Computer Graphics, Lab Assignment 2

Handed out: March 21, 2024

Recommended due: 15:00, March 29 2024

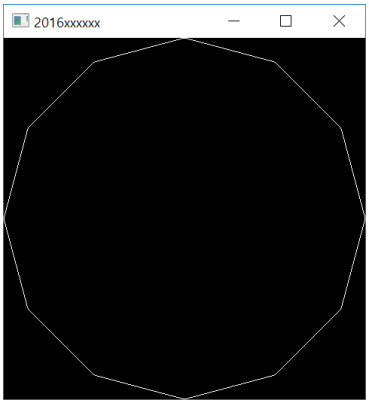
Hard due: 23:59, March 29, 2024 **(NO SCORE for late submissions!)**

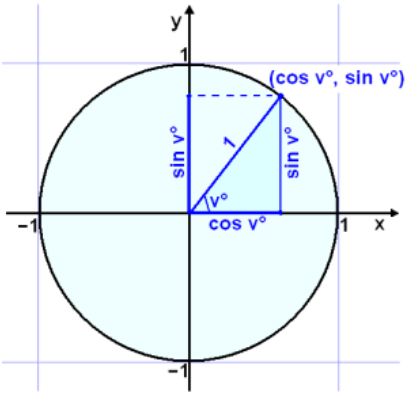
Submit your assignment only through the lecture home at portal.hanyang.ac.kr.

Submit a single zip **[studentID]-[assignment#].**zip file containing two source files.

1. Write down a Python program to draw a regular 12-sided polygon (dodecagon, 정12각형).

- Set the window title to **[studentID]-[assignment#]-[prob#]** (e.g. **2017123456-2-1)** and the window size to (480,480).
- Use np.linspace() (or np.arrange()), np.cos(), np.sin() to compute the positions of vertices.
- Do not hardcode the position of each vertex.
- The 12 vertices should be specified counterclockwise starting from the vertex on the x-axis.





- If the keys 1, 2, 3, … 9, 0 are entered, the primitive type should be changed.

  Hint: Use a global variable to store the primitive type

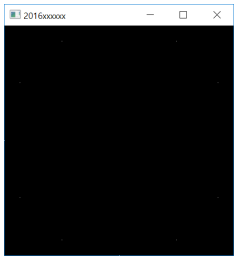
Key	Primitive Type
1	GL_POINTS
2	GL_LINES
3	GL_LINE_STRIP
4	GL_LINE_LOOP
5	GL_TRIANGLES
6	GL_TRIANGLE_STRIP
7	GL_TRIANGLE_FAN

8	GL_QUADS
9	GL_QUAD_STRIP
10	GL_POLYGON

- Use a single .py file - **[studentID]-[assignment#]-[prob#].py** (e.g. **2017123456-2-1.py**)
- Expected result:

When the program starts

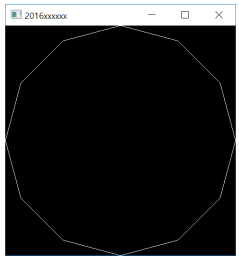
Press '1'



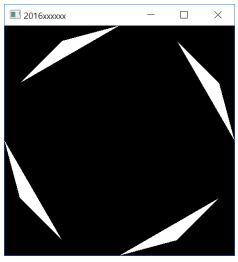
Press '2'

Press '3'

Press '4'

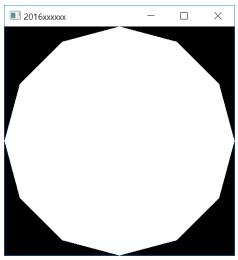


Press '5'

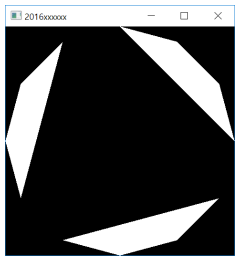


Press '6'

Press '7'

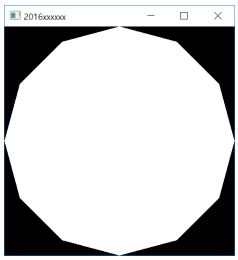


Press '8'



Press '9'

Press '0'



2. Write down a Python program to draw a rotating triangle.

   A. Set the window title to **[studentID]-[assignment#]-[prob#].**(e.g. **2017123456-2-2)** and the window size to (480,480).

   B. Draw a triangle using render() function below (DO NOT modify it!).

```
def render(T):
    glClear(GL_COLOR_BUFFER_BIT)
    glLoadIdentity()
    # draw cooridnate
    glBegin(GL_LINES)
    glColor3ub(255, 0, 0)
    glVertex2fv(np.array([0.,0.]))
    glVertex2fv(np.array([1.,0.]))
    glColor3ub(0, 255, 0)
    glVertex2fv(np.array([0.,0.]))
    glVertex2fv(np.array([0.,1.]))
    glEnd()
    # draw triangle
    glBegin(GL_TRIANGLES)
    glColor3ub(255, 255, 255)
    glVertex2fv( (T @ np.array([.0,.5,1.]))[:-1] )
    glVertex2fv( (T @ np.array([.0,.0,1.]))[:-1] )
    glVertex2fv( (T @ np.array([.5,.0,1.]))[:-1] )
    glEnd()
```

C. Use a single .py file - **[studentID]-[assignment#]-[prob#].py.** (e.g. **2017123456-2-2.py**)

D. Expected result: Uploaded as LabAssignment2-2.mp4

   i. Do not mind the initial angle of the triangle.