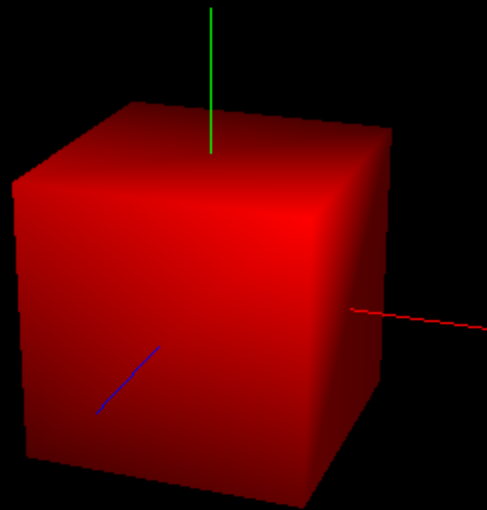


Daily Assignment 17

- In Gouraud shading, one vertex has only one normal. This makes using `glDrawElements()` easier.
- Start from code in today's lecture slides, draw a smooth-shaded cube using code segments in next pages.
 - **What you have to do is to fill the blanks in `createVertexAndIndexArrayIndexed()`**
 - Fill proper "smooth" normal vectors. (You don't need to compute the average of face normals)
 - You may need `normalized()` function to make an arbitrary length vector to a unit vector
 - Your `render()` should call `drawUnitCube_glDrawElements()` to draw a cube
- Change light position & color and material color as you want.



```

def createVertexAndIndexArrayIndexed():
    varr = np.array([
        normalized([ 0.5, 0.5,-0.5]),
        [ 0.5, 0.5,-0.5],
        normalized([-0.5, 0.5,-0.5]),
        [-0.5, 0.5,-0.5],
        normalized([-0.5, 0.5, 0.5]),
        [-0.5, 0.5, 0.5],
        normalized([ 0.5, 0.5, 0.5]),
        [ 0.5, 0.5, 0.5],
        normalized([ 0.5,-0.5, 0.5]),
        [ 0.5,-0.5, 0.5],
        normalized([-0.5,-0.5, 0.5]),
        [-0.5,-0.5, 0.5],
        normalized([-0.5,-0.5,-0.5]),
        [-0.5,-0.5,-0.5],
        normalized([ 0.5,-0.5,-0.5]),
        [ 0.5,-0.5,-0.5],
    ], 'float32')

    iarr = np.array([
        [0,1,2],
        [0,2,3],
        [4,5,6],
        [4,6,7],
        [3,2,5],
        [3,5,4],
        [7,6,1],
        [7,1,0],
        [2,1,6],
        [2,6,5],
        [0,3,4],
        [0,4,7],
    ])

    return varr, iarr

```

