Diary

Week 8:

Researched texture handling in WebGPU to ensure efficient rendering and high-quality visuals.
Implemented logic to resolve texture URIs correctly, particularly for external files with relative paths, ensuring accurate file fetching for further processing.
Experimented with methods to associate textures with shaders for rendering.

Week 9:

Focused on loading texture data using the fetch API, converting texture files into ImageBitmap objects compatible with WebGPU.
Investigated optimal configurations for GPU-compatible textures, ensuring they were properly uploaded to the GPU for rendering.
Addressed challenges related to raw texture data preparation for GPU usage.

Week 10:

Worked on generating mipmaps to improve texture quality for objects at varying distances.
Researched methods to reduce visual artifacts like aliasing through mipmap optimization.
Associated textures with their respective materials (e.g., base color, normal maps) using BindGroups, ensuring shaders could access the textures during rendering.

Week 11:

Utilized textures in fragment shaders to sample and apply them to 3D model surfaces.
Experimented with texture mapping techniques, bringing the textures to life with detailed and realistic visuals.
Analyzed the structured approach from parsing GLTF texture references to shader applications, enhancing the rendering pipeline.

Week 12:

Attempted to simulate candlelight using a custom CandleRenderer class, creating dynamic point lights that mimicked the flicker and glow of real flames.
Faced challenges with light attenuation, dynamic flicker behavior, and broader lighting setup integration, leading to unsatisfactory results.
Transitioned to alternative lighting strategies, such as directional and ambient lighting, to maintain scene realism.

Explored advanced physically-based rendering techniques to improve lighting realism.

Used metallic and roughness properties to control reflectivity and surface detail in shaders.
Integrated Fresnel-Schlick approximations and GGX normal distribution to enhance depth, highlights, and reflections, achieving dynamic and lifelike lighting effects.

-- Weights --

Areej: 100%
Saad: 100%(me)
Imaad: 100%
Total: 300% (final sum = number of members × 100)