

OpenGL in Python

Working with OpenGL

To start download : <https://www.lfd.uci.edu/~gohlke/pythonlibs/#pyopengl>

- ✓ PyOpenGL-3.1.6-cp311-cp311-win_amd64.whl
- ✓ PyOpenGL_accelerate-3.1.6-cp311-cp311-win_amd64.whl

The install it using pip

Question 1: Callback in OpenGL

```
from OpenGL.GL import *
from OpenGL.GLUT import *
import sys

window_width = 800
window_height = 600

def display():
    glClear(GL_COLOR_BUFFER_BIT)
    glBegin(GL_TRIANGLES)
    glVertex2f(-0.5, -0.5)
    glVertex2f(0.5, -0.5)
    glVertex2f(0.0, 0.5)
    glEnd()
    glFlush()

def reshape(width, height):
    global window_width, window_height
    window_width = width
    window_height = height
    glViewport(0, 0, width, height)
    glMatrixMode(GL_PROJECTION)
    glLoadIdentity()
    glOrtho(-1, 1, -1, 1, -1, 1)
    glMatrixMode(GL_MODELVIEW)
    glLoadIdentity()

def keyboard(key, x, y):
    if key == b'\x1b': # Escape key
        glutLeaveMainLoop()

def mouse(button, state, x, y):
    if button == GLUT_LEFT_BUTTON and state == GLUT_DOWN:
        print("Left mouse button clicked at ({}, {})".format(x, y))

def idle():
    glutPostRedisplay()

def main():
```

```

glutInit(sys.argv)
glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB)
glutInitWindowSize(window_width, window_height)
glutCreateWindow(b"OpenGL Callbacks")

glClearColor(0.0, 0.0, 0.0, 1.0)

# Registering callbacks
glutDisplayFunc(display)
glutReshapeFunc(reshape)
glutKeyboardFunc(keyboard)
glutMouseFunc(mouse)
glutIdleFunc(idle)

glutMainLoop()

if __name__ == "__main__":
    main()

```

Question 2: Drawing Pixel in OpenGL

```

from OpenGL.GL import *
from OpenGL.GLUT import *
from OpenGL.raw.GLU import gluOrtho2D

def draw_pixel(x, y):
    glBegin(GL_POINTS)
    glVertex2f(x, y)
    glEnd()

def display():
    glClear(GL_COLOR_BUFFER_BIT)
    glColor3f(1.0, 1.0, 1.0) # Set color to white

    draw_pixel(100, 100)
    glFlush()

def main():
    glutInit()
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB)
    glutInitWindowSize(400, 400)
    glutCreateWindow(b"Drawing Pixels")

    glClearColor(0.0, 0.0, 0.0, 1.0)
    glMatrixMode(GL_PROJECTION)
    glLoadIdentity()
    gluOrtho2D(0, 400, 0, 400)

    glutDisplayFunc(display)
    glutMainLoop()

if __name__ == "__main__":
    main()

```

Question 3: Drawing a line in OpenGL

```
from OpenGL.GL import *
from OpenGL.GLUT import *
from OpenGL.raw.GLU import gluOrtho2D

def draw_line(x1, y1, x2, y2):
    glBegin(GL_LINES)
    glVertex2f(x1, y1)
    glVertex2f(x2, y2)
    glEnd()

def display():
    glClear(GL_COLOR_BUFFER_BIT)
    glColor3f(1.0, 1.0, 1.0) # Set color to white
    draw_line(100, 100, 300, 300)

    glFlush()

def main():
    glutInit()
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB)
    glutInitWindowSize(400, 400)
    glutCreateWindow(b"Drawing Lines")

    glClearColor(0.0, 0.0, 0.0, 1.0)
    glMatrixMode(GL_PROJECTION)
    glLoadIdentity()
    gluOrtho2D(0, 400, 0, 400)

    glutDisplayFunc(display)
    glutMainLoop()

if __name__ == "__main__":
    main()
```

Question 4: Drawing polygon in OpenGL

```
from OpenGL.GL import *
from OpenGL.GLUT import *
from OpenGL.raw.GLU import gluOrtho2D

def draw_polygon():
    glBegin(GL_POLYGON)
    glVertex2f(100, 100)
    glVertex2f(300, 100)
    glVertex2f(200, 300)
    glEnd()

def display():
    glClear(GL_COLOR_BUFFER_BIT)
    glColor3f(1.0, 1.0, 1.0) # Set color to white
```

```

draw_polygon()

glFlush()

def main():
    glutInit()
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB)
    glutInitWindowSize(400, 400)
    glutCreateWindow(b"Drawing Polygons")

    glClearColor(0.0, 0.0, 0.0, 1.0)
    glMatrixMode(GL_PROJECTION)
    glLoadIdentity()
    gluOrtho2D(0, 400, 0, 400)

    glutDisplayFunc(display)
    glutMainLoop()

if __name__ == "__main__":
    main()

```

Question 5: Viewing & Lighting in OpenGL

```

from OpenGL.GL import *
from OpenGL.GLUT import *
from OpenGL.raw.GLU import gluPerspective, gluLookAt

def init():
    glEnable(GL_DEPTH_TEST)
    glEnable(GL_LIGHTING)
    glEnable(GL_LIGHT0)
    glLightfv(GL_LIGHT0, GL_POSITION, [0.0, 1.0, 1.0, 0.0])
    glEnable(GL_COLOR_MATERIAL)

def display():
    glClear(GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT)
    glMatrixMode(GL_MODELVIEW)
    glLoadIdentity()
    gluLookAt(0.0, 0.0, 5.0,
              0.0, 0.0, 0.0,
              0.0, 1.0, 0.0)

    glutSolidSphere(1.0, 50, 50)
    glFlush()

def main():
    glutInit()
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB | GLUT_DEPTH)
    glutInitWindowSize(400, 400)
    glutCreateWindow(b"Viewing and Lighting in OpenGL")
    glClearColor(0.0, 0.0, 0.0, 1.0)
    glMatrixMode(GL_PROJECTION)
    gluPerspective(45, 1.0, 0.1, 100)
    init()

```

```
glutDisplayFunc(display)
glutMainLoop()

if __name__ == "__main__":
    main()
```

Conclusion

- What did u learn?