**GAM 531/DPS 931**

**Lab Three**

**3D Solar System**

In this lab, you are requested to complete lab two by using 3D cubes instead of 2D circles and to introduce camera to the scene. To do this, you will need to follow these steps:

* Create 8 vertices (3D) to draw a cube
  + You will need to use glDrawElements to render each face of the cube. You will use this function in future very frequently, so, it is important to read the details about this function. You can find more details about this function here:

https://www.khronos.org/registry/OpenGL-Refpages/gl4/html/glDrawElements.xhtml

* Create a function drawCube() as follows:

void drawCube()

{

GLubyte top\_face[] = { 0, 1, 2, 3 };

GLubyte bottom\_face[] = { 4, 5, 6, 7 };

GLubyte left\_face[] = { 0, 4, 7, 3 };

GLubyte right\_face[] = { 1, 5, 6, 2 };

GLubyte front\_face[] = { 2, 3, 7, 6 };

GLubyte back\_face[] = { 2, 3, 7, 6 };

glDrawElements(GL\_LINE\_LOOP, 4, GL\_UNSIGNED\_BYTE, top\_face);

glDrawElements(GL\_LINE\_LOOP, 4, GL\_UNSIGNED\_BYTE, bottom\_face);

glDrawElements(GL\_LINE\_LOOP, 4, GL\_UNSIGNED\_BYTE, left\_face);

glDrawElements(GL\_LINE\_LOOP, 4, GL\_UNSIGNED\_BYTE, right\_face);

glDrawElements(GL\_LINE\_LOOP, 4, GL\_UNSIGNED\_BYTE, front\_face);

glDrawElements(GL\_LINE\_LOOP, 4, GL\_UNSIGNED\_BYTE, back\_face);

}

* **Note:** Now that your vertices are 3D, you will need to change the following parameter:

glBindAttribLocation(program, 0, "vPosition");

glVertexAttribPointer(0, 3, GL\_FLOAT, GL\_FALSE, 0, BUFFER\_OFFSET(0));

The 3 in the above statement indicates that “every three floats in the vertex buffer corresponds to one vertex (3D vertex)”

* So far, you should be able to upgrade your 2D solar system to 3D with cubes used as planets.
* Next, you will need to add camera and projection matrix as we did in class.
* Finally add “WASD” and “+, -“keyboard controls to move your camera to along +Y, -X, -Y, +X, zoom in and zoom out, respectively.