

## Computer Graphics, Lab Assignment 2

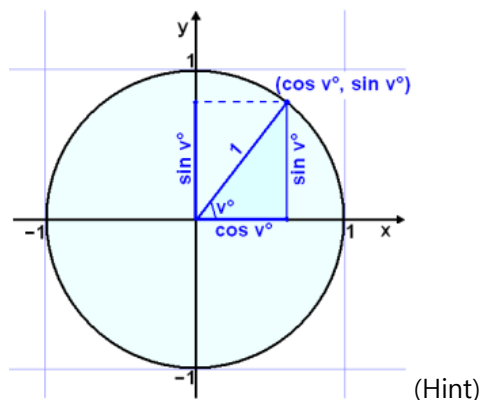
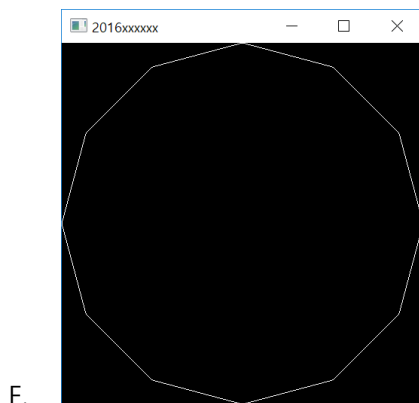
Handed out: March 27, 2019

**Recommended due: 15:00**, March 27, 2019

**Hard due: 23:59**, March 27, 2019 **(NO SCORE for late submissions!)**

*Submit your assignment only through the lecture home at [portal.hanyang.ac.kr](http://portal.hanyang.ac.kr).*

1. Write down a Python program to draw a regular 12-sided polygon (dodecagon, 정 12 각형).
  - A. Set the window title to **[studentID]-[assignment#]-[prob#]** (e.g. **2017123456-2-2**) and the window size to (480,480).
  - B. Use `np.linspace()` (or `np.arange()`), `np.cos()`, `np.sin()` to compute the positions of vertices.
  - C. Do not hardcode the position of each vertex.
  - D. The 12 vertices should be specified counterclockwise starting from the vertex on the x-axis.



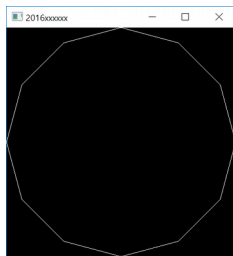
- F. If the keys 1, 2, 3, ... 9, 0 are entered, the primitive type should be changed.
  - i. Hint: Use a global variable to store the primitive type

Key	Primitive Type
1	GL_POINTS
2	GL_LINES
3	GL_LINE_STRIP
4	GL_LINE_LOOP

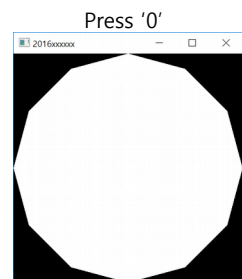
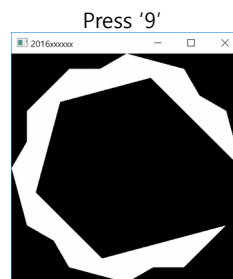
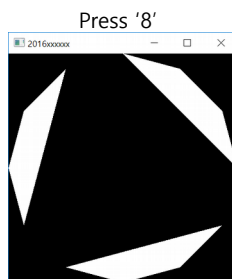
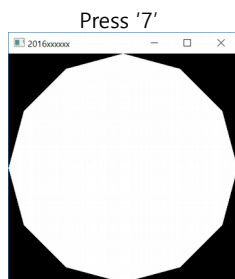
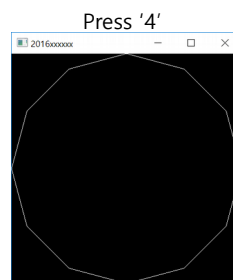
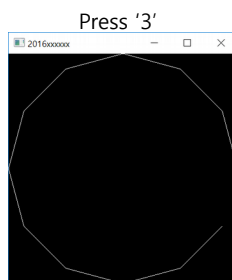
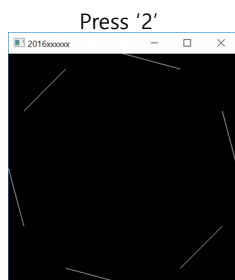
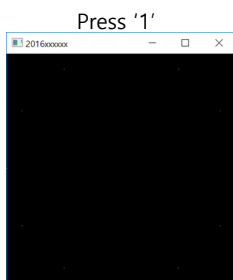
5	GL_TRIANGLES
6	GL_TRIANGLE_STRIP
7	GL_TRIANGLE_FAN
8	GL_QUADS
9	GL_QUAD_STRIP
10	GL_POLYGON

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

B. Expected result:



When the program starts



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

- A. Set the window title to **[studentID]-[assignment#]-[prob#]**.(e.g. **2017123456-3-1**) 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 coordinate  
    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. Submit a single .py file - **[studentID]-[assignment#]-[prob#].py**. (e.g. **2017123456-3-1.py**)
- D. Expected result: LabAssignment2-2.mp4 (uploaded)
- i. Do not mind the initial angle of the triangle.