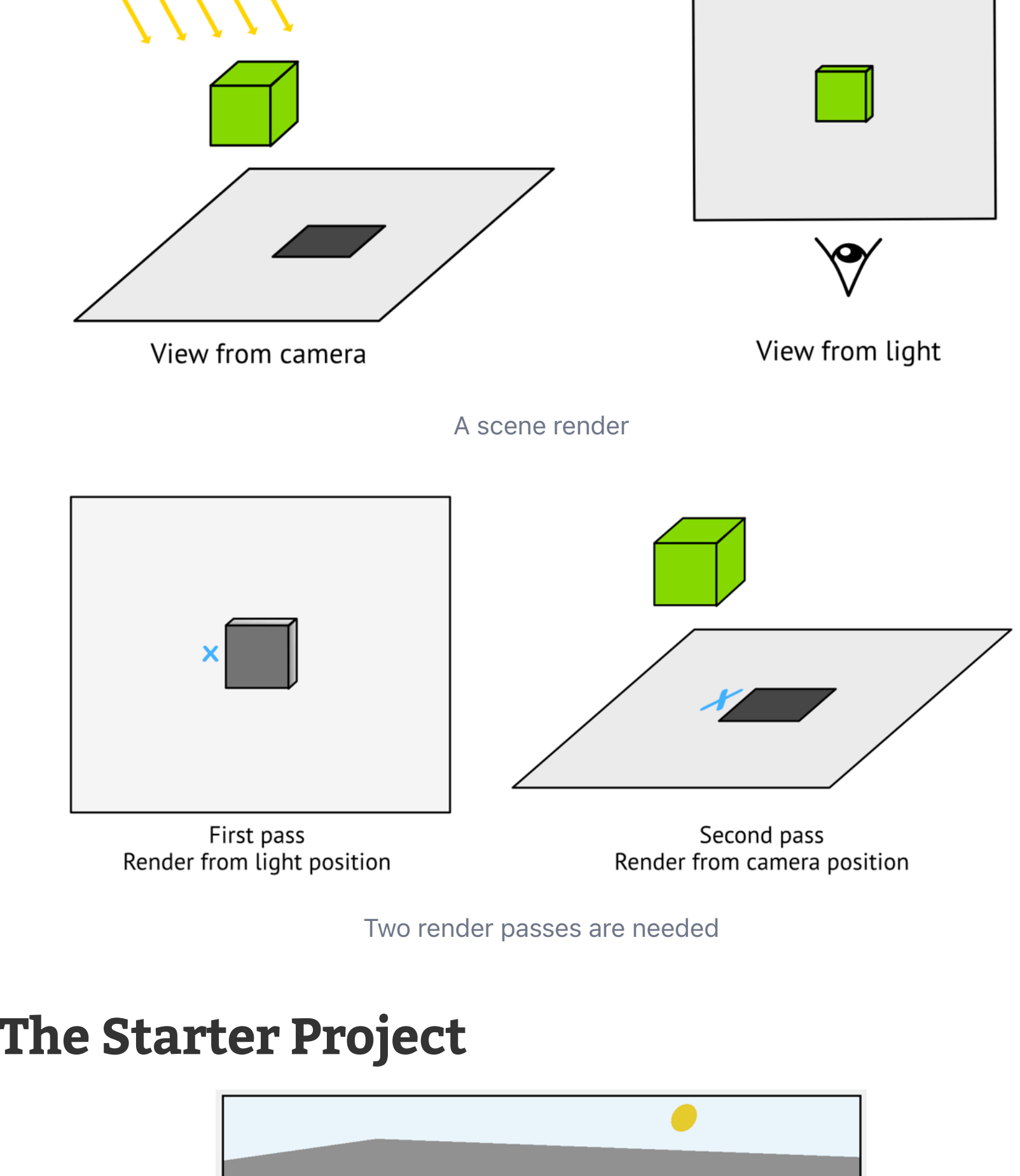
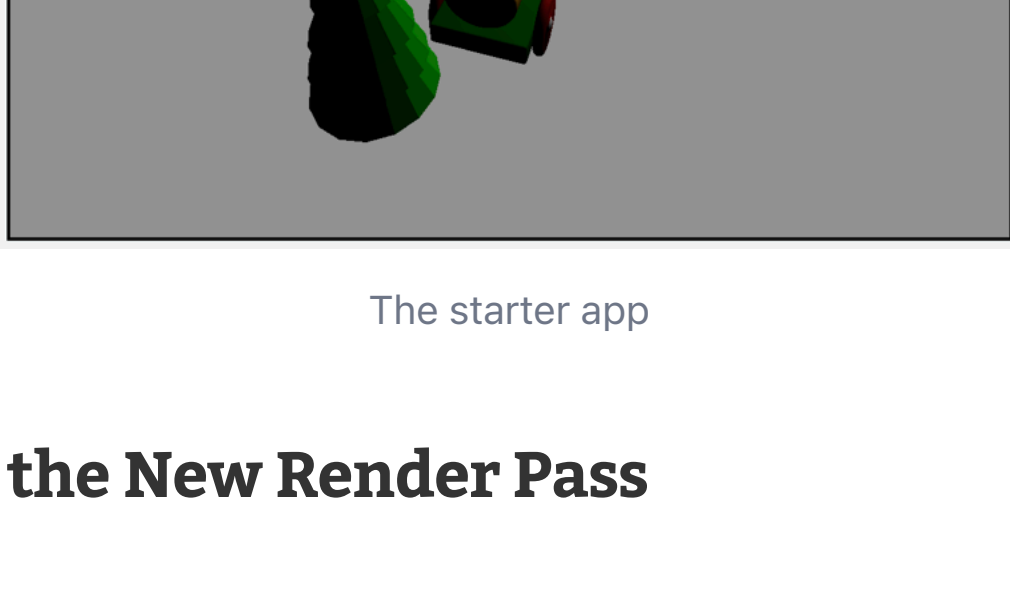


13 Shadows

Shadow Maps



The Starter Project



The starter app

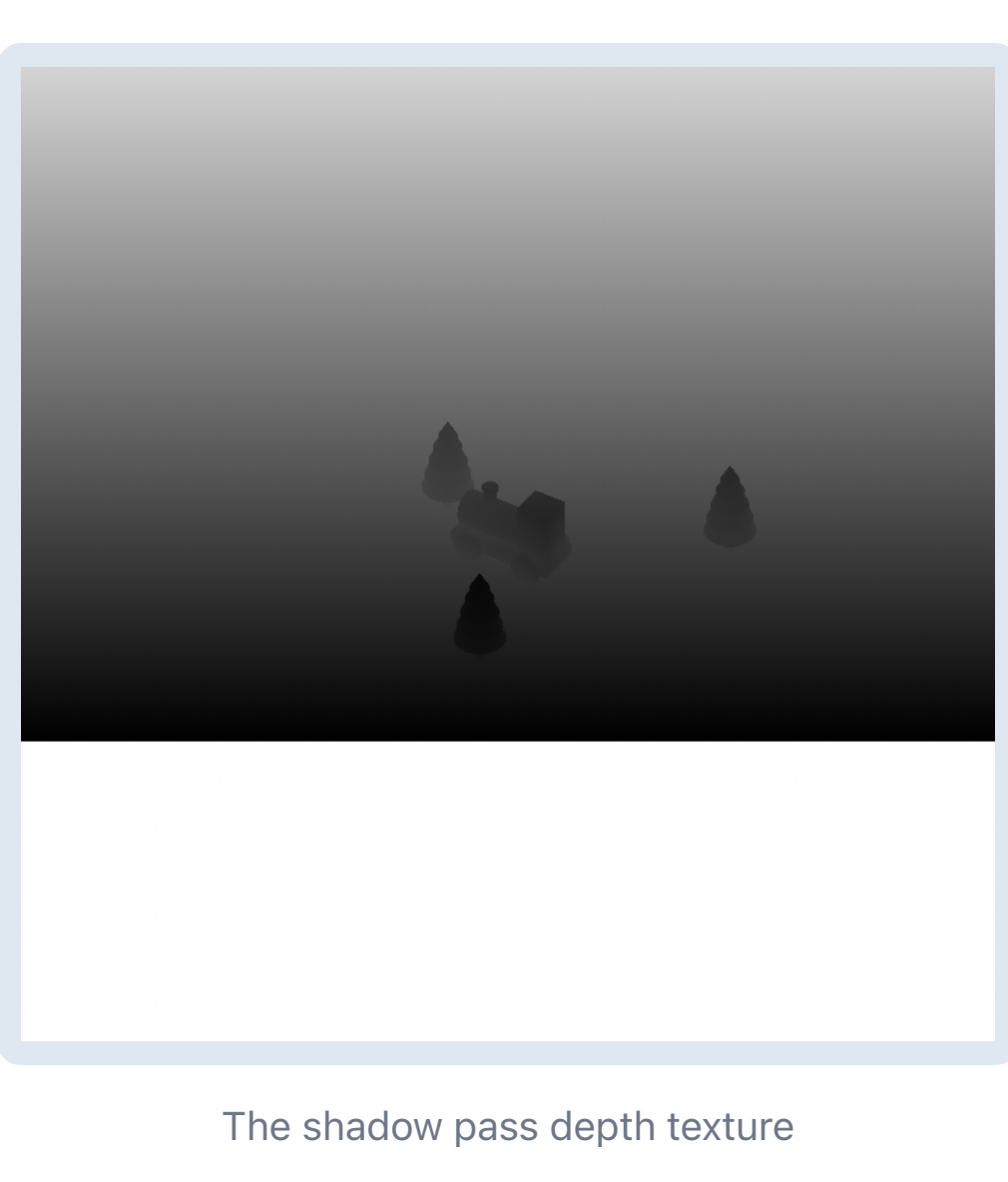
1. Creating the New Render Pass
2. Declaring and Drawing the Render Pass
3. Setting up the Render Pass Drawing Code
4. Setting up the Light Camera
5. Creating the Shader Function



No shadow yet



GPU frame capture



The shadow pass depth texture

The Main Pass



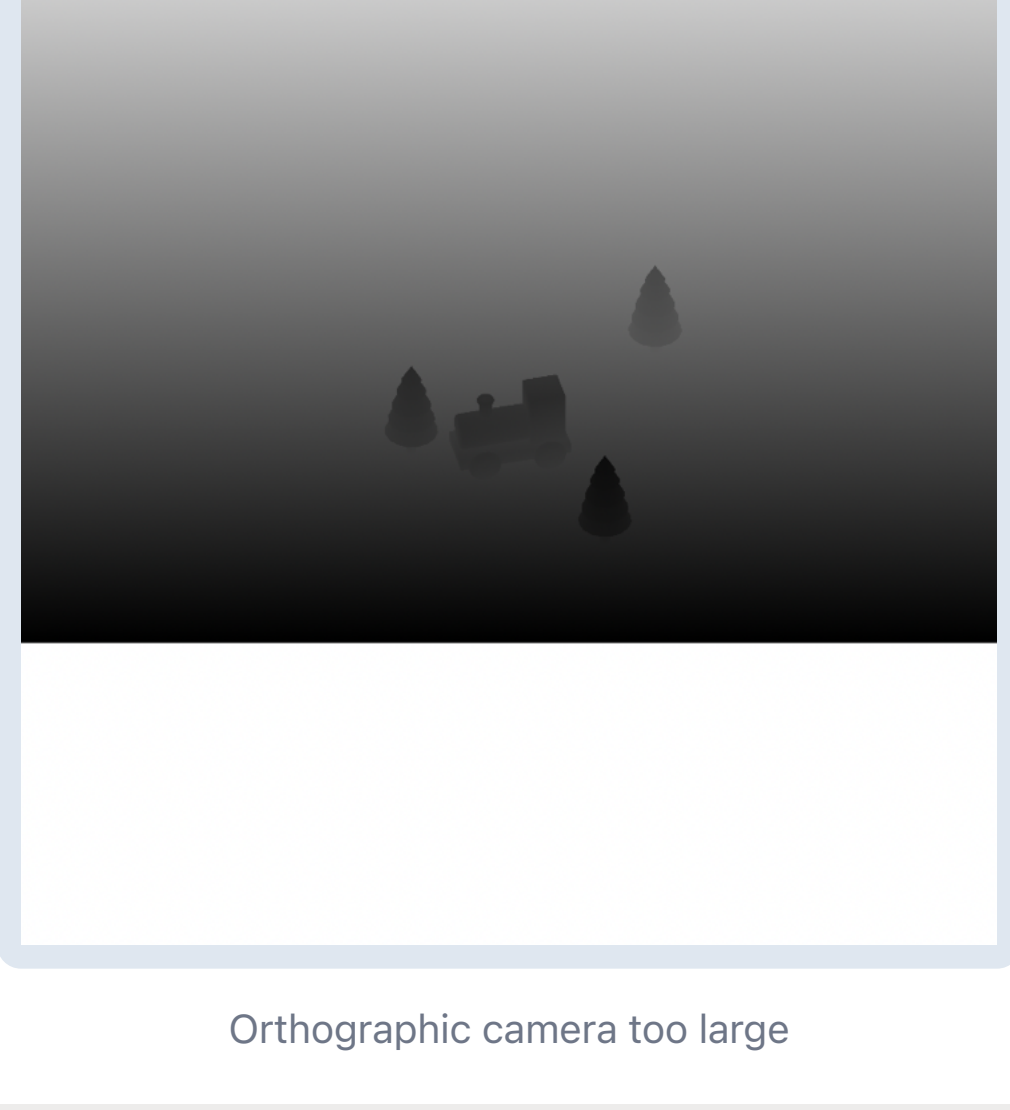
Shadows added

Shadow Acne

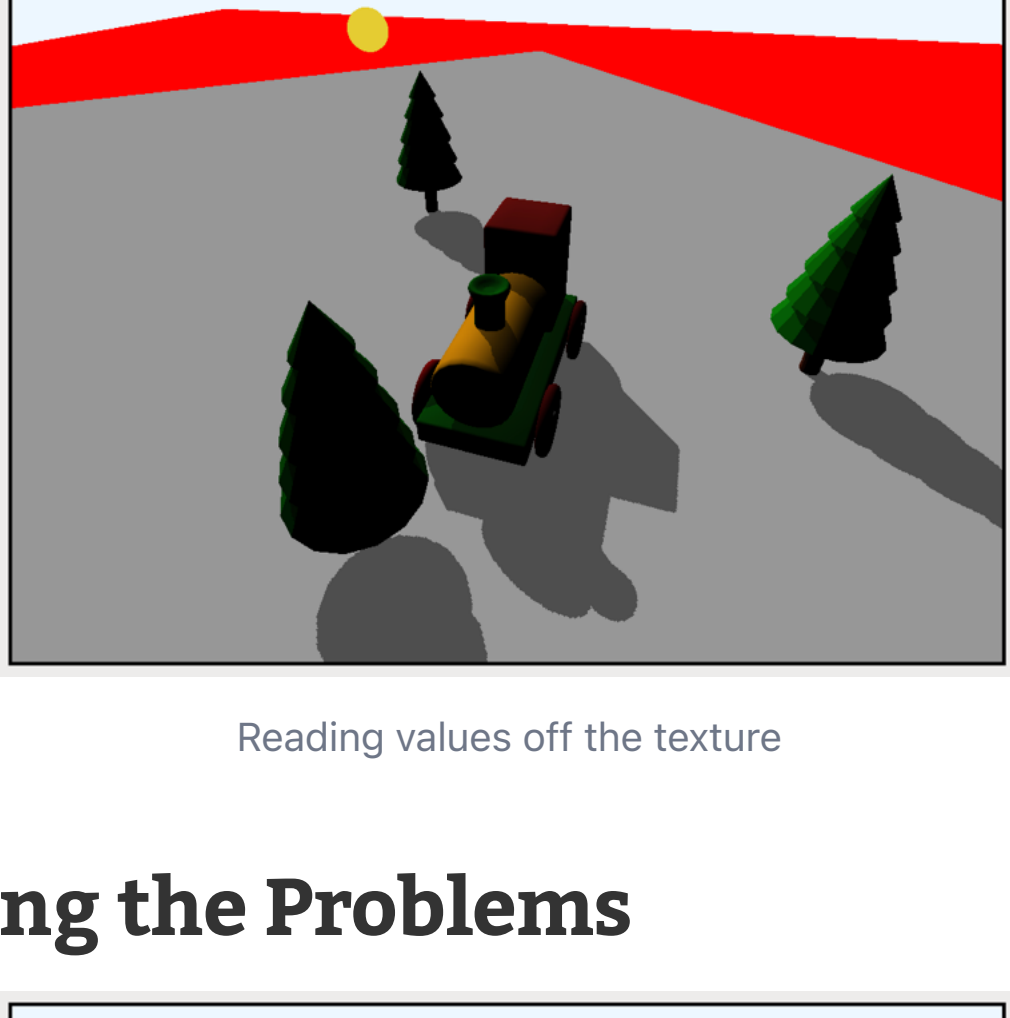


Shadows with no acne

Identifying Problems



Orthographic camera too large

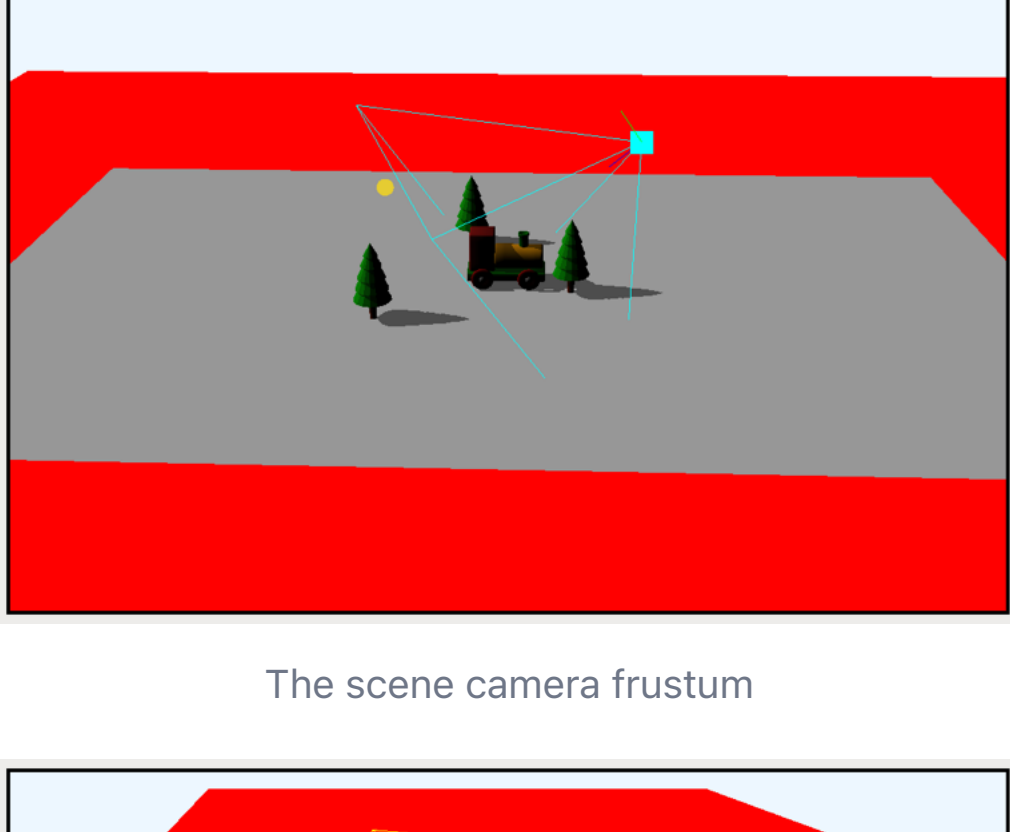


Reading values off the texture

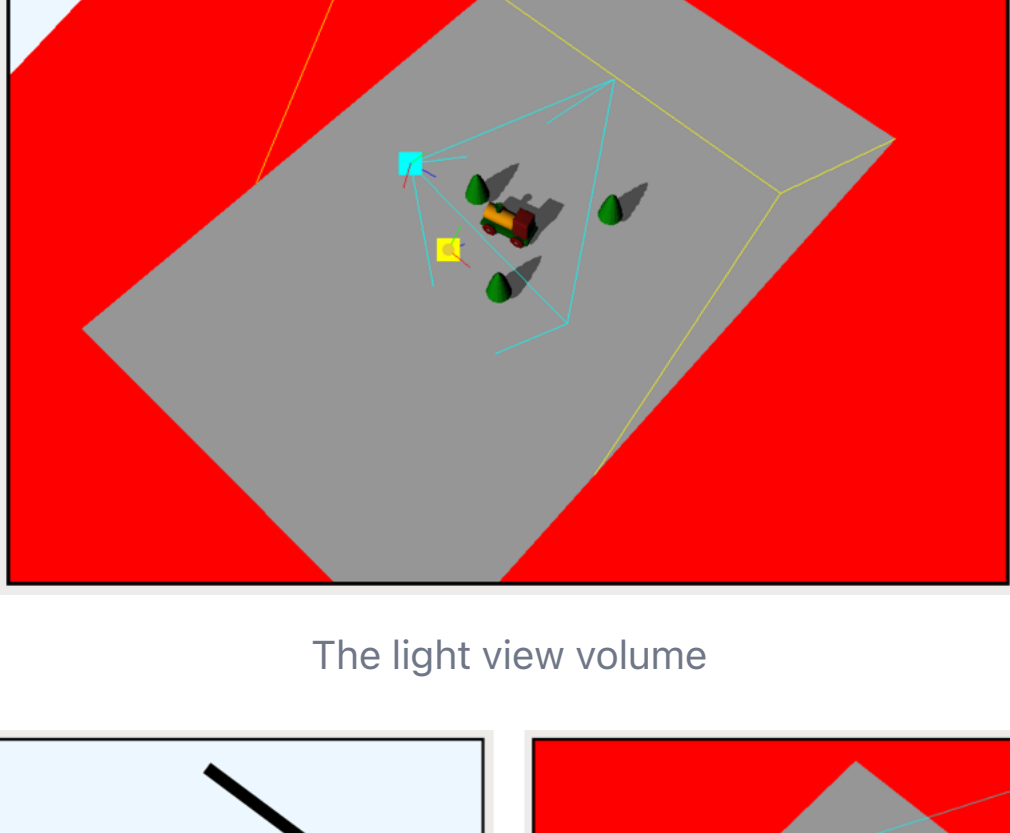
Visualizing the Problems



Some of the scene is missing.



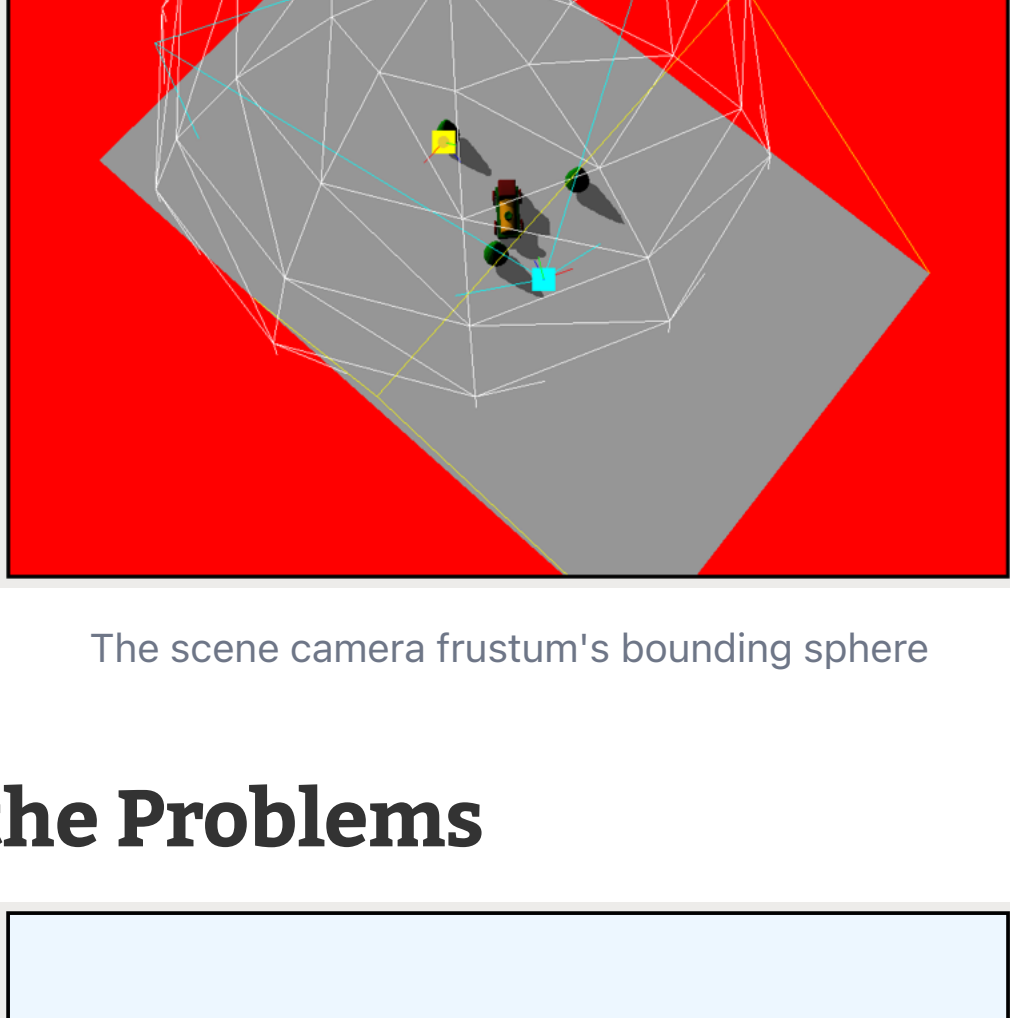
The scene camera frustum



The light view volume

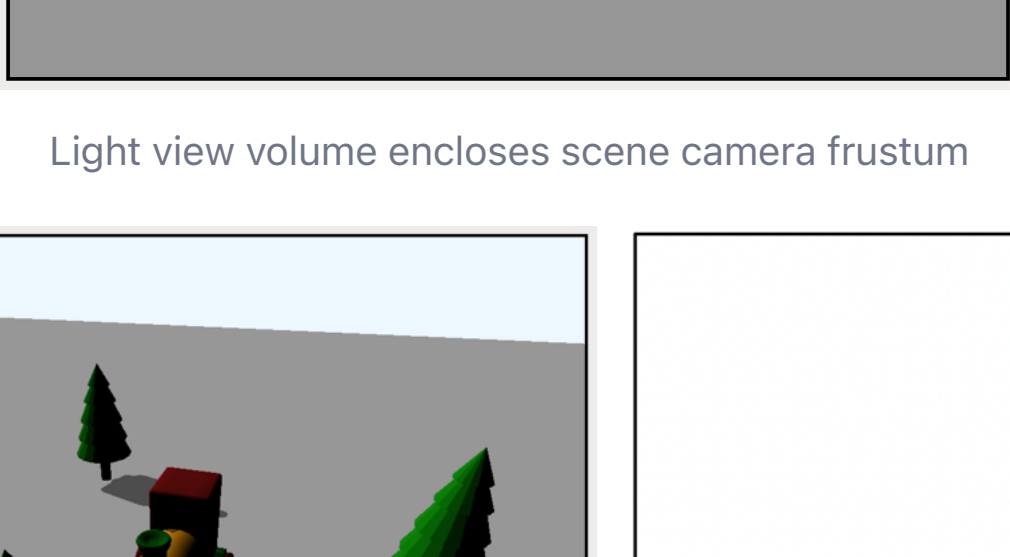


Understanding why the scene captures area off texture



The scene camera frustum's bounding sphere

Solving the Problems



Light view volume encloses scene camera frustum



Blocky shadows when the light volume is too large

Cascaded Shadow Mapping