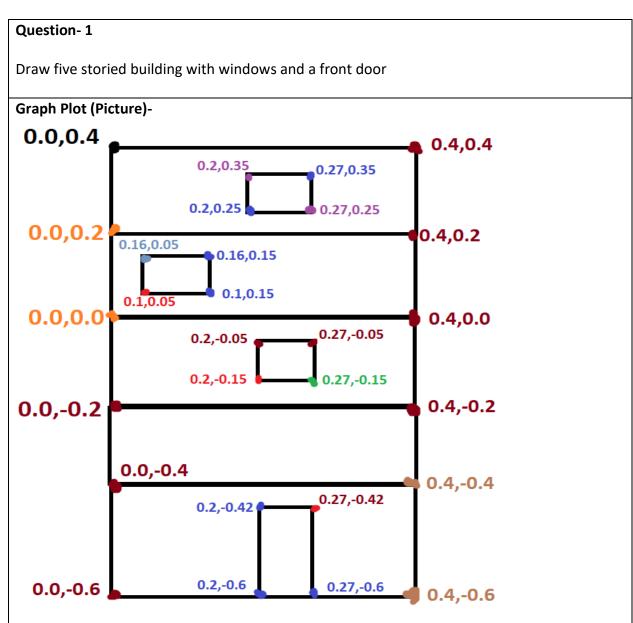
Lab Taks-3

Submission Guidelines-

- Rename the file to your id only. If your id is 18-XXXXX-1, then the file name must be 18-XXXXX-1.docx.
- Must submit within time that will be discussed in class VUES to the section named Lab Tak-3
- Must include resources for all the section in the table



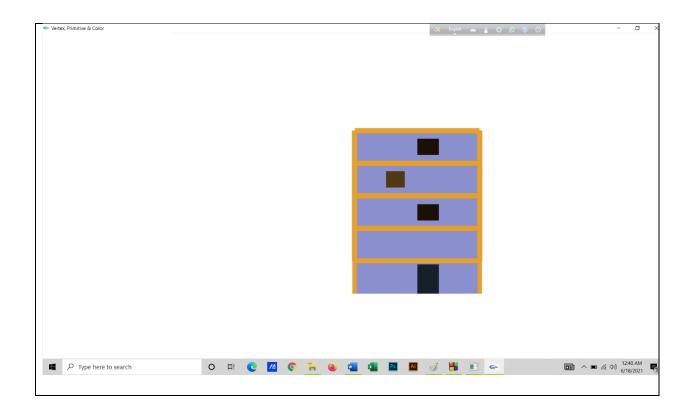
```
Code-
#include <windows.h> // for MS Windows
#include <GL/glut.h> // GLUT, include glu.h and gl.h
/* Initialize OpenGL Graphics */
void initGL() {
       // Set "clearing" or background color
       glClearColor(1.0f, 1.0f, 1.0f, 1.0f); // Black and opaque
}
/* Handler for window-repaint event. Call back when the window first appears and
whenever the window needs to be re-painted. */
void display() {
       glClear(GL COLOR BUFFER BIT); // Clear the color buffer with current clearing
color
     glBegin(GL_POLYGON);
                                   // These vertices form a closed polygon
       glColor3ub(138, 143, 206);
       glVertex2f(0.0f, 0.0f);
       glVertex2f(0.0f, -0.2f);
       glVertex2f(0.4f, -0.2f);
  glVertex2f(0.4f, 0.0f);
  glEnd();
  glLineWidth(13);
       // Draw a Red 1x1 Square centered at origin
       glBegin(GL LINES); // Each set of 4 vertices form a quad
       glColor3ub(229, 160, 46);
       glVertex2f(0.0f, 0.0f);
       glVertex2f(0.0f, -0.2f);
  glVertex2f(0.0f, -0.2f);
  glVertex2f(0.4f, -0.2f);
  glVertex2f(0.4f, -0.2f);
       glVertex2f(0.4f, 0.0f);
       glVertex2f(0.4f, 0.0f);
       glVertex2f(0.0f, 0.0f);
  glEnd();
  glBegin(GL_POLYGON);
                                // These vertices form a closed polygon
       glColor3ub(138, 143, 206);
       glVertex2f(0.0f, -0.2f);
       glVertex2f(0.0f, -0.4f);
       glVertex2f(0.4f, -0.4f);
  glVertex2f(0.4f, -0.2f);
  glEnd();
```

```
glLineWidth(13);
     // Draw a Red 1x1 Square centered at origin
     glBegin(GL_LINES); // Each set of 4 vertices form a quad
     glColor3ub(229, 160, 46);
glVertex2f(0.0f, -0.2f);
     glVertex2f(0.0f, -0.4f);
glVertex2f(0.0f, -0.4f);
     glVertex2f(0.4f, -0.4f);
     glVertex2f(0.4f, -0.4f);
glVertex2f(0.4f, -0.2f);
glVertex2f(0.4f, -0.2f);
glVertex2f(0.0f, -0.2f);
glEnd();
glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
     glColor3ub(138, 143, 206);
     glVertex2f(0.0f, -0.4f);
     glVertex2f(0.0f, -0.6f);
     glVertex2f(0.4f, -0.6f);
glVertex2f(0.4f, -0.4f);
glEnd();
glLineWidth(11);
     // Draw a Red 1x1 Square centered at origin
     glBegin(GL LINES); // Each set of 4 vertices form a quad
     glColor3ub(229, 160, 46);
     glVertex2f(0.0f, -0.4f);
     glVertex2f(0.0f, -0.6f);
     //glVertex2f(0.0f, -0.6f);
glVertex2f(0.4f, -0.6f);
//glVertex2f(0.4f, -0.6f);
glVertex2f(0.4f, -0.4f);
glVertex2f(0.4f, -0.4f);
     glVertex2f(0.0f, -0.4f);
glEnd();
glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
     glColor3ub(138, 143, 206);
     glVertex2f(0.0f, 0.2f);
     glVertex2f(0.0f, 0.0f);
     glVertex2f(0.4f, 0.0f);
glVertex2f(0.4f, 0.2f);
glEnd();
```

```
glLineWidth(13);
     // Draw a Red 1x1 Square centered at origin
     glBegin(GL_LINES); // Each set of 4 vertices form a quad
     glColor3ub(229, 160, 46);
     glVertex2f(0.0f, 0.2f);
     glVertex2f(0.0f, 0.0f);
glVertex2f(0.0f, 0.0f);
     glVertex2f(0.4f, 0.0f);
glVertex2f(0.4f, 0.0f);
glVertex2f(0.4f, 0.2f);
glVertex2f(0.4f, 0.2f);
     glVertex2f(0.0f, 0.2f);
glEnd();
glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
     glColor3ub(138, 143, 206);
     glVertex2f(0.0f, 0.4f);
     glVertex2f(0.0f, 0.2f);
     glVertex2f(0.4f, 0.2f);
glVertex2f(0.4f, 0.4f);
glEnd();
glLineWidth(13);
     // Draw a Red 1x1 Square centered at origin
     glBegin(GL LINES); // Each set of 4 vertices form a quad
     glColor3ub(229, 160, 46);
     glVertex2f(0.0f, 0.4f);
     glVertex2f(0.0f, 0.2f);
glVertex2f(0.0f, 0.2f);
     glVertex2f(0.4f, 0.2f);
glVertex2f(0.4f, 0.2f);
glVertex2f(0.4f, 0.4f);
glVertex2f(0.4f, 0.4f);
glVertex2f(0.0f, 0.4f);
glEnd();
 glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
     glColor3ub(23, 32, 42);
     glVertex2f(0.2f, -0.42f);
     glVertex2f(0.2f, -0.6f);
     glVertex2f(0.27f, -0.6f);
glVertex2f(0.27, -0.42f);
glEnd();
```

```
glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
       glColor3ub(26, 17, 4);
       glVertex2f(0.2f, -0.15);
       glVertex2f(0.27f, -0.15f);
       glVertex2f(0.27f, -0.05f);
  glVertex2f(0.2, -0.05f);
  glEnd();
  glBegin(GL POLYGON);
                               // These vertices form a closed polygon
       glColor3ub(82, 56, 18);
       glVertex2f(0.1f, 0.05);
       glVertex2f(0.16f, 0.05f);
       glVertex2f(0.16f, 0.15f);
  glVertex2f(0.1f, 0.15f);
  glEnd();
  glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
       glColor3ub(26, 17, 4);
       glVertex2f(0.2f, 0.35);
       glVertex2f(0.2f, 0.25f);
       glVertex2f(0.27, 0.25f);
  glVertex2f(0.27f, 0.35f);
  glEnd();
       glFlush(); // Render now
/* Main function: GLUT runs as a console application starting at main() */
int main(int argc, char** argv) {
       glutInit(&argc, argv);
                                 // Initialize GLUT
       glutCreateWindow("Vertex, Primitive & Color"); // Create window with the given
title
       glutInitWindowSize(320, 320); // Set the window's initial width & height
       glutDisplayFunc(display); // Register callback handler for window re-paint event
       initGL();
                           // Our own OpenGL initialization
       glutMainLoop();
                                // Enter the event-processing loop
       return 0;
}
```

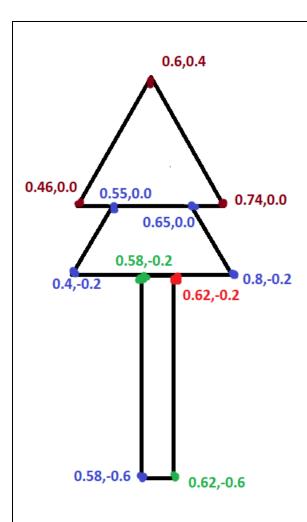
Output Screenshot (Full Screen)-



Question- 2

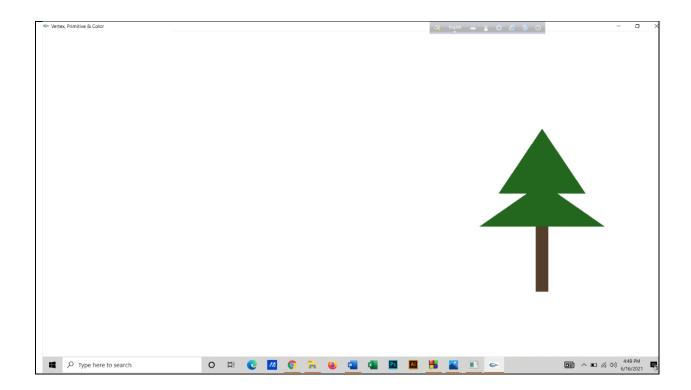
Draw a tree

Graph Plot (Picture)-



```
Code-
#include <windows.h> // for MS Windows
#include <GL/glut.h> // GLUT, include glu.h and gl.h
/* Initialize OpenGL Graphics */
void initGL() {
      // Set "clearing" or background color
      glClearColor(1.0f, 1.0f, 1.0f, 1.0f); // Black and opaque
}
/* Handler for window-repaint event. Call back when the window first appears and
whenever the window needs to be re-painted. */
void display() {
      glClear(GL_COLOR_BUFFER_BIT); // Clear the color buffer with current clearing
color
                              // These vertices form a closed polygon
  glBegin(GL_POLYGON);
       glColor3ub(35, 103, 31);
```

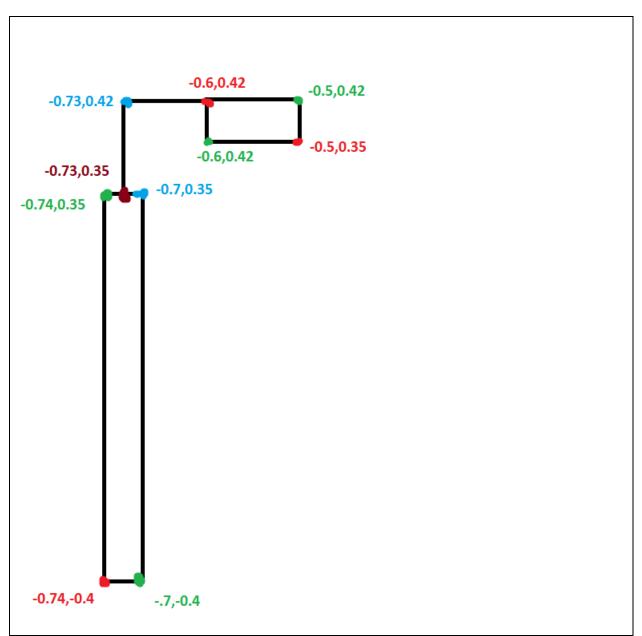
```
glVertex2f(0.46f, 0.0f);
       glVertex2f(0.74f, 0.0f);
       glVertex2f(0.6f, 0.4f);
  glEnd();
  glBegin(GL_POLYGON);
                                // These vertices form a closed polygon
       glColor3ub(35, 103, 31);
       glVertex2f(0.65f, 0.0f);
       glVertex2f(0.55f, 0.0f);
       glVertex2f(0.4f, -0.2f);
  glVertex2f(0.8f, -0.2f);
  glEnd();
  glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
       glColor3ub(85, 62, 43 );
       glVertex2f(0.62f, -0.2f);
       glVertex2f(0.58f, -0.2f);
       glVertex2f(0.58f, -0.6f);
  glVertex2f(0.62f, -0.6f);
  glEnd();
       glFlush(); // Render now
/* Main function: GLUT runs as a console application starting at main() */
int main(int argc, char** argv) {
       glutInit(&argc, argv);
                                 // Initialize GLUT
       glutCreateWindow("Vertex, Primitive & Color"); // Create window with the given
title
       glutInitWindowSize(320, 320); // Set the window's initial width & height
       glutDisplayFunc(display); // Register callback handler for window re-paint event
                           // Our own OpenGL initialization
       initGL();
       glutMainLoop();
                                // Enter the event-processing loop
       return 0;
}
Output Screenshot (Full Screen)-
```



Question- 3

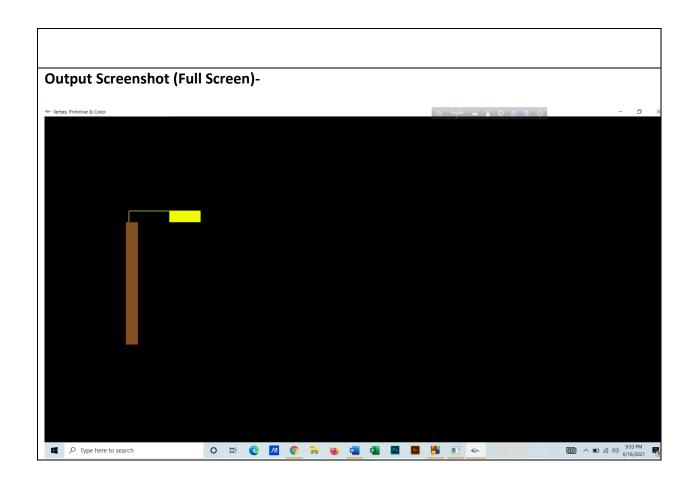
Draw a lamppost with black background

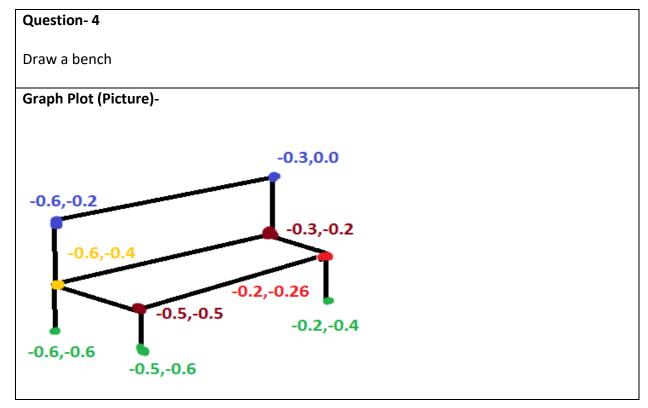
Graph Plot (Picture)-



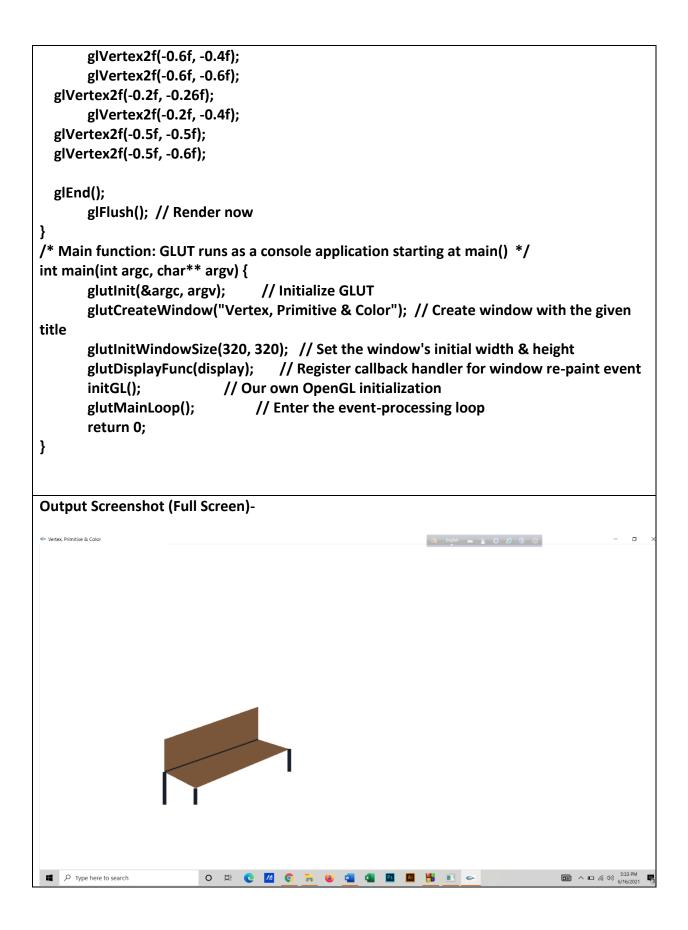
Code-

```
/* Handler for window-repaint event. Call back when the window first appears and
whenever the window needs to be re-painted. */
void display() {
      glClear(GL COLOR BUFFER BIT); // Clear the color buffer with current clearing
color
  glBegin(GL_POLYGON);
                                // These vertices form a closed polygon
       glColor3ub(130, 80, 33);
       glVertex2f(-0.74f, 0.35f);
       glVertex2f(-0.74f, -0.4f);
       glVertex2f(-0.7f, -0.4f);
  glVertex2f(-0.7f, 0.35f);
  glEnd();
  glLineWidth(3);
       // Draw a Red 1x1 Square centered at origin
       glBegin(GL LINES); // Each set of 4 vertices form a quad
       glColor3ub(121, 125, 32);
  glVertex2f(-0.5f, 0.42f);
  glVertex2f(-0.73f, 0.42f);
  glVertex2f(-0.73f, 0.42f);
  glVertex2f(-0.73f, 0.35f);
  glEnd();
  glBegin(GL_POLYGON);
                                // These vertices form a closed polygon
       glColor3ub(241, 252, 0);
       glVertex2f(-0.5f, 0.42f);
       glVertex2f(-0.6f, 0.42f);
       glVertex2f(-0.6f, 0.35f);
  glVertex2f(-0.5f, 0.35f);
 glEnd();
       glFlush(); // Render now
/* Main function: GLUT runs as a console application starting at main() */
int main(int argc, char** argv) {
       glutInit(&argc, argv);
                                // Initialize GLUT
       glutCreateWindow("Vertex, Primitive & Color"); // Create window with the given
title
       glutInitWindowSize(320, 320); // Set the window's initial width & height
       glutDisplayFunc(display); // Register callback handler for window re-paint event
                           // Our own OpenGL initialization
       initGL();
       glutMainLoop();
                                // Enter the event-processing loop
       return 0;
```





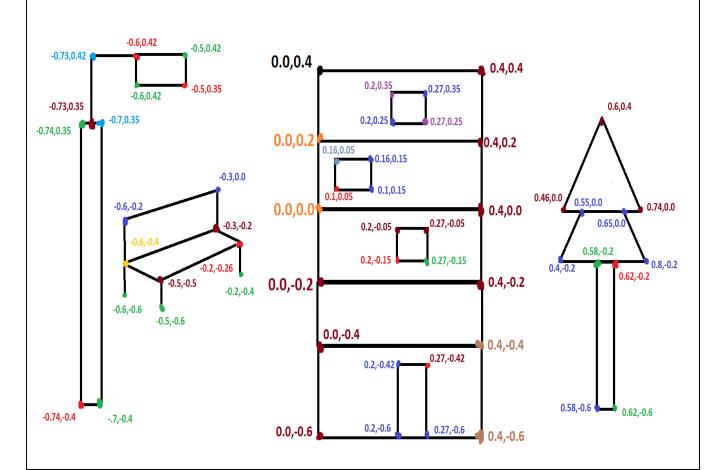
```
Code-
#include <windows.h> // for MS Windows
#include <GL/glut.h> // GLUT, include glu.h and gl.h
/* Initialize OpenGL Graphics */
void initGL() {
       // Set "clearing" or background color
       glClearColor(1.0f, 1.0f, 1.0f, 1.0f); // Black and opaque
}
/* Handler for window-repaint event. Call back when the window first appears and
whenever the window needs to be re-painted. */
void display() {
       glClear(GL COLOR BUFFER BIT); // Clear the color buffer with current clearing
color
  glBegin(GL POLYGON);
                                // These vertices form a closed polygon
       glColor3ub(121, 85, 57);
       glVertex2f(-0.3f, 0.0f);
       glVertex2f(-0.6f, -0.2f);
       glVertex2f(-0.6f, -0.4f);
  glVertex2f(-0.3f, -0.2f);
  glEnd();
  glBegin(GL_POLYGON);
                                // These vertices form a closed polygon
       glColor3ub(121, 85, 57);
       glVertex2f(-0.3f, -0.2f);
       glVertex2f(-0.6f, -0.4f);
       glVertex2f(-0.5f, -0.5f);
  glVertex2f(-0.2f, -0.26f);
  glEnd();
  glLineWidth(3);
       // Draw a Red 1x1 Square centered at origin
       glBegin(GL LINES); // Each set of 4 vertices form a quad
       glColor3ub(23, 32, 42);
       glVertex2f(-0.3f, -0.2f);
       glVertex2f(-0.6f, -0.4f);
  glEnd();
  glLineWidth(9);
       // Draw a Red 1x1 Square centered at origin
       glBegin(GL LINES); // Each set of 4 vertices form a quad
       glColor3ub(23, 32, 42);
```



Question-5

Use the building, tree, lamppost and bench to create a scenario

Graph Plot (Picture)-



Code-

```
glClear(GL_COLOR_BUFFER_BIT); // Clear the color buffer with current clearing color
glBegin(GL POLYGON);
                             // These vertices form a closed polygon
     glColor3ub(130, 80, 33);
     glVertex2f(-0.74f, 0.35f);
     glVertex2f(-0.74f, -0.4f);
     glVertex2f(-0.7f, -0.4f);
glVertex2f(-0.7f, 0.35f);
glEnd();
glLineWidth(3);
    // Draw a Red 1x1 Square centered at origin
     glBegin(GL_LINES); // Each set of 4 vertices form a quad
     glColor3ub(121, 125, 32);
glVertex2f(-0.5f, 0.42f);
glVertex2f(-0.73f, 0.42f);
glVertex2f(-0.73f, 0.42f);
glVertex2f(-0.73f, 0.35f);
glEnd();
glBegin(GL POLYGON);
                              // These vertices form a closed polygon
     glColor3ub(241, 252, 0);
     glVertex2f(-0.5f, 0.42f);
     glVertex2f(-0.6f, 0.42f);
     glVertex2f(-0.6f, 0.35f);
glVertex2f(-0.5f, 0.35f);
glEnd();
glBegin(GL_POLYGON);
                              // These vertices form a closed polygon
     glColor3ub(121, 85, 57);
     glVertex2f(-0.3f, 0.0f);
     glVertex2f(-0.6f, -0.2f);
     glVertex2f(-0.6f, -0.4f);
glVertex2f(-0.3f, -0.2f);
glEnd();
glBegin(GL POLYGON);
                              // These vertices form a closed polygon
     glColor3ub(121, 85, 57);
    glVertex2f(-0.3f, -0.2f);
     glVertex2f(-0.6f, -0.4f);
     glVertex2f(-0.5f, -0.5f);
glVertex2f(-0.2f, -0.26f);
glEnd();
glLineWidth(3);
     // Draw a Red 1x1 Square centered at origin
```

```
glBegin(GL_LINES); // Each set of 4 vertices form a quad
     glColor3ub(23, 32, 42);
     glVertex2f(-0.3f, -0.2f);
     glVertex2f(-0.6f, -0.4f);
glEnd();
glLineWidth(9);
     // Draw a Red 1x1 Square centered at origin
     glBegin(GL_LINES); // Each set of 4 vertices form a quad
     glColor3ub(23, 32, 42);
     glVertex2f(-0.6f, -0.4f);
     glVertex2f(-0.6f, -0.6f);
glVertex2f(-0.2f, -0.26f);
     glVertex2f(-0.2f, -0.4f);
glVertex2f(-0.5f, -0.5f);
glVertex2f(-0.5f, -0.6f);
glEnd();
  glBegin(GL_POLYGON);
                                 // These vertices form a closed polygon
     glColor3ub(35, 103, 31);
     glVertex2f(0.46f, 0.0f);
     glVertex2f(0.74f, 0.0f);
     glVertex2f(0.6f, 0.4f);
glEnd();
glBegin(GL_POLYGON);
                              // These vertices form a closed polygon
     glColor3ub(35, 103, 31 );
     glVertex2f(0.65f, 0.0f);
     glVertex2f(0.55f, 0.0f);
     glVertex2f(0.4f, -0.2f);
glVertex2f(0.8f, -0.2f);
glEnd();
glBegin(GL POLYGON);
                              // These vertices form a closed polygon
     glColor3ub(85, 62, 43 );
     glVertex2f(0.62f, -0.2f);
     glVertex2f(0.58f, -0.2f);
     glVertex2f(0.58f, -0.6f);
glVertex2f(0.62f, -0.6f);
glEnd();
```

```
glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
     glColor3ub(138, 143, 206);
     glVertex2f(0.0f, 0.0f);
     glVertex2f(0.0f, -0.2f);
     glVertex2f(0.4f, -0.2f);
glVertex2f(0.4f, 0.0f);
glEnd();
glLineWidth(13);
     // Draw a Red 1x1 Square centered at origin
     glBegin(GL_LINES); // Each set of 4 vertices form a quad
     glColor3ub(229, 160, 46);
     glVertex2f(0.0f, 0.0f);
     glVertex2f(0.0f, -0.2f);
glVertex2f(0.0f, -0.2f);
glVertex2f(0.4f, -0.2f);
glVertex2f(0.4f, -0.2f);
     glVertex2f(0.4f, 0.0f);
     glVertex2f(0.4f, 0.0f);
     glVertex2f(0.0f, 0.0f);
glEnd();
glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
     glColor3ub(138, 143, 206);
     glVertex2f(0.0f, -0.2f);
     glVertex2f(0.0f, -0.4f);
     glVertex2f(0.4f, -0.4f);
glVertex2f(0.4f, -0.2f);
glEnd();
 glLineWidth(13);
     // Draw a Red 1x1 Square centered at origin
     glBegin(GL_LINES); // Each set of 4 vertices form a quad
     glColor3ub(229, 160, 46);
glVertex2f(0.0f, -0.2f);
     glVertex2f(0.0f, -0.4f);
glVertex2f(0.0f, -0.4f);
     glVertex2f(0.4f, -0.4f);
     glVertex2f(0.4f, -0.4f);
glVertex2f(0.4f, -0.2f);
glVertex2f(0.4f, -0.2f);
glVertex2f(0.0f, -0.2f);
glEnd();
```

```
glBegin(GL POLYGON);
                               // These vertices form a closed polygon
     glColor3ub(138, 143, 206);
     glVertex2f(0.0f, -0.4f);
     glVertex2f(0.0f, -0.6f);
     glVertex2f(0.4f, -0.6f);
glVertex2f(0.4f, -0.4f);
glEnd();
glLineWidth(11);
     // Draw a Red 1x1 Square centered at origin
     glBegin(GL_LINES); // Each set of 4 vertices form a quad
     glColor3ub(229, 160, 46);
     glVertex2f(0.0f, -0.4f);
     glVertex2f(0.0f, -0.6f);
     //glVertex2f(0.0f, -0.6f);
glVertex2f(0.4f, -0.6f);
//glVertex2f(0.4f, -0.6f);
glVertex2f(0.4f, -0.4f);
glVertex2f(0.4f, -0.4f);
     glVertex2f(0.0f, -0.4f);
glEnd();
glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
     glColor3ub(138, 143, 206);
     glVertex2f(0.0f, 0.2f);
     glVertex2f(0.0f, 0.0f);
     glVertex2f(0.4f, 0.0f);
glVertex2f(0.4f, 0.2f);
glEnd();
glLineWidth(13);
     // Draw a Red 1x1 Square centered at origin
     glBegin(GL_LINES); // Each set of 4 vertices form a quad
     glColor3ub(229, 160, 46);
     glVertex2f(0.0f, 0.2f);
     glVertex2f(0.0f, 0.0f);
glVertex2f(0.0f, 0.0f);
     glVertex2f(0.4f, 0.0f);
glVertex2f(0.4f, 0.0f);
glVertex2f(0.4f, 0.2f);
glVertex2f(0.4f, 0.2f);
     glVertex2f(0.0f, 0.2f);
glEnd();
```

```
glBegin(GL POLYGON);
                              // These vertices form a closed polygon
     glColor3ub(138, 143, 206);
     glVertex2f(0.0f, 0.4f);
     glVertex2f(0.0f, 0.2f);
     glVertex2f(0.4f, 0.2f);
glVertex2f(0.4f, 0.4f);
glEnd();
glLineWidth(13);
    // Draw a Red 1x1 Square centered at origin
     glBegin(GL_LINES); // Each set of 4 vertices form a quad
     glColor3ub(229, 160, 46);
     glVertex2f(0.0f, 0.4f);
     glVertex2f(0.0f, 0.2f);
glVertex2f(0.0f, 0.2f);
    glVertex2f(0.4f, 0.2f);
glVertex2f(0.4f, 0.2f);
glVertex2f(0.4f, 0.4f);
glVertex2f(0.4f, 0.4f);
glVertex2f(0.0f, 0.4f);
glEnd();
 glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
     glColor3ub(23, 32, 42);
     glVertex2f(0.2f, -0.42f);
     glVertex2f(0.2f, -0.6f);
     glVertex2f(0.27f, -0.6f);
glVertex2f(0.27, -0.42f);
glEnd();
glBegin(GL POLYGON);
                              // These vertices form a closed polygon
     glColor3ub(26, 17, 4);
    glVertex2f(0.2f, -0.15);
     glVertex2f(0.27f, -0.15f);
     glVertex2f(0.27f, -0.05f);
glVertex2f(0.2, -0.05f);
glEnd();
glBegin(GL POLYGON);
                              // These vertices form a closed polygon
     glColor3ub(82, 56, 18 );
     glVertex2f(0.1f, 0.05);
     glVertex2f(0.16f, 0.05f);
```

```
glVertex2f(0.16f, 0.15f);
  glVertex2f(0.1f, 0.15f);
  glEnd();
  glBegin(GL_POLYGON);
                               // These vertices form a closed polygon
       glColor3ub(26, 17, 4);
       glVertex2f(0.2f, 0.35);
       glVertex2f(0.2f, 0.25f);
       glVertex2f(0.27, 0.25f);
  glVertex2f(0.27f, 0.35f);
  glEnd();
       glFlush(); // Render now
}
/* Main function: GLUT runs as a console application starting at main() */
int main(int argc, char** argv) {
       glutInit(&argc, argv);
                                 // Initialize GLUT
       glutCreateWindow("Vertex, Primitive & Color"); // Create window with the given title
       glutInitWindowSize(320, 320); // Set the window's initial width & height
       glutDisplayFunc(display); // Register callback handler for window re-paint event
       initGL();
                           // Our own OpenGL initialization
       glutMainLoop();
                                // Enter the event-processing loop
       return 0;
}
```

Output Screenshot (Full Screen)-

