# Tutorial 03
# Basic shapes in OpenGL
# IS2107_2020

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**Activity 1: Drawing a Cube**

**(following code goes within main method)**

a. Create a window with name "My Cube"
   Use **glutCreateWindow(name)** function.
b. Draw a window of size 1500px wide and 1500px in height.
   Use **glutInitWindowSize(width,height)** function.
c. Position the window at x = 0 px and y = 0 px
   Use **glutInitWindowPosition(x,y)**.
d. Create a separate function named createCube.
e. Code following within the **createCube function**.
   i. Make the background color of the window black. Make sure to set the alpha value(transparency) to 1.0.
      Use **glClearColor(R,G,B,alpha)** function.
   ii. Clear the color buffer by using **glClear(mask name)** function. **GL_COLOR_BUFFER_BIT** is the mask that represents the buffers that are currently being used for applying colors
   iii. **glBegin(mode)** used for grouping statements that lead to a specific shape. You can create different shapes such as points, lines, triangles, rectangles, and more, by grouping the required vertices within this grouping statement. The shape that you want to create can be specified by specifying any of the modes: GL_POINTS, GL_LINES, GL_LINE_STRIP, GL_LINE_LOOP, GL_TRIANGLES, GL_TRIANGLE_STRIP, GL_TRIANGLE_FAN, GL_QUADS, GL_QUAD_STRIP, and GL_POLYGON. **glBegin(mode)** ends with **glEnd()**.
   iv. Create six groups of glBegin() to form six faces of a cube by defining vertices. You may use GL_POLYGON as the mode. Use the function **glVertex3f(x,y,z)** to define vertices and **glColor3f(R,G,B)** to set color to the polygons.

   Set colors of the cube as follows:
   - Front: white
   - Back: purple
   - Left and Right: Green
   - Top: Blue

- Bottom: Red

Coordinates (x,y,z) of the vertices of front face are:

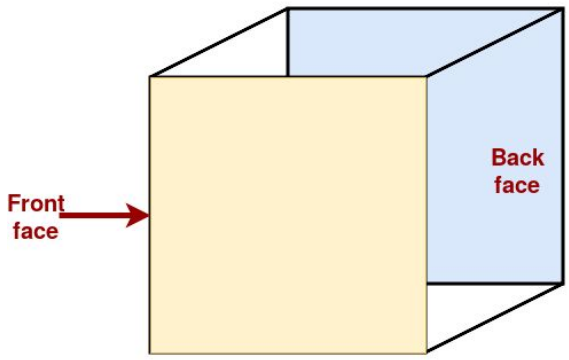
- Bottom left: -0.4, -0.2, 0
- Top left: -0.4, 0.2, 0
- Top right: 0, 0.2, 0
- Bottom right: 0, -0.2, 0

Code for the front face:

```
// White side - Front
   glBegin(GL_POLYGON);
   glColor3f(   1.0,  1.0, 1.0 );
   glVertex3f(  -0.4, -0.2, 0 );
   glVertex3f( -0.4, 0.2, 0 );
   glVertex3f( 0, 0.2, 0 );
   glVertex3f( 0, -0.2, 0 );
   glEnd();
```

Coordinates (x,y,z) of the vertices of back face are:

- Bottom left: -0.2, 0, -0.4
- Top left: -0.2, 0.4, -0.4
- Top right: 0.2, 0.4, -0.4
- Bottom right: 0.2, 0, -0.4




v. Clear all buffers by using **glFlush() function.**

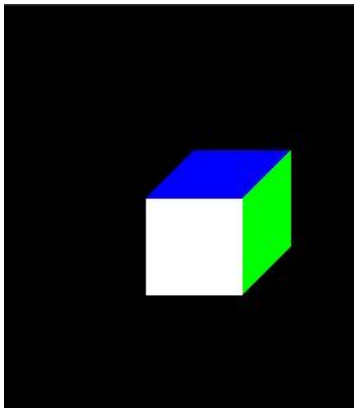
**PS-** Using the coordinates of the front and back face you can find the coordinates for vertices of other faces.

**(Following code goes with in main method)**

f. Call createCube function using the **glutDisplayFunc(callback function).**

g. Set an entry point for the GLUT event processing loop by using **glutMainLoop()** function.

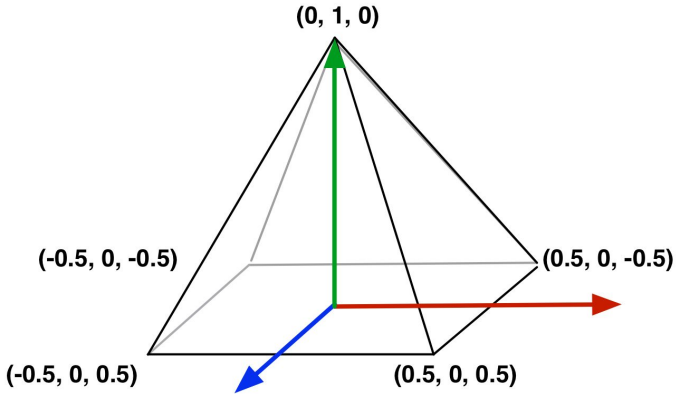
Your final output may look like this.



**Activity 2: Drawing a pyramid**

a. Using the same techniques used in the above activity try to draw a pyramid (use any color according to your preference).

Coordinates of the vertices are given by the following diagram.




You may use GL_TRIANGLES completely or a combination of GL_TRIANGLES with GL_POLYGON or GL_QUADS.

**Hint:** you can form a square shape by using two triangles.

**Upload a zip file containing all the executable codes and screenshots into the VLE. Rename the submission file to Tutorial03_<index_no> when submitting.**