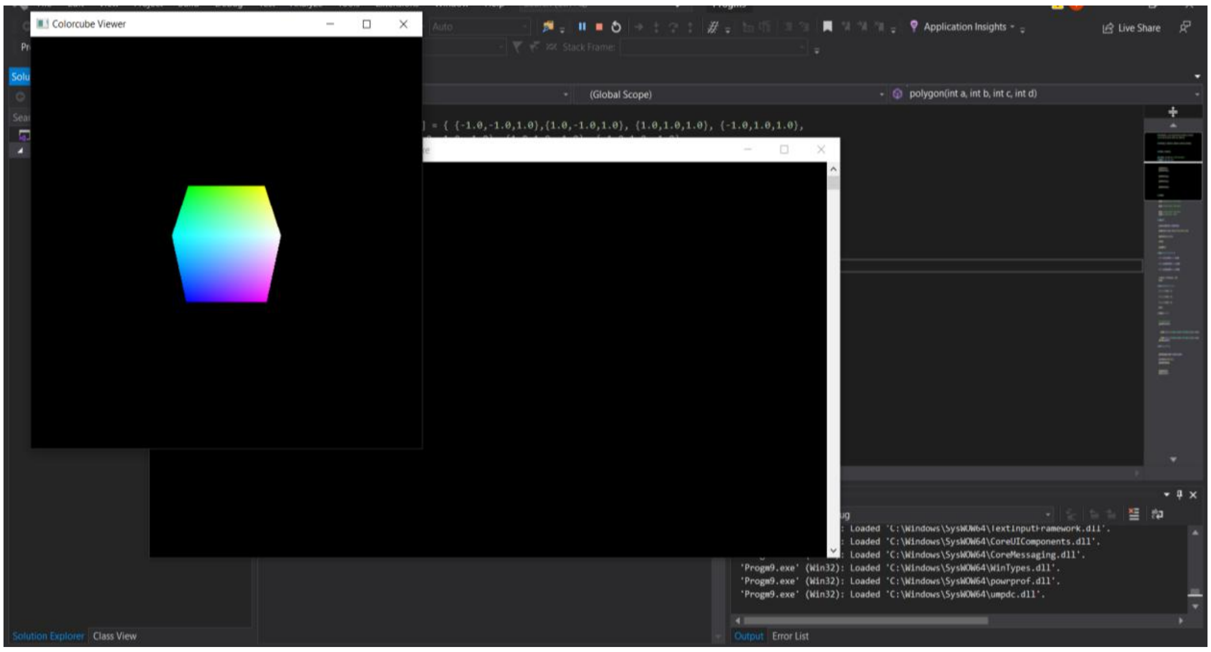
10) Write a program to create a color cube and spin it using OpenGL transformations.

```
#include<GL/glut.h>
                                GLfloat vertices[8][3] = { {-1.0,-1.0,1.0},{1.0,-1.0,1.0},
                                {1.0,1.0,1.0}, {-1.0,1.0,1.0},
                                 {-1.0,-1.0,-1.0}, {1.0,-1.0,-1.0}, {1.0,1.0,-1.0}, {-1.0,1.0,-
                                1.0}
                                };
                                GLfloat colors[8][3] = { {0.0,0.0,1.0}, {1.0,0.0,1.0},
                                {1.0,1.0,1.0}, {0.0,1.0,1.0},
                                {0.0,0.0,0.0},{1.0,0.0,0.0}, {1.0,1.0,0.0}, {0.0,1.0,0.0}
                                };
                                GLfloat theta[] = { 0.0,0.0,0.0 };
                                GLint axis = 2;
                                GLdouble viewer[] = { 0.0, 0.0, 5.0 }; /* initial viewer location
                                */
                                void polygon(int a, int b, int c, int d)
                                {
                                        glBegin(GL_POLYGON);
                                        glColor3fv(colors[a]);
                                        glVertex3fv(vertices[a]);
                                        glColor3fv(colors[b]);
                                        glVertex3fv(vertices[b]);
                                        glColor3fv(colors[c]);
                                        glVertex3fv(vertices[c]);
                                        glColor3fv(colors[d]);
                                        glVertex3fv(vertices[d]);
                                        glEnd();
                                }
                                void colorcube()
                                {
                                        polygon(0, 3, 2, 1); // front face - counter clockwise
                                        polygon(4, 5, 6, 7); // back face - clockwise
                                        polygon(2, 3, 7, 6); // front face - counter clockwise
                                        polygon(1, 5, 4, 0); // back face - clockwise
                                        polygon(1, 2, 6, 5); // front face - counter clockwise
                                        polygon(0, 4, 7, 3); // back face - clockwise
                                }
                                void display(void)
                                {
                                        glClear(GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT);
                                        glLoadIdentity();
                                        gluLookAt(viewer[0], viewer[1], viewer[2], 0.0, 0.0, 0.0,
                                0.0, 1.0, 0.0);
                                        glRotatef(theta[0], 1.0, 0.0, 0.0);
                                        glRotatef(theta[1], 0.0, 1.0, 0.0);
                                        glRotatef(theta[2], 0.0, 0.0, 1.0);
```

```
        colorcube();
        glFlush();
        glutSwapBuffers();
}
void mouse(int btn, int state, int x, int y)
{
        if (btn == GLUT_LEFT_BUTTON && state == GLUT_DOWN)
                axis = 0;
        if (btn == GLUT_MIDDLE_BUTTON && state == GLUT_DOWN)
                axis = 1;
        if (btn == GLUT_RIGHT_BUTTON && state == GLUT_DOWN)
                axis = 2;
        theta[axis] += 2.0;
        if (theta[axis] > 360.0) theta[axis] -= 360.0;
        display();
}
void keys(unsigned char key, int x, int y)
{
        if (key == 'x') viewer[0] -= 1.0;
        if (key == 'X') viewer[0] += 1.0;
        if (key == 'y') viewer[1] -= 1.0;
        if (key == 'Y') viewer[1] += 1.0;
        if (key == 'z') viewer[2] -= 1.0;
        if (key == 'Z') viewer[2] += 1.0;
        display();
}
void myReshape(int w, int h)
{
        glViewport(0, 0, w, h);
        /* Use a perspective view */
        glMatrixMode(GL_PROJECTION);
        glLoadIdentity();
        if (w <= h)
                glFrustum(-2.0, 2.0, -2.0 * (GLfloat)h /
(GLfloat)w, 2.0 * (GLfloat)h / (GLfloat)w, 2.0, 20.0);
        else
                glFrustum(-2.0, 2.0, -2.0 * (GLfloat)w /
(GLfloat)h, 2.0 * (GLfloat)w / (GLfloat)h, 2.0, 20.0);
        glMatrixMode(GL_MODELVIEW);
}
void main(int argc, char** argv)
{
        glutInit(&argc, argv);
        glutInitDisplayMode(GLUT_DOUBLE | GLUT_RGB | GLUT_DEPTH);
        glutInitWindowSize(500, 500);
        glutCreateWindow("Colorcube Viewer");
        glutReshapeFunc(myReshape);
        glutDisplayFunc(display);
        glutMouseFunc(mouse);
        glutKeyboardFunc(keys);
        glEnable(GL_DEPTH_TEST);
        glutMainLoop();
}
```



```
] = { {-1.0,-1.0,1.0},{1.0,-1.0,1.0}, {1.0,1.0,1.0}, {-1.0,1.0,1.0},
```

```
: Loaded 'C:\Windows\SysWOW64\TextInputFramework.dll'.
: Loaded 'C:\Windows\SysWOW64\CoreUIComponents.dll'.
: Loaded 'C:\Windows\SysWOW64\CoreMessaging.dll'.
'Progm9.exe' (Win32): Loaded 'C:\Windows\SysWOW64\WinTypes.dll'.
'Progm9.exe' (Win32): Loaded 'C:\Windows\SysWOW64\powrprof.dll'.
'Progm9.exe' (Win32): Loaded 'C:\Windows\SysWOW64\umpdc.dll'.
```