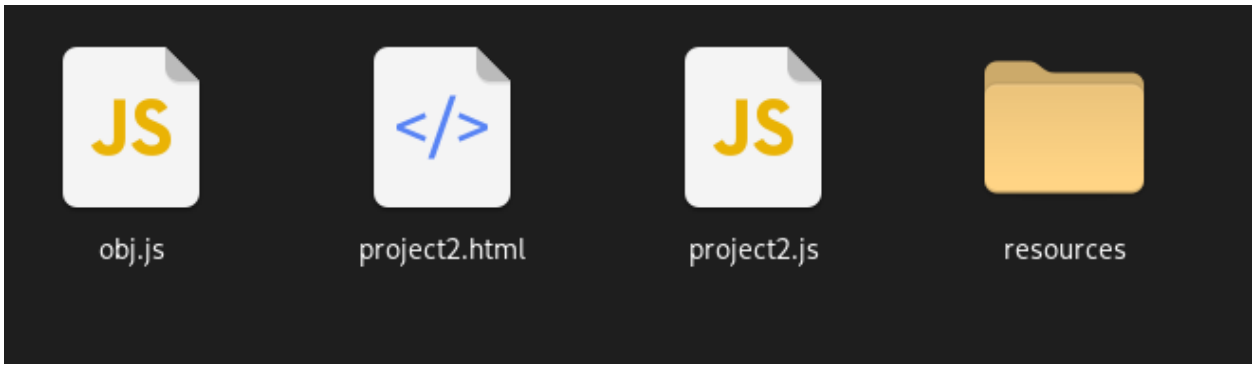
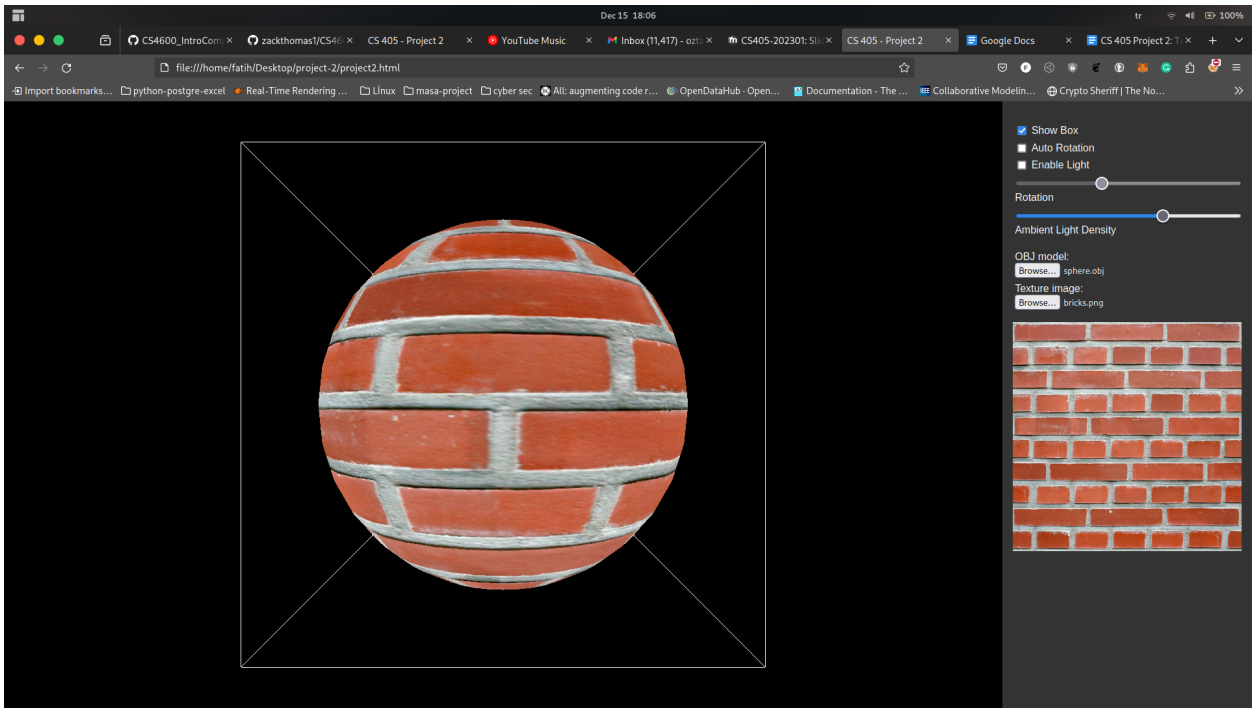
CS 405 Project 2: Textures + Illumination

Instructions

Please Download the assignment content from SUcourse. Inside the folder, you should see the **resources** folder and 3 files: **project2.html, project2.js,** and **obj.js.**



If you open project2.html in your browser, you should see a screen where you can upload mesh and texture data to render them on your screen:



In this project, you should complete 2 tasks to get full points.

Important note: For all tasks, please only modify the project2.js file. Any submission that modifies the project2.html will not be graded.

Task 1

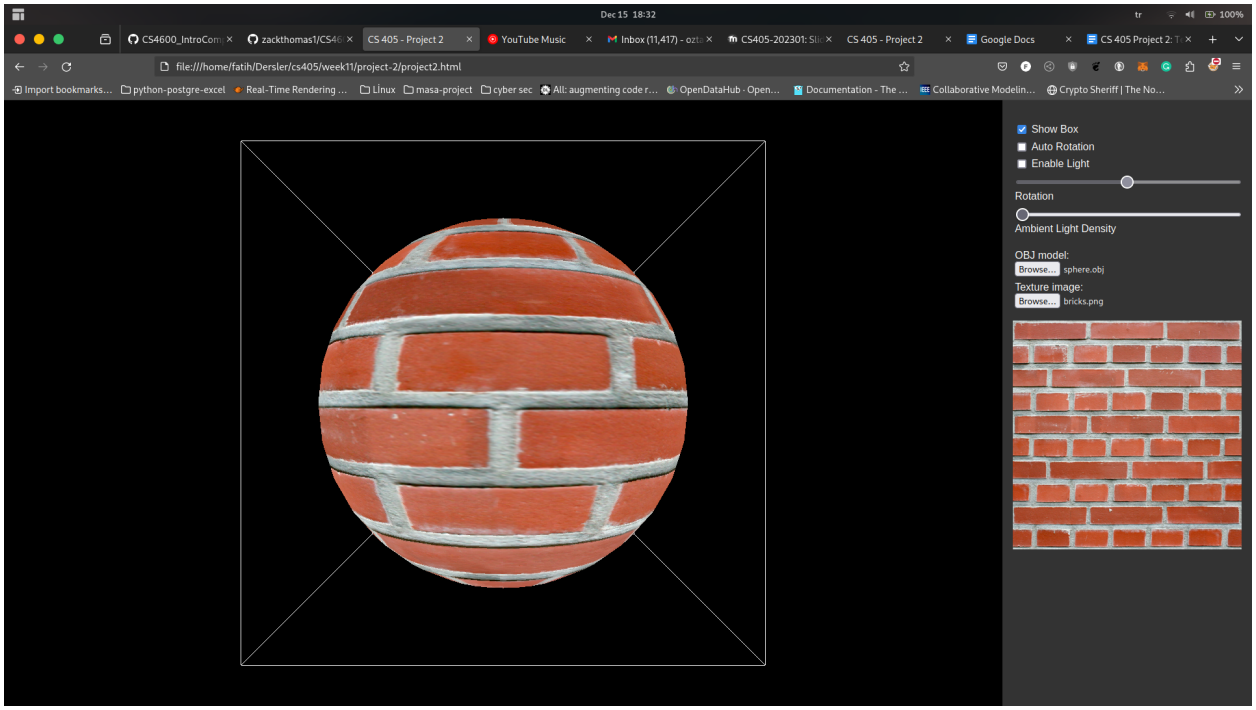
In this task, you should modify the **setTexture** method inside the project2.js file. The current implementation of this method only accepts pictures that have width and height values of a power of two. To allow any sized images to be used as textures, you should modify the following section:

```
// This method is called to set the texture of the mesh.
// The argument is an HTML IMG element containing the texture data.
setTexture(img) {
    const texture = gl.createTexture();
    gl.bindTexture(gl.TEXTURE_2D, texture);

    // You can set the texture image data using the following command.
    gl.texImage2D(
        gl.TEXTURE_2D,
        0,
        gl.RGB,
        gl.RGB,
        gl.UNSIGNED_BYTE,
        img);

    // Set texture parameters
    if (isPowerOf2(img.width) && isPowerOf2(img.height)) {
        gl.generateMipmap(gl.TEXTURE_2D);
    } else {
        console.error("Task 1: Non power of 2, you should implement this part to accept non p
        /**
         * @Task1 : You should implement this part to accept non power of 2 sized textures
         */
    }

    gl.useProgram(this.prog);
    gl.activeTexture(gl.TEXTURE0);
    gl.bindTexture(gl.TEXTURE_2D, texture);
    const sampler = gl.getUniformLocation(this.prog, 'tex');
    gl.uniform1i(sampler, 0);
}
```

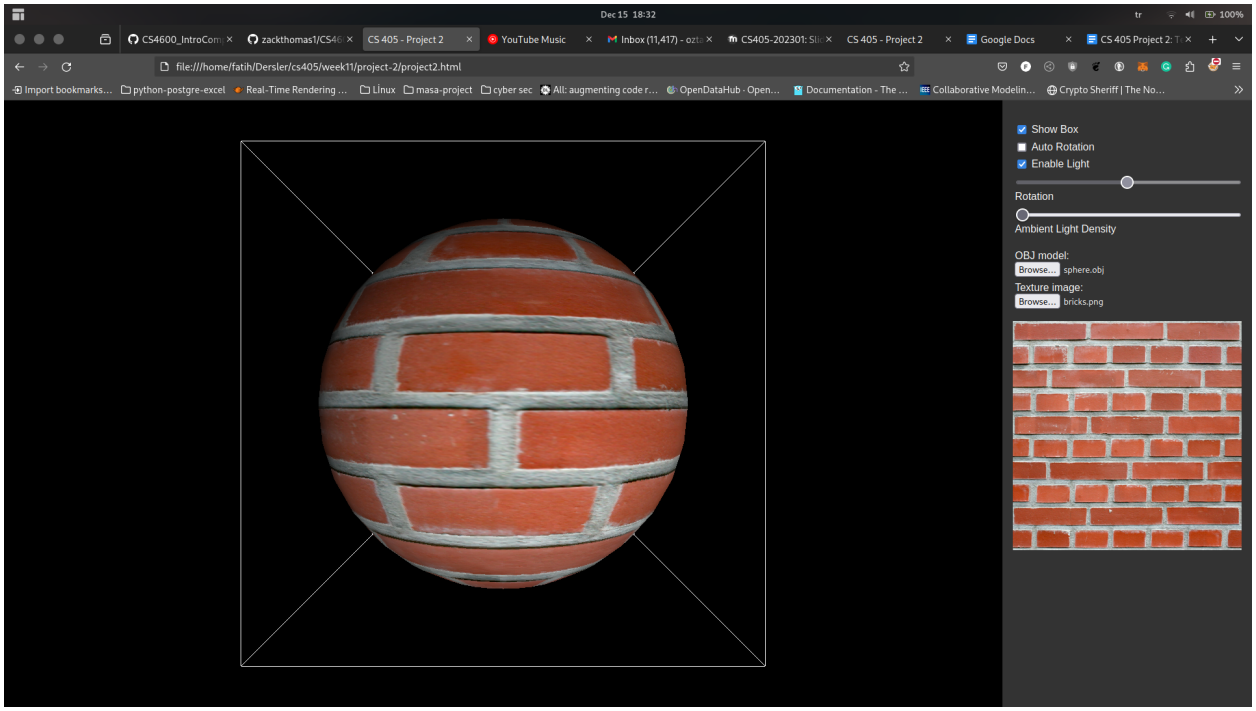
To test whether your implementation supports any sized images, you can try using the image **leaves.jpg** under the resources.

Task 2

In this task, you should implement basic lighting for this scene. The lighting should at least include ambient light and diffuse light. For this task, you should modify the **constructor, setMesh, draw, enableLighting,** and **setAmbientLight** methods, and you should modify the **fragment shader(meshFS)**. If you have implemented the light properly, your scene should look like this:



Without Light



With Light

You should also be able to change the ambient parameter by using the **“Ambient Light Density”** slider to get full points from Task 2. Additionally, **if the light is working properly, pressing the arrow buttons should change the light’s location.** Please check the project2.js file for more information about the task 2.

Report

Additionally, we expect you to write a report that clearly explains your methodology. **Any submission without the report will not be graded!**

Submission Guidelines

You should upload your work **to both GitHub and SuCourse.**
GitHub: Uploading the codes only is sufficient. Once you upload your code to GitHub, write the repository link to a txt file named github-link.txt and include that file with your submission to SuCourse.
SuCourse: You should zip all of your work (report, the code(s), and github-link.txt file) and upload it to SuCourse.

Important: Plagiarism will not be tolerated!