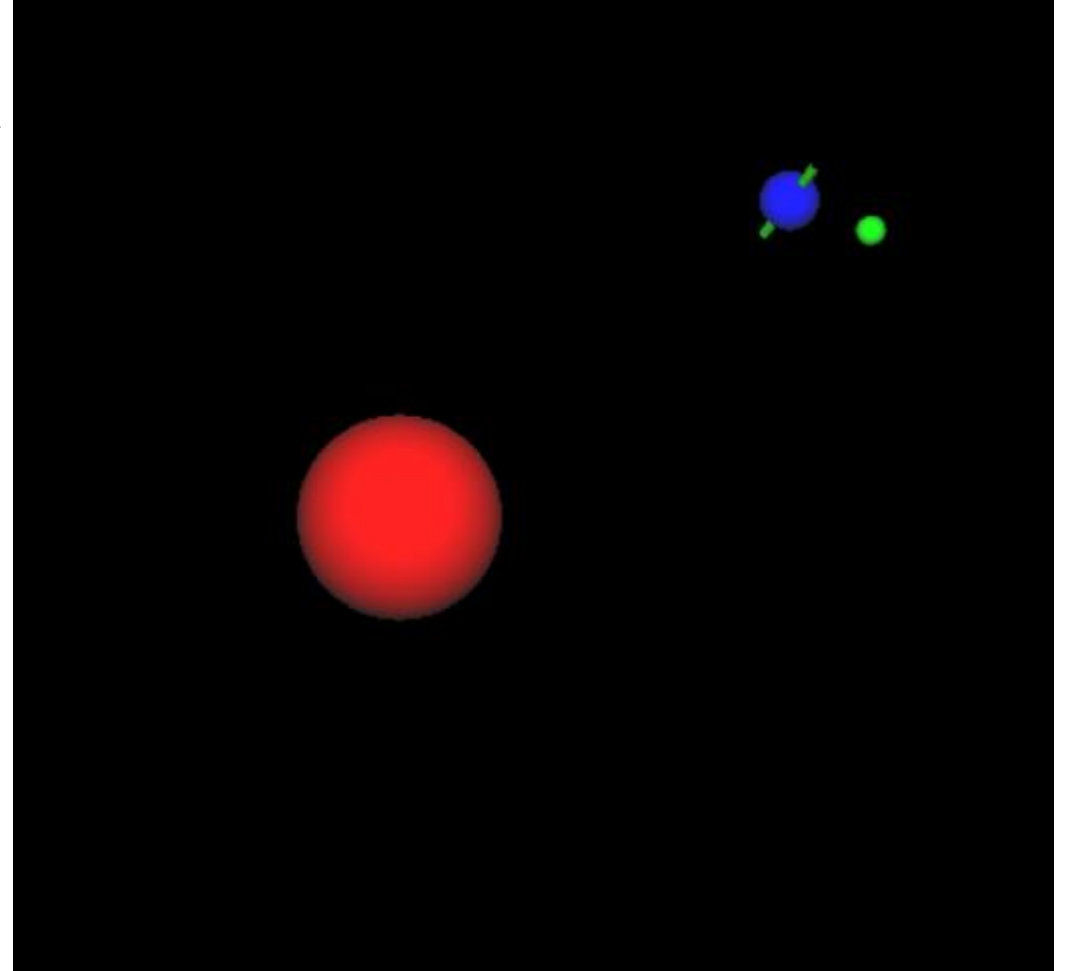
HW1

# Goal

- Draw three solid sphere: Sun, Earth, Moon.  
The Earth should have spin axis, like the picture.   
(You can use `gluCylinder(...)` function to draw the axis.)
- The Sun is located in the center with the Earth rotates around it, and the Moon rotates around the Earth.
- When pressing the key “P”, all the planets should stop moving. When pressing the key “O”, the Earth should switch the slice and stack number.

\*You can use any mode to draw the planets  
(ex. `GL_TRIANGLES`, `GL_TRIANGLE_STRIP`, `GL_QUADS`)  
But if you use `glutSolidSphere()`, you can't get the score  
of this part.

\*You should use `glPushMatrix()` and `glPopMatrix()` to  
implement the rotation and revolution of the planets.



# Spec

## Global value:

Degree: X(any value)

Radius: Y(any value)

## Camera:

Position: (0, 30, 50)

Center: (0, 0, 0)

Up vector: (0, 1, 0)

## Light:

Position: (0, 10, 0)

Diffuse: (1, 1, 1, 1)

Ambient: (0.5, 0.5, 0.5, 1)

## Keyboard:

“P”: Pause the planets


“O”: Switch the slice and stack number of the Earth

# Spec

## Sun:

Position: (0, 0, 0)  
Slice: 240  
Stack: 60  
Rotation: 0  
Radius:  $7*Y$   
Diffuse material: any

## Earth:

Slice: 360  
Stack: 180  
  
<Switch when pressing key "O">  
  
Rotation: X  
Revolution:  $X/365$   
Radius:  $2*Y$   
Obliquity: 23.5  
Length of rotation axis:  $8*Y$   
Revolution radius(around sun): 18  
Diffuse material: any

## Moon:

Slice: 240  
Stack: 60  
Rotation:  $X/28$   
Revolution:  $X/28$   
Radius: Y  
Revolution radius(around earth): 3  
Diffuse material: any

# Score

1. Draw the solid planets (20%)

If you use `glutsolidsphere()`, you **can't** get the score of this part.

2. Implement the rotation(自轉) and revolution(公轉) (65%)

3. Report (15%)

Your report should include:

(1). (Briefly) Explain the whole program's structure.

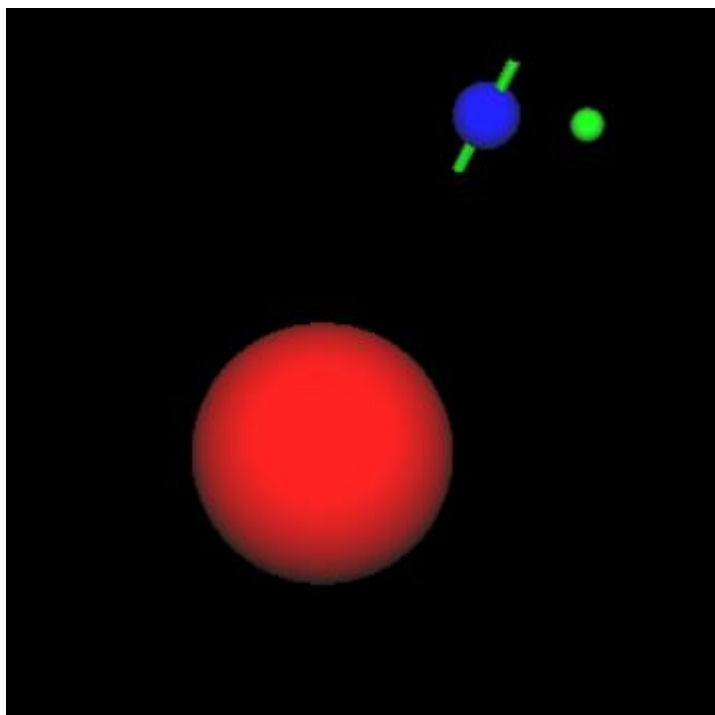
(2). (Detailed) How do you implement the revolution and rotation by `glPushMatrix()` and `glPopMatrix()`?

(3). (Detailed) How do you draw the planets?( If you don't use `glutsolidsphere()` )

# Others

1. Use Visual Studio 2017 or 2019 for this homework.
2. You can do this homework in the “**StudentID\_HW1.cpp**” file because we had prepared basic framework for you. Remember to rename this cpp file with your own student ID.
3. Zip your Visual Studio project into “ StudentID\_HW1.zip”, and name your report “StudentID\_HW1.pdf”. Then upload both of them separately to New e3.
4. The deadline is at **11:55 pm on October 14**.
5. If you submit your homework late, the score will be discounted.  
submit between (10/15 ~ 10/21) : Your final score \* 0.9  
submit between (10/22 ~ 10/28) : Your final score \* 0.8  
submit after 10/29 : Your final score \* 0.7

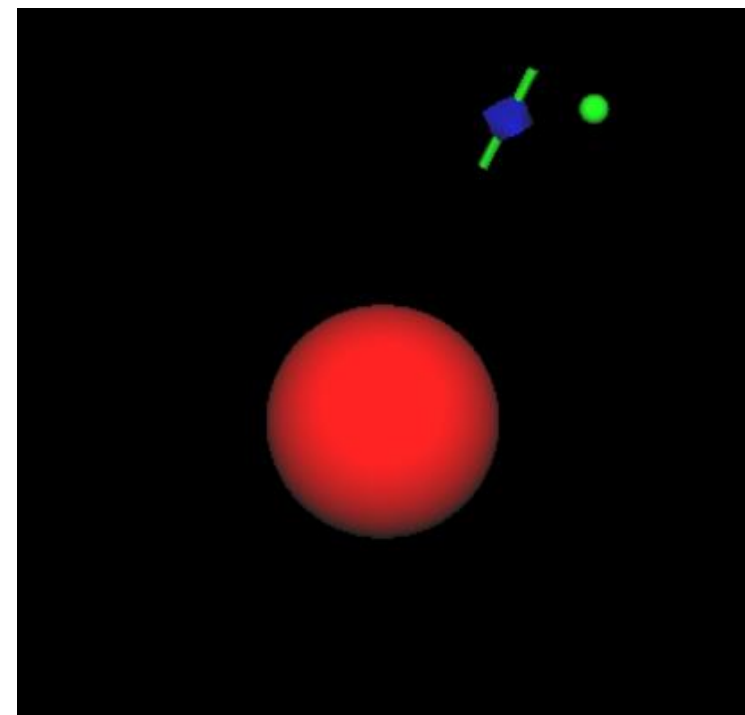
# Result for pressing key "O"



slice, stack = (360, 180)



<Switch when pressing key "O">



slice, stack = (4, 2)