실습 02

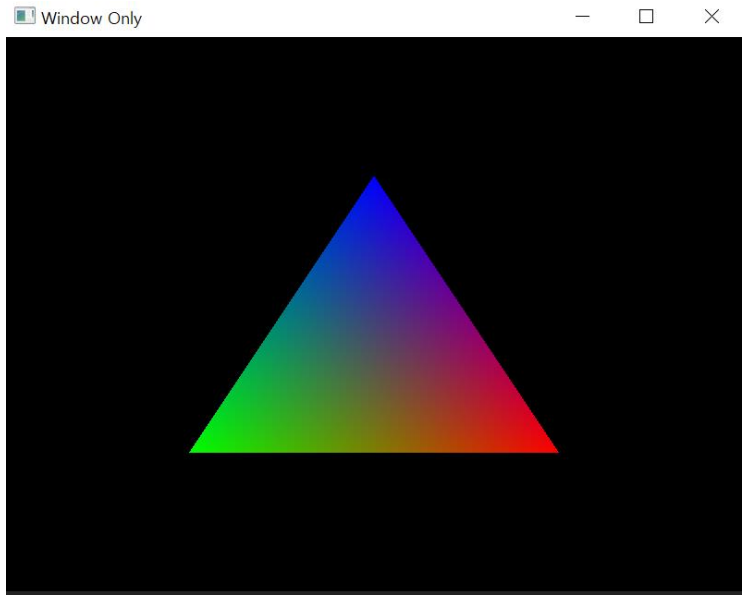
그래픽스

새로운 명령 키 목록

- glGetUniformLocation(…)
- glUniform1i(…)
- glUniform3fv(…)

- uniform vec3 …
- switch (…) { case…

Vertex Color 사용하기

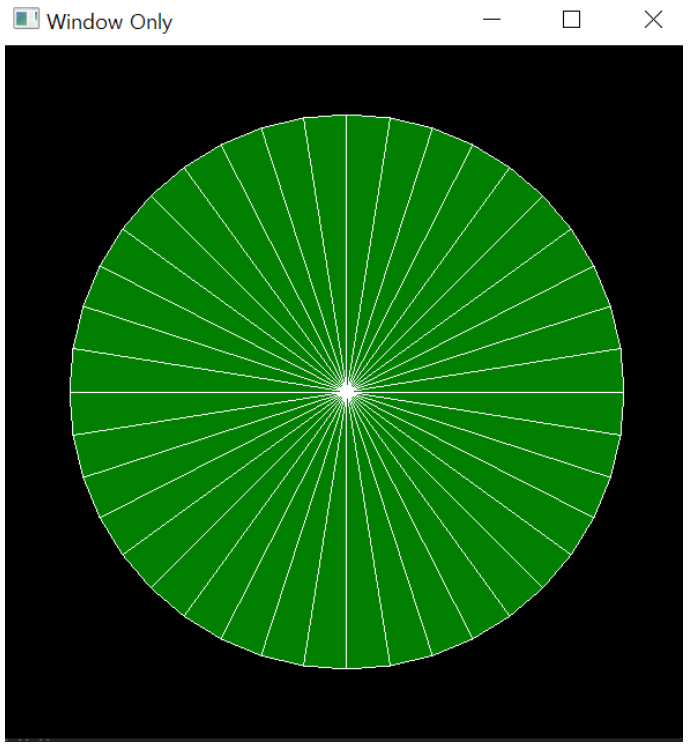


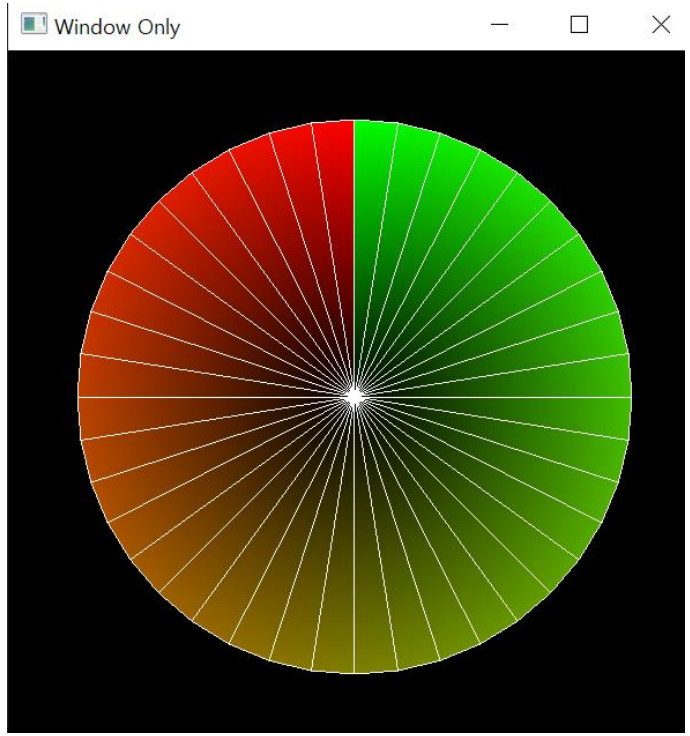

```
vertexData = numpy.array(
 [    # 위치                  # 컬러
      0.5, -0.5, 0.0,   1.0, 0.0, 0.0,   # 우측 하단
     -0.5, -0.5, 0.0,   0.0, 1.0, 0.0,   # 좌측 하단
      0.0,  0.5, 0.0,   0.0, 0.0, 1.0    # 위
 ], numpy.float32)
```

```
#version 330 core
layout (location = 0) in vec3 aPos;
layout (location = 1) in vec3 aColor;
```

```
## position of the attrib array, Position
glVertexAttribPointer(0, 3, GL_FLOAT, GL_FALSE, 6 * 4, None)
glEnableVertexAttribArray(0)

## position of the attrib array, Color
glVertexAttribPointer(1, 3, GL_FLOAT, GL_FALSE, 6 * 4, ctypes.c_void_p(3 * 4))
glEnableVertexAttribArray(1)
```

Circle 그리기






```
for x in range(40):
        posx = math.sin(x * math.pi / 40.0 * 2.0)
        posy = math.cos(x * math.pi / 40.0 * 2.0)
```

```
uniform vec3 incolor;

void main(){
    FragColor = vec4(incolor, 1.0f);
}
```

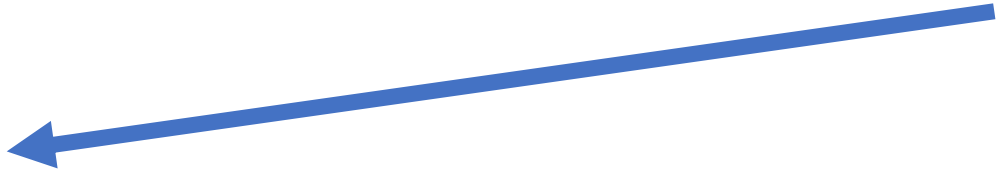
```
uniform int incase;

void main(){
    switch (incase)
    {
        case 0:
            FragColor = vec4(outColor, 1.0f);
            break;
        case 1:
            FragColor = vec4(1.0f, 1.0f, 1.0f, 1.0f);
            break;
    }
}
```

Shader 에 Param 전달

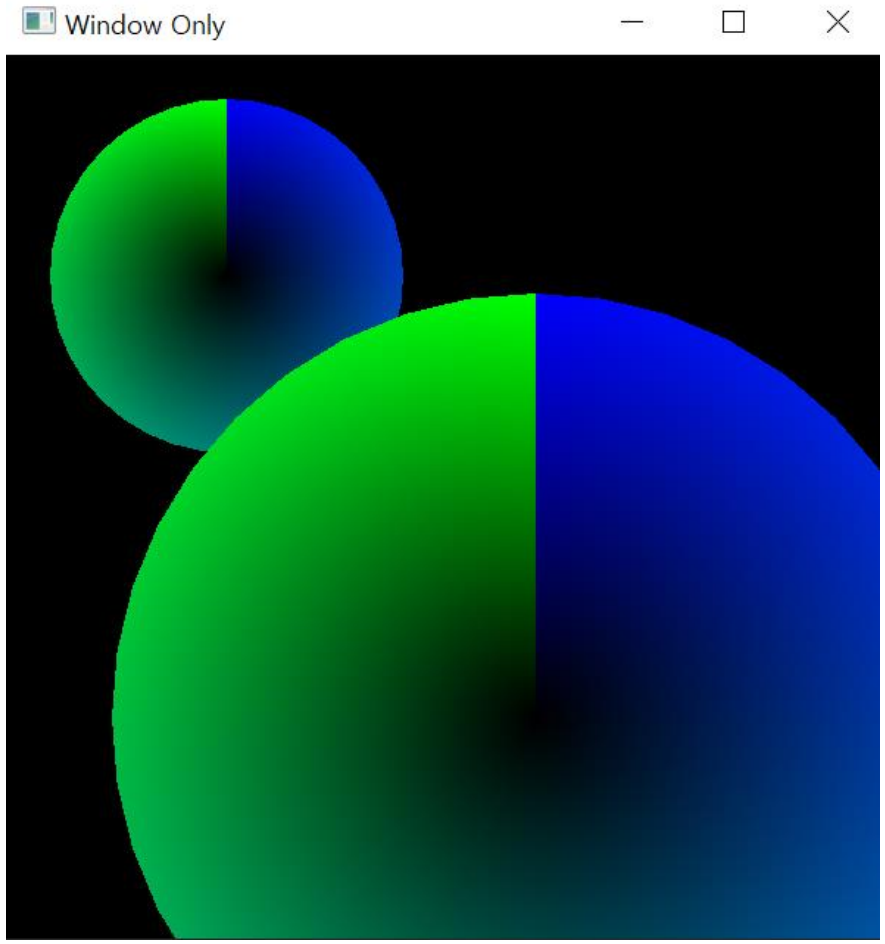
```
#version 330 core
layout (location = 0) in vec3 aPos;
layout (location = 1) in vec3 aColor;

uniform vec3 scale;
uniform vec3 trans;

out vec3 outColor;

void main(){
    vec3 nposition = aPos * scale + trans;
    gl_Position = vec4(nposition, 1.0);
    outColor = aColor;
}
```

```
scaleM = glGetUniformLocation(program, "scale")
transM = glGetUniformLocation(program, "trans")
```

```
glUniform3fv(scaleM, 1, numpy.array([1.2, 1.2, 1.2], numpy.float32))
glUniform3fv(transM, 1, numpy.array([0.2, -0.5, 0.0], numpy.float32))
```



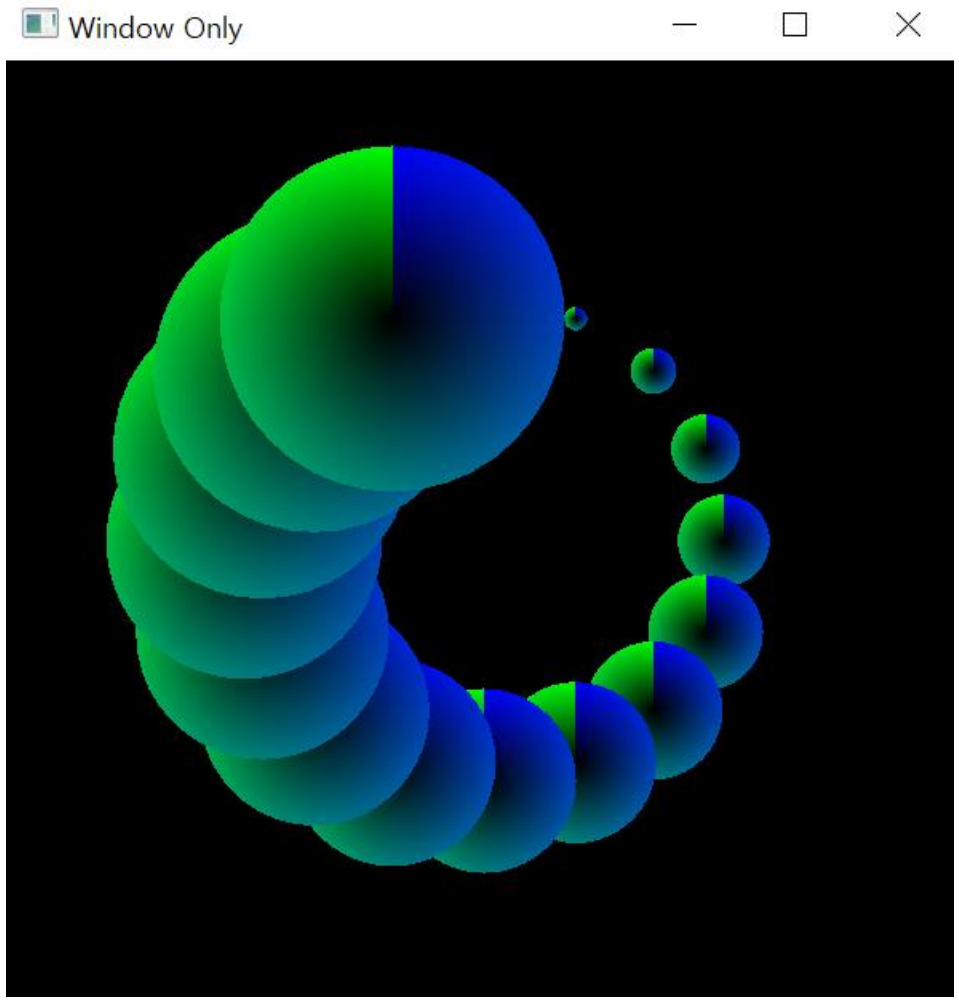
Scale, Trans 구현하기




```
#version 330 core
layout (location = 0) in vec3 aPos;
layout (location = 1) in vec3 aColor;

uniform vec3 scale;
uniform vec3 trans;

out vec3 outColor;

void main(){
    vec3 nposition = aPos * scale + trans;
    gl_Position = vec4(nposition, 1.0);
    outColor = aColor;
}
```

과제:
아래 그림을 그리는 코드를 작성하세요.

math 의 sin, cos 을 사용.



과제 제출방법

- 학번_이름.py, 학번_이름.pdf 로 제출
  - 보고서, (보고서에는 결과 사진, 소스코드만 넣기)
- 제출 기한: 수업 끝나는 시간까지 (10시 15분)