Timewinator

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Timewinator is a single player puzzle game around the mechanic of time travel inspired by Braid (Number None) and Portal (Valve). There are 5 total levels to beat.

Features

- Physics Engine (qu3e Engine)
- HUD (and billboards)
- Bloom
- Physically Based Shading
- BSP-Sorting for semi-transparents
- Cubemap Reflection
- Contours using a stencil buffer

Controls

Standard first person controls with WASD, mouse and spacebar, holding Space rewinds the game, E can be used to interact with objects and R restarts the current level. Esc stops the game. You can release the mouse cursor by pressing scroll lock. F10 toggles BSP-Sorting (effect seen on level 3), F11 opens the level editor (prone to crashing, not part of the game). F1 start recording enginestate & userinputs, F2 replay (in a loop) & F3 cancel (this feature is not necessary to play the levels). F5 and F6 change the brightness.

Technical Details

Elevator, Button, Light, Ground, Barrier, Cable
These assets use the PBR-Shader. The shader uses the throwbridge-reitz distribution, schlick-ggx geometry & scklick fresnel functions. Notable additions to the shader are: uv-scale & uv-offset uniform, a reflection skybox (blurred by using a lower LOD)(not irradiance based lighting), an emission texture and a uniform to draw an outline around the models. The effect of PBR is seen most on the metallic elevator.
HUD & Floaty Text

To draw text we read from a bmp with specific uv-offsets. The HUD simply renders last, the text in worldspace is rendered into a framebuffer, which is rendered on a quad with all other semi-transparent quads. Semi-transparent quads are sorted in a BSP-tree.

Used Programs/Libraries

- CLion/GCC
- Blender
- Gimp
- Renderdoc (debugging)
- Qu3e (physics)
- Dear ImGui (used to make the level editor)
- SDL
- AssImp (importing models)

Walkthrough/Solution

Level 1
Go to elevator → Go to Button → Press → Rewind → Activate Elevator

Level 2
Go to left button → Press → Go to elevator → Go to button → Press → Go to right button → Press → Rewind → Activate elevator

Level 3
Go to button → Press → Wait → Press → Go to elevator → Rewind → Activate Elevator

Level 4
Go to button 1 → Press → Go to button 2 → Rewind → Go to button 3 → Press → Go to elevator → Activate elevator

Level 5
Go to energy barrier → Go to button → Press → Rewind → Pick up cube → Throw cube over wall → Rewind → Place cube on pressure plate → Activate elevator