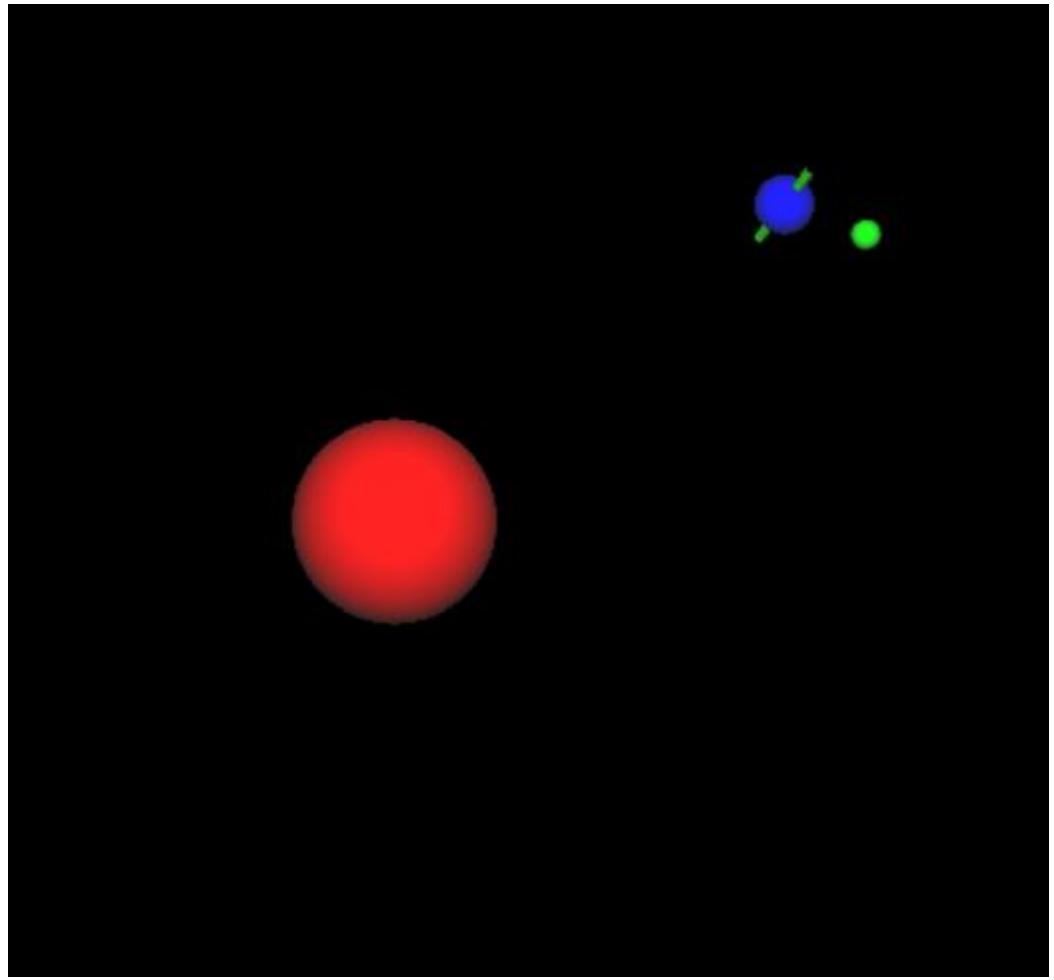
HW1

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

Slice: 4
Stack: 2

<Switch when pressing key “O”>

Rotation: X
Revolution: X/365
Radius: 2*Y
Obliquity: 23.5
Length of rotation axis: 4*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.

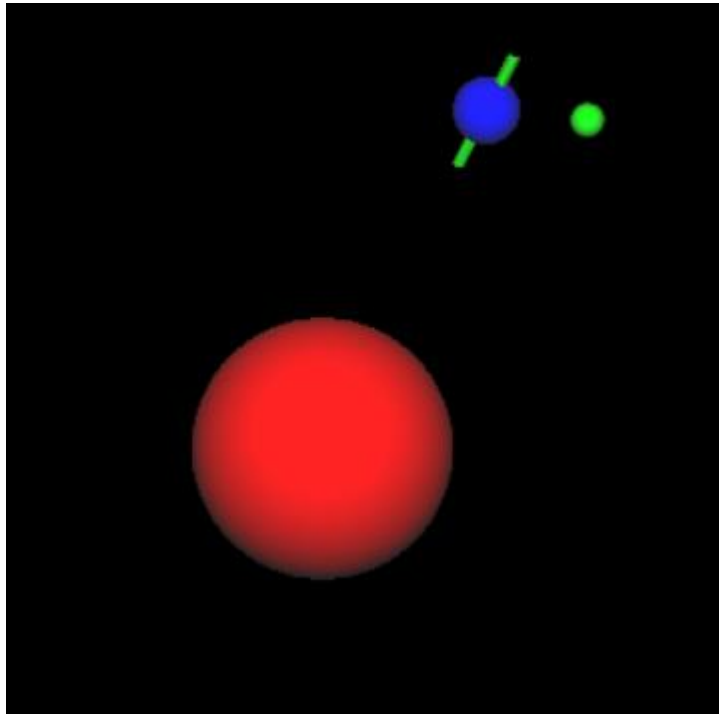
2. You can do this homework in the “StudentID_HW1.cpp” file because we had prepared basic framework for you. Remember to rename this cpp file with your own student ID.

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 Octobor 14.

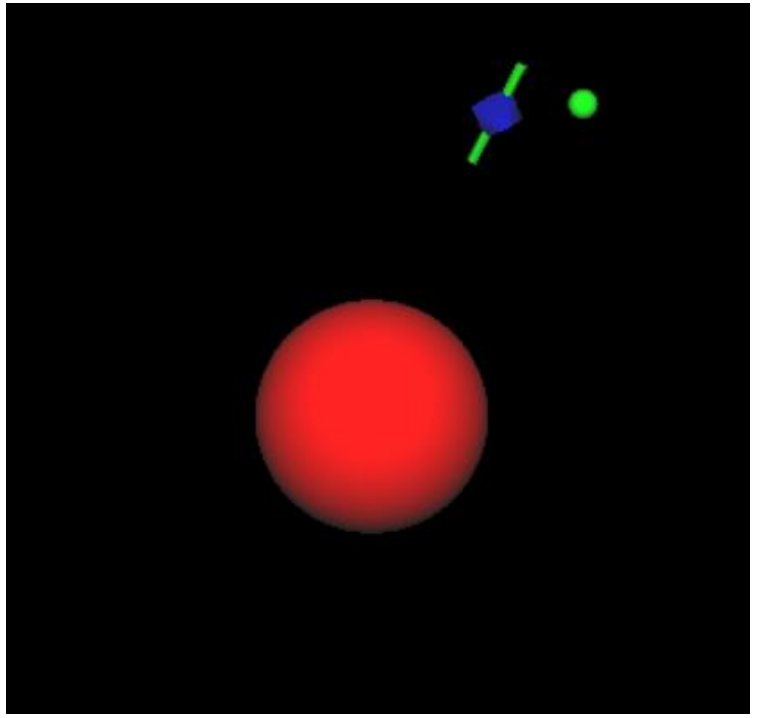
5. If you submit your homework late, the score will be discounted.
   submit between (10/15 ~ 10/21) : Your final score * 0.9
   submit between (10/22 ~ 10/28) : Your final score * 0.8
   submit after 10/29 : Your final score * 0.7

Result for pressing key ”O”



slice, stack = (360, 180)

<Switch when pressing key “O”>



slice, stack = (4, 2)