Computer Graphic Homework 1 Report

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

A:
At first, I declare a struct "point" to indicate a point in 3D coordinate. Then, create a "getPoint" function to transform a point from spherical coordinate system to 3D coordinate.
"getSlice" and "getStack" is the apporiate slice and stack according to spec.
"drawSphere" function draw points and set normal vector to a point in a sphere.
"lighting" function set a light
"idle" function make the planets keep moving when the program start to execute.
"keyboard" function set the specified condition according to spec.
"display" function set the point of view, the viewer's perspective and do the depth test, clear buffer. Then, draw the planets, set material parameter and handle the relative position of every planet.(Resolution and Revolution)
Last, main function call these function above and execute the program.

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

A:
1.clear matrix by glLoadIdentity()
2.Draw a Sun in the original point.
3.Translate and Rotate to draw a earth which does revolution to sun and rotation itself.
4.push matrix (store the state that after drawing the earth but before earth rotation because earth rotation will influence the moon revolution, and now the stack has two state and they are the same)
5.translate and rotate to draw the spin axis of earth
6.popMatrix and back to the state after drawing earth
7.translate and rotate to draw a moon which does revolution to earth and rotation itself.

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

A: To draw a planet, which is a sphere, I divided the sphere into three parts. The first part and the third part are the top and bottom of sphere's surface, which are composed of triangles, the second part is the middle part of sphere's surface, which is composed of quads.
That is, I use triangles and quads to simulate the sphere's surface, with more numbers of triangles and quads, we can gradually fit the sphere's surface. As for the method that how to find a point in sphere's surface, I refer the spherical coordinate system to draw every points in sphere.
Reference: https://blog.csdn.net/u010607947/article/details/71107140
https://en.wikipedia.org/wiki/Spherical_coordinate_system