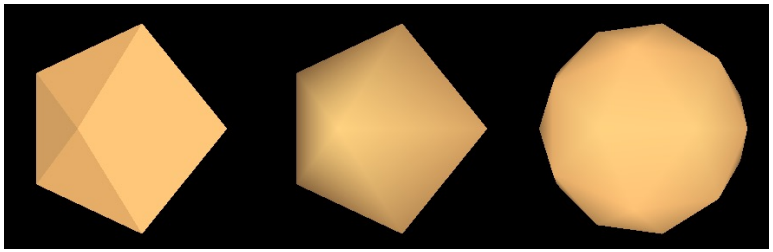
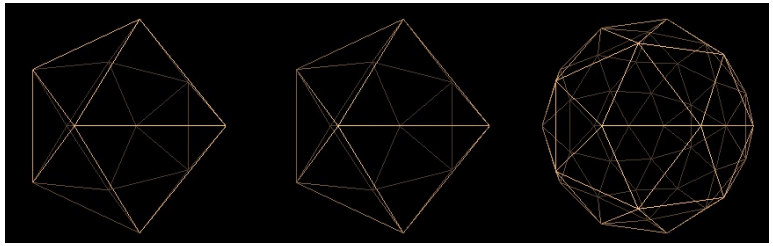
Lighting/Shading SubDivision

2021/06/08

Shading and Subdivision

- Use 3 viewport to display the icoshedron
- 3 Displaying Mode
  - Flat, Interpolate, Subdivision with interpolate shading
- The third viewport shows the icoshedron with adjustable subdivision depth
  - Subdivide once, twice or more…

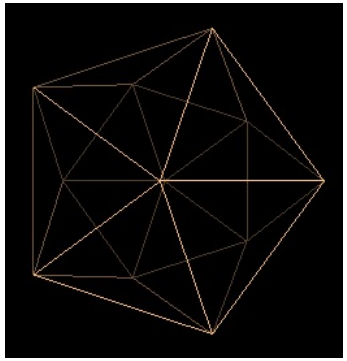




Subdivision

- Use keyboard to control
  - Subdivision depth (+ , -)
    - (apply to the third view port only)
    - recursive how many times
  - Rotate the icosahedron along its own center
    - x-axis, y-axis, z-axis
  - Polygon mode
    - Line, fill

Icosahedron

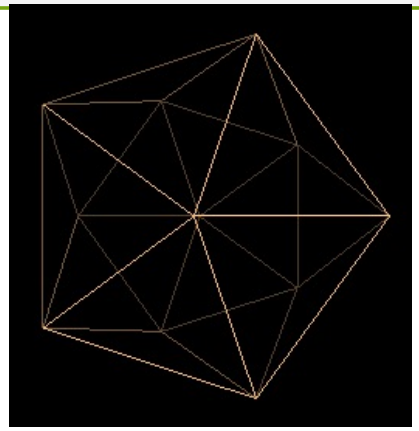


- Approximating a Sphere: using Icosahedron

Define the vertices

```
#define X .525731112119133606
#define Z .850650808352039932
static GLfloat vdata[12][3] = {
                    {-X, 0.0, Z}, {X, 0.0, Z}, {-X, 0.0, -Z}, {X, 0.0, -Z},
                    {0.0, Z, X}, {0.0, Z, -X}, {0.0, -Z, X}, {0.0, -Z, -X},
                    {Z, X, 0.0}, {-Z, X, 0.0}, {Z, -X, 0.0}, {-Z, -X, 0.0}
          };
```

Defining the Faces



- Index into vertex data array

```
static GLuint tindices[20][3] = {
        {1,4,0}, {4,9,0}, {4,9,5}, {8,5,4}, {1,8,4},
        {1,10,8}, {10,3,8}, {8,3,5}, {3,2,5}, {3,7,2},
        {3,10,7}, {10,6,7}, {6,11,7}, {6,0,11}, {6,1,0},
        {10,1,6}, {11,0,9}, {2,11,9}, {5,2,9}, {11,2,7}
};
```

Finish all function in Lab class get extra 5 points.

Submit your code, pdf, demo video before 6/15 midnight