# Assignment#3

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This is assignment#3 in **CSE4020** at Hanyang Univ.

## Implements

### Assignment

* Manipulate the camera
  + Rotation
  + Zoom
* Load obj file and render
  + Drag and drop to load obj file
  + Display mesh only using vertex position, normals and faces
  + Toogle wireframe / solid mode by pressing Z key
  + Print informations when open a new .obj file
* Lighting
  + Use multiple light sources

Additional Implements

* Use glDrawArrays to render a mesh
* Trianglize quad or polygons

### Lightings

I made a great class for lighting called **Light** on lib/light.py. You can easily implement lighting as below, and up to 8 can be created depending on the support of OpenGL.

# register light instance  
Light({  
 'pos': ( 1., 0., 0., 0.),  
 'ambient': ( .1, 0., 0., 1.),  
 'diffuse': ( 1., 0., 0., 1.),  
 'specular': ( 1., 0., 0., 1.),  
})  
  
# render lights  
Light.render()

In this assignments, there are 4 lights with position (1, 0, 0,), (0, 1, 0), (0, 0, 1) and (-1, -1, -1). See L#24 at main.py for more detail.

### Object

Also, I made a class for object called **OBJ** which can read .obj file, trianglize it and render it. You can import object with one line as below.

# load .obj file and parse  
obj = OBJ.read\_obj(obj\_file\_path)  
  
# render object  
obj.render()

In this assignments, only one object without texcoord, but multiple size faces.

**OBJ** class has some *staticmehtods* for parsing and trianglize.

* ***trianglize***
* This implements based on Seidel's algorithm ([See also](http://gamma.cs.unc.edu/SEIDEL/)) using numpy.
* ***read\_obj***
* Parses the .obj file to extract *vertex*, *normal*, *texcoords*, and *face* values. It call trianglize automatically to trianglize quad or polygon.

## Usage

### Requirements

Install dependency as below

pip install -r requirements.txt

or install directly.

* PyOpenGL
* PyOpenGL-accelerate
* glfw
* numpy

These are the basic libraries in the CSE4020. Most are pre-installed and do not need to be installed.

### Run

Run as below

python main.py

and drag and drop .obj file to look.

## Samples

