

**TASK 1: SceneNode Class - draw function implementation**

The SceneNode class's draw function is designed to render the node and its children in a 3D scene. It involves matrix transformations, including model view projection (MVP), ModelView, Normal, and Model matrices. The function iterates through the node's children, applying transformations and rendering each node's MeshDrawer if available.

**TASK 2: Shader - Lighting Calculation**

Fragment shader snippet is part of a Phong lighting model. It calculates diffuse and specular lighting based on the dot product of normalized vectors representing the surface normal, light direction, and view direction. The specular lighting is determined by the reflection vector. This adheres to the Phong reflection model for realistic lighting in computer graphics.

**TASK 3: Mars SceneNode Initialization**

The code initializes a Mars SceneNode with a MeshDrawer, Texture, and Transformation (TRS). The MeshDrawer is configured with position, texture coordinate, and normal buffers. A texture is applied to the MeshDrawer. The TRS object sets initial translation and scale for Mars. Finally, the SceneNode is created for Mars with the specified MeshDrawer, TRS, and a parent node. Additionally, a rotation is applied to Mars around the z-axis. The rotation angle is set to 1.5 times an external variable zRotation. Rotation is dynamic and responsive to changes in zRotation.