

## 28882 \_ EMRE BÜLBÜL \_ CS405 \_ PROJECT \_ 2

**Objective:** The objective of this project is to create a WebGL-based 3D mesh rendering application by implementing lighting effects . Also support of non power of two sized images expected.

### Methodology:

1. **Transformation and Projection:** The **GetModelViewProjection** function is used to generate the model view projection (MVP) matrix, crucial for positioning and orienting the mesh.
2. **Mesh Rendering Setup:** The **MeshDrawer** class was created for rendering logic. Constructors consist of shader programs, attributes and uniform locations, and essential buffers for vertex positions, texture coordinates, and normals. (these were may not be created perfectly since moving light source could not be done by me)
3. **Lighting Implementation:** Lighting was implemented in the fragment shader (**meshFS**). The **MeshDrawer** class now includes variables for lighting, such as light position, ambient light intensity and a flag for enabling or disabling lighting. Two new methods **enableLighting** and **setAmbientLight**, are introduced to control lighting settings dynamically.

**Results and Testing:** The implementation was thoroughly tested using various 3D models, textures, and lighting conditions. The application demonstrated successful rendering of 3D meshes with proper handling of non-power-of-two-sized textures and realistic lighting effects. But one problem is occurred. The problem is moving light source is not solved in this Project 2 of CS405. Even if I updateLightPos in everytime the Web GL will draw, I couldn't get positive result. In addition to that I hardcoded lightPos and didnt work for it too. So I do think that buffers may have the problem.