Kathmandu University

Department of Computer Science and Engineering

Dhulikhel, Kavre

COMP 342

LAB 1

SUBMITTED BY:
Ashish Subedi
CE
ROLL NO: 53

SUBMITTED TO:
Mr. DHIRAJ SHRESTHA
DOCSE

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1. **Mention the name of Programming language and Graphics Library you are using this semester for performing your Computer Graphics Lab and Project**

   Programming Language: Python
   Graphics Library: pyopengl

2. **Write the code snippets for setting graphics environment in your chosen graphics library and display the resolution of your display system through functions/classes provided by your graphics library**

```
import glfw



# Raise exception if not initialized
if not glfw.init():
   raise Exception("GLFW cannot be initialized")

# Create GLFW window handle
window = glfw.create_window(640, 480, "Lab 1", None, None)
# If failed, terminate and raise exception
if not window:
   glfw.terminate()
   raise Exception("GLFW window cannot be creted")
# Set current position to specified position
glfw.set_window_pos(window, 400, 200)
# Create the context for the window
glfw.make_context_current(window)




print(glfw.get_window_size(window))
# Main loop
while not glfw.window_should_close(window):
   glfw.poll_events()

   glfw.swap_buffers(window)
```

```
glfw.terminate()
```

Resolution of display system provided by glfw windows is 640*480.

3. **Get familiar with the coordinate system and draw a flag of Nepal using the chosen graphics geometrical functions and classes provided by your chosen graphics library and also colour the flag accordingly.**

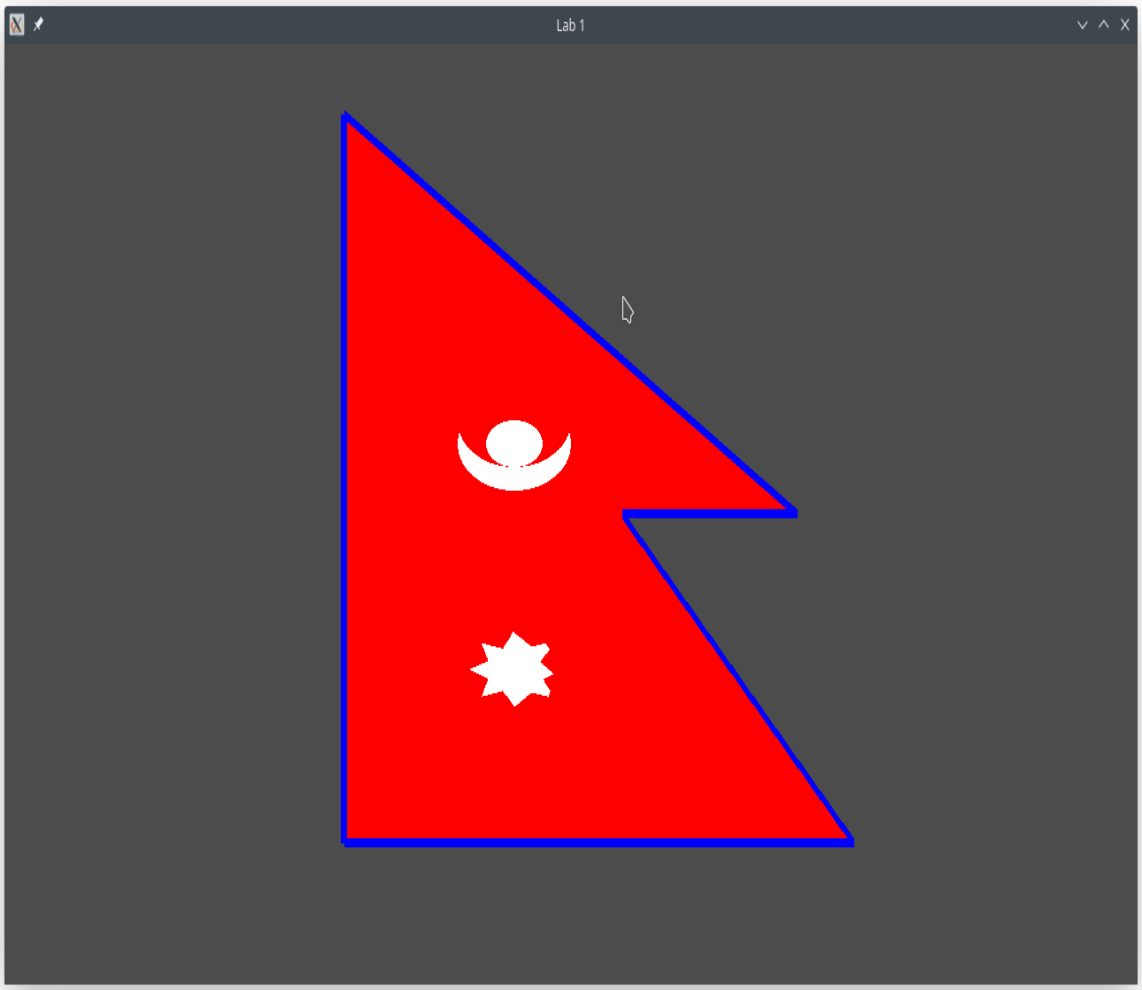
```
import glfw
from OpenGL.GL import *
import numpy as np
from numpy import sin,cos

def circle1(x, y, radius):
    angle = 0.0
    glBegin(GL_POLYGON)
    for i in range(100):

        angle = i*2*(np.pi/100)
        glVertex2f(x+(cos(angle)*radius),y+(sin(angle)*radius))

    glEnd()

# Raise exception if not initialized
if not glfw.init():
    raise Exception("GLFW cannot be initialized")

# Create GLFW window handle
window = glfw.create_window(1280, 720, "Lab 1", None, None)
# If failed, terminate and raise exception
if not window:
    glfw.terminate()
    raise Exception("GLFW window cannot be creted")
# Set current position to specified position
glfw.set_window_pos(window, 400, 200)
# Create the context for the window
glfw.make_context_current(window)

x_offest = -.32
y_offset = -.99
scale = 2
```

```
vertices = np.array([
   scale*(0.150)+x_offest,scale*(0.330)+y_offset,0,
   scale*(0.132)+x_offest,scale*(0.320)+y_offset,0,
   scale*(0.140)+x_offest,scale*(0.301)+y_offset,0,
   scale*(0.119)+x_offest,scale*(0.307)+y_offset,0,
   scale*(0.110)+x_offest,scale*(0.290)+y_offset,0,
   scale*(0.100)+x_offest,scale*(0.307)+y_offset,0,
   scale*(0.081)+x_offest,scale*(0.301)+y_offset,0,
   scale*(0.087)+x_offest,scale*(0.320)+y_offset,0,
   scale*(0.070)+x_offest,scale*(0.330)+y_offset,0,
   scale*(0.087)+x_offest,scale*(0.339)+y_offset,0,
   scale*(0.081)+x_offest,scale*(0.358)+y_offset,0,
   scale*(0.100)+x_offest,scale*(0.352)+y_offset,0,
   scale*(0.109)+x_offest,scale*(0.370)+y_offset,0,
   scale*(0.119)+x_offest,scale*(0.352)+y_offset,0,
   scale*(0.138)+x_offest,scale*(0.358)+y_offset,0,
   scale*(0.132)+x_offest,scale*(0.359)+y_offset,0,
   scale*(0.132)+x_offest,scale*(0.359)+y_offset,0,
],dtype=np.float32)

glEnableClientState(GL_VERTEX_ARRAY)
glVertexPointer(3,GL_FLOAT,0,vertices)

glClearColor(0.3,0.3,0.3,.3)

# Main loop
while not glfw.window_should_close(window):
   glfw.poll_events()
   glClear(GL_COLOR_BUFFER_BIT)
   # Draws the shape of in red

   glColor3f(1.0,0.,0.)
   glBegin(GL_POLYGON)
   glVertex3f(-0.4,0.85,0)
```

```
glVertex3f(0.4, 0.0, 0)
glVertex3f(-0.2, 0.0, 0)
glVertex3f(0.5, -0.7, 0)
glVertex3f(-0.4, -0.7, 0)
glEnd()

#Outlines blue border
glColor3f(0.0,0.,1.)
glLineWidth(10)

glBegin(GL_LINE_LOOP)
glVertex3f(-0.4,0.85,0)
glVertex3f(0.4, 0.0, 0)
glVertex3f(0.09, 0.0, 0)
glVertex3f(0.5, -0.7, 0)
glVertex3f(-0.4, -0.7, 0)
glEnd()



#Moon

glColor3f(1.0,1.0,1.0)
circle1(-0.1,0.15,0.1)
glColor3f(1.0,0.0,0.0)
circle1(-0.1,0.2,0.1)
glColor3f(1.0,1.0,1.0)
circle1(-0.1,0.15,0.05)

#Sun
 glColor3f(1.0,1.0,1.0)
glDrawArrays(GL_TRIANGLE_FAN,0, 15)

glColor3f(1.0,0.0,0)
glBegin(GL_TRIANGLES)
glVertex3f(-0.062,-0.325,0)
glVertex3f(-0.,-0.45,0)
glVertex3f(-0.0,-0.23,0)
```

```
    glEnd()
    glColor3f(1.0,1.0,1.0)
    glBegin(GL_TRIANGLES)
    glVertex3f(-0.067,-0.3,0)
    glVertex3f(-0.03,-0.34,0)
    glVertex3f(-0.067,-0.36,0)
    glEnd()









    glfw.swap_buffers(window)
    glFlush()

glfw.terminate()
```

Output



Conclusion

This lab helped us learn about glfw to draw basic window and explore pyopengl library to draw different shapes, vertices and how to colour them.