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CS 405 Project 3 Report

Task 1:

```
draw(mvp, modelView, normalMatrix, modelMatrix) {
    /**
     * @Task1 : Implement the draw function for the SceneNode class.
     */

    // Combine the current node's transformation with the parent transformations
    var transformedMvp = MatrixMult(mvp, this.trs.getTransformationMatrix());
    var transformedModelView = MatrixMult(modelView, this.trs.getTransformationMatrix());
    var transformedNormals = MatrixMult(normalMatrix, this.trs.getTransformationMatrix());
    var transformedModel = MatrixMult(modelMatrix, this.trs.getTransformationMatrix());




    // Draw the MeshDrawer
    if (this.meshDrawer) {
        this.meshDrawer.draw(transformedMvp, transformedModelView, transformedNormals, transformedModel);
    }
    // Iterate through the children and invoke their draw method with updated transformations
    for (let child of this.children) {
    child.draw(transformedMvp, transformedModelView, transformedNormals, transformedModel);

}
```

Task 2:

```
// Diffuse
diff = max(0.0, dot(normal, lightdir));

// Specular
vec3 viewDirection = normalize(-vPosition);
vec3 reflectedDirection = reflect(-lightdir, normal);
spec = pow(max(0.0, dot(viewDirection, reflectedDirection)), phongExp);
```

Task 3:

```
/**
 * @Task3 : Add Mars to the solar system
 * Mars should be a child of the sun.
 * Mars should use sphere as the mesh object.
 * Mars should be translated by -6 units on the X axis with respect to the sun
 * Mars should be scaled to 0.35 for x,y and z coordinates
 * use the image on the link below as texture:
 * @link : https://i.imgur.com/Mwsa16j.jpeg
 *
 */

 // Mars' mesh drawer setup with the sphere mesh and texture
marsMeshDrawer = new MeshDrawer();
marsMeshDrawer.setMesh(sphereBuffers.positionBuffer, sphereBuffers.texCoordBuffer, sphereBuffers.normalBuffer);
setTextureImg(marsMeshDrawer, "https://i.imgur.com/Mwsa16j.jpeg");

// Configure Mars' position and size using the TRS object
marsTrs = new TRS();
marsTrs.setTranslation(-6, 0, 0); // Position Mars 6 units left of the sun
marsTrs.setScale(0.35, 0.35, 0.35); // Scale Mars to 35% of its original size
```

```
 /**
  *@task3 : add rotation to mars on z-axis.
     the rotation should be 1.5 * zRotation
 */
 // Create Mars as a child node of the sun in the scene graph
 marsNode = new SceneNode(marsMeshDrawer, marsTrs, sunNode);

 sunNode.draw(mvp, modelViewMatrix, normalMatrix, modelMatrix);
 requestAnimationFrame(renderLoop);
```