

Computer Graphics Assignment: 2

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The code uses ImGui functions like `ImGui::IsKeyDown` and `ImGui::IsKeyPressed` to detect key presses for various keys to control camera movement and transformations.

```
if (ImGui::IsKeyDown(ImGui::GetKeyIndex(ImGuiKey_LeftArrow))) {
    strcpy(textKeyStatus, "Key status: Left");
    camPosition.x += u.x;
    camPosition.y += u.y;
    camPosition.z += u.z;

    setupViewTransformation(shaderProgram);
}
else if (ImGui::IsKeyDown(ImGui::GetKeyIndex(ImGuiKey_RightArrow))) {
    strcpy(textKeyStatus, "Key status: Right");

    camPosition.x -= u.x;
    camPosition.y -= u.y;
    camPosition.z -= u.z;
    setupViewTransformation(shaderProgram);
}
```

Coordinate System Calculation: The `coordinateSystem` function calculates the coordinate system vectors u , v , and w based on the camera's position and t vector. These vectors are used to define the view matrix and determine the orientation of the camera in the scene.

w is calculated as the negative of the normalized vector pointing from the camera position to the target (t).

u is calculated as the normalized cross product of the t vector and w .

v is calculated as the cross product of w and u .

```
void coordinateSystem(){ //basis vector function
    w = -1.0f * glm::normalize(glm::vec3(camPosition));
    u = glm::normalize(glm::cross(t,w));
    v = glm::cross(w,u);

    // Formulae taken from Lecture Viewing II
}
```

Numpad keys 1,2,3 are used for different views (top side, side view, front view).

```
else if(ImGui::IsKeyPressed(GLFW_KEY_KP_1)){
    camPosition.x = 0;
    camPosition.y = 0;
    camPosition.z = 100;
    setupViewTransformation(shaderProgram);
}

else if(ImGui::IsKeyPressed(GLFW_KEY_KP_2)){
    camPosition.x = 1;
    camPosition.y = 100;
    camPosition.z = 0;
    setupViewTransformation(shaderProgram);
}

else if(ImGui::IsKeyPressed(GLFW_KEY_KP_3)){
    camPosition.x = 100;
    camPosition.y = 0;
    camPosition.z = 0;
    setupViewTransformation(shaderProgram);
}
```