This is the release notes documentation for the Lightning game engine. This document’s goal is to assist you, the developer, in understanding all of the Lightning game engine’s latest functionality.

**Version 1.1.0 Release Candidate 0 (Pre-release)**October, 2022

**General**

* Updated from SDL 2.0.22 to SDL 2.24.1.
* Updated to SDL2\_mixer 2.6.2 – MOD files are no longer supported due to bugs on SDL’s end, sorry, but there are many new functions.
* Updated to SDL2\_image 2.6.2 – JPEG-XL and AVIF image formats are now supported.
* Examples now use the installed engine instead of the version in the “shared” folder.
* All **UI events** can now be used by any renderable.
* The API has been standardised on American English in order to make it easier for developers who develop against other engines to adapt to Lightning. Please update your games accordingly.
* Unified the **MousePressedEvent**, **MouseReleasedEvent** and **MouseEvent** classes into one **MouseEvent** class.
* **NuCore.SDL2** has been renamed to **LightningBase**.
* Everywhere that previously referenced **frames** as a measure of time now measures **milliseconds**, such as the Particle Manager.
* AssetManager is now an actual base class for all asset managers (except LocalisationManager for technical reasons) and all asset managers can have **AddAsset** called on them with an Asset object to add and load an asset and **RemoveAsset** called on them with an Asset object to unload and remove it. The asset classes are called **\*\*\*AssetManager**, (such as TextAssetManager, etc) but for compatibility with Lightning 1.0 applications, they are instantiated under the 1.0 style property names. A global using is used to abstract this process from the developer in the project template.

**Rendering**

* Refactored the renderer. It is now a lot more centralised and somewhat faster.
* Implemented **Z-Index** for renderables using the **Renderable::ZIndex** property. Renderables are only re-sorted when the order changes.
* Offscreen renderables are now culled. This increases performance.
* Fixed **Renderer::CurFPS** being an internal property.
* **Window** has been renamed to **Renderer**, and **WindowSettings** has been renamed to **RendererSettings**.
* Renamed the **Renderer** enum to **RenderingBackend**.

**Texture**

* Added **Texture::Access** so you can acquire a Texture’s access at runtime.
* Added **Texture::SetOpacity** to quickly set the Opacity of a texture.
* **TextureManager** is no longer experimental.
* Added **TextureManager::GetInstanceOfTexture** to clone a texture. The **clone** parameter will use the original texture’s handle if set to true. This has the beneficial effect of reducing memory usage, but will also result in **SetPixel** and **GetPixel** affecting every single draw of the texture.
* **AnimatedTextures** now obey delta time.

**Text**

* Implemented font caching (with the internal **FontCache\*\*** classes). Text is now cached by the engine and automatically discarded when no longer used, resulting in a speedup of 20x in some cases. (Minesweeper went from 43fps to 550-800fps, and my Test Program went from 80-100 to 450-600fps!).
* **FontManager::DrawText** has been moved to a new **TextAssetManager** class, usable through **TextManager::DrawText**.

**Camera**

* Implemented camera shake using the **Camera::CameraShake** property.
* Implemented camera velocity using the **Camera::Velocity** property.
* Implemented the **Camera::AllowCameraMoveOnShake** property to disable the correction behaviour to keep the camera in the same place when shaking.
* Implemented the **Floor** camera type. This positions the origin of the camera at the bottom of the screen, as if a floor was rising.

**Packaging**

* Lightning now verifies the intended engine version of a WAD file instead of using a placeholder value, as in version 1.0.

**Animation**

* **A new animation engine has been implemented:**
* The new animation engine allows you to animate any property of any Renderable. There are currently 6 modifiable properties for animations, more will be added in future releases.  
  The animation format uses JSON files.
* Added the new Lightning Animation Editor (**AnimTool.exe**) that allows you to edit and generate animations.

**Settings**

* Moved both Global and Local Settings APIs to **LightningBase.**
* Implemented **LocalSettings::AddValue**, **LocalSettings::SetValue** and **LocalSettings::DeleteKey** to more easily manipulate LocalSettings.
* Local Settings is no longer an experimental API.
* If the GlobalSetting **DontSaveLocalSettingsOnShutdown** is **false**, Lightning will save local settings on shutdown.

**Lighting**

* Coloured lighting has been implemented using the **Light::Color** property.

**Particle Effects**

* Minor refactoring.
* Particle effects now obey delta time.
* Changed all **uint** properties of **ParticleEffect** to **int**.

**UI**

* Cursor blink now obeys delta time.

**Version 1.0.4  
September 17, 2022**

* Change all remaining “LightningGL” branding to “Lightning Game Engine”
* Modify GlobalSettings values when changing position or size of window
* Fix minor typo in release notes documentation (“zThis” => “This”)

**Version 1.0.3  
September 4, 2022**

* Fix lighting screen-space map moving with the camera (catastrophic failure)
* Implemented **ParticleEffect::RemoveEffect**,which will unload and remove a particle effect.
* Fixed the Light Manager’s screen space map being unlocked twice each frame.

**Version 1.0.2  
September 3, 2022**

* Fix all UI elements being rendered twice. This will increase overall performance by 10-100% depending on how much UI is being used in your game.
* Allow particle effects to actually be unloaded.
* Implement the **forceStop** parameter to **ParticleEffect::Stop**. It can be used to immediately stop a particle effect.
* Implement **GlobalSettings::Save** as a stopgap.
* Minor API fixes

**Version 1.0.1  
August 31, 2022**

* Add the ability to remove UI gadgets.
* Fix an issue with Texture loading in the Visual Studio project template.
* Fix an internal method of FontManager accidentally being made public.

**Version 1.0.0  
August 30, 2022**

Initial release of the Lightning game engine.