Final Project Design

In this project, I implemented part of the solar system.

Overview of my project:

```
└── Graphics-final
    ├── Final_Project.html
    ├── js
    │   ├── fragShader.glsl
    │   ├── main.js
    │   └── vertShader.glsl
    ├── model
    │   ├── BUS.json
    │   ├── Earth 2K.json
    │   ├── Mars 2K.json
    │   ├── Mercury 1K.json
    │   ├── Moon_2K.json
    │   ├── Venus_1K.json
    │   └── sol.json
    └── texture
        ├── 2k_sun.jpg
        ├── Bump_2K.png
        ├── Clouds_2K.png
        ├── Diffuse_2K.png
        ├── Dust_2K.png
        ├── Earth_Bump_2K.png
        ├── Earth_Clouds_2K.png
        ├── Earth_Diffuse_2K.png
        ├── Mars_Diffuse_2K.png
        ├── Mercury_Bump_1K.png
        ├── Mercury_Diffuse_1K.png
        ├── Venus_Atmosphere_2K.png
        ├── Venus_Diffuse_1K.png
        └── base_color.jpg
```

There are 7 model json files, and the corresponding textures. Code for vertex shader and fragment shader are stored in .glsl files. The program in main.js loads the json files, images, and shader files on the server.

Models:

The sources of the models are listed as follows.
Sun: https://free3d.com/3d-model/sun-43982.html
Moon: https://free3d.com/3d-model/moon-photorealistic-2k-853071.html
Earth: https://free3d.com/3d-model/earth-photorealistic-2k-927613.html
Mars: https://free3d.com/3d-model/mars-photorealistic-2k-671043.html
Mercury: https://free3d.com/3d-model/mercury-photorealistic-1k-260439.html
Venus: https://free3d.com/3d-model/venus-photorealistic-1k-273057.html
School Bus: https://www.turbosquid.com/3d-models/3d-lowpoly-cartoon-school-bus-1814775

Although most of the models have more than one meshes, only one of the meshes for planets will appear. It is because of the problem of the model, only the outer mesh could be seen from outside. Therefore, I chose to draw the first mesh and apply two textures for some of the planets.
Different methods of mixing two textures are tried, including mix(textureColor1, textureColor2, percentage), textureColor1+textureColor2, textureColor1*textureColor2. To make it look more natural, I chose textureColor1+textureColor2*0.5, where textureColor1 is the basic color, textureColor2 is the color of atmosphere, cloud or dust.

Animations:

Sun: rotates.
Mercury: rotates on its axis while revolving around the sun.
Venus: rotates on its axis while revolving around the sun.
Earth: rotates on its axis while revolving around the sun.
Moon: rotates on its axis while revolving around the earth.
Mars: rotates on its axis while revolving around the sun.
School Bus: the front wheels and back wheels are rotating, while the bus is revolving around the sun.
The speeds and directions of rotation and revolution are referenced from those in the actual solar system.