Blade Engine

Generated by Doxygen 1.8.13

Contents

1 Namespace Index **1**

1.1 Namespace List 1

2 Hierarchical Index **3**

2.1 Class Hierarchy 3

3 Class Index **7**

3.1 Class List 7

4 Namespace Documentation **11**

4.1 Blade Namespace Reference 11

4.1.1 Detailed Description 16

5 Class Documentation **17**

5.1 Blade::AbstractViewport Class Reference 17

5.1.1 Detailed Description 17

5.1.2 Constructor & Destructor Documentation 18

5.1.2.1 AbstractViewport() 18

5.1.3 Member Function Documentation 18

5.1.3.1 GetRect() 18

5.1.3.2 SetRect() 18

5.2 Blade::Animation Class Reference 19

5.3 Blade::Application Class Reference 19

5.4 Blade::AudioManager Class Reference 20

5.5 Blade::AudioSample Class Reference 21

5.6 Blade::AudioSource Class Reference 21
5.7 Blade::AudioStream Class Reference 22
5.8 Blade::AudioStreamBuffer Struct Reference 22
5.9 Blade::BehaviourComponent Class Reference 23
5.9.1 Constructor & Destructor Documentation 23
5.9.1.1 BehaviourComponent() 23
5.9.2 Member Function Documentation 24
5.9.2.1 Update() 24
5.10 Blade::BehaviourSystem Class Reference 24
5.10.1 Detailed Description 25
5.10.2 Member Function Documentation 25
5.10.2.1 Initialize() 25
5.10.2.2 Process() 25
5.10.2.3 RegisterComponent() 25
5.10.2.4 UnregisterComponent() 26
5.11 Blade::BoundingSphere Class Reference 26
5.12 Blade::Camera Class Reference 27
5.13 Blade::CameraComponent Class Reference 27
5.13.1 Detailed Description 28
5.13.2 Constructor & Destructor Documentation 28
5.13.2.1 CameraComponent() `[1/3]` 28
5.13.2.2 CameraComponent() `[2/3]` 29
5.13.2.3 CameraComponent() `[3/3]` 29
5.13.2.4 ∼CameraComponent() 30
5.13.3 Member Function Documentation 30
5.13.3.1 GetClippingPlanes() 30
5.13.3.2 GetFarPlane() 30
5.13.3.3 GetFov() 30
5.13.3.4 GetNearPlane() 31
5.13.3.5 GetProjectionMatrix() 31

5.13.3.6 GetViewMatrix() 31
5.13.3.7 GetViewport() 31
5.13.3.8 SetClippingPlanes() [1/2] 31
5.13.3.9 SetClippingPlanes() [2/2] 32
5.13.3.10 SetFarPlane() 32
5.13.3.11 SetFov() 32
5.13.3.12 SetNearPlane() 33
5.13.3.13 SetViewMatrix() 33
5.13.3.14 SetViewport() 33
5.14 Blade::CameraDesc Struct Reference 33
5.15 Blade::CameraSystem Class Reference 34
5.15.1 Detailed Description 34
5.15.2 Member Function Documentation 35
5.15.2.1 GetActiveCamera() 35
5.15.2.2 GetActiveCameraProjectionMatrtix() 35
5.15.2.3 GetActiveCameraViewMatrix() 35
5.15.2.4 GetActiveCameraViewport() 35
5.15.2.5 GetCamera() 35
5.15.2.6 RegisterComponent() 36
5.15.2.7 SetActiveCamera() 36
5.15.2.8 UnregisterComponent() 36
5.16 Blade::Collider Class Reference 37
5.17 Blade::ColliderComponent Class Reference 37
5.18 Blade::Command Class Reference 38
5.19 Blade::Component Class Reference 38
5.19.1 Detailed Description 39
5.19.2 Constructor & Destructor Documentation 39
5.19.2.1 Component() 39
5.19.3 Member Function Documentation 39
5.19.3.1 GetId() 40

5.19.3.2 GetParent() 40

5.19.3.3 GetType() 40

5.19.3.4 OnMessage() 40

5.20 Blade::ConfigEntry Class Reference 41

5.21 Blade::ConfigFile Class Reference 41

5.22 Blade::ConnectionInfo Struct Reference 42

5.23 Blade::ContactManifold Class Reference 42

5.24 Blade::D3D11BlendState Class Reference 42

5.25 Blade::D3D11Context Class Reference 43

5.26 Blade::D3D11DepthStencilState Class Reference 43

5.27 Blade::D3D11IBO Class Reference 44

5.28 Blade::D3D11RasterizerState Class Reference 44

5.29 Blade::D3D11RenderTarget Class Reference 45

5.30 Blade::D3D11Shader Class Reference 45

5.31 Blade::D3D11ShaderProgram Class Reference 46

5.32 Blade::D3D11Texture Class Reference 46

5.33 Blade::D3D11VBO Class Reference 47

5.34 Blade::D3D11Viewport Class Reference 47

5.34.1 Detailed Description 47

5.34.2 Constructor & Destructor Documentation 48

5.34.2.1 D3D11Viewport() 48

5.35 Blade::D3D11Window Class Reference 48

5.36 Blade::MathUtils::Derivative Struct Reference 49

5.37 Blade::DirectionalLight Class Reference 49

5.38 Blade::DirectionalLightComponent Class Reference 49

5.39 Blade::DirectionalLightDesc Struct Reference 50

5.39.1 Detailed Description 50

5.40 Blade::EmitterComponent Class Reference 50

5.40.1 Member Function Documentation 51

5.40.1.1 Update() 51

5.41 Blade::EmitterDescriptor Struct Reference 52
5.42 Blade::EngineContext Class Reference 53
5.43 Blade::Entity Class Reference 53
5.44 Blade::GAPIContext Class Reference 54
5.45 Blade::IBO Class Reference 55
5.46 Blade::InputComponent Class Reference 55
5.46.1 Member Function Documentation 56
5.46.1.1 Update() 56
5.47 Blade::InputDevice Class Reference 56
5.48 Blade::InputManager Class Reference 58
5.48.1 Member Function Documentation 58
5.48.1.1 ActiveDeviceExists() 59
5.48.1.2 AssignDeviceToPlayer() 59
5.48.1.3 DevicePoolQueryType() 59
5.48.1.4 EnumerateDevices() 59
5.48.1.5 GetActiveDevice() 60
5.48.1.6 Initialize() 60
5.48.1.7 PooledDeviceExists() 60
5.48.1.8 QueryAllKeyStates() 60
5.48.1.9 QueryKeyState() 61
5.48.1.10 QueryMouseButtonState() 61
5.48.1.11 QueryMouseMovement() 61
5.48.1.12 QueryMouseMovementNormalized() 61
5.48.1.13 QueryMousePosition() 62
5.48.1.14 UnassignDevice() 62
5.49 Blade::InputState Struct Reference 62
5.49.1 Detailed Description 63
5.50 Blade::JoypadInputComponent Class Reference 63
5.50.1 Member Function Documentation 64
5.50.1.1 Update() 64

5.51 Blade::KeyboardInput Class Reference 64
5.51.1 Detailed Description 64
5.51.2 Member Function Documentation 65
5.51.2.1 QueryAllKeyStates() 65
5.51.2.2 QueryKeyState() 65
5.52 Blade::KeyboardInputComponent Class Reference 65
5.52.1 Member Function Documentation 66
5.52.1.1 Update() 66
5.53 Blade::Keyframe< T > Struct Template Reference 67
5.54 Blade::LightComponent Class Reference 67
5.54.1 Detailed Description 67
5.55 Blade::LightSystem Class Reference 68
5.55.1 Detailed Description 68
5.55.2 Member Function Documentation 68
5.55.2.1 GetDirectionalLightDescriptions() 69
5.55.2.2 GetPointLightDescriptions() 69
5.55.2.3 GetSpotlightDescriptions() 69
5.55.2.4 Initialize() 69
5.55.2.5 Process() 69
5.55.2.6 RegisterComponent() 70
5.55.2.7 UnregisterComponent() 70
5.56 Blade::ManifoldEntry Struct Reference 70
5.57 Blade::Material Struct Reference 71
5.58 Blade::Mesh Class Reference 71
5.59 Blade::Message< T > Class Template Reference 72
5.60 Blade::NCF Class Reference 72
5.61 Blade::NetworkManager Class Reference 73
5.62 Blade::NetworkMessage Class Reference 73
5.63 Blade::Observer Class Reference 74
5.64 Blade::ObserverSubject Class Reference 74

5.65 Blade::OggVorbisStream Class Reference 75
5.66 Blade::Particle Struct Reference 75
5.67 Blade::ParticleSystem Class Reference 75
5.67.1 Member Function Documentation 76
5.67.1.1 Initialize() 76
5.67.1.2 Process() 76
5.68 Blade::Pipeline< T, Tdata > Class Template Reference 77
5.68.1 Detailed Description 77
5.68.2 Member Function Documentation 77
5.68.2.1 AddStage() 77
5.68.2.2 Execute() 78
5.69 Blade::PipelineData< T > Class Template Reference 78
5.69.1 Detailed Description 78
5.69.2 Constructor & Destructor Documentation 78
5.69.2.1 PipelineData() 79
5.69.3 Member Function Documentation 79
5.69.3.1 Get() 79
5.70 Blade::PipelineStage< T, Tdata > Class Template Reference 79
5.70.1 Detailed Description 80
5.70.2 Constructor & Destructor Documentation 80
5.70.2.1 PipelineStage() 80
5.70.3 Member Function Documentation 80
5.70.3.1 Execute() 80
5.70.3.2 Initialize() 81
5.71 Blade::PlaneCollider Class Reference 81
5.71.1 Detailed Description 82
5.72 Blade::PointLight Class Reference 82
5.73 Blade::PointLightComponent Class Reference 82
5.74 Blade::PointLightDesc Struct Reference 83
5.74.1 Detailed Description 83

5.75 Blade::RefCountedContainer< T > Class Template Reference 83
5.76 Blade::RenderComponent Class Reference 84
5.76.1 Detailed Description 84
5.76.2 Constructor & Destructor Documentation 84
5.76.2.1 RenderComponent() 84
5.76.3 Member Function Documentation 85
5.76.3.1 GetMaterial() 85
5.76.3.2 GetMesh() 85
5.76.3.3 SetMaterial() 85
5.76.3.4 SetMesh() 86
5.77 Blade::RenderState Class Reference 86
5.78 Blade::RenderStateManager Class Reference 86
5.79 Blade::RenderSystem Class Reference 87
5.79.1 Detailed Description 87
5.79.2 Member Function Documentation 87
5.79.2.1 Initialize() 87
5.79.2.2 Process() 88
5.79.2.3 RegisterComponent() 88
5.79.2.4 SetRenderPassPipeline() 88
5.79.2.5 UnregisterComponent() 88
5.80 Blade::RenderTarget Class Reference 89
5.81 Blade::Resource Class Reference 89
5.82 Blade::ResourceManager Class Reference 90
5.83 Blade::MathUtils::RungeKutta4Integrator Class Reference 90
5.84 Blade::SamplePlaylist Struct Reference 90
5.85 Blade::Scene Class Reference 91
5.86 Blade::SceneManager Class Reference 91
5.87 Blade::Serializable Class Reference 92
5.88 Blade::Shader Class Reference 92
5.89 Blade::ShaderProgram Class Reference 92

5.90 Blade::ShaderProgramDesc Struct Reference 93
5.91 Blade::ShaderProgramManager Class Reference 93
5.92 Blade::SimulationComponent Class Reference 94
5.93 Blade::SimulationComponentState Struct Reference 94
5.94 Blade::SimulationSystem Class Reference 95
5.94.1 Detailed Description 95
5.94.2 Member Function Documentation 95
5.94.2.1 Initialize() 96
5.94.2.2 Process() 96
5.95 Blade::Socket Class Reference 96
5.96 Blade::Spotlight Class Reference 97
5.97 Blade::SpotlightComponent Class Reference 97
5.98 Blade::SpotlightDesc Struct Reference 98
5.98.1 Detailed Description 98
5.99 Blade::MathUtils::State Struct Reference 98
5.100 Blade::StreamPlaylist Struct Reference 99
5.101 Blade::System Class Reference 99
5.101.1 Detailed Description 99
5.101.2 Member Function Documentation 99
5.101.2.1 Initialize() 100
5.101.2.2 Process() 100
5.102 Blade::Texture Class Reference 100
5.103 Blade::ThreadPool Class Reference 101
5.103.1 Member Function Documentation 101
5.103.1.1 Initialize() 101
5.104 Blade::ThumbStick Struct Reference 101
5.104.1 Detailed Description 102
5.105 Blade::Timer Class Reference 102
5.106 Blade::VBO Class Reference 102
5.107 Blade::Vertex Struct Reference 103
5.108 Blade::Win32Window Class Reference 103
5.109 Blade::Window Class Reference 104
5.110 Blade::WindowFunctionCallbacks Struct Reference 105
5.111 Blade::WindowingService Class Reference 105
5.112 Blade::XInputDevice Class Reference 106

Index **107**

Chapter 1

Namespace Index

1.1 Namespace List

Here is a list of all documented namespaces with brief descriptions:

Blade

Key values for keyboard input 11

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

- Blade::AbstractViewport 17
  - Blade::D3D11Viewport 47
- Blade::Animation 19
- Blade::Application 19
- Blade::AudioManager 20
- Blade::AudioSource 21
- Blade::AudioStream 22
  - Blade::OggVorbisStream 75
- Blade::AudioStreamBuffer 22
- Blade::CameraDesc 33
- Blade::Collider 37
  - Blade::BoundingSphere 26
  - Blade::PlaneCollider 81
- Blade::Command 38
- Blade::ConfigEntry 41
- Blade::ConfigFile 41
- Blade::ConnectionInfo 42
- Blade::ContactManifold 42
- Blade::MathUtils::Derivative 49
- Blade::DirectionalLightDesc 50
- Blade::EngineContext 53
- Blade::GAPIContext 54
  - Blade::D3D11Context 43
- Blade::IBO 55
  - Blade::D3D11IBO 44
- Blade::InputDevice 56
  - Blade::XInputDevice 106
- Blade::InputManager 58
- Blade::InputState 62
- Blade::KeyboardInput 64
- Blade::Keyframe< T > 67
- Blade::ManifoldEntry 70
- Blade::Material 71

Blade::Message< T > . . . 72
Blade::Message< int > . . . 72
  Blade::NetworkMessage . . . 73
Blade::NCF . . . 72
Blade::NetworkManager . . . 73
Blade::Observer . . . 74
  Blade::Component . . . 38
    Blade::BehaviourComponent . . . 23
      Blade::EmitterComponent . . . 50
      Blade::InputComponent . . . 55
        Blade::JoypadInputComponent . . . 63
        Blade::KeyboardInputComponent . . . 65
    Blade::CameraComponent . . . 27
    Blade::ColliderComponent . . . 37
    Blade::LightComponent . . . 67
      Blade::DirectionalLightComponent . . . 49
      Blade::PointLightComponent . . . 82
      Blade::SpotlightComponent . . . 97
    Blade::RenderComponent . . . 84
    Blade::SimulationComponent . . . 94
Blade::ObserverSubject . . . 74
  Blade::Entity . . . 53
    Blade::Camera . . . 27
    Blade::DirectionalLight . . . 49
    Blade::PointLight . . . 82
    Blade::Spotlight . . . 97
Blade::Particle . . . 75
Blade::Pipeline< T, Tdata > . . . 77
Blade::PipelineData< T > . . . 78
Blade::PipelineStage< T, Tdata > . . . 79
Blade::PointLightDesc . . . 83
Blade::RefCountedContainer< T > . . . 83
Blade::RenderState . . . 86
  Blade::D3D11BlendState . . . 42
  Blade::D3D11DepthStencilState . . . 43
  Blade::D3D11RasterizerState . . . 44
Blade::RenderStateManager . . . 86
Blade::RenderTarget . . . 89
  Blade::D3D11RenderTarget . . . 45
Blade::Resource . . . 89
  Blade::AudioSample . . . 21
  Blade::EmitterDescriptor . . . 52
  Blade::Entity . . . 53
  Blade::Mesh . . . 71
  Blade::Shader . . . 92
    Blade::D3D11Shader . . . 45
  Blade::Texture . . . 100
    Blade::D3D11Texture . . . 46
Blade::ResourceManager . . . 90
Blade::MathUtils::RungeKutta4Integrator . . . 90
Blade::SamplePlaylist . . . 90
Blade::Scene . . . 91
Blade::SceneManager . . . 91
Blade::Serializable . . . 92
  Blade::NetworkMessage . . . 73
Blade::ShaderProgram . . . 92

    - Blade::D3D11ShaderProgram 46
- Blade::ShaderProgramDesc 93
- Blade::ShaderProgramManager 93
- Blade::SimulationComponentState 94
- Blade::Socket 96
- Blade::SpotlightDesc 98
- Blade::MathUtils::State 98
- Blade::StreamPlaylist 99
- Blade::System 99
    - Blade::BehaviourSystem 24
    - Blade::CameraSystem 34
    - Blade::LightSystem 68
    - Blade::ParticleSystem 75
    - Blade::RenderSystem 87
    - Blade::SimulationSystem 95
- Blade::ThreadPool 101
- Blade::ThumbStick 101
- Blade::Timer 102
- Blade::VBO 102
    - Blade::D3D11VBO 47
- Blade::Vertex 103
- Blade::Window 104
    - Blade::Win32Window 103
        - Blade::D3D11Window 48
- Blade::WindowFunctionCallbacks 105
- Blade::WindowingService 105

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Blade::AbstractViewport
Describes an implementation agnostic Viewport 17
Blade::Animation 19
Blade::Application 19
Blade::AudioManager 20
Blade::AudioSample 21
Blade::AudioSource 21
Blade::AudioStream 22
Blade::AudioStreamBuffer 22
Blade::BehaviourComponent 23
Blade::BehaviourSystem
A System responsible to process and manage the BehaviourComponents by calling the Update method on every component 24
Blade::BoundingSphere 26
Blade::Camera 27
Blade::CameraComponent
Represents a CameraComponent. This component contains all the information needed for the view and projection transformations. Managed by the CameraSystem 27
Blade::CameraDesc 33
Blade::CameraSystem
A System responsible to process and manage the CameraComponents by swapping the current active camera and providing the current active camera's matrices 34
Blade::Collider 37
Blade::ColliderComponent 37
Blade::Command 38
Blade::Component
Base Component class of the engine. All the components of the engine derive from this class. Compoment inherits from the Observer class so it can register and receive specific messages . 38
Blade::ConfigEntry 41
Blade::ConfigFile 41
Blade::ConnectionInfo 42
Blade::ContactManifold 42
Blade::D3D11BlendState 42
Blade::D3D11Context 43
Blade::D3D11DepthStencilState 43

Blade::D3D11IBO . . . 44
Blade::D3D11RasterizerState . . . 44
Blade::D3D11RenderTarget . . . 45
Blade::D3D11Shader . . . 45
Blade::D3D11ShaderProgram . . . 46
Blade::D3D11Texture . . . 46
Blade::D3D11VBO . . . 47
Blade::D3D11Viewport
D3D11 implementation of the AbstractViewport . . . 47
Blade::D3D11Window . . . 48
Blade::MathUtils::Derivative . . . 49
Blade::DirectionalLight . . . 49
Blade::DirectionalLightComponent . . . 49
Blade::DirectionalLightDesc
A struct describing a directional light . . . 50
Blade::EmitterComponent . . . 50
Blade::EmitterDescriptor . . . 52
Blade::EngineContext . . . 53
Blade::Entity . . . 53
Blade::GAPIContext . . . 54
Blade::IBO . . . 55
Blade::InputComponent . . . 55
Blade::InputDevice . . . 56
Blade::InputManager . . . 58
Blade::InputState
InputState describes the current state of a device . . . 62
Blade::JoypadInputComponent . . . 63
Blade::KeyboardInput
Keyboard abstraction of the engine . . . 64
Blade::KeyboardInputComponent . . . 65
Blade::Keyframe< T > . . . 67
Blade::LightComponent
Abstract class that describes a LightComponent. Provides the base functinality of a Light↩ Component. It contains the component's type and an index to the entry of the correct light description cache in the LightSystem. Managed by the LightSystem . . . 67
Blade::LightSystem
A System responsible for managing LightComponents. This system updates the positions of all the lights in the scene every frame. It is also responsible for caching the light descriptions of each light upon registration of a LightConponent . . . 68
Blade::ManifoldEntry . . . 70
Blade::Material . . . 71
Blade::Mesh . . . 71
Blade::Message< T > . . . 72
Blade::NCF . . . 72
Blade::NetworkManager . . . 73
Blade::NetworkMessage . . . 73
Blade::Observer . . . 74
Blade::ObserverSubject . . . 74
Blade::OggVorbisStream . . . 75
Blade::Particle . . . 75
Blade::ParticleSystem . . . 75
Blade::Pipeline< T, Tdata >
Abstract class that describes a pipeline that processes the specified object data type . . . 77
Blade::PipelineData< T >
An abstract data container for the data returned by a PipelineStage . . . 78
Blade::PipelineStage< T, Tdata >
This class describes an abstract stage of a pipeline that processes the specified type of data and returns the specified type of data . . . 79

Blade::PlaneCollider
Bounding Plane class is a collider 81
Blade::PointLight 82
Blade::PointLightComponent 82
Blade::PointLightDesc
A struct describing a point light 83
Blade::RefCountedContainer< T > 83
Blade::RenderComponent
Represents a RenderComponent. The RenderComponent makes an entity renderable. This component is processed by the RenderSystem 84
Blade::RenderState 86
Blade::RenderStateManager 86
Blade::RenderSystem
A System responsible for processing the RenderComponents by passing them through a specified pipeline 87
Blade::RenderTarget 89
Blade::Resource 89
Blade::ResourceManager 90
Blade::MathUtils::RungeKutta4Integrator 90
Blade::SamplePlaylist 90
Blade::Scene 91
Blade::SceneManager 91
Blade::Serializable 92
Blade::Shader 92
Blade::ShaderProgram 92
Blade::ShaderProgramDesc 93
Blade::ShaderProgramManager 93
Blade::SimulationComponent 94
Blade::SimulationComponentState 94
Blade::SimulationSystem
The simulation system of the engine 95
Blade::Socket 96
Blade::Spotlight 97
Blade::SpotlightComponent 97
Blade::SpotlightDesc
A struct describing a spotlight 98
Blade::MathUtils::State 98
Blade::StreamPlaylist 99
Blade::System
An interface that represents a system of the engine 99
Blade::Texture 100
Blade::ThreadPool 101
Blade::ThumbStick
Thumbstick structure to hold X/Y axis information 101
Blade::Timer 102
Blade::VBO 102
Blade::Vertex 103
Blade::Win32Window 103
Blade::Window 104
Blade::WindowFunctionCallbacks 105
Blade::WindowingService 105
Blade::XInputDevice 106

Chapter 4

Namespace Documentation

4.1 Blade Namespace Reference

Key values for keyboard input.

Classes

- class AbstractViewport

  Describes an implementation agnostic Viewport.
- class Animation
- class Application
- class AudioManager
- class AudioSample
- class AudioSource
- class AudioStream
- struct AudioStreamBuffer
- class BehaviourComponent
- class BehaviourSystem

  A System responsible to process and manage the BehaviourComponents by calling the Update method on every component.
- class BoundingSphere
- class Camera
- class CameraComponent

  Represents a CameraComponent. This component contains all the information needed for the view and projection transformations. Managed by the CameraSystem.
- struct CameraDesc
- class CameraSystem

  A System responsible to process and manage the CameraComponents by swapping the current active camera and providing the current active camera's matrices.
- class Collider
- class ColliderComponent
- class Command
- class Component

  Base Component class of the engine. All the components of the engine derive from this class. Compoment inherits from the Observer class so it can register and receive specific messages.
- class ConfigEntry
- class ConfigFile

- struct ConnectionInfo
- class ContactManifold
- class D3D11BlendState
- class D3D11Context
- class D3D11DepthStencilState
- class D3D11IBO
- class D3D11RasterizerState
- class D3D11RenderTarget
- class D3D11Shader
- class D3D11ShaderProgram
- class D3D11Texture
- class D3D11VBO
- class D3D11Viewport

  D3D11 implementation of the AbstractViewport.
- class D3D11Window
- class DirectionalLight
- class DirectionalLightComponent
- struct DirectionalLightDesc

  A struct describing a directional light.
- class EmitterComponent
- struct EmitterDescriptor
- class EngineContext
- class Entity
- class GAPIContext
- class IBO
- class InputComponent
- class InputDevice
- class InputManager
- struct InputState

  InputState describes the current state of a device.
- class JoypadInputComponent
- class KeyboardInput

  Keyboard abstraction of the engine.
- class KeyboardInputComponent
- struct Keyframe
- class LightComponent

  Abstract class that describes a LightComponent. Provides the base functinality of a LightComponent. It contains the component's type and an index to the entry of the correct light description cache in the LightSystem. Managed by the LightSystem.
- class LightSystem

  A System responsible for managing LightComponents. This system updates the positions of all the lights in the scene every frame. It is also responsible for caching the light descriptions of each light upon registration of a LightConponent.
- struct ManifoldEntry
- struct Material
- class Mesh
- class Message
- class NCF
- class NetworkManager
- class NetworkMessage
- class Observer
- class ObserverSubject
- class OggVorbisStream
- struct Particle
- class ParticleSystem

- class Pipeline

  Abstract class that describes a pipeline that processes the specified object data type.
- class PipelineData

  An abstract data container for the data returned by a PipelineStage.
- class PipelineStage

  This class describes an abstract stage of a pipeline that processes the specified type of data and returns the specified type of data.
- class PlaneCollider

  Bounding Plane class is a collider.
- class PointLight
- class PointLightComponent
- struct PointLightDesc

  A struct describing a point light.
- class RefCountedContainer
- class RenderComponent

  Represents a RenderComponent. The RenderComponent makes an entity renderable. This component is processed by the RenderSystem.
- class RenderState
- class RenderStateManager
- class RenderSystem

  A System responsible for processing the RenderComponents by passing them through a specified pipeline.
- class RenderTarget
- class Resource
- class ResourceManager
- struct SamplePlaylist
- class Scene
- class SceneManager
- class Serializable
- class Shader
- class ShaderProgram
- struct ShaderProgramDesc
- class ShaderProgramManager
- class SimulationComponent
- struct SimulationComponentState
- class SimulationSystem

  The simulation system of the engine.
- class Socket
- class Spotlight
- class SpotlightComponent
- struct SpotlightDesc

  A struct describing a spotlight.
- struct StreamPlaylist
- class System

  An interface that represents a system of the engine.
- class Texture
- class ThreadPool
- struct ThumbStick

  Thumbstick structure to hold X/Y axis information.
- class Timer
- class VBO
- struct Vertex
- class Win32Window
- class Window
- struct WindowFunctionCallbacks
- class WindowingService
- class XInputDevice

Typedefs

- using Recti = Vec4i

  Type alias of a Vec4i.
- using **KeyframeVec3f** = Keyframe< Vec3f >
- using **KeyframeQuatf** = Keyframe< Quatf >
- using **LoadEntityCallback** = std::function< bool(const std::wstring &fileName, Entity *thisObject)>
- using **PointLightDescTuple** = std::tuple< PointLightDesc *, LightComponent * >
- using **DirectionalLightDescTuple** = std::tuple< DirectionalLightDesc *, LightComponent * >
- using **SpotlightDescTuple** = std::tuple< SpotlightDesc *, LightComponent * >
- using **OnNewClientCallback** = std::function< void(ConnectionInfo connectionInfo)>
- using **OnNewPacketCallback** = std::function< void(std::vector< Byte >)>
- using **OnClientDisconnectCallback** = std::function< void()>
- using **ConnectionMap** = std::map< unsigned long, std::unique_ptr< Socket > >
- using **MessageQueue** = std::queue< std::shared_ptr< NetworkMessage > >
- using **SocketHandle** = int
- template<typename T >
  using **TimePoint** = std::chrono::time_point< T >
- using **HighResolutionClock** = std::chrono::high_resolution_clock
- using **HighResolutionTimePoint** = std::chrono::time_point< std::chrono::high_resolution_clock >
- using **Vec2i** = glm::ivec2
- using **Vec3i** = glm::ivec3
- using **Vec4i** = glm::ivec4
- using **Vec2ui** = glm::uvec2
- using **Vec3ui** = glm::uvec3
- using **Vec4ui** = glm::uvec4
- using **Vec2f** = glm::vec2
- using **Vec3f** = glm::vec3
- using **Vec4f** = glm::vec4
- using **Vec2d** = glm::dvec2
- using **Vec3d** = glm::dvec3
- using **Vec4d** = glm::dvec4
- using **Mat2f** = glm::mat2
- using **Mat3f** = glm::mat3
- using **Mat4f** = glm::mat4
- using **Mat2d** = glm::dmat2
- using **Mat3d** = glm::dmat3
- using **Mat4d** = glm::dmat4
- using **Quatf** = glm::quat
- using **Quatd** = glm::dquat
- using **Byte** = char
- template<typename T >
  using **ComPtr** = Microsoft::WRL::ComPtr< T >
- template<typename T >
  using **MessageContainer** = RefCountedContainer< Message< T > >
- using **ReshapeFunc** = void(*)(int, int)
- using **KeyboardFunc** = void(*)(unsigned char, int, int)
- using **KeyboardUpFunc** = void(*)(unsigned char, int, int)
- using **SpecialFunc** = void(*)(int, int, int)
- using **SpecialUpFunc** = void(*)(int, int, int)
- using **MouseFunc** = void(*)(int, bool, int, int)
- using **MotionFunc** = void(*)(int, int)
- using **PassiveMotionFunc** = void(*)(int, int)
- using **AddRemoveInputDeviceFunc** = void(*)()

Enumerations

- enum **DeviceType** { **KEYBAORD**, **JOYPAD**, **OTHER**, **DEVTYPE_ERROR** }
- enum **AnalogDeadzone** { **ANALOG_STICK_LEFT**, **ANALOG_STICK_RIGHT**, **ANALOG_TRIGGER** }
- enum **JoypadNumber** { **JOYPAD1**, **JOYPAD2**, **JOYPAD3**, **JOYPAD4** }
- enum **MouseButton** { **LEFT** = 0, **RIGHT** = 1 }
- enum **InputSensor** {
  BTN_FACE_1 = JOYBTN_FACE1, **BTN_FACE_2** = JOYBTN_FACE2, **BTN_FACE_3** = JOYBTN_FACE3, **BTN_FACE_4** = JOYBTN_FACE4,
  BTN_STICK_L = JOYBTN_STICKL, **BTN_STICK_R** = JOYBTN_STICKR, **BTN_SHOULDER_L** = JOYBT↩ N_SHOULDER1, **BTN_SHOULDER_R** = JOYBTN_SHOULDER2,
  BTN_OPTION_1 = JOYBTN_OPTION1, **BTN_OPTION_2** = JOYBTN_OPTION2, **DPAD_UP** = JOYDPAD↩ _UP, **DPAD_DOWN** = JOYDPAD_DOWN,
  DPAD_LEFT = JOYDPAD_LEFT, **DPAD_RIGHT** = JOYDPAD_RIGHT, **TRIGGER_LEFT**, **TRIGGER_RIG↩ HT**,
  STICK_LEFT, **STICK_RIGHT** }
- enum LightType { **POINT**, **DIRECTIONAL**, **SPOTLIGHT** }

  An enumeration used to specify a light type.
- enum **VertexWinding** { **CLOCKWISE**, **ANTICLOCKWISE** }
- enum **RenderStateType** {
  BS_BLEND_DISSABLED, **BS_BLEND_ADDITIVE**, **BS_BLEND_ALPHA**, **RS_CULL_FRONT**,
  RS_CULL_BACK, **RS_DRAW_WIRE**, **RS_DRAW_SOLID**, **DSS_DEPTH_MASK_0**,
  DSS_DEPTH_MASK_1, **DSS_DEPTH_TEST_DISABLE**, **DSS_DEPTH_TEST_ENABLE** }
- enum **RenderTargetBindType** { **COLOR_AND_DEPTH**, **DEPTH** }
- enum **ShaderType** {
  VERTEX_SHADER, **HULL_SHADER**, **DOMAIN_SHADER**, **GEOMETRY_SHADER**,
  FRAGMENT_SHADER, **SHADER_COUNT** }
- enum **InputLayoutMask** {
  IL_POSITION = 0x02, **IL_NORMAL** = 0x04, **IL_TANGENT** = 0x08, **IL_TEXCOORD** = 0x10,
  IL_COLOR = 0x20 }
- enum **AudioPlaymode** { **AUDIO_PLAYMODE_ONCE**, **AUDIO_PLAYMODE_LOOP** }
- enum **TextureType** {
  TEX_DIFFUSE, **TEX_SPECULAR**, **TEX_NORMAL**, **TEX_EMISSION**,
  TEX_AMBIENT_OCCLUSION, **SUPPORTED_TEX_COUNT** }
- enum **CpuCoreNumber** {
  CPU_0 = 1, **CPU_1** = 2, **CPU_2** = 4, **CPU_3** = 8,
  CPU_4 = 16, **CPU_5** = 32, **CPU_6** = 64, **CPU_7** = 128 }
- enum **PrimitiveTopology** { **TRIANGLE_LIST**, **TRIANGLE_STRIP** }
- enum **VirtualKey** : int {
  KEY_BACKSPACE = VK_BACK, **KEY_TAB** = VK_TAB, **KEY_RETURN** = VK_RETURN, **KEY_PAUSE** = VK_PAUSE,
  KEY_ESC = VK_ESCAPE, **KEY_SPACE** = VK_SPACE, **KEY_PGUP** = VK_PRIOR, **KEY_PGDN** = VK_N↩ EXT,
  KEY_END = VK_END, **KEY_HOME** = VK_HOME, **KEY_LEFT** = VK_LEFT, **KEY_RIGHT** = VK_RIGHT,
  KEY_UP = VK_UP, **KEY_DOWN** = VK_DOWN, **KEY_SELECT** = VK_SELECT, **KEY_PRINT** = VK_PRINT,
  KEY_PRTSCRN = VK_SNAPSHOT, **KEY_INSERT** = VK_INSERT, **KEY_DELETE** = VK_DELETE, **KEY_↩ HELP** = VK_HELP,
  KEY_0 = 0x30, **KEY_1** = 0x31, **KEY_2** = 0x32, **KEY_3** = 0x33,
  KEY_4 = 0x34, **KEY_5** = 0x35, **KEY_6** = 0x36, **KEY_7** = 0x37,
  KEY_8 = 0x38, **KEY_9** = 0x39, **KEY_A** = 0x41, **KEY_B** = 0x42,
  KEY_C = 0x43, **KEY_D** = 0x44, **KEY_E** = 0x45, **KEY_F** = 0x46,
  KEY_G = 0x47, **KEY_H** = 0x48, **KEY_I** = 0x49, **KEY_J** = 0x4A,
  KEY_K = 0x4B, **KEY_L** = 0x4C, **KEY_M** = 0x4D, **KEY_N** = 0x4E,
  KEY_O = 0x4F, **KEY_P** = 0x50, **KEY_Q** = 0x51, **KEY_R** = 0x52,
  KEY_S = 0x53, **KEY_T** = 0x54, **KEY_U** = 0x55, **KEY_V** = 0x56,
  KEY_W = 0x57, **KEY_X** = 0x58, **KEY_Y** = 0x59, **KEY_Z** = 0x5A,

KEY_NUM_0 = VK_NUMPAD0, **KEY_NUM_1** = VK_NUMPAD0, **KEY_NUM_2** = VK_NUMPAD0, **KEY_N↩ UM_3** = VK_NUMPAD0,
KEY_NUM_4 = VK_NUMPAD0, **KEY_NUM_5** = VK_NUMPAD0, **KEY_NUM_6** = VK_NUMPAD0, **KEY_N↩ UM_7** = VK_NUMPAD0,
KEY_NUM_8 = VK_NUMPAD0, **KEY_NUM_9** = VK_NUMPAD0, **KEY_NUM_MULTIPLY** = VK_MULTIPLY, **KEY_NUM_ADD** = VK_ADD,
KEY_NUM_SUBTRACT = VK_SUBTRACT, **KEY_NUM_DECIMAL** = VK_DECIMAL, **KEY_NUM_DIVIDIE** = VK_DIVIDE, **KEY_F1** = VK_F1,
KEY_F2 = VK_F2, **KEY_F3** = VK_F3, **KEY_F4** = VK_F4, **KEY_F5** = VK_F5,
KEY_F6 = VK_F6, **KEY_F7** = VK_F7, **KEY_F8** = VK_F8, **KEY_F9** = VK_F9,
KEY_F10 = VK_F10, **KEY_F11** = VK_F11, **KEY_F12** = VK_F12, **KEY_F13** = VK_F13,
KEY_F14 = VK_F14, **KEY_F15** = VK_F15, **KEY_F16** = VK_F16, **KEY_F17** = VK_F17,
KEY_F18 = VK_F18, **KEY_F19** = VK_F19, **KEY_F20** = VK_F20, **KEY_F21** = VK_F21,
KEY_F22 = VK_F22, **KEY_F23** = VK_F23, **KEY_F24** = VK_F24, **KEY_LSHIFT** = VK_LSHIFT,
KEY_RSHIFT = VK_RSHIFT, **KEY_LCTRL** = VK_LCONTROL, **KEY_RCTRL** = VK_RCONTROL, **KEY_L↩ MENU** = VK_LMENU,
KEY_RMENU = VK_RMENU, **KEY_NUM_SEPR** = VK_SEPARATOR, **KEY_WIN_L** = VK_LWIN, **KEY_W↩ IN_R** = VK_RWIN,
KEY_APPS = VK_APPS }

Functions

- bool **AttachCurrentThreadToCore** (unsigned int coreNumber)

4.1.1 Detailed Description

Key values for keyboard input.

Chapter 5

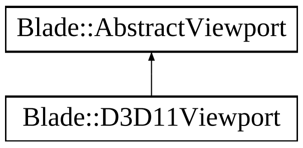
Class Documentation

5.1 Blade::AbstractViewport Class Reference

Describes an implementation agnostic Viewport.

`#include <abstract_viewport.h>`

Inheritance diagram for Blade::AbstractViewport:



Public Member Functions

- AbstractViewport ()=default

  AbstractViewport's default constructor.
- AbstractViewport (const Recti &rect)

  AbstractViewport's constructor.
- virtual ∼AbstractViewport ()=default

  AbstractViewport's default destructor.
- const Recti & GetRect () const noexcept

  Provides the dimensions of the Viewport.
- void SetRect (const Recti &rect) noexcept

  Sets the dimensions of the Viewport.
- virtual void Set () const noexcept=0

  Sets the Viewport to the Rasterizer.

5.1.1 Detailed Description

Describes an implementation agnostic Viewport.

5.1.2 Constructor & Destructor Documentation

5.1.2.1 AbstractViewport()

```
Blade::AbstractViewport::AbstractViewport (
             const Recti & rect )  [inline], [explicit]
```

AbstractViewport's constructor.

Parameters

rect	The dimensions of the Viewport.

5.1.3 Member Function Documentation

5.1.3.1 GetRect()

```
const Recti & Blade::AbstractViewport::GetRect ( ) const  [noexcept]
```

Provides the dimensions of the Viewport.

Returns

The dimensions of the Viewport.

5.1.3.2 SetRect()

```
void Blade::AbstractViewport::SetRect (
             const Recti & rect )  [noexcept]
```

Sets the dimensions of the Viewport.

Parameters

rect	The dimensions of the Viewport.

The documentation for this class was generated from the following files:

- include/abstract_viewport.h
- src/abstract_viewport.cpp

5.2 Blade::Animation Class Reference

Public Member Functions

- **Animation** (const std::string &name, bool loopState)
- void **SetName** (const std::string &name)
- void **SetLooping** (bool loopState)
- const std::string & **GetName** () const noexcept
- const KeyframeVec3f & **GetPositionKeyframe** (unsigned int idx) const noexcept
- const KeyframeQuatf & **GetRotationKeyframe** (unsigned int idx) const noexcept
- const KeyframeVec3f & **GetScalingKeyframe** (unsigned int idx) const noexcept
- size_t **GetPositionKeyframeCount** () const noexcept
- size_t **GetRotationKeyframeCount** () const noexcept
- size_t **GetScalingKeyframeCount** () const noexcept
- void **SetAnimationSpeed** (float speed) noexcept
- float **GetAnimationSpeed** () const noexcept
- bool **HasPositionKeyframes** () const noexcept
- bool **HasRotationKeyframes** () const noexcept
- bool **HasScalingKeyframes** () const noexcept
- bool **DoesLoop** () const noexcept
- void **AddPositionKeyframe** (const KeyframeVec3f &pos) noexcept
- void **AddRotationKeyframe** (const KeyframeQuatf &rot) noexcept
- void **AddScalingKeyframe** (const KeyframeVec3f &scaling) noexcept
- void **ReplacePositionKeyframe** (const KeyframeVec3f &pos, unsigned int idx) noexcept
- void **ReplaceRotationKeyframe** (const KeyframeQuatf &rot, unsigned int idx) noexcept
- void **ReplaceScalingKeyframe** (const KeyframeVec3f &scaling, unsigned int idx) noexcept
- void **ClearKeyframes** () noexcept
- void **SortPositionKeyframes** () noexcept
- void **SortRotationKeyframes** () noexcept
- void **SortScalingKeyframes** () noexcept

The documentation for this class was generated from the following files:

- include/animation.h
- src/animation.cpp

5.3 Blade::Application Class Reference

Public Member Functions

- **Application** (const Application &application)=delete
- Application & **operator=** (const Application &application)=delete
- void **SetTermination** (bool state) noexcept
- bool **ShouldTerminate** () const noexcept
- double **GetDelta** () const noexcept
- long **GetMsec** () const noexcept
- double **GetSec** () const noexcept
- void **Pause** () noexcept
- void **UnPause** () noexcept
- bool **IsPaused** () const noexcept
- void **SetLoadEntityCallback** (const LoadEntityCallback &callback) noexcept

- const LoadEntityCallback & **GetLoadEntityCallback** () const noexcept
- virtual bool **Initialize** (int ∗argc, char ∗argv[ ])
- virtual void **Update** () noexcept=0
- virtual void **Draw** () const noexcept=0
- virtual int **Run** () noexcept=0

The documentation for this class was generated from the following files:

- include/application.h
- src/application.cpp

5.4 Blade::AudioManager Class Reference

Public Member Functions

- void **SetSourcesVolume** (float volume)
- void **SetStreamsVolume** (float volume)
- void **SetMasterVolume** (float volume)
- OggVorbisStream ∗ **GetAudioStream** (int idx)
- AudioSource ∗ **GetAudioSource** (int idx)
- AudioSource ∗ **GetAudioSource** (AudioSample ∗sample)
- void **PlayStream** (const std::wstring &fname, float volume, AudioPlaymode mode, int ∗stream_idx=nullptr)
- void **PlaySample** (AudioSample ∗sample, float volume, AudioPlaymode mode, const Vec3f &position=Vec3f{ 0, 0, 0 }, int ∗src_idx=nullptr)
- void **PlayStreamPlaylist** (StreamPlaylist ∗playlist, float volume)
- void **PlaySamplePlaylist** (SamplePlaylist ∗playlist, float volume)
- void **StopStream** (int stream_idx)
- void **StopSource** (int source_idx)
- void **StopStreams** ()
- void **StopSources** ()
- void **PauseStreams** ()
- void **PauseSources** ()
- void **ResumeStreams** ()
- void **ResumeSources** ()
- void **RegulateVolumes** ()

Static Public Member Functions

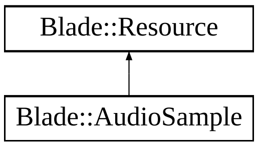
- static void **SetListenerPosition** (const Vec3f &pos=Vec3f{ 0, 0, 0 })
- static void **SetListenerOrientation** (const Vec3f &dir, const Vec3f &up=Vec3f{ 0, 1, 0 })

The documentation for this class was generated from the following files:

- include/audio_manager.h
- src/audio_manager.cpp

5.5 Blade::AudioSample Class Reference

Inheritance diagram for Blade::AudioSample:



Public Member Functions

- bool **Load** (const std::wstring &fileName) noexcept override
- unsigned int **GetBuffer** () const noexcept

The documentation for this class was generated from the following files:

- include/sample.h
- src/sample.cpp

5.6 Blade::AudioSource Class Reference

Public Member Functions

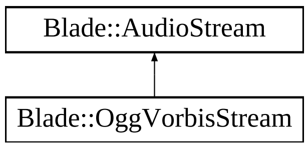
- void **SetSample** (const AudioSample ∗sample) noexcept
- const AudioSample ∗ **GetSample** () const noexcept
- void **SetPosition** (const Vec3f &pos, bool viewspace=false) const noexcept
- Vec3f **GetPosition** () const noexcept
- void **SetVolume** (float vol) noexcept
- float **GetVolume** () const noexcept
- void **SetPlaybackVolume** (float vol) const noexcept
- float **GetPlaybackVolume** () const noexcept
- void **SetLooping** (bool state) const noexcept
- void **SetReferenceDist** (float rdist) const noexcept
- float **GetReferenceDist** () const noexcept
- void **SetMaxDist** (float dist) const noexcept
- float **GetMaxDist** () const noexcept
- bool **IsPlaying** () const noexcept
- bool **IsPaused** () const noexcept
- void **Play** () const noexcept
- void **Stop** () const noexcept
- void **Pause** () const noexcept

The documentation for this class was generated from the following files:

- include/source.h
- src/source.cpp

5.7 Blade::AudioStream Class Reference

Inheritance diagram for Blade::AudioStream:



Public Member Functions

- void **PollLoop** () noexcept
- void **SetVolume** (float vol) noexcept
- float **GetVolume** () const noexcept
- void **SetPlaybackVolume** (float vol) noexcept
- float **GetPlaybackVolume** () const noexcept
- virtual void **Play** (AudioPlaymode mode) noexcept
- virtual void **Stop** () noexcept
- virtual void **Rewind** () noexcept=0
- virtual bool **IsPlaying** () const noexcept
- virtual bool **IsLooping** () const noexcept
- virtual int **FreqCount** (int bin) const noexcept
- virtual int **FreqCount** (int range_start, int range_end) const noexcept

The documentation for this class was generated from the following files:

- include/stream.h
- src/stream.cpp

5.8 Blade::AudioStreamBuffer Struct Reference

Public Attributes

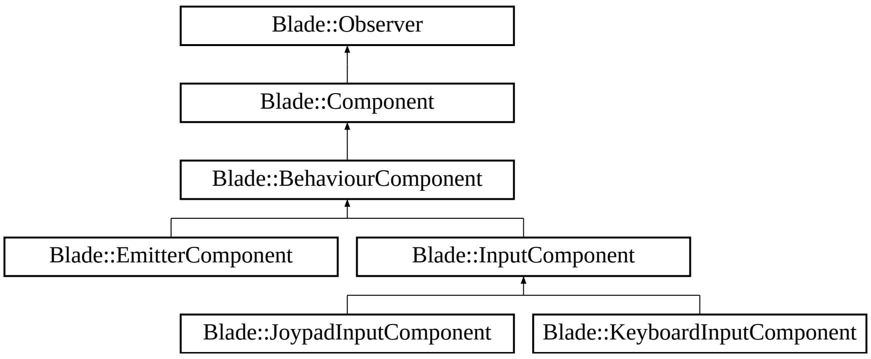
- Byte **samples** [AUDIO_BUFFER_BYTES]
- int **sampleCount**
- int **channels**
- int **sampleRate**

The documentation for this struct was generated from the following file:

- include/stream.h

5.9 Blade::BehaviourComponent Class Reference

Inheritance diagram for Blade::BehaviourComponent:


Blade::Observer
Blade::Component
Blade::BehaviourComponent
Blade::EmitterComponent
Blade::InputComponent
Blade::JoypadInputComponent
Blade::KeyboardInputComponent

Public Member Functions

- BehaviourComponent (const std::string &type, Entity ∗parent)

  Component constructor.
- **BehaviourComponent** (const BehaviourComponent &other)=delete
- BehaviourComponent & **operator=** (const BehaviourComponent &other)=delete
- virtual void Update (const float dt, const long time=0) noexcept=0

  Updates the Component on each frame.
- virtual void Setup () noexcept=0

  Performs setup actions after the BehaviourComponent's creation.
- virtual void Teardown () noexcept=0

  Performs actions before the BehaviourComponent is destroyed.
- virtual void **OnCollision** (Entity ∗other) noexcept

5.9.1 Constructor & Destructor Documentation

5.9.1.1 BehaviourComponent()

```
Blade::BehaviourComponent::BehaviourComponent (
             const std::string & type,
             Entity * parent )
```

Component constructor.

Parameters

type	The type of the Component as a string.
parent	The Entity the Component will be attached to.

5.9.2 Member Function Documentation

5.9.2.1 Update()

```
virtual void Blade::BehaviourComponent::Update (
             const float dt,
             const long time = 0 )  [pure virtual], [noexcept]
```

Updates the Component on each frame.

Parameters

dt	The time elapsed from the previous frame of the Application.
time	The elapsed time since the start of the Application.

Implemented in Blade::EmitterComponent, Blade::InputComponent, Blade::JoypadInputComponent, and Blade::↩ KeyboardInputComponent.

The documentation for this class was generated from the following files:

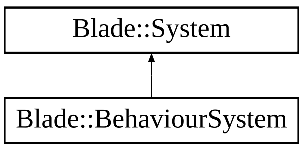
- include/behaviour_component.h
- src/behaviour_component.cpp

5.10 Blade::BehaviourSystem Class Reference

A System responsible to process and manage the BehaviourComponents by calling the Update method on every component.

```
#include <behaviour_system.h>
```

Inheritance diagram for Blade::BehaviourSystem:



Public Member Functions

- void Process (float deltaTime=.0f, long time=0) noexcept override

  Processes the BehaviourComponent.
- bool Initialize () noexcept override

  Initializes the BehaviourSystem.
- void RegisterComponent (BehaviourComponent ∗behaviourComponent) noexcept

  Registers the specified BehaviourComponent to the BehaviourSystem.
- void UnregisterComponent (int id) noexcept

  Unregisters a BehaviourComponent from the BehaviourSystem.
- virtual void Setup () noexcept

  Setup all the BehaviourComponent that are currently registered with the BehaviourSystem.
- virtual void Teardown () noexcept

  Teardown all the BehaviourComponent that are currently registered with the BehaviourSystem.

5.10.1 Detailed Description

A System responsible to process and manage the BehaviourComponents by calling the Update method on every component.

5.10.2 Member Function Documentation

5.10.2.1 Initialize()

```
bool Blade::BehaviourSystem::Initialize ( )  [override], [virtual], [noexcept]
```

Initializes the BehaviourSystem.

Returns

TRUE if initialization is successful, FALSE otherwise.

Implements Blade::System.

5.10.2.2 Process()

```
void Blade::BehaviourSystem::Process (
            float deltaTime = .0f,
            long time = 0 )  [override], [virtual], [noexcept]
```

Processes the BehaviourComponent.

Parameters

deltaTime	The time elapsed from the previous frame of the application.

Implements Blade::System.

5.10.2.3 RegisterComponent()

```
void Blade::BehaviourSystem::RegisterComponent (
            BehaviourComponent * behaviourComponent )  [noexcept]
```

Registers the specified BehaviourComponent to the BehaviourSystem.

Parameters

behaviourComponent	The BehaviourComponent to be registered to the BehaviourSystem for processing.

5.10.2.4 UnregisterComponent()

```
void Blade::BehaviourSystem::UnregisterComponent (
             int id )  [noexcept]
```

Unregisters a BehaviourComponent from the BehaviourSystem.

Parameters

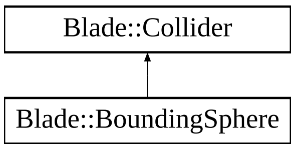
id	The unique id of the BehaviourComponent to be unregistered.

The documentation for this class was generated from the following files:

- include/behaviour_system.h
- src/behaviour_sytem.cpp

5.11 Blade::BoundingSphere Class Reference

Inheritance diagram for Blade::BoundingSphere:



Public Member Functions

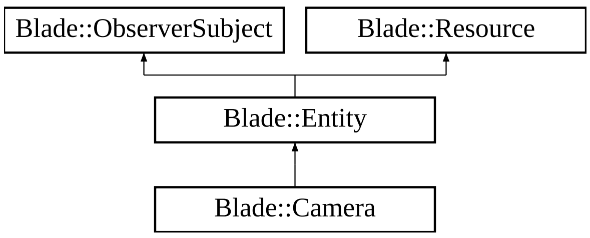
- **BoundingSphere** (float radius)
- bool **Collide** (const Collider ∗collider, ContactManifold &manifold) const noexcept override
- bool **Collide** (const BoundingSphere ∗bsphere, ContactManifold &manifold) const noexcept override
- bool **Collide** (const PlaneCollider ∗plane, ContactManifold &manifold) const noexcept override
- const float **GetRadius** () const noexcept

The documentation for this class was generated from the following files:

- include/bounding_sphere.h
- src/bounding_sphere.cpp

5.12 Blade::Camera Class Reference

Inheritance diagram for Blade::Camera:



Public Member Functions

- **Camera** (const std::string &name, const CameraDesc &cameraDescription)
- void **Update** (float dt, long time=0) noexcept override

The documentation for this class was generated from the following files:

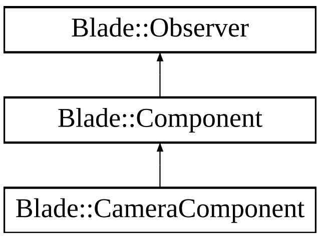
- include/camera.h
- src/camera.cpp

5.13 Blade::CameraComponent Class Reference

Represents a CameraComponent. This component contains all the information needed for the view and projection transformations. Managed by the CameraSystem.

```
#include <camera_component.h>
```

Inheritance diagram for Blade::CameraComponent:



Public Member Functions

- CameraComponent (Entity ∗parent)

    CameraComponent's constructor.
- CameraComponent (Entity ∗parent, float fov, const Viewport &viewport, float nearPlane, float farPlane)
- CameraComponent (Entity ∗parent, float fov, const Viewport &viewport, const Vec2f &clippingPlanes)
- ∼CameraComponent ()

    CameraComponent's destructor.
- float GetFov () const noexcept

    Provides the field of view.
- void SetFov (float fov) noexcept

    Sets the field of view.
- const Viewport & GetViewport () const noexcept

    Provides the Viewport.
- void SetViewport (const Viewport &viewport) noexcept

    Sets the Viewport.
- const Vec2f & GetClippingPlanes () const noexcept

    Provides the clipping planes as a Vec2f.
- void SetClippingPlanes (float nearPlane, float farPlane) noexcept

    Sets the near and the far clipping planes.
- void SetClippingPlanes (const Vec2f &clippingPlanes) noexcept
- float GetNearPlane () const noexcept

    Provides the near clipping plane.
- void SetNearPlane (float nearPlane) noexcept

    Sets the near clipping plane.
- float GetFarPlane () const noexcept

    Provides the far clipping plane.
- void SetFarPlane (float farPlane) noexcept

    Sets the far clipping plane.
- const Mat4f & GetViewMatrix () const noexcept

    Provides the view matrix.
- void SetViewMatrix (const Mat4f &viewMatrix) noexcept

    Sets the view matrix.
- const Mat4f & GetProjectionMatrix () const noexcept

    Provides the projection matrix.
- void UsePerspectiveProjection () noexcept

    Set the projection matrix with perspectiveLH.

5.13.1 Detailed Description

Represents a CameraComponent. This component contains all the information needed for the view and projection transformations. Managed by the CameraSystem.

5.13.2 Constructor & Destructor Documentation

5.13.2.1 CameraComponent() [1/3]

```
Blade::CameraComponent::CameraComponent (
            Entity * parent )  [explicit]
```

CameraComponent's constructor.

Registers the component to the CameraSystem.

Parameters

parent	The entity the CameraComponent will be attached to.

5.13.2.2 CameraComponent() [2/3]

```
Blade::CameraComponent::CameraComponent (
            Entity * parent,
            float fov,
            const Viewport & viewport,
            float nearPlane,
            float farPlane )
```

This is an overloaded member function, provided for convenience. It differs from the above function only in what argument(s) it accepts.

Parameters

parent	The entity the CameraComponent will be attached to.
fov	The field of view.
viewport	The viewport of the camera.
nearPlane	The near clipping plane.
farPlane	The far clipping plane.

5.13.2.3 CameraComponent() [3/3]

```
Blade::CameraComponent::CameraComponent (
            Entity * parent,
            float fov,
            const Viewport & viewport,
            const Vec2f & clippingPlanes )
```

This is an overloaded member function, provided for convenience. It differs from the above function only in what argument(s) it accepts.

Parameters

parent	The entity the CameraComponent will be attached to.
fov	The field of view.
viewport	The viewport of the camera.
clippingPlanes	The clipping planes for the projection.

clippingPlanes.x - The near clipping plane.

clippingPlanes.y - The far clipping plane.

5.13.2.4 ∼CameraComponent()

```
Blade::CameraComponent::∼CameraComponent ( )
```

CameraComponent's destructor.

Unregisters the component from the CameraSystem.

5.13.3 Member Function Documentation

5.13.3.1 GetClippingPlanes()

```
const Vec2f & Blade::CameraComponent::GetClippingPlanes ( ) const  [noexcept]
```

Provides the clipping planes as a Vec2f.

x - The near clipping plane.

y - The far clipping plane.

Returns

The clipping planes as a Vec2f.

5.13.3.2 GetFarPlane()

```
float Blade::CameraComponent::GetFarPlane ( ) const  [noexcept]
```

Provides the far clipping plane.

Returns

The far clipping plane.

5.13.3.3 GetFov()

```
float Blade::CameraComponent::GetFov ( ) const  [noexcept]
```

Provides the field of view.

Returns

The field of view.

5.13.3.4 GetNearPlane()

```
float Blade::CameraComponent::GetNearPlane ( ) const  [noexcept]
```

Provides the near clipping plane.

Returns

The near clipping plane.

5.13.3.5 GetProjectionMatrix()

```
const Mat4f & Blade::CameraComponent::GetProjectionMatrix ( ) const  [noexcept]
```

Provides the projection matrix.

Returns

The projection matrix.

5.13.3.6 GetViewMatrix()

```
const Mat4f & Blade::CameraComponent::GetViewMatrix ( ) const  [noexcept]
```

Provides the view matrix.

Returns

The view matrix.

5.13.3.7 GetViewport()

```
const Viewport & Blade::CameraComponent::GetViewport ( ) const  [noexcept]
```

Provides the Viewport.

Returns

The Viewport.

5.13.3.8 SetClippingPlanes() [1/2]

```
void Blade::CameraComponent::SetClippingPlanes (
             float nearPlane,
             float farPlane )  [noexcept]
```

Sets the near and the far clipping planes.

Parameters

nearPlane	The near clipping plane.
farPlane	The far clipping plane.

5.13.3.9 SetClippingPlanes() [2/2]

```
void Blade::CameraComponent::SetClippingPlanes (
             const Vec2f & clippingPlanes )  [noexcept]
```

This is an overloaded member function, provided for convenience. It differs from the above function only in what argument(s) it accepts.

x - The near clipping plane.

y - The far clipping plane.

Parameters

clippingPlanes	The clipping planes as a Vec2f.

5.13.3.10 SetFarPlane()

```
void Blade::CameraComponent::SetFarPlane (
             float farPlane )  [noexcept]
```

Sets the far clipping plane.

Parameters

farPlane	The far clipping plane.

5.13.3.11 SetFov()

```
void Blade::CameraComponent::SetFov (
             float fov )  [noexcept]
```

Sets the field of view.

Parameters

fov	The field of view.

5.13.3.12 SetNearPlane()

```
void Blade::CameraComponent::SetNearPlane (
            float nearPlane )  [noexcept]
```

Sets the near clipping plane.

Parameters

nearPlane	The near clipping plane.

5.13.3.13 SetViewMatrix()

```
void Blade::CameraComponent::SetViewMatrix (
            const Mat4f & viewMatrix )  [noexcept]
```

Sets the view matrix.

Parameters

farPlane	The new view matrix

5.13.3.14 SetViewport()

```
void Blade::CameraComponent::SetViewport (
            const Viewport & viewport )  [noexcept]
```

Sets the Viewport.

Parameters

viewport	The Viewport.

The documentation for this class was generated from the following files:

- include/camera_component.h
- src/camera_component.cpp

5.14 Blade::CameraDesc Struct Reference

Public Attributes

- Viewport **viewport**
- float **nearPlane**
- float **farPlane**
- float **fov**

The documentation for this struct was generated from the following file:

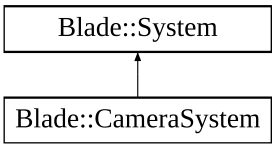
- include/camera.h

5.15 Blade::CameraSystem Class Reference

A System responsible to process and manage the CameraComponents by swapping the current active camera and providing the current active camera's matrices.

```
#include <camera_system.h>
```

Inheritance diagram for Blade::CameraSystem:



Public Member Functions

- void RegisterComponent (CameraComponent ∗cameraComponent) noexcept

  Registeres the specified CameraComponent to the CameraSystem.
- void UnregisterComponent (int id) noexcept

  Unregisters a CameraComponent from the CameraSystem.
- void SetActiveCamera (const std::string &name) noexcept

  Set the camera with the specified name as the active camera.
- const Mat4f & GetActiveCameraViewMatrix () const noexcept

  Provides the active camera's view matrix.
- const Mat4f & GetActiveCameraProjectionMatrtix () const noexcept

  Provides the active camera's projection matrix.
- const Viewport & GetActiveCameraViewport () const noexcept

  Provides the active camera's Viewport.
- CameraComponent ∗ GetActiveCamera () const noexcept

  Provides the active camera's CameraComponent.
- CameraComponent ∗ GetCamera (const std::string &name) noexcept

  Provides the CameraComponent of the camera with the specified name.

5.15.1 Detailed Description

A System responsible to process and manage the CameraComponents by swapping the current active camera and providing the current active camera's matrices.

5.15.2 Member Function Documentation

5.15.2.1 GetActiveCamera()

```
CameraComponent * Blade::CameraSystem::GetActiveCamera ( ) const  [noexcept]
```

Provides the active camera's CameraComponent.

Returns

The active camera's CameraComponent.

5.15.2.2 GetActiveCameraProjectionMatrtix()

```
const Mat4f & Blade::CameraSystem::GetActiveCameraProjectionMatrtix ( ) const  [noexcept]
```

Provides the active camera's projection matrix.

Returns

The active camera's projection matrix.

5.15.2.3 GetActiveCameraViewMatrix()

```
const Mat4f & Blade::CameraSystem::GetActiveCameraViewMatrix ( ) const  [noexcept]
```

Provides the active camera's view matrix.

Returns

The active camera's view matrix.

5.15.2.4 GetActiveCameraViewport()

```
const Viewport & Blade::CameraSystem::GetActiveCameraViewport ( ) const  [noexcept]
```

Provides the active camera's Viewport.

Returns

The active camera's Viewport.

5.15.2.5 GetCamera()

```
CameraComponent * Blade::CameraSystem::GetCamera (
             const std::string & name )  [noexcept]
```

Provides the CameraComponent of the camera with the specified name.

Parameters

name	The name of the camera to be returned.

Returns

The CameraComponent of the camera with the specified name.

5.15.2.6 RegisterComponent()

```
void Blade::CameraSystem::RegisterComponent (
            CameraComponent * cameraComponent )  [noexcept]
```

Registeres the specified CameraComponent to the CameraSystem.

Parameters

cameraComponent	The CameraComponent to be registered to the CameraSytstem for processing.

5.15.2.7 SetActiveCamera()

```
void Blade::CameraSystem::SetActiveCamera (
            const std::string & name )  [noexcept]
```

Set the camera with the specified name as the active camera.

Parameters

name	The name of the camera to be set as active.

5.15.2.8 UnregisterComponent()

```
void Blade::CameraSystem::UnregisterComponent (
            int id )  [noexcept]
```

Unregisters a CameraComponent from the CameraSystem.

Parameters

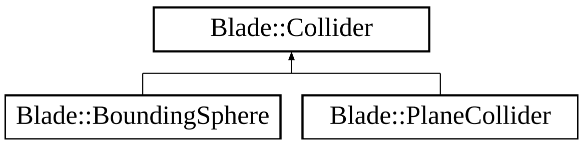
id	The unique id of the CameraComponent to be unregistered.

The documentation for this class was generated from the following files:

- include/camera_system.h
- src/camera_system.cpp

5.16 Blade::Collider Class Reference

Inheritance diagram for Blade::Collider:



Public Member Functions

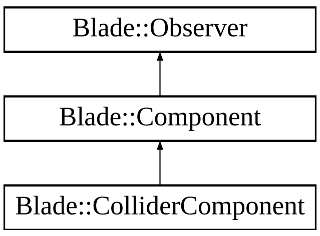
- virtual bool **Collide** (const Collider ∗collider, ContactManifold &manifold) const noexcept=0
- virtual bool **Collide** (const BoundingSphere ∗bsphere, ContactManifold &manifold) const noexcept=0
- virtual bool **Collide** (const PlaneCollider ∗plane, ContactManifold &manifold) const noexcept=0
- ColliderComponent ∗ **GetColliderComponent** () const noexcept
- void **SetParent** (ColliderComponent ∗cc) noexcept

The documentation for this class was generated from the following file:

- include/collider.h

5.17 Blade::ColliderComponent Class Reference

Inheritance diagram for Blade::ColliderComponent:



Public Member Functions

- **ColliderComponent** (Entity ∗parent, std::unique_ptr< Collider > collider)
- **ColliderComponent** (ColliderComponent &)=delete
- ColliderComponent & **operator=** (ColliderComponent &)=delete
- void **SetCollider** (std::unique_ptr< Collider > collider) noexcept
- Collider ∗ **GetCollider** () const noexcept
- bool **IsActive** () const noexcept
- void **SetCollisionResponseFlag** (bool flag) noexcept
- void **AddListener** (BehaviourComponent ∗listener) noexcept
- void **NotifyCollisionListeners** (Entity ∗entity) noexcept

The documentation for this class was generated from the following files:

- include/collider_component.h
- src/collider_component.cpp

5.18 Blade::Command Class Reference

Public Member Functions

- **Command** (bool online=false)
- virtual void **Execute** (Entity ∗entity, const float dt)=0

Protected Attributes

- bool **m_Online**

The documentation for this class was generated from the following file:

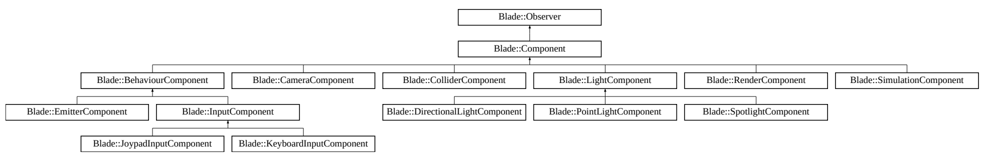
- include/command.h

5.19 Blade::Component Class Reference

Base Component class of the engine. All the components of the engine derive from this class. Compoment inherits from the Observer class so it can register and receive specific messages.

`#include <component.h>`

Inheritance diagram for Blade::Component:


Blade::Observer
Blade::Component
Blade::BehaviourComponent
Blade::CameraComponent
Blade::ColliderComponent
Blade::LightComponent
Blade::RenderComponent
Blade::SimulationComponent
Blade::EmitterComponent
Blade::InputComponent
Blade::DirectionalLightComponent
Blade::PointLightComponent
Blade::SpotlightComponent
Blade::JoypadInputComponent
Blade::KeyboardInputComponent

Public Member Functions

- Component (const std::string &type, Entity ∗parent)

  Component constructor.
- **Component** (const Component &other)=delete
- Component & **operator=** (const Component &other)=delete
- virtual ∼Component ()

  Default destructor of the Component.
- const std::string & GetType () const noexcept

  Returns the type of the Component.
- Entity ∗ GetParent () const noexcept

  Returns the Entity that the Component is attached to.
- void **SetParent** (Entity ∗parent) noexcept
- int GetId () const noexcept

  Returns the unique Component ID.
- void OnMessage (const MessageContainer< std::string > &msg) override

  Broadcasts the recieved message to the current active Scene through the SceneManager.

5.19.1 Detailed Description

Base Component class of the engine. All the components of the engine derive from this class. Compoment inherits from the Observer class so it can register and receive specific messages.

5.19.2 Constructor & Destructor Documentation

5.19.2.1 Component()

```
Blade::Component::Component (
             const std::string & type,
             Entity * parent )
```

Component constructor.

Parameters

type	The type of the Component as a string.
parent	The Entity the Component will be attached to.

5.19.3 Member Function Documentation

5.19.3.1 GetId()

```
int Blade::Component::GetId ( ) const  [noexcept]
```

Returns the unique Component ID.

Returns

The unique Component ID.

5.19.3.2 GetParent()

```
Entity * Blade::Component::GetParent ( ) const  [noexcept]
```

Returns the Entity that the Component is attached to.

Returns

The Entity that the Component is attached to.

5.19.3.3 GetType()

```
const std::string & Blade::Component::GetType ( ) const  [noexcept]
```

Returns the type of the Component.

Returns

The type of the Component.

5.19.3.4 OnMessage()

```
void Blade::Component::OnMessage (
             const MessageContainer< std::string > & msg )  [override], [virtual]
```

Broadcasts the recieved message to the current active Scene through the SceneManager.

Parameters

msg	The message received.

Implements Blade::Observer.

The documentation for this class was generated from the following files:

- include/component.h
- src/component.cpp

5.20 Blade::ConfigEntry Class Reference

Public Member Functions

- **ConfigEntry** (const char ∗name, const char ∗value)
- bool **IsValid** () const
- const char ∗ **GetName** () const
- const char ∗ **GetValueString** () const
- bool **IsNumber** () const
- int **GetValueInt** () const
- float **GetValueFloat** () const
- Vec4f **GetValueVec4f** () const

The documentation for this class was generated from the following files:

- include/cfg.h
- src/cfg.cpp

5.21 Blade::ConfigFile Class Reference

Public Member Functions

- **ConfigFile** (const char ∗fname)
- bool **Open** (const char ∗fname)
- bool **IsOpen** () const
- ConfigEntry **Get** (const char ∗optname) const
- std::list< ConfigEntry > **GetAll** (const char ∗groupname) const
- const char ∗ **GetString** (const char ∗optname, const char ∗def=nullptr) const
- int **GetInteger** (const char ∗optname, int def=0) const
- float **GetFloat** (const char ∗optname, float def=0.0f) const
- Vec4f **GetVec4f** (const char ∗optname, const Vec4f &def=Vec4f{ 0.0f, 0.0f, 0.0f, 1.0f }) const
- void **SetNcf** (NCF ∗n)
- NCF ∗ **GetNcf** ()

The documentation for this class was generated from the following files:

- include/cfg.h
- src/cfg.cpp

5.22 Blade::ConnectionInfo Struct Reference

Public Attributes

- std::tuple$<$ std::string, unsigned long $>$ **ip**
- unsigned short **port**

The documentation for this struct was generated from the following file:

- include/socket.h

5.23 Blade::ContactManifold Class Reference

Public Member Functions

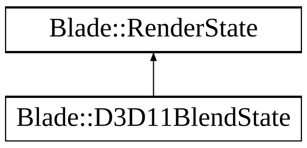
- void **AddEntry** (const ManifoldEntry &manifoldEntry) noexcept
- const ManifoldEntry & **GetEntry** (const int index) const noexcept
- const ManifoldEntry & **operator[ ]** (const int index) const noexcept
- const size_t **Size** () const noexcept
- void **Clear** () noexcept

The documentation for this class was generated from the following files:

- include/contact_manifold.h
- src/contact_manifold.cpp

5.24 Blade::D3D11BlendState Class Reference

Inheritance diagram for Blade::D3D11BlendState:



Public Member Functions

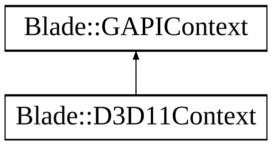
- **D3D11BlendState** (RenderStateType render_state_type)
- void **Set** () const noexcept override

The documentation for this class was generated from the following files:

- include/d3d/D3D11_blend_state.h
- src/d3d/D3D11_blend_state.cpp

5.25 Blade::D3D11Context Class Reference

Inheritance diagram for Blade::D3D11Context:



Public Member Functions

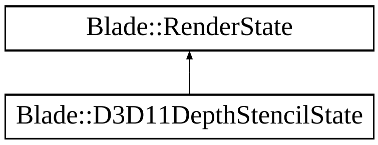
- bool **Create** (LUID ∗luid) override
- ID3D11Device ∗ **GetDevice** () const
- ID3D11DeviceContext ∗ **GetDeviceContext** () const
- ID3D11Debug ∗ **GetDebugInterface** () const noexcept
- ID3D11Texture2D ∗ **GetBackBuffer** () const noexcept
- ID3D11Texture2D ∗∗ **GetAddressOfBackBuffer** () noexcept
- ID3D11RenderTargetView ∗ **GetDefaultRenderTargetView** () const noexcept
- ID3D11DepthStencilView ∗ **GetDefaultDepthStencilView** () const noexcept
- ID3D11RenderTargetView ∗∗ **GetGetAddressOfDefaultRenderTargetView** () noexcept
- ID3D11DepthStencilView ∗∗ **GetAddressOfDefaultDepthStencilView** () noexcept
- unsigned int **GetMSAAQuality** (int sample_count) const

The documentation for this class was generated from the following files:

- include/d3d/D3D11_context.h
- src/d3d/D3D11_context.cpp

5.26 Blade::D3D11DepthStencilState Class Reference

Inheritance diagram for Blade::D3D11DepthStencilState:



Public Member Functions

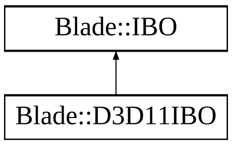
- **D3D11DepthStencilState** (RenderStateType renderStateType)
- void **Set** () const noexcept override

The documentation for this class was generated from the following files:

- include/d3d/D3D11_depth_stencil_state.h
- src/d3d/D3D11_depth_stencil_state.cpp

5.27 Blade::D3D11IBO Class Reference

Inheritance diagram for Blade::D3D11IBO:



Public Member Functions

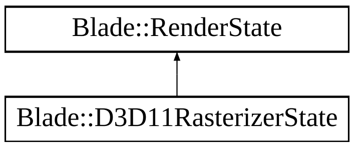
- bool **Create** (const std::vector< unsigned int > &indices) noexcept override
- void **Bind** () const noexcept override
- void **Draw** () const noexcept override

The documentation for this class was generated from the following files:

- include/d3d/D3D11_IBO.h
- src/d3d/D3D11_IBO.cpp

5.28 Blade::D3D11RasterizerState Class Reference

Inheritance diagram for Blade::D3D11RasterizerState:



Public Member Functions

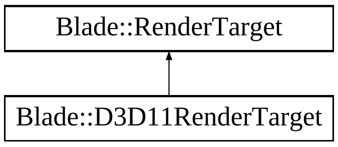
- **D3D11RasterizerState** (RenderStateType renderStateType)
- void **Set** () const noexcept override

The documentation for this class was generated from the following files:

- include/d3d/D3D11_rasterizer_state.h
- src/d3d/D3D11_rasterizer_state.cpp

5.29 Blade::D3D11RenderTarget Class Reference

Inheritance diagram for Blade::D3D11RenderTarget:



Public Member Functions

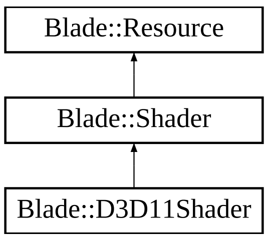
- **D3D11RenderTarget** (const Vec2i &size, bool MSAA, int sampleCount)
- bool **Create** (const Vec2i &size) override
- bool **Bind** (RenderTargetBindType bindType) const override
- bool **Unbind** () const override
- void **Clear** (float ∗color) const noexcept
- void **SetColorAttachment** (ID3D11Texture2D ∗colorAttachment, DXGI_FORMAT format) noexcept
- ID3D11ShaderResourceView ∗ **GetColorAttachment** () const noexcept
- ID3D11ShaderResourceView ∗ **GetDepthAttachment** () const noexcept

The documentation for this class was generated from the following files:

- include/d3d/D3D11_render_target.h
- src/d3d/D3D11_render_target.cpp

5.30 Blade::D3D11Shader Class Reference

Inheritance diagram for Blade::D3D11Shader:



Public Member Functions

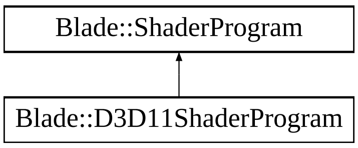
- ID3DBlob ∗ **GetBlob** () const noexcept
- bool **Load** (const std::wstring &fileName) noexcept override

The documentation for this class was generated from the following files:

- include/d3d/D3D11_shader.h
- src/d3d/D3D11_shader.cpp

5.31 Blade::D3D11ShaderProgram Class Reference

Inheritance diagram for Blade::D3D11ShaderProgram:



Public Member Functions

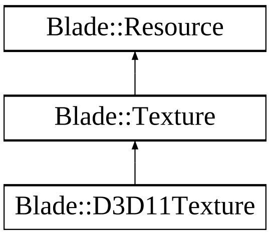
- bool **Create** (const ShaderProgramDesc &shaderProgramDesc) noexcept override
- void **Bind** () const noexcept override

The documentation for this class was generated from the following files:

- include/d3d/D3D11_shader_program.h
- src/d3d/D3D11_shader_program.cpp

5.32 Blade::D3D11Texture Class Reference

Inheritance diagram for Blade::D3D11Texture:



Public Member Functions

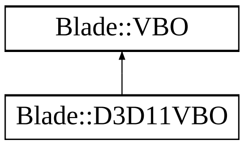
- **D3D11Texture** (TextureType textureType)
- bool **Load** (const std::wstring &fileName) noexcept override
- void **Bind** () const noexcept override

The documentation for this class was generated from the following files:

- include/d3d/D3D11_texture.h
- src/d3d/D3D11_texture.cpp

5.33 Blade::D3D11VBO Class Reference

Inheritance diagram for Blade::D3D11VBO:



Public Member Functions

- bool **Create** (const std::vector< Vertex > &vertices, PrimitiveTopology primitiveTopology) noexcept override
- void **Bind** () const noexcept override
- void **Draw** () const noexcept override

The documentation for this class was generated from the following files:

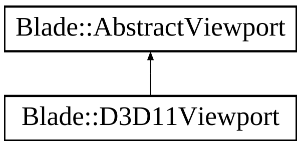
- include/d3d/D3D11_VBO.h
- src/d3d/D3D11_VBO.cpp

5.34 Blade::D3D11Viewport Class Reference

D3D11 implementation of the AbstractViewport.

```
#include <D3D11_viewport.h>
```

Inheritance diagram for Blade::D3D11Viewport:



Public Member Functions

- D3D11Viewport ()=default

  D3D11Viewport default constructor.
- D3D11Viewport (const Recti &rect, float minDepth, float maxDepth)

  D3D11Viewport constructor.
- void Set () const noexcept override

  Sets the Viewport to the Rasterizer.

5.34.1 Detailed Description

D3D11 implementation of the AbstractViewport.

5.34.2 Constructor & Destructor Documentation

5.34.2.1 D3D11Viewport()

```
Blade::D3D11Viewport::D3D11Viewport (
             const Recti & rect,
             float minDepth,
             float maxDepth )  [inline]
```

D3D11Viewport constructor.

Parameters

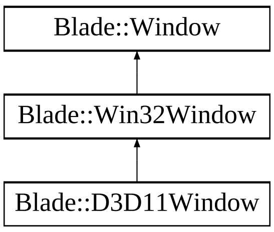
rect	The dimensions of the viewport.
minDepth	The minimum value of the depth buffer.
maxDepth	The maximum value of the depth buffer.

The documentation for this class was generated from the following files:

- include/d3d/D3D11_viewport.h
- src/d3d/D3D11_viewport.cpp

5.35 Blade::D3D11Window Class Reference

Inheritance diagram for Blade::D3D11Window:



Public Member Functions

- **D3D11Window** (const std::wstring &title, const Vec2i &size, const Vec2i &position, const unsigned int windowId, const bool focused, const bool minimized, const bool resizeable, const bool showCursor, const bool enableMSAA, const int msaaSampleCount, const WindowFunctionCallbacks &callbacks)
- void **EnableMSAA** (bool state) noexcept
- bool **MSAAEnabled** () const noexcept
- int **GetSampleCount** () const noexcept
- unsigned int **GetMSAAQuality** () const noexcept
- void **SwapBuffers** (unsigned syncInterval) const noexcept override

The documentation for this class was generated from the following files:

- include/d3d/D3D11_window.h
- src/d3d/D3D11_window.cpp

5.36 Blade::MathUtils::Derivative Struct Reference

Public Attributes

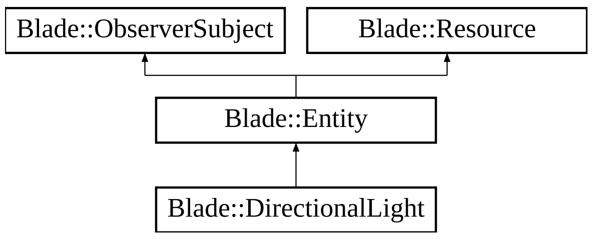
- float **dx** { 0.0f }
- float **dv** { 0.0f }

The documentation for this struct was generated from the following file:

- include/math_utils.h

5.37 Blade::DirectionalLight Class Reference

Inheritance diagram for Blade::DirectionalLight:



Public Member Functions

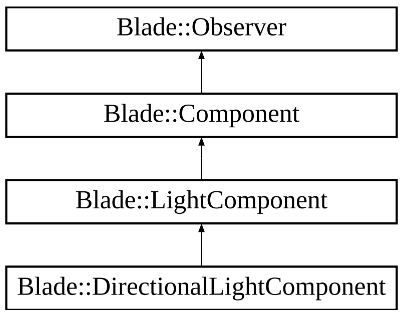
- **DirectionalLight** (const std::string &name, const DirectionalLightDesc &lightDescription)

The documentation for this class was generated from the following files:

- include/directional_light.h
- src/directional_light.cpp

5.38 Blade::DirectionalLightComponent Class Reference

Inheritance diagram for Blade::DirectionalLightComponent:



Public Member Functions

- **DirectionalLightComponent** (const DirectionalLightDesc &lightDesc, Entity ∗parent)
- const DirectionalLightDesc & **GetLightDescription** () const noexcept
- DirectionalLightDesc ∗ **GetLightDescriptionPtr** () noexcept

The documentation for this class was generated from the following files:

- include/directional_light_component.h
- src/directional_light_component.cpp

5.39 Blade::DirectionalLightDesc Struct Reference

A struct describing a directional light.

```
#include <light_component.h>
```

Public Attributes

- Vec4f **ambientIntensity**
- Vec4f **diffuseIntensity**
- Vec4f **specularIntensity**
- Vec3f **direction**
- float **pad**

5.39.1 Detailed Description

A struct describing a directional light.

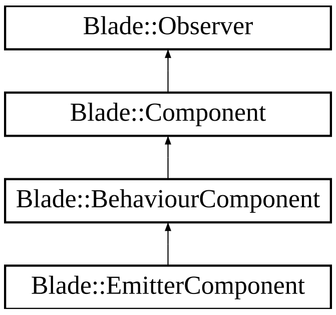
This struct is also used to represent a directional light in shaders.

The documentation for this struct was generated from the following file:

- include/light_component.h

5.40 Blade::EmitterComponent Class Reference

Inheritance diagram for Blade::EmitterComponent:



Public Member Functions

- **EmitterComponent** (Entity ∗parent)
- **EmitterComponent** (Entity ∗entity, EmitterDescriptor descriptor)
- **EmitterComponent** (const EmitterComponent &other)=default
- EmitterComponent & **operator=** (const EmitterComponent &other)=default
- const std::vector< Particle > & **GetParticles** () const noexcept
- const EmitterDescriptor & **GetEmitterDescriptor** () const noexcept
- void **SetDescriptor** (const EmitterDescriptor &descriptor) noexcept
- float **GetSpawnRate** () const noexcept
- void **SetSpawnRate** (const float spawnRate) noexcept
- float **GetLifeSpan** () const noexcept
- void **SetLifeSpan** (const float lifespan) noexcept
- float **GetMaxParticles** () const noexcept
- void **SetMaxParticles** (const float maxParticles) noexcept
- float **GetSpawnRadius** () const noexcept
- void **SetSpawnRadius** (const float spawnRadius) noexcept
- float **GetParticleSize** () const noexcept
- void **SetParticleSize** (const float particleSize) noexcept
- const Vec4f & **GetStartColor** () const noexcept
- void **SetStartColor** (const Vec4f &startColor) noexcept
- const Vec4f & **GetEndColor** () const noexcept
- void **SetEndColor** (const Vec4f &endColor) noexcept
- bool **IsActive** () const noexcept
- void **SetActive** (const bool active) noexcept
- const Vec3f & **GetVelocity** () const noexcept
- void **SetVelocity** (const Vec3f &velocity) noexcept
- float **GetVelocityRange** () const noexcept
- void **SetVelocityRange** (const float velocityRange) noexcept
- const Vec3f & **GetExternalForce** () const noexcept
- void **SetExternalForce** (const Vec3f &externalFroce) noexcept
- Mesh ∗ **GetMesh** () const noexcept
- void **SetMesh** (Mesh ∗mesh) noexcept
- Texture ∗ **GetTexture** () const noexcept
- void **SetTexture** (Texture ∗texture) noexcept
- RenderStateType **GetBlendStateType** () const noexcept
- void **SetBlendStateType** (RenderStateType blendStateType) noexcept
- void Update (const float dt, const long time) noexcept override

  Updates the Component on each frame.
- void Setup () noexcept override

  Performs setup actions after the BehaviourComponent's creation.
- void Teardown () noexcept override

  Performs actions before the BehaviourComponent is destroyed.

5.40.1 Member Function Documentation

5.40.1.1 Update()

```
void Blade::EmitterComponent::Update (
            const float dt,
            const long time )  [override], [virtual], [noexcept]
```

Updates the Component on each frame.

Parameters

dt	The time elapsed from the previous frame of the Application.
time	The elapsed time since the start of the Application.

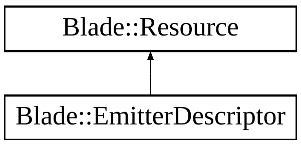
Implements Blade::BehaviourComponent.

The documentation for this class was generated from the following files:

- include/emitter_component.h
- src/emitter_component.cpp

5.41 Blade::EmitterDescriptor Struct Reference

Inheritance diagram for Blade::EmitterDescriptor:



Public Member Functions

- bool **Load** (const std::wstring &file_name) noexcept override

Public Attributes

- Vec3f **velocity**
- Vec3f **externalForce**
- float **spawnRate**
- float **lifespan**
- float **maxParticles**
- float **spawnRadius**
- float **particleSize**
- Vec4f **startColor**
- Vec4f **endColor**
- Texture ∗ **texture**
- RenderStateType **blendStateType**
- float **particlesToSpawn** { 0 }
- float **velocityRange**
- bool **active**

The documentation for this struct was generated from the following files:

- include/emitter_component.h
- src/emitter_component.cpp

5.42 Blade::EngineContext Class Reference

Public Member Functions

- **EngineContext** (const EngineContext &context)=delete
- EngineContext & **operator=** (const EngineContext &context)=delete

Static Public Member Functions

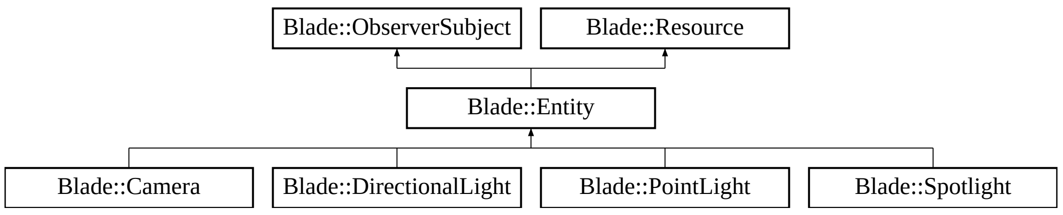
- static bool **Initialize** ()
- static ThreadPool & **GetThreadPool** () noexcept
- static RenderSystem & **GetRenderSystem** () noexcept
- static CameraSystem & **GetCameraSystem** () noexcept
- static LightSystem & **GetLightSystem** () noexcept
- static SimulationSystem & **GetSimulationSystem** () noexcept
- static BehaviourSystem & **GetBehaviourSystem** () noexcept
- static NetworkManager & **GetNetworkManager** () noexcept
- static RenderStateManager & **GetRenderStateManager** () noexcept
- static ResourceManager & **GetResourceManager** () noexcept
- static SceneManager & **GetSceneManager** () noexcept
- static ShaderProgramManager & **GetShaderProgramManager** () noexcept
- static InputManager & **GetInputManager** () noexcept
- static ParticleSystem & **GetParticleSystem** () noexcept
- static void **RegisterApplication** (Application ∗application) noexcept
- static Application & **GetApplication** () noexcept
- static AudioManager & **GetAudioManager** () noexcept

The documentation for this class was generated from the following files:

- include/engine_context.h
- src/engine_context.cpp

5.43 Blade::Entity Class Reference

Inheritance diagram for Blade::Entity:



Public Member Functions

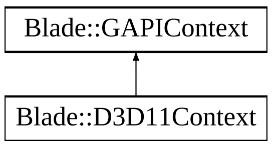
- **Entity** (const std::string &name)
- **Entity** (const Entity &other)
- Entity & **operator=** (const Entity &other)
- const std::string & **GetName** () const noexcept
- const Vec3f & **GetLocalPosition** () const noexcept
- Vec3f **GetWorldPosition** () noexcept
- void **SetPosition** (const Vec3f &position) noexcept
- const Quatf & **GetOrientation** () const noexcept
- void **SetOrientation** (const Quatf &orientation) noexcept
- void **SetOrientation** (const Vec3f &axis, float angle) noexcept
- const Vec3f & **GetScale** () const noexcept
- void **SetScale** (const Vec3f &scale) noexcept
- Entity ∗ **GetParent** () const noexcept
- void **SetParent** (Entity ∗entity) noexcept
- const std::vector< Entity ∗ > & **GetChildren** () const noexcept
- Entity ∗ **GetChild** (int index) const noexcept
- Entity ∗ **GetEntityFromHierarchy** (const std::string &name) noexcept
- void **AddChild** (Entity ∗entity) noexcept
- size_t **GetChildrenCount** () const noexcept
- const Mat4f & **GetXform** () const noexcept
- void **SetXform** (const Mat4f &xform) noexcept
- void **CalculateXform** () noexcept
- Component ∗ **GetComponent** (const std::string &type) const noexcept
- void **Entity::RemoveComponent** (const int id) noexcept
- std::vector< Component ∗ > **GetComponents** (const std::string &type) const noexcept
- void **AddComponent** (Component ∗component) noexcept
- bool **IsAlive** () const noexcept
- void **SetAlive** (bool state) noexcept
- virtual void **Update** (float dt, long time=0) noexcept
- bool **Load** (const std::wstring &fileName) noexcept override

The documentation for this class was generated from the following files:

- include/entity.h
- src/entity.cpp

5.44 Blade::GAPIContext Class Reference

Inheritance diagram for Blade::GAPIContext:



Public Member Functions

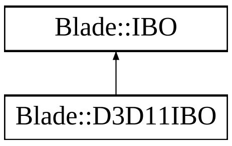
- virtual bool **Create** (LUID ∗luid)=0

The documentation for this class was generated from the following file:

- include/GAPI_context.h

5.45 Blade::IBO Class Reference

Inheritance diagram for Blade::IBO:



Public Member Functions

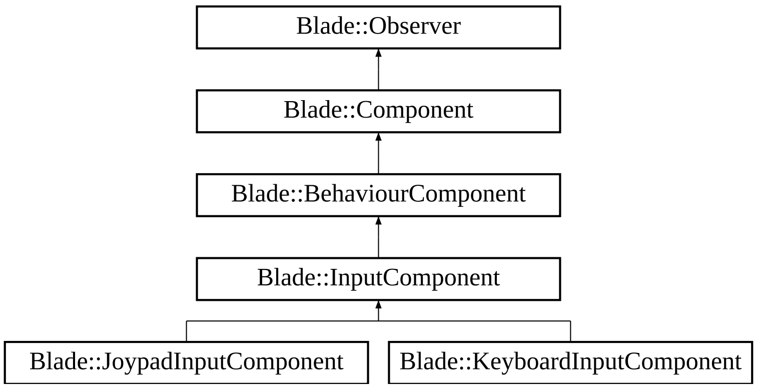
- void **SetIndexCount** (unsigned int idxCount) noexcept
- unsigned int **GetIndexCount** () const noexcept
- virtual bool **Create** (const std::vector< unsigned int > &indices) noexcept=0
- virtual void **Bind** () const noexcept=0
- virtual void **Draw** () const noexcept=0

The documentation for this class was generated from the following files:

- include/IBO.h
- src/IBO.cpp

5.46 Blade::InputComponent Class Reference

Inheritance diagram for Blade::InputComponent:


Blade::Observer
Blade::Component
Blade::BehaviourComponent
Blade::InputComponent
Blade::JoypadInputComponent
Blade::KeyboardInputComponent

Public Member Functions

- **InputComponent** (const std::string &type, Entity ∗parent, bool online=false)
- **InputComponent** (const InputComponent &other)=delete
- InputComponent & **operator=** (const InputComponent &other)=delete
- virtual void Update (const float dt, const long time=0) noexcept=0

  Updates the Component on each frame.
- virtual void Setup () noexcept=0

  Performs setup actions after the BehaviourComponent's creation.
- virtual void Teardown () noexcept=0

  Performs actions before the BehaviourComponent is destroyed.

Protected Attributes

- bool **m_Online**

5.46.1 Member Function Documentation

5.46.1.1 Update()

```
virtual void Blade::InputComponent::Update (
              const float dt,
              const long time = 0 )  [pure virtual], [noexcept]
```

Updates the Component on each frame.

Parameters

dt	The time elapsed from the previous frame of the Application.
time	The elapsed time since the start of the Application.

Implements Blade::BehaviourComponent.

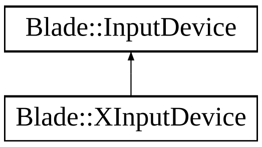
Implemented in Blade::JoypadInputComponent, and Blade::KeyboardInputComponent.

The documentation for this class was generated from the following files:

- include/input_component.h
- src/input_component.cpp

5.47 Blade::InputDevice Class Reference

Inheritance diagram for Blade::InputDevice:



Public Member Functions

- **InputDevice** (const InputDevice &)=delete
- InputDevice & **operator=** (const InputDevice &rhs)=delete
- **InputDevice** (InputDevice &&src)=delete
- InputDevice & **operator=** (InputDevice &&rhs)=delete
- **InputDevice** (int device_id, DeviceType devType)
- const InputState & **GetInputState** () const
- int **GetDeviceID** () const
- virtual void **Update** (float fDeltaTime)=0
- virtual bool **SetVibration** (float leftMotor, float rightMotor) const =0
- void **SetDeadzone** (AnalogDeadzone flag, float value)
- float **GetDeadzone** (AnalogDeadzone flag) const
- virtual bool **IsConnected** () const =0
- DeviceType **GetDeviceType** () const
- const InputState & **GetCurrentState** () const
- const InputState & **GetPreviousState** () const

Protected Member Functions

- void **SetDeviceID** (int id)
- void **SetDeviceType** (DeviceType devType)
- void **SetInputState** (const InputState &state)
- virtual bool **Initialize** ()=0

Static Protected Member Functions

- static void **FilterStateData** (const InputState &stateIn, InputState &stateOut)

The documentation for this class was generated from the following files:

- include/input_device.h
- src/input_device.cpp

5.48 Blade::InputManager Class Reference

Public Member Functions

- void **SetMouseButtonState** (MouseButton state, bool value)
- void **UpdateMousePos** (Vec2i mousepos)
- Vec2f **GetAnalogStickVector** (JoypadNumber player, InputSensor sensor)
- bool QueryKeyState (VirtualKey key) const noexcept

    Query the keyboard device for the state of a key.
- bool QueryAllKeyStates (std::map< VirtualKey, bool > &destMap) const noexcept

    Query the Keyboard device for the state of ALL keys associated to the device.
- Vec2f QueryMouseMovement ()

    Query the Keyboard device for the state of ALL keys associated to the device.
- Vec2f QueryMouseMovementNormalized ()

    Query the Keyboard device for the state of ALL keys associated to the device.
- Vec2i QueryMousePosition () const noexcept

    Query the Keyboard device for the state of ALL keys associated to the device.
- bool QueryMouseButtonState (MouseButton button)

    Query the state of the mouse buttons (providing an enum per button)
- bool QueryDeviceState (JoypadNumber player, InputSensor sensor)

    Query the state of a sensor on an active pad linked to player.
- bool QueryDeviceAllStates (JoypadNumber player, std::map< InputSensor, bool > &map)

    Query the input states of sensors on an active device linked to player, return in supplied map.
- void Update (float deltaTime)

    Update the states of managed input devices, and re-enumerate input devices.
- bool Initialize () noexcept

    Initialize the input manager.
- int EnumerateDevices () noexcept

    Counts and store the number of connected devices to the machine.
- DeviceType DevicePoolQueryType (int deviceId)

    Query a device pool for its type.
- bool PooledDeviceExists (int deviceId)

    Search the device pool for a device with id equal to deviceId.
- bool ActiveDeviceExists (int deviceId)

    Search the active device map for a device with id equal to deviceId.
- bool AssignDeviceToPlayer (JoypadNumber playerID, int deviceNumber)

    Assigns a player to an input device.
- bool UnassignDevice (JoypadNumber playerID)

    Unassigns an input device from a player (by player ID).
- InputDevice $*$ GetActiveDevice (JoypadNumber playerID)

    Returns an active (not in the pool) assigned input device, searched by player.

5.48.1 Member Function Documentation

5.48.1.1 ActiveDeviceExists()

```
bool Blade::InputManager::ActiveDeviceExists (
            int deviceId )
```

Search the active device map for a device with id equal to deviceId.

Returns

True if the device is found, otherwise false

5.48.1.2 AssignDeviceToPlayer()

```
bool Blade::InputManager::AssignDeviceToPlayer (
            JoypadNumber playerID,
            int deviceNumber )
```

Assigns a player to an input device.

Returns

True if successful, false otherwise

5.48.1.3 DevicePoolQueryType()

```
DeviceType Blade::InputManager::DevicePoolQueryType (
            int deviceId )
```

Query a device pool for its type.

Returns

DeviceType enum of the device in the pool denoted by devIndex

Remarks

If the device is not found, or an error has occurred, DEVTYPE_ERROR is returned

5.48.1.4 EnumerateDevices()

```
int Blade::InputManager::EnumerateDevices ( )  [noexcept]
```

Counts and store the number of connected devices to the machine.

Returns

An integer representing the number of connected input devices

5.48.1.5 GetActiveDevice()

```
InputDevice * Blade::InputManager::GetActiveDevice (
             JoypadNumber playerID )
```

Returns an active (not in the pool) assigned input device, searched by player.

Returns

Active input device for player id, nullptr otherwise

5.48.1.6 Initialize()

```
bool Blade::InputManager::Initialize ( ) [noexcept]
```

Initialize the input manager.

Returns

True if the initialization is successful, false otherwise

5.48.1.7 PooledDeviceExists()

```
bool Blade::InputManager::PooledDeviceExists (
             int deviceId )
```

Search the device pool for a device with id equal to deviceId.

Returns

True if the device is found, otherwise false

5.48.1.8 QueryAllKeyStates()

```
bool Blade::InputManager::QueryAllKeyStates (
             std::map< VirtualKey, bool > & destMap ) const [noexcept]
```

Query the Keyboard device for the state of ALL keys associated to the device.

Returns

True if successful, false otherwise

5.48.1.9 QueryKeyState()

```
bool Blade::InputManager::QueryKeyState (
            VirtualKey key ) const  [noexcept]
```

Query the keyboard device for the state of a key.

Returns

True if the key is a PRESSED state (down), false otherwise

5.48.1.10 QueryMouseButtonState()

```
bool Blade::InputManager::QueryMouseButtonState (
            MouseButton button )
```

Query the state of the mouse buttons (providing an enum per button)

Returns

True if pressed, false otherwise

5.48.1.11 QueryMouseMovement()

```
Vec2f Blade::InputManager::QueryMouseMovement ( )
```

Query the Keyboard device for the state of ALL keys associated to the device.

Returns

True if successful, false otherwise

5.48.1.12 QueryMouseMovementNormalized()

```
Vec2f Blade::InputManager::QueryMouseMovementNormalized ( )
```

Query the Keyboard device for the state of ALL keys associated to the device.

Returns

True if successful, false otherwise

5.48.1.13 QueryMousePosition()

```
Vec2i Blade::InputManager::QueryMousePosition ( ) const  [noexcept]
```

Query the Keyboard device for the state of ALL keys associated to the device.

Returns

True if successful, false otherwise

5.48.1.14 UnassignDevice()

```
bool Blade::InputManager::UnassignDevice (
             JoypadNumber playerID )
```

Unassigns an input device from a player (by player ID).

Returns

Destroy the association between player and device, and mark device as inactive

The documentation for this class was generated from the following files:

- include/input_manager.h
- src/input_manager.cpp

5.49 Blade::InputState Struct Reference

InputState describes the current state of a device.

```
#include <input_state.h>
```

Public Member Functions

- **InputState** (const InputState &src) noexcept=default
- InputState & **operator=** (const InputState &rhs) noexcept=default
- **InputState** (InputState &&src) noexcept=default
- InputState & **operator=** (InputState &&rhs) noexcept=default

Public Attributes

- int **digitalButtonData** { 0 }
- ThumbStick **stickLeft** { 0 }
- ThumbStick **stickRight** { 0 }
- float **triggerLeft** { 0.0f }
- float **triggerRight** { 0.0f }

5.49.1 Detailed Description

InputState describes the current state of a device.

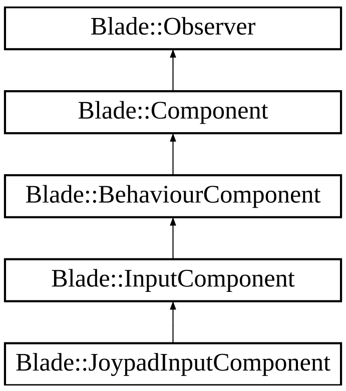
Only joy pad support for the moment. A function to compare two states has to be provided

The documentation for this struct was generated from the following files:

- include/input_state.h
- src/input_state.cpp

5.50 Blade::JoypadInputComponent Class Reference

Inheritance diagram for Blade::JoypadInputComponent:



Public Member Functions

- **JoypadInputComponent** (Entity ∗parent, JoypadNumber joypad_number, bool online)
- **JoypadInputComponent** (const JoypadInputComponent &other)=delete
- JoypadInputComponent & **operator=** (const JoypadInputComponent &other)=delete
- virtual void Update (const float dt, const long time=0) noexcept=0

  Updates the Component on each frame.
- virtual void Setup () noexcept=0

  Performs setup actions after the BehaviourComponent's creation.
- virtual void Teardown () noexcept=0

  Performs actions before the BehaviourComponent is destroyed.
- bool **LoadConfiguration** (const std::vector< InputSensor > &control, const std::vector< std::shared_ptr< Command >> &commands) noexcept
- bool **LoadConfiguration** (const JoypadCommandMap &map)
- const JoypadCommandMap & **GetCommandMap** () const noexcept

Public Attributes

- JoypadNumber **m_JoypadNum**

Protected Attributes

- JoypadCommandMap **m_JoypadCommandMap**

5.50.1 Member Function Documentation

5.50.1.1 Update()

```
virtual void Blade::JoypadInputComponent::Update (
             const float dt,
             const long time = 0 )  [pure virtual], [noexcept]
```

Updates the Component on each frame.

Parameters

dt	The time elapsed from the previous frame of the Application.
time	The elapsed time since the start of the Application.

Implements Blade::InputComponent.

The documentation for this class was generated from the following files:

- include/joypad_input_component.h
- src/joypad_input_component.cpp

5.51 Blade::KeyboardInput Class Reference

Keyboard abstraction of the engine.

```
#include <keyboard_input.h>
```

Static Public Member Functions

- static bool QueryKeyState (VirtualKey value) noexcept

  Query the state of a virtual key.
- static bool QueryAllKeyStates (std::map< VirtualKey, bool > &destMap) noexcept

  Query all virtual key states for attached keyboard.

5.51.1 Detailed Description

Keyboard abstraction of the engine.

5.51.2 Member Function Documentation

5.51.2.1 QueryAllKeyStates()

```
bool Blade::KeyboardInput::QueryAllKeyStates (
            std::map< VirtualKey, bool > & destMap )  [static], [noexcept]
```

Query all virtual key states for attached keyboard.

Returns

True if successful, false otherwise

5.51.2.2 QueryKeyState()

```
bool Blade::KeyboardInput::QueryKeyState (
            VirtualKey value )  [static], [noexcept]
```

Query the state of a virtual key.

Returns

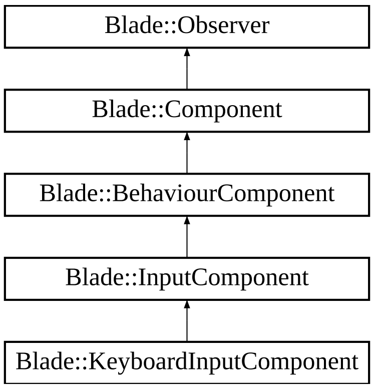
True if the key being queried is PRESSED (down), false otherwise

The documentation for this class was generated from the following files:

- include/keyboard_input.h
- src/keyboard_input.cpp

5.52 Blade::KeyboardInputComponent Class Reference

Inheritance diagram for Blade::KeyboardInputComponent:



Public Types

- using **KeyboardCommandMap** = std::map< VirtualKey, std::shared_ptr< Command > >

Public Member Functions

- **KeyboardInputComponent** (Entity ∗parent, bool online)
- **KeyboardInputComponent** (const KeyboardInputComponent &other)=delete
- KeyboardInputComponent & **operator=** (const KeyboardInputComponent &other)=delete
- virtual void Update (const float dt, const long time=0) noexcept=0

    Updates the Component on each frame.
- virtual void Setup () noexcept=0

    Performs setup actions after the BehaviourComponent's creation.
- virtual void Teardown () noexcept=0

    Performs actions before the BehaviourComponent is destroyed.
- bool **LoadConfiguration** (std::vector< VirtualKey > &keys, const std::vector< std::shared_ptr< Command >> &commands) noexcept
- bool **LoadConfiguration** (const KeyboardCommandMap &map)
- const KeyboardCommandMap & **GetKeyboardCommandMap** () const noexcept

Protected Attributes

- KeyboardCommandMap **m_KeyboardCommandMap**

5.52.1 Member Function Documentation

5.52.1.1 Update()

```
virtual void Blade::KeyboardInputComponent::Update (
            const float dt,
            const long time = 0 )  [pure virtual], [noexcept]
```

Updates the Component on each frame.

Parameters

dt	The time elapsed from the previous frame of the Application.
time	The elapsed time since the start of the Application.

Implements Blade::InputComponent.

The documentation for this class was generated from the following files:

- include/keyboard_input_component.h
- src/keyboard_input_component.cpp

5.53 Blade::Keyframe< T > Struct Template Reference

Public Member Functions

- **Keyframe** (const T &value, long time)
- bool **operator<** (const Keyframe< T > &other) const noexcept

Public Attributes

- T **value**
- long **time** { 0 }

The documentation for this struct was generated from the following file:

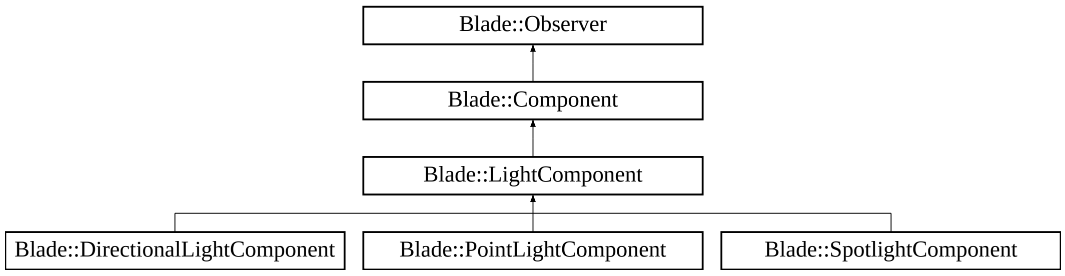
- include/animation.h

5.54 Blade::LightComponent Class Reference

Abstract class that describes a LightComponent. Provides the base functinality of a LightComponent. It contains the component's type and an index to the entry of the correct light description cache in the LightSystem. Managed by the LightSystem.

`#include <light_component.h>`

Inheritance diagram for Blade::LightComponent:


Blade::Observer
Blade::Component
Blade::LightComponent
Blade::DirectionalLightComponent
Blade::PointLightComponent
Blade::SpotlightComponent

Public Member Functions

- **LightComponent** (LightType lightType, Entity ∗parent)
- LightType **GetLightType** () const noexcept
- int **GetLightDescCacheIndex** () const noexcept
- void **SetLightDescCacheIndex** (int index) noexcept

5.54.1 Detailed Description

Abstract class that describes a LightComponent. Provides the base functinality of a LightComponent. It contains the component's type and an index to the entry of the correct light description cache in the LightSystem. Managed by the LightSystem.

The documentation for this class was generated from the following file:

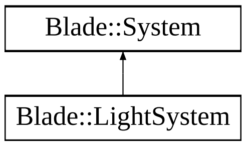
- include/light_component.h

5.55 Blade::LightSystem Class Reference

A System responsible for managing LightComponents. This system updates the positions of all the lights in the scene every frame. It is also responsible for caching the light descriptions of each light upon registration of a LightConponent.

```
#include <light_system.h>
```

Inheritance diagram for Blade::LightSystem:



Public Member Functions

- void RegisterComponent (LightComponent ∗lightComponent) noexcept

  Registers a LightComponent to the system.
- void UnregisterComponent (int id) noexcept

  Unregisters a LightComponent from the system.
- std::vector< PointLightDesc > GetPointLightDescriptions () const noexcept

  Provides a vector of the cached point light description structs.
- std::vector< DirectionalLightDesc > GetDirectionalLightDescriptions () const noexcept

  Provides a vector of the cached directional light description structs.
- std::vector< SpotlightDesc > GetSpotlightDescriptions () const noexcept

  Provides a vector of the chached spotlight description structs.
- bool Initialize () noexcept override

  Pure virtual method implemented by the engine's systems to perform their initialization.
- void Process (float deltaTime=.0f, long time=0) noexcept override

  Processes the LightComponents.

5.55.1 Detailed Description

A System responsible for managing LightComponents. This system updates the positions of all the lights in the scene every frame. It is also responsible for caching the light descriptions of each light upon registration of a LightConponent.

5.55.2 Member Function Documentation

5.55.2.1 GetDirectionalLightDescriptions()

```
std::vector< DirectionalLightDesc > Blade::LightSystem::GetDirectionalLightDescriptions ( )
const [noexcept]
```

Provides a vector of the cached directional light description structs.

Returns

A vector of the cached directional light description structs.

5.55.2.2 GetPointLightDescriptions()

```
std::vector< PointLightDesc > Blade::LightSystem::GetPointLightDescriptions ( ) const [noexcept]
```

Provides a vector of the cached point light description structs.

Returns

A vector of the cached point light description structs.

5.55.2.3 GetSpotlightDescriptions()

```
std::vector< SpotlightDesc > Blade::LightSystem::GetSpotlightDescriptions ( ) const [noexcept]
```

Provides a vector of the chached spotlight description structs.

Returns

A vector of the cached spotlight description structs.

5.55.2.4 Initialize()

```
bool Blade::LightSystem::Initialize ( ) [override], [virtual], [noexcept]
```

Pure virtual method implemented by the engine's systems to perform their initialization.

Returns

TRUE if initialization is successfull, FALSE otherwise.

Implements Blade::System.

5.55.2.5 Process()

```
void Blade::LightSystem::Process (
             float deltaTime = .0f,
             long time = 0 ) [override], [virtual], [noexcept]
```

Processes the LightComponents.

This method iterates through all the active LightComponents. Based on their type it updates the position/direction data members of each LightComponent's light description contained in the matching cache.

Parameters

deltaTime	The time elapsed from the previous frame of the application.

Implements Blade::System.

5.55.2.6 RegisterComponent()

```
void Blade::LightSystem::RegisterComponent (
             LightComponent * lightComponent )  [noexcept]
```

Registers a LightComponent to the system.

This method registers a LightComponent to the system. It maps the LightComponent with a name and based on it's type it puts the light description contained in the LightComponent to the correct light description cache.

Parameters

lightComponent	The LightComponent to be registered.

5.55.2.7 UnregisterComponent()

```
void Blade::LightSystem::UnregisterComponent (
             int id )  [noexcept]
```

Unregisters a LightComponent from the system.

This method unregisters a LightComponent and based on it's type removes it's light description from the correct light description cache.

Parameters

id	The id of the LightComponent to unregister.

The documentation for this class was generated from the following files:

- include/light_system.h
- src/light_system.cpp

5.56 Blade::ManifoldEntry Struct Reference

Public Attributes

- const Collider ∗ **collider1**

- const Collider ∗ **collider2**
- Vec3f **contactNormal**
- float **t** { 0.0f }
- float **penetration** { 0.0f }

The documentation for this struct was generated from the following file:

- include/contact_manifold.h

5.57 Blade::Material Struct Reference

Public Member Functions

- **Material** (const Material &other)=default
- Material & **operator=** (const Material &other)=default

Public Attributes

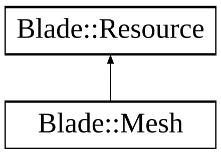
- std::array< Texture ∗, SUPPORTED_TEX_COUNT > **textures**
- Vec4f **diffuse**
- Vec4f **specular**
- Mat4f **textureMatrix**
- std::string **shaderProgramName** { "sdrprog_default" }
- RenderStateType **blendState**

The documentation for this struct was generated from the following files:

- include/material.h
- src/material.cpp

5.58 Blade::Mesh Class Reference

Inheritance diagram for Blade::Mesh:



Public Member Functions

- **Mesh** (const Mesh &other)=default
- Mesh & **operator=** (const Mesh &other)=default
- VBO ∗ **GetVbo** () const noexcept
- IBO ∗ **GetIbo** () const noexcept
- size_t **GetVertexCount** () const noexcept
- size_t **GetIndexCount** () const noexcept
- void **SetName** (const std::string &name) noexcept
- const std::string & **GetName** () const noexcept
- void **InitiazeBufferObjects** (PrimitiveTopology primitiveTopology=PrimitiveTopology::TRIANGLE_LIST) const noexcept
- void **SetVertexData** (const Vertex ∗vertices, int vertexCount) noexcept
- Vertex ∗ **GetVertexData** () const noexcept
- void **AddVertex** (const Vertex &vertex) noexcept
- void **SetIndexData** (const unsigned int ∗indices, int indexCount) noexcept
- unsigned int ∗ **GetIndexData** () const noexcept
- void **AddIndex** (unsigned int index) noexcept
- bool **Load** (const std::wstring &fileName) noexcept override
- void **GenerateIndices** (VertexWinding winding) noexcept

The documentation for this class was generated from the following files:

- include/mesh.h
- src/mesh.cpp

5.59 Blade::Message< T > Class Template Reference

Public Member Functions

- **Message** (T &&type)
- const T & **GetType** () const noexcept

The documentation for this class was generated from the following file:

- include/message.h

5.60 Blade::NCF Class Reference

Public Member Functions

- void **SetSource** (const char ∗file)
- const char ∗ **GetSource** () const
- void **Purge** ()
- int **Parse** ()
- int **Dump** (const char ∗file, int create=1) const
- bool **QueryProperty** (const char ∗name) const
- bool **QueryGroup** (const char ∗name) const

- unsigned int **CountProperties** () const
- unsigned int **CountGroups** () const
- void **SetProperty** (const char ∗name, const char ∗value)
- const char ∗ **GetPropertyByName** (const char ∗name) const
- const char ∗ **GetPropertyByIndex** (unsigned int index) const
- const char ∗ **GetPropertyNameByIndex** (unsigned int index) const
- NCF ∗ **GetGroupByName** (const char ∗name) const
- NCF ∗ **GetGroupByIndex** (unsigned int index) const
- const char ∗ **GetName** () const
- **NCF** (const NCF &)=delete
- NCF & **operator=** (const NCF &)=delete

The documentation for this class was generated from the following files:

- include/ncf.h
- src/ncf.cpp

5.61 Blade::NetworkManager Class Reference

Public Member Functions

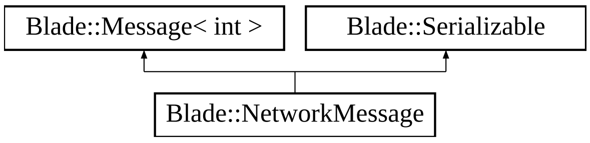
- bool **Initialize** () noexcept
- void **Listen** (const unsigned short port) noexcept
- void **Connect** (const std::string &host, const unsigned short port) noexcept
- void **QueueMessage** (const std::shared_ptr< NetworkMessage > &message) noexcept
- size_t **GetConnectionCount** () noexcept
- void **SetOnNewPacketCallback** (const OnNewPacketCallback &callback) noexcept
- void **SetOnNewClientCallback** (const OnNewClientCallback &callback) noexcept
- void **SetOnClientDisconnectCallback** (const OnClientDisconnectCallback &callback) noexcept

The documentation for this class was generated from the following files:

- include/network_manager.h
- src/network_manager.cpp

5.62 Blade::NetworkMessage Class Reference

Inheritance diagram for Blade::NetworkMessage:



Public Member Functions

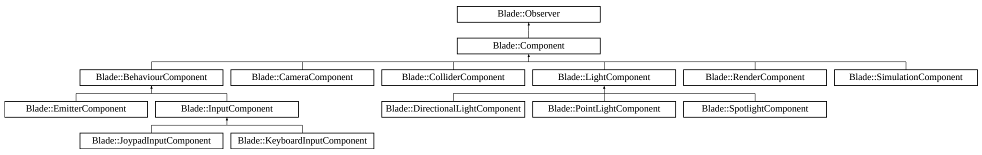
- **NetworkMessage** (int &&type, long recipientId)

The documentation for this class was generated from the following file:

- include/network_message.h

5.63 Blade::Observer Class Reference

Inheritance diagram for Blade::Observer:


Blade::Observer
Blade::Component
Blade::BehaviourComponent
Blade::CameraComponent
Blade::ColliderComponent
Blade::LightComponent
Blade::RenderComponent
Blade::SimulationComponent
Blade::EmitterComponent
Blade::InputComponent
Blade::DirectionalLightComponent
Blade::PointLightComponent
Blade::SpotlightComponent
Blade::JoypadInputComponent
Blade::KeyboardInputComponent

Public Member Functions

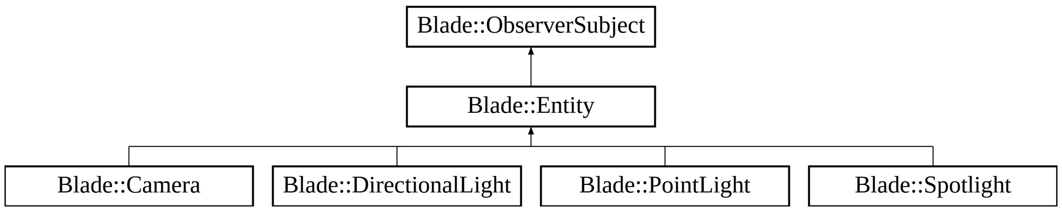
- virtual void **OnMessage** (const MessageContainer$<$ std::string $>$ &msg)=0

The documentation for this class was generated from the following files:

- include/observer.h
- src/observer.cpp

5.64 Blade::ObserverSubject Class Reference

Inheritance diagram for Blade::ObserverSubject:



Public Member Functions

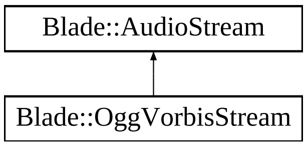
- void **RegisterObserver** (const std::string &msg, Observer $*$o) noexcept
- void **UnregisterObserver** (const std::string &msg, Observer $*$o) noexcept
- void **BroadcastMessage** (const MessageContainer$<$ std::string $>$ &msg) const noexcept

The documentation for this class was generated from the following files:

- include/observer_subject.h
- src/observer_subject.cpp

5.65 Blade::OggVorbisStream Class Reference

Inheritance diagram for Blade::OggVorbisStream:



Public Member Functions

- bool **Open** (const char ∗fname) noexcept
- void **Close** () noexcept
- void **Play** (AudioPlaymode mode) noexcept override
- void **Rewind** () noexcept override

The documentation for this class was generated from the following files:

- include/ovstream.h
- src/ovstream.cpp

5.66 Blade::Particle Struct Reference

Public Attributes

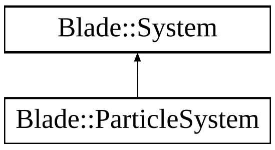
- Vec3f **position**
- Vec4f **color**
- float **size**
- Vec3f **velocity**
- float **life**
- bool **active**
- double **spawn_time**

The documentation for this struct was generated from the following file:

- include/emitter_component.h

5.67 Blade::ParticleSystem Class Reference

Inheritance diagram for Blade::ParticleSystem:



Public Member Functions

- void **RegisterComponent** (EmitterComponent ∗emitterComponent) noexcept
- void **UnregisterComponent** (const int id) noexcept
- bool Initialize () noexcept override

  Pure virtual method implemented by the engine's systems to perform their initialization.
- std::vector< EmitterComponent ∗ > & **GetEmitterComponents** () noexcept
- void Process (float deltaTime=.0f, long time=0) noexcept override

  Pure virtual method implemented by the engine's systems to process the registered components.

5.67.1 Member Function Documentation

5.67.1.1 Initialize()

```
bool Blade::ParticleSystem::Initialize ( )  [override], [virtual], [noexcept]
```

Pure virtual method implemented by the engine's systems to perform their initialization.

Returns

TRUE if initialization is successfull, FALSE otherwise.

Implements Blade::System.

5.67.1.2 Process()

```
void Blade::ParticleSystem::Process (
             float deltaTime = .0f,
             long time = 0 )  [override], [virtual], [noexcept]
```

Pure virtual method implemented by the engine's systems to process the registered components.

Parameters

deltaTime	The time elapsed from the previous frame of the application.

Implements Blade::System.

The documentation for this class was generated from the following files:

- include/particle_system.h
- src/particle_system.cpp

5.68 Blade::Pipeline< T, Tdata > Class Template Reference

Abstract class that describes a pipeline that processes the specified object data type.

```
#include <pipeline.h>
```

Public Member Functions

- void AddStage (PipelineStage< T, Tdata > ∗stage)

  Adds a PipelineStage to the Pipeline.
- void Execute (const std::vector< T > &data)

  Processes the objects provided by passing then through each PipelineStage.

5.68.1 Detailed Description

template<typename T, typename Tdata>
class Blade::Pipeline< T, Tdata >

Abstract class that describes a pipeline that processes the specified object data type.

Template Parameters

T	The type of data that the Pipeline's PipelineStages will process.
Tdata	The type of data that the PipelineStages will return after executed.

5.68.2 Member Function Documentation

5.68.2.1 AddStage()

```
template<typename T , typename Tdata >
void Blade::Pipeline< T, Tdata >::AddStage (
            PipelineStage< T, Tdata > ∗ stage )  [inline]
```

Adds a PipelineStage to the Pipeline.

Parameters

stage	The PipelineStage to be added to the Pipeline.

5.68.2.2 Execute()

```
template<typename T , typename Tdata >
void Blade::Pipeline< T, Tdata >::Execute (
            const std::vector< T > & data ) [inline]
```

Processes the objects provided by passing then through each PipelineStage.

Parameters

data	The objects to be processed by the Pipeline's stages.

The documentation for this class was generated from the following file:

- include/pipeline.h

5.69 Blade::PipelineData< T > Class Template Reference

An abstract data container for the data returned by a PipelineStage.

`#include <pipeline_stage.h>`

Public Member Functions

- PipelineData (T data)

  PipelineData constructor.
- T Get () const noexcept

  Returns the data contained in the PipelineData container.

5.69.1 Detailed Description

template<typename T>
class Blade::PipelineData< T >

An abstract data container for the data returned by a PipelineStage.

Template Parameters

T	The type of data the container will hold.

5.69.2 Constructor & Destructor Documentation

5.69.2.1 PipelineData()

```
template<typename T>
Blade::PipelineData< T >::PipelineData (
             T data )  [inline], [explicit]
```

PipelineData constructor.

Parameters

data	The data to store in the container.

5.69.3 Member Function Documentation

5.69.3.1 Get()

```
template<typename T>
T Blade::PipelineData< T >::Get ( ) const  [inline], [noexcept]
```

Returns the data contained in the PipelineData container.

Returns

The data contained in the container.

The documentation for this class was generated from the following file:

- include/pipeline_stage.h

5.70 Blade::PipelineStage< T, Tdata > Class Template Reference

This class describes an abstract stage of a pipeline that processes the specified type of data and returns the specified type of data.

```
#include <pipeline_stage.h>
```

Public Member Functions

- PipelineStage (const std::string &name)

  PipelineStage constructor.
- virtual ~PipelineStage ()=default

  Default destructor of the PipelineStage.
- virtual bool Initialize ()=0

  Initializes the PipelineStage.
- virtual PipelineData< Tdata > Execute (const std::vector< T > &data, const PipelineData< Tdata > &tdata) noexcept=0

  Processes the vector of objects provided and return the result.

5.70.1 Detailed Description

template<typename T, typename Tdata>
class Blade::PipelineStage< T, Tdata >

This class describes an abstract stage of a pipeline that processes the specified type of data and returns the specified type of data.

Template Parameters

T	The type of data the PipelineStage will process.
Tdata	The type of data the PipelineStage will return.

5.70.2 Constructor & Destructor Documentation

5.70.2.1 PipelineStage()

```
template<typename T, typename Tdata>
Blade::PipelineStage< T, Tdata >::PipelineStage (
             const std::string & name )  [inline], [explicit]
```

PipelineStage constructor.

Parameters

name	The name of the PipelineStage.

5.70.3 Member Function Documentation

5.70.3.1 Execute()

```
template<typename T, typename Tdata>
virtual PipelineData<Tdata> Blade::PipelineStage< T, Tdata >::Execute (
             const std::vector< T > & data,
             const PipelineData< Tdata > & tdata )  [pure virtual], [noexcept]
```

Processes the vector of objects provided and return the result.

Parameters

data	The type of data the PipelineStage will process.
tdata	The type of data the PipelineStage will return.

Returns

A PipelineData container with the the appropriate data type encapsulated.

5.70.3.2 Initialize()

```
template<typename T, typename Tdata>
virtual bool Blade::PipelineStage< T, Tdata >::Initialize ( )  [pure virtual]
```

Initializes the PipelineStage.

Returns

TRUE if initialization succeded, FALSE otherwise.

The documentation for this class was generated from the following file:

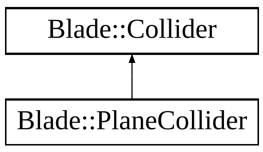
- include/pipeline_stage.h

5.71 Blade::PlaneCollider Class Reference

Bounding Plane class is a collider.

```
#include <plane_collider.h>
```

Inheritance diagram for Blade::PlaneCollider:



Public Member Functions

- **PlaneCollider** (const Vec3f &planeNormal, const float offset)
- bool **Collide** (const Collider ∗collider, ContactManifold &manifold) const noexcept override
- bool **Collide** (const BoundingSphere ∗bsphere, ContactManifold &manifold) const noexcept override
- bool **Collide** (const PlaneCollider ∗plane, ContactManifold &manifold) const noexcept override
- const Vec3f & **GetPlaneNormal** () const noexcept
- void **SetPlaneNormal** (const Vec3f &normal) noexcept
- float **GetOffeset** () const noexcept
- void **SetOffset** (const float offset) noexcept

5.71.1 Detailed Description

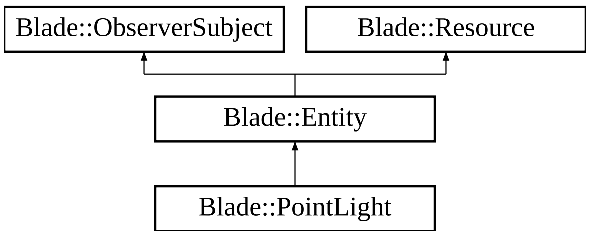
Bounding Plane class is a collider.

The documentation for this class was generated from the following files:

- include/plane_collider.h
- src/plane_collider.cpp

5.72 Blade::PointLight Class Reference

Inheritance diagram for Blade::PointLight:



Public Member Functions

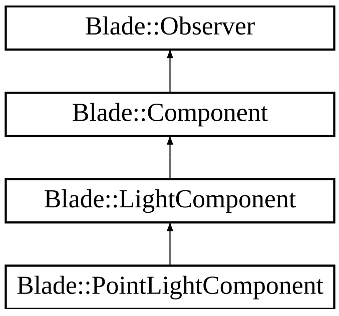
- **PointLight** (const std::string &name, const PointLightDesc &lightDescription)

The documentation for this class was generated from the following files:

- include/point_light.h
- src/point_light.cpp

5.73 Blade::PointLightComponent Class Reference

Inheritance diagram for Blade::PointLightComponent:



Public Member Functions

- **PointLightComponent** (const PointLightDesc &lightDesc, Entity ∗parent)
- const PointLightDesc & **GetLightDescription** () const noexcept
- PointLightDesc ∗ **GetLightDescriptionPtr** () noexcept

The documentation for this class was generated from the following files:

- include/point_light_component.h
- src/point_light_component.cpp

5.74 Blade::PointLightDesc Struct Reference

A struct describing a point light.

```
#include <light_component.h>
```

Public Attributes

- Vec4f **ambientIntensity**
- Vec4f **diffuseIntensity**
- Vec4f **specularIntensity**
- Vec3f **position**
- float **constantAttenuation**
- float **linearAttenuation**
- float **quadraticAttenuation**
- Vec2f **pad**

5.74.1 Detailed Description

A struct describing a point light.

This struct is also used to represent a point light in shaders.

The documentation for this struct was generated from the following file:

- include/light_component.h

5.75 Blade::RefCountedContainer< T > Class Template Reference

Public Member Functions

- **RefCountedContainer** (T ∗item)
- **RefCountedContainer** (const RefCountedContainer &other)
- **RefCountedContainer** (RefCountedContainer &&other) noexcept=delete
- RefCountedContainer & **operator=** (const RefCountedContainer &other)
- RefCountedContainer & **operator=** (RefCountedContainer &&other) noexcept=delete
- void **AddReference** () noexcept
- void **SubtractReference** () noexcept
- int **GetReferenceCount** () const noexcept
- T ∗ **Get** () const noexcept

The documentation for this class was generated from the following file:

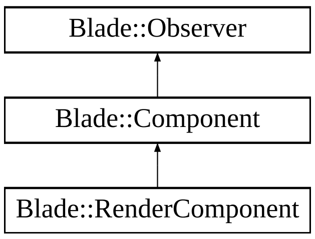
- include/ref_counted_container.h

5.76 Blade::RenderComponent Class Reference

Represents a RenderComponent. The RenderComponent makes an entity renderable. This component is processed by the RenderSystem.

```
#include <render_component.h>
```

Inheritance diagram for Blade::RenderComponent:



Public Member Functions

- RenderComponent (Entity ∗parent)

  RenderComponent's constructor. Registers the RenderComponent to the RenderSystem.
- ∼RenderComponent ()

  RenderComponent's destructor. Unregisters the RenderComponent from the RenderSystem.
- Mesh ∗ GetMesh () const noexcept

  Provides a pointer to the Mesh contained in the RenderComponent.
- void SetMesh (Mesh ∗mesh) noexcept

  Sets the specified Mesh to the RenderComponent.
- const Material & GetMaterial () const noexcept

  Provides the Material of the RenderComponent.
- void SetMaterial (const Material &material) noexcept

  Sets the specified Material to the RenderComponent.

5.76.1 Detailed Description

Represents a RenderComponent. The RenderComponent makes an entity renderable. This component is processed by the RenderSystem.

5.76.2 Constructor & Destructor Documentation

5.76.2.1 RenderComponent()

```
Blade::RenderComponent::RenderComponent (
          Entity ∗ parent )  [explicit]
```

RenderComponent's constructor. Registers the RenderComponent to the RenderSystem.

Parameters

parent	The entity the component will be attached to.

5.76.3 Member Function Documentation

5.76.3.1 GetMaterial()

```
const Material & Blade::RenderComponent::GetMaterial ( ) const  [noexcept]
```

Provides the Material of the RenderComponent.

Returns

The Material of the RenderComponent.

5.76.3.2 GetMesh()

```
Mesh * Blade::RenderComponent::GetMesh ( ) const  [noexcept]
```

Provides a pointer to the Mesh contained in the RenderComponent.

Returns

The pointer to the Mesh of the RenderComponent.

5.76.3.3 SetMaterial()

```
void Blade::RenderComponent::SetMaterial (
             const Material & material )  [noexcept]
```

Sets the specified Material to the RenderComponent.

Parameters

material	The Material to be set.

5.76.3.4 SetMesh()

```
void Blade::RenderComponent::SetMesh (
            Mesh * mesh )  [noexcept]
```

Sets the specified Mesh to the RenderComponent.

Parameters

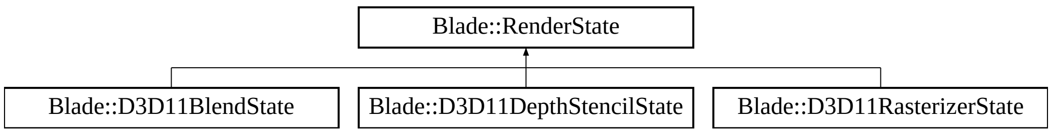
mesh	The mesh to be used when rendering.

The documentation for this class was generated from the following files:

- include/render_component.h
- src/render_component.cpp

5.77 Blade::RenderState Class Reference

Inheritance diagram for Blade::RenderState:



Public Member Functions

- virtual void **Set** () const noexcept=0

The documentation for this class was generated from the following files:

- include/render_state.h
- src/render_state.cpp

5.78 Blade::RenderStateManager Class Reference

Public Member Functions

- void **Initialize** () noexcept
- void **Set** (RenderStateType renderState) noexcept

The documentation for this class was generated from the following files:

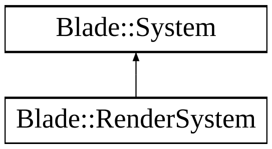
- include/render_state_manager.h
- src/render_state_manager.cpp

5.79 Blade::RenderSystem Class Reference

A System responsible for processing the RenderComponents by passing them through a specified pipeline.

```
#include <render_system.h>
```

Inheritance diagram for Blade::RenderSystem:



Public Member Functions

- ∼RenderSystem ()

    Destructor of the RenderSystem. Deallocates the pipeline member.
- void RegisterComponent (RenderComponent ∗renderComponent) noexcept

    Registeres a RenderComponent to the RenderSystem.
- void UnregisterComponent (int id) noexcept

    Unregisters a RenderComponent from the RenderSystem.
- void SetRenderPassPipeline (RenderPassPipeline ∗renderPassPipeline) noexcept

    Sets the pipeline that the RenderSystem will pass the RenderComponents through.
- void ClearRenderPassPipeline () noexcept

    Removed the pipeline from the RenderSystem if one is set.
- bool Initialize () noexcept override

    Initializes the RenderSystem.
- void Process (float deltaTime=.0f, long time=0) noexcept override

    Processes the RenderComponents by passing them through the RenderPassPipeline.
- void **SetSorting** (bool sorting) noexcept

5.79.1 Detailed Description

A System responsible for processing the RenderComponents by passing them through a specified pipeline.

5.79.2 Member Function Documentation

5.79.2.1 Initialize()

```
bool Blade::RenderSystem::Initialize ( )  [override], [virtual], [noexcept]
```

Initializes the RenderSystem.

Returns

TRUE if initialization is successfull, FALSE otherwise.

Implements Blade::System.

5.79.2.2 Process()

```
void Blade::RenderSystem::Process (
             float deltaTime = .0f,
             long time = 0 )  [override], [virtual], [noexcept]
```

Processes the RenderComponents by passing them through the RenderPassPipeline.

Parameters

deltaTime	The time elapsed from the previous frame of the application.

Implements Blade::System.

5.79.2.3 RegisterComponent()

```
void Blade::RenderSystem::RegisterComponent (
             RenderComponent * renderComponent )  [noexcept]
```

Registeres a RenderComponent to the RenderSystem.

Parameters

renderComponent	The component to be registered to the RenderSytstem for processing.

5.79.2.4 SetRenderPassPipeline()

```
void Blade::RenderSystem::SetRenderPassPipeline (
             RenderPassPipeline * renderPassPipeline )  [noexcept]
```

Sets the pipeline that the RenderSystem will pass the RenderComponents through.

Parameters

renderPassPipeline	The pipeline that processes the RenderComponents.

5.79.2.5 UnregisterComponent()

```
void Blade::RenderSystem::UnregisterComponent (
             int id )  [noexcept]
```

Unregisters a RenderComponent from the RenderSystem.

Parameters

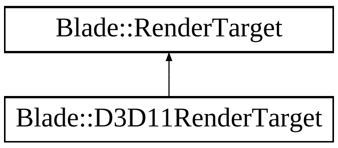
id	The unique id of the RenderComponent to be unregistered.

The documentation for this class was generated from the following files:

- include/render_system.h
- src/render_system.cpp

5.80 Blade::RenderTarget Class Reference

Inheritance diagram for Blade::RenderTarget:



Public Member Functions

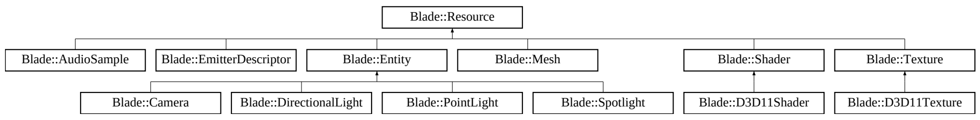
- **RenderTarget** (const Vec2i &size)
- virtual bool **Create** (const Vec2i &size)=0
- virtual bool **Bind** (RenderTargetBindType bind_type) const =0
- virtual bool **Unbind** () const =0
- void **SetSize** (const Vec2i &size) noexcept
- const Vec2i & **GetSize** () const noexcept

The documentation for this class was generated from the following files:

- include/render_target.h
- src/render_target.cpp

5.81 Blade::Resource Class Reference

Inheritance diagram for Blade::Resource:



Public Member Functions

- **Resource** (unsigned int id)
- unsigned int **GetId** () const noexcept
- void **SetId** (unsigned int id) noexcept
- virtual bool **Load** (const std::wstring &file_name) noexcept=0

The documentation for this class was generated from the following files:

- include/resource.h
- src/resource.cpp

5.82 Blade::ResourceManager Class Reference

Public Member Functions

- template< typename T >
  bool **Load** (const std::wstring &fileName)
- template< typename T >
  T * **Get** (const std::wstring &fileName)
- void **RegisterResource** (Resource *resource, const std::wstring &name)

The documentation for this class was generated from the following file:

- include/resource_manager.h

5.83 Blade::MathUtils::RungeKutta4Integrator Class Reference

Static Public Member Functions

- static void **Integrate** (Vec3f &position, Vec3f &velocity, const Vec3f &force, float mass, float timeSec, float deltaTime) noexcept

The documentation for this class was generated from the following files:

- include/math_utils.h
- src/math_utils.cpp

5.84 Blade::SamplePlaylist Struct Reference

Public Attributes

- std::list< AudioSample * > **samples**
- std::list< AudioSample * >::iterator **it**
- bool **loop**
- bool **started** { false }
- int **source_idx** { -1 }

The documentation for this struct was generated from the following files:

- include/audio_manager.h
- src/audio_manager.cpp

5.85 Blade::Scene Class Reference

Public Member Functions

- **Scene** (const Scene &other)=delete
- Scene & **operator=** (const Scene &other)=delete
- virtual bool **Initialize** ()=0
- void **AddEntity** (Entity ∗object) noexcept
- void **RemoveEntity** (const std::string &name) noexcept
- void **RemoveEntities** () noexcept
- const std::vector< Entity ∗ > & **GetEntities** () const noexcept
- Entity ∗ **GetEntityByName** (const std::string &name) noexcept
- virtual void **OnKeyDown** (unsigned char key, int x, int y) noexcept=0
- virtual void **OnKeyUp** (unsigned char key, int x, int y) noexcept=0
- virtual void **OnMouseMotion** (int x, int y) noexcept=0
- virtual void **OnMouseClick** (int button, bool state, int x, int y) noexcept=0
- virtual void **Update** (float deltaTime, long time=0) noexcept
- virtual void **Draw** () const noexcept=0
- virtual void **OnMessage** (const MessageContainer< std::string > &msg) const noexcept

The documentation for this class was generated from the following files:

- include/scene.h
- src/scene.cpp

5.86 Blade::SceneManager Class Reference

Public Member Functions

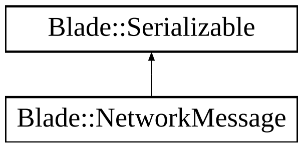
- bool **PushScene** (std::unique_ptr< Scene > scene) noexcept
- void **PopScene** () noexcept
- void **OnKeyDown** (unsigned char key, int x, int y) noexcept
- void **OnKeyUp** (unsigned char key, int x, int y) noexcept
- void **OnMouseMotion** (int x, int y) noexcept
- void **OnMouseClick** (int button, bool state, int x, int y) noexcept
- void **OnMessage** (const MessageContainer< std::string > &msg) noexcept
- void **Update** (float delta_time, long time) noexcept
- void **Draw** () noexcept
- Scene ∗ **GetCurrentScene** () const noexcept

The documentation for this class was generated from the following files:

- include/scene_manager.h
- src/scene_manager.cpp

5.87 Blade::Serializable Class Reference

Inheritance diagram for Blade::Serializable:



Public Member Functions

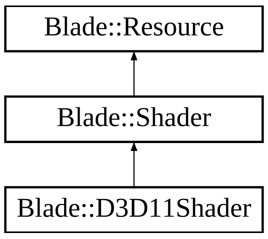
- virtual std::vector$<$ Byte $>$ **Serialize** () noexcept=0

The documentation for this class was generated from the following file:

- include/serializable.h

5.88 Blade::Shader Class Reference

Inheritance diagram for Blade::Shader:



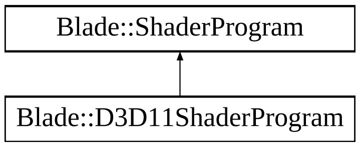
Additional Inherited Members

The documentation for this class was generated from the following file:

- include/shader.h

5.89 Blade::ShaderProgram Class Reference

Inheritance diagram for Blade::ShaderProgram:



Public Member Functions

- **ShaderProgram** (const ShaderProgram &)=default
- ShaderProgram & **operator=** (const ShaderProgram &)=default
- virtual bool **Create** (const ShaderProgramDesc &shaderProgramDesc) noexcept=0
- virtual void **Bind** () const noexcept=0

The documentation for this class was generated from the following files:

- include/shader_program.h
- src/shader_program.cpp

5.90 Blade::ShaderProgramDesc Struct Reference

Public Attributes

- std::string **name**
- unsigned int **inputLayoutMask**
- std::wstring **vertexShader**
- std::wstring **fragmentShader**
- std::wstring **hullShader**
- std::wstring **domainShader**
- std::wstring **geometryShader**

The documentation for this struct was generated from the following file:

- include/shader_program.h

5.91 Blade::ShaderProgramManager Class Reference

Public Member Functions

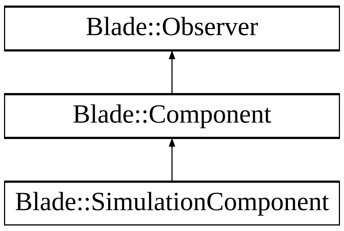
- bool **Create** (const ShaderProgramDesc &shaderProgramDesc) noexcept
- ShaderProgram ∗ **Get** (const std::string &progName) noexcept

The documentation for this class was generated from the following files:

- include/shader_program_manager.h
- src/shader_program_manager.cpp

5.92 Blade::SimulationComponent Class Reference

Inheritance diagram for Blade::SimulationComponent:



Public Member Functions

- **SimulationComponent** (Entity ∗parent, float mass)
- void **SetAcceleration** (const Vec3f &acc) noexcept
- const Vec3f & **GetAcceleration** () const noexcept
- void **AddForce** (const Vec3f &force) noexcept
- void **SetForce** (const Vec3f &force) noexcept
- void **SetPreviousForce** (const Vec3f &force) noexcept
- const Vec3f & **GetForce** () const noexcept
- const Vec3f & **GetPreviousForce** () const noexcept
- void **ResetForce** () noexcept
- void **SetVelocity** (const Vec3f &velocity) noexcept
- void **SetPreviousVelocity** (const Vec3f &velocity) noexcept
- const Vec3f & **GetVelocity** () const noexcept
- const Vec3f & **GetPreviousVelocity** () const noexcept
- void **SetPreviousPosition** (const Vec3f &position) noexcept
- const Vec3f & **GetPreviousPosition** () const noexcept
- float **GetMass** () const noexcept
- float **GetInverseMass** () const noexcept
- bool **IsActive** () const noexcept
- void **SetActive** (bool active) noexcept

The documentation for this class was generated from the following files:

- include/simulation_component.h
- src/simulation_component.cpp

5.93 Blade::SimulationComponentState Struct Reference

Public Attributes

- Vec3f **force**
- Vec3f **velocity**
- float **mass**
- SimulationComponent ∗ **parent** { nullptr }

The documentation for this struct was generated from the following file:

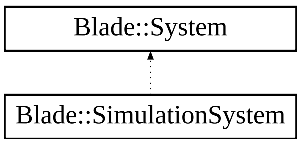
- include/simulation_component.h

5.94 Blade::SimulationSystem Class Reference

The simulation system of the engine.

`#include <simulation_system.h>`

Inheritance diagram for Blade::SimulationSystem:



Public Member Functions

- SimulationSystem & **operator=** (SimulationSystem &)=delete
- **SimulationSystem** (SimulationSystem &)=delete
- bool Initialize () noexcept override

    Pure virtual method implemented by the engine's systems to perform their initialization.
- void Process (float deltaTime=.0f, long time=0) noexcept override

    Pure virtual method implemented by the engine's systems to process the registered components.
- void **RegisterComponent** (SimulationComponent ∗simComp) noexcept
- void **RegisterComponent** (ColliderComponent ∗colComp) noexcept
- void **UnregisterComponent** (SimulationComponent ∗simComp) noexcept
- void **UnregisterComponent** (ColliderComponent ∗colComp) noexcept
- const std::vector< SimulationComponent ∗ > & **GetSimulationComponents** () const noexcept

Public Attributes

- float **timeSec**

Static Public Attributes

- static float **frequency** = 2000.0f
- static float **elasticity** = 0.3f
- static float **friction** = 1.0f
- static float **dt** = 0.0f
- static float **dtScale** = 1.0f

5.94.1 Detailed Description

The simulation system of the engine.

Performs the simulation routine: update, detection, response using threads.

5.94.2 Member Function Documentation

5.94.2.1 Initialize()

```
bool Blade::SimulationSystem::Initialize ( )  [override], [virtual], [noexcept]
```

Pure virtual method implemented by the engine's systems to perform their initialization.

Returns

TRUE if initialization is successfull, FALSE otherwise.

Implements Blade::System.

5.94.2.2 Process()

```
void Blade::SimulationSystem::Process (
            float deltaTime = .0f,
            long time = 0 )  [override], [virtual], [noexcept]
```

Pure virtual method implemented by the engine's systems to process the registered components.

Parameters

deltaTime	The time elapsed from the previous frame of the application.

Implements Blade::System.

The documentation for this class was generated from the following files:

- include/simulation_system.h
- src/simulation_system.cpp

5.95 Blade::Socket Class Reference

Public Member Functions

- **Socket** (SocketHandle handle)
- **Socket** (const Socket &other)=delete
- **Socket** (Socket &&other) noexcept
- bool **Connect** (const std::string &host, unsigned short port, ConnectionInfo ∗connection_info=nullptr) const noexcept
- bool **Listen** (unsigned short port, int maxQueueSize=8) const noexcept
- void **Close** () noexcept
- Socket **Accept** (ConnectionInfo ∗connectionInfo=nullptr) const noexcept
- bool **IsValid** () const noexcept
- SocketHandle **GetHandle** () const noexcept
- void **SetHandle** (SocketHandle handle) noexcept
- bool **Send** (const char ∗buffer, int size) const noexcept

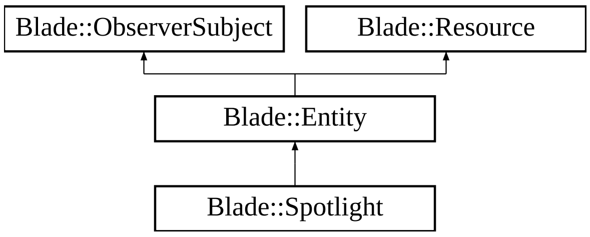
- int **Receive** (char ∗buffer, int size) const noexcept

The documentation for this class was generated from the following files:

- include/socket.h
- src/socket.cpp

5.96 Blade::Spotlight Class Reference

Inheritance diagram for Blade::Spotlight:



Public Member Functions

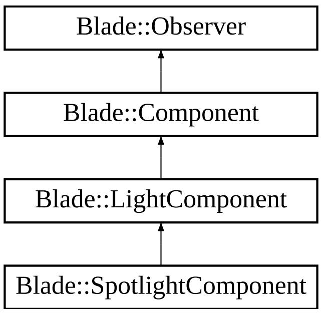
- **Spotlight** (const std::string &name, const SpotlightDesc &lightDescription)

The documentation for this class was generated from the following files:

- include/spotlight.h
- src/spotlight.cpp

5.97 Blade::SpotlightComponent Class Reference

Inheritance diagram for Blade::SpotlightComponent:



Public Member Functions

- **SpotlightComponent** (const SpotlightDesc &lightDesc, Entity ∗parent)
- const SpotlightDesc & **GetLightDescription** () const noexcept
- SpotlightDesc ∗ **GetLightDescriptionPtr** () noexcept

The documentation for this class was generated from the following files:

- include/spotlight_component.h
- src/spotlight_component.cpp

5.98 Blade::SpotlightDesc Struct Reference

A struct describing a spotlight.

```
#include <light_component.h>
```

Public Attributes

- Vec4f **ambientIntensity**
- Vec4f **diffuseIntensity**
- Vec4f **specularIntensity**
- Vec3f **position**
- float **constantAttenuation**
- float **linearAttenuation**
- float **quadraticAttenuation**
- Vec3f **direction**
- float **spotCutoff**
- float **spotExponent**
- float **pad**

5.98.1 Detailed Description

A struct describing a spotlight.

This struct is also used to represent a spotlight in shaders.

The documentation for this struct was generated from the following file:

- include/light_component.h

5.99 Blade::MathUtils::State Struct Reference

Public Attributes

- float **x** { 0.0f }
- float **v** { 0.0f }
- float **force** { 0.0f }
- float **mass** { 0.0f }

The documentation for this struct was generated from the following file:

- include/math_utils.h

5.100 Blade::StreamPlaylist Struct Reference

Public Attributes

- std::list< std::string > **files**
- std::list< std::string >::iterator **it**
- bool **loop**
- bool **started** { false }
- int **stream_idx** { -1 }

The documentation for this struct was generated from the following files:

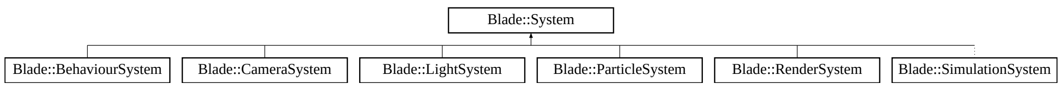
- include/audio_manager.h
- src/audio_manager.cpp

5.101 Blade::System Class Reference

An interface that represents a system of the engine.

```
#include <system.h>
```

Inheritance diagram for Blade::System:



Public Member Functions

- System ()=default

  Default constructor of a System.
- virtual ∼System ()

  Default destructor of a System.
- virtual bool Initialize () noexcept=0

  Pure virtual method implemented by the engine's systems to perform their initialization.
- virtual void Process (float deltaTime=.0f, long time=0) noexcept=0

  Pure virtual method implemented by the engine's systems to process the registered components.

5.101.1 Detailed Description

An interface that represents a system of the engine.

5.101.2 Member Function Documentation

5.101.2.1 Initialize()

```
virtual bool Blade::System::Initialize ( )  [pure virtual], [noexcept]
```

Pure virtual method implemented by the engine's systems to perform their initialization.

Returns

TRUE if initialization is successfull, FALSE otherwise.

Implemented in Blade::SimulationSystem, Blade::LightSystem, Blade::RenderSystem, Blade::ParticleSystem, and Blade::BehaviourSystem.

5.101.2.2 Process()

```
virtual void Blade::System::Process (
             float deltaTime = .0f,
             long time = 0 )  [pure virtual], [noexcept]
```

Pure virtual method implemented by the engine's systems to process the registered components.

Parameters

deltaTime	The time elapsed from the previous frame of the application.

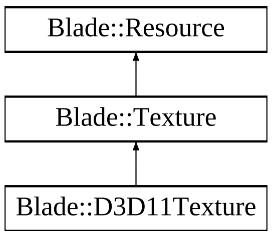
Implemented in Blade::SimulationSystem, Blade::LightSystem, Blade::RenderSystem, Blade::ParticleSystem, and Blade::BehaviourSystem.

The documentation for this class was generated from the following files:

- include/system.h
- src/system.cpp

5.102 Blade::Texture Class Reference

Inheritance diagram for Blade::Texture:



Public Member Functions

- **Texture** (TextureType textureType)
- virtual void **Bind** () const noexcept=0
- void **SetTextureType** (TextureType texture_type) noexcept
- TextureType **GetTextureType** () const noexcept

The documentation for this class was generated from the following file:

- include/texture.h

5.103 Blade::ThreadPool Class Reference

Public Member Functions

- bool Initialize ()
- void **Wait** ()
- void **Terminate** ()
- void **AddTask** (std::function< void()> job)
- void **AddTasks** (const std::vector< std::function< void()>> &jobs)
- size_t **QueuedTaskCount** () const
- size_t **ActiveTaskCount** () const
- size_t **PendingTaskCount** () const

5.103.1 Member Function Documentation

5.103.1.1 Initialize()

```
bool Blade::ThreadPool::Initialize ( )
```

Get the system's supported thread count.

Spawn the worker threads.

The workers will execute an infinite loop function and will wait for a job to enter the job queue. Once a job is in the the queue the threads will wake up to acquire and execute it.

The documentation for this class was generated from the following files:

- include/thread_pool.h
- src/thread_pool.cpp

5.104 Blade::ThumbStick Struct Reference

Thumbstick structure to hold X/Y axis information.

```
#include <input_state.h>
```

Public Attributes

- float **axisX**
- float **axisY**

5.104.1 Detailed Description

Thumbstick structure to hold X/Y axis information.

Uses STICK_THRESHOLD to normalize to floating point values in [0..1] range

The documentation for this struct was generated from the following file:

- include/input_state.h

5.105 Blade::Timer Class Reference

Public Member Functions

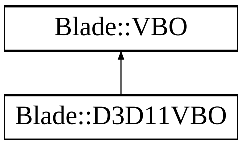
- void **Reset** () noexcept
- void **Start** () noexcept
- void **Stop** () noexcept
- bool **IsRunning** () const noexcept
- long long **GetMsec** () const noexcept
- double **GetSec** () const noexcept
- double **GetDelta** () const noexcept

The documentation for this class was generated from the following file:

- include/timer.h

5.106 Blade::VBO Class Reference

Inheritance diagram for Blade::VBO:



Public Member Functions

- void **SetVertexCount** (const unsigned int vertexCount) noexcept
- unsigned int **GetVertexCount** () const noexcept
- void **SetPrimitiveTopology** (PrimitiveTopology primitiveTopology) noexcept
- PrimitiveTopology **GetPrimitiveTopology** () const noexcept
- virtual bool **Create** (const std::vector< Vertex > &vertices, PrimitiveTopology primitiveTopology) noexcept=0
- virtual void **Bind** () const noexcept=0
- virtual void **Draw** () const noexcept=0

The documentation for this class was generated from the following files:

- include/VBO.h
- src/VBO.cpp

5.107 Blade::Vertex Struct Reference

Public Member Functions

- **Vertex** (const Vec3f &p, const Vec3f &n, const Vec3f &tan, const Vec2f &tcoord, const Vec4f &col)

Public Attributes

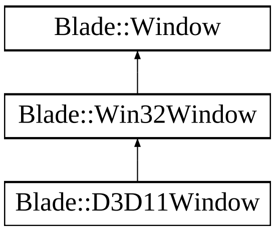
- Vec3f **position**
- Vec3f **normal**
- Vec3f **tangent**
- Vec2f **texcoord**
- Vec4f **color**

The documentation for this struct was generated from the following file:

- include/vertex.h

5.108 Blade::Win32Window Class Reference

Inheritance diagram for Blade::Win32Window:



Public Member Functions

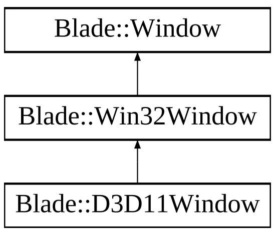
- **Win32Window** (const std::wstring &title, const Vec2i &size, const Vec2i &position, const unsigned int windowId, const bool focused, const bool minimized, const bool resizeable, const bool show_cursor, const WindowFunctionCallbacks &callbacks)
- virtual LRESULT CALLBACK **WinProc** (HWND handle, UINT msg, WPARAM wparam, LPARAM lparam)
- **Win32Window** (const Win32Window &)=delete
- Win32Window & **operator=** (const Win32Window &)=delete
- HWND **GetHandle** () const
- void **SetHandle** (HWND hwnd)
- HWND **GetParent** () const
- void **SetParent** (HWND hwnd)
- HMENU **GetMenu** () const
- void **SetMenu** (HMENU hmenu)
- unsigned int **GetFlags** () const
- void **SetFlags** (unsigned int flags)
- unsigned int **GetFlagsEx** () const
- void **SetFlagsEx** (unsigned int flags_ex)

The documentation for this class was generated from the following files:

- include/win32_window.h
- src/win32_window.cpp

5.109 Blade::Window Class Reference

Inheritance diagram for Blade::Window:



Public Member Functions

- **Window** (const std::wstring &title, const Vec2i &size, const Vec2i &position, const unsigned int windowId, const bool focused, const bool minimized, const bool resizeable, const bool showCursor, const Window↩ FunctionCallbacks &callbacks)
- **Window** (const Window &win)=delete
- Window & **operator=** (const Window &win)=delete
- const std::wstring & **GetTitle** () const noexcept
- void **SetSize** (const Vec2i &size) noexcept
- const Vec2i & **GetSize** () const noexcept
- unsigned int **GetId** () const noexcept
- const Vec2i & **GetMousePosition** () const noexcept
- void **SetMousePosition** (const Vec2i &mousePos) noexcept
- void **SetFocus** (const bool focus) noexcept

- bool **IsFocused** () const noexcept
- void **SetMinimized** (const bool minimized) noexcept
- bool **IsMinimized** () const noexcept
- void **SetResizable** (const bool resizeable) noexcept
- bool **IsResizeable** () const noexcept
- void **SetChangedSize** (const bool state) noexcept
- bool **ChangedSize** () const noexcept
- void **SetRedisplay** (const bool redisplay) noexcept
- void **SetShowCursor** (bool show) noexcept
- bool **ShowCursor** () const noexcept
- void **SetWindowCallbacks** (const WindowFunctionCallbacks &callbacks) noexcept
- const WindowFunctionCallbacks & **GetCallbacks** () const noexcept
- virtual void **SwapBuffers** (unsigned syncInterval=0) const noexcept=0

The documentation for this class was generated from the following files:

- include/window.h
- src/window.cpp

5.110 Blade::WindowFunctionCallbacks Struct Reference

Public Attributes

- AddRemoveInputDeviceFunc **device_change_func** { nullptr }
- ReshapeFunc **reshape_func** { nullptr }
- KeyboardFunc **keyboard_func** { nullptr }
- KeyboardUpFunc **keyboard_up_func** { nullptr }
- SpecialFunc **special_func** { nullptr }
- SpecialUpFunc **special_up_func** { nullptr }
- MouseFunc **mouse_func** { nullptr }
- MotionFunc **motion_func** { nullptr }
- PassiveMotionFunc **passive_motion_func** { nullptr }

The documentation for this struct was generated from the following file:

- include/windowing_types.h

5.111 Blade::WindowingService Class Reference

Public Member Functions

- **WindowingService** (const WindowingService &service)=delete
- WindowingService & **operator=** (const WindowingService &service)=delete

Static Public Member Functions

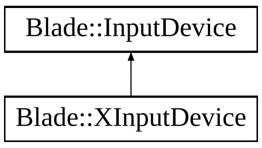
- static void **AddWindow** (Window ∗window)
- static void **Create** (const std::wstring &title, const Vec2i &size, const Vec2i &position, const bool focused, const bool minimized, const bool resizeable, const bool showCursor, const bool enableMSAA, const int M↩ SAASampleCount, const WindowFunctionCallbacks &callbacks)
- static void **DestroyWindow** (unsigned int win_id)
- static Window ∗ **GetWindow** (unsigned int win_id) noexcept
- static Window ∗ **GetWindow** (const std::wstring &title) noexcept
- static size_t **GetWindowCount** () noexcept
- static void **SwapBuffers** (int syncInterval) noexcept

The documentation for this class was generated from the following files:

- include/windowing_service.h
- src/windowing_service.cpp

5.112 Blade::XInputDevice Class Reference

Inheritance diagram for Blade::XInputDevice:



Public Member Functions

- **XInputDevice** (int device_id, DeviceType devType)
- void **Update** (float deltaTime) override
- bool **SetVibration** (float leftMotor, float rightMotor) const override
- bool **IsConnected** () const override

Protected Member Functions

- bool **Initialize** () override

Additional Inherited Members

The documentation for this class was generated from the following files:

- include/xinput_device.h
- src/xinput_device.cpp

Index

~CameraComponent
    Blade::CameraComponent, 29

AbstractViewport
    Blade::AbstractViewport, 18
ActiveDeviceExists
    Blade::InputManager, 58
AddStage
    Blade::Pipeline, 77
AssignDeviceToPlayer
    Blade::InputManager, 59

BehaviourComponent
    Blade::BehaviourComponent, 23
Blade, 11
Blade::AbstractViewport, 17
    AbstractViewport, 18
    GetRect, 18
    SetRect, 18
Blade::Animation, 19
Blade::Application, 19
Blade::AudioManager, 20
Blade::AudioSample, 21
Blade::AudioSource, 21
Blade::AudioStream, 22
Blade::AudioStreamBuffer, 22
Blade::BehaviourComponent, 23
    BehaviourComponent, 23
    Update, 24
Blade::BehaviourSystem, 24
    Initialize, 25
    Process, 25
    RegisterComponent, 25
    UnregisterComponent, 26
Blade::BoundingSphere, 26
Blade::Camera, 27
Blade::CameraComponent, 27
    ~CameraComponent, 29
    CameraComponent, 28, 29
    GetClippingPlanes, 30
    GetFarPlane, 30
    GetFov, 30
    GetNearPlane, 30
    GetProjectionMatrix, 31
    GetViewMatrix, 31
    GetViewport, 31
    SetClippingPlanes, 31, 32
    SetFarPlane, 32
    SetFov, 32
    SetNearPlane, 33
    SetViewMatrix, 33
    SetViewport, 33
Blade::CameraDesc, 33
Blade::CameraSystem, 34
    GetActiveCamera, 35
    GetActiveCameraProjectionMatrtix, 35
    GetActiveCameraViewMatrix, 35
    GetActiveCameraViewport, 35
    GetCamera, 35
    RegisterComponent, 36
    SetActiveCamera, 36
    UnregisterComponent, 36
Blade::Collider, 37
Blade::ColliderComponent, 37
Blade::Command, 38
Blade::Component, 38
    Component, 39
    GetId, 39
    GetParent, 40
    GetType, 40
    OnMessage, 40
Blade::ConfigEntry, 41
Blade::ConfigFile, 41
Blade::ConnectionInfo, 42
Blade::ContactManifold, 42
Blade::D3D11BlendState, 42
Blade::D3D11Context, 43
Blade::D3D11DepthStencilState, 43
Blade::D3D11IBO, 44
Blade::D3D11RasterizerState, 44
Blade::D3D11RenderTarget, 45
Blade::D3D11Shader, 45
Blade::D3D11ShaderProgram, 46
Blade::D3D11Texture, 46
Blade::D3D11VBO, 47
Blade::D3D11Viewport, 47
    D3D11Viewport, 48
Blade::D3D11Window, 48
Blade::DirectionalLight, 49
Blade::DirectionalLightComponent, 49
Blade::DirectionalLightDesc, 50
Blade::EmitterComponent, 50
    Update, 51
Blade::EmitterDescriptor, 52
Blade::EngineContext, 53
Blade::Entity, 53
Blade::GAPIContext, 54
Blade::IBO, 55
Blade::InputComponent, 55

Update, 56
Blade::InputDevice, 56
Blade::InputManager, 58
ActiveDeviceExists, 58
AssignDeviceToPlayer, 59
DevicePoolQueryType, 59
EnumerateDevices, 59
GetActiveDevice, 59
Initialize, 60
PooledDeviceExists, 60
QueryAllKeyStates, 60
QueryKeyState, 60
QueryMouseButtonState, 61
QueryMouseMovement, 61
QueryMouseMovementNormalized, 61
QueryMousePosition, 61
UnassignDevice, 62
Blade::InputState, 62
Blade::JoypadInputComponent, 63
Update, 64
Blade::KeyboardInput, 64
QueryAllKeyStates, 65
QueryKeyState, 65
Blade::KeyboardInputComponent, 65
Update, 66
Blade::Keyframe< T >, 67
Blade::LightComponent, 67
Blade::LightSystem, 68
GetDirectionalLightDescriptions, 68
GetPointLightDescriptions, 69
GetSpotlightDescriptions, 69
Initialize, 69
Process, 69
RegisterComponent, 70
UnregisterComponent, 70
Blade::ManifoldEntry, 70
Blade::Material, 71
Blade::MathUtils::Derivative, 49
Blade::MathUtils::RungeKutta4Integrator, 90
Blade::MathUtils::State, 98
Blade::Mesh, 71
Blade::Message< T >, 72
Blade::NCF, 72
Blade::NetworkManager, 73
Blade::NetworkMessage, 73
Blade::Observer, 74
Blade::ObserverSubject, 74
Blade::OggVorbisStream, 75
Blade::Particle, 75
Blade::ParticleSystem, 75
Initialize, 76
Process, 76
Blade::Pipeline
AddStage, 77
Execute, 77
Blade::Pipeline< T, Tdata >, 77
Blade::PipelineData
Get, 79
PipelineData, 78
Blade::PipelineData< T >, 78
Blade::PipelineStage
Execute, 80
Initialize, 81
PipelineStage, 80
Blade::PipelineStage< T, Tdata >, 79
Blade::PlaneCollider, 81
Blade::PointLight, 82
Blade::PointLightComponent, 82
Blade::PointLightDesc, 83
Blade::RefCountedContainer< T >, 83
Blade::RenderComponent, 84
GetMaterial, 85
GetMesh, 85
RenderComponent, 84
SetMaterial, 85
SetMesh, 85
Blade::RenderState, 86
Blade::RenderStateManager, 86
Blade::RenderSystem, 87
Initialize, 87
Process, 87
RegisterComponent, 88
SetRenderPassPipeline, 88
UnregisterComponent, 88
Blade::RenderTarget, 89
Blade::Resource, 89
Blade::ResourceManager, 90
Blade::SamplePlaylist, 90
Blade::Scene, 91
Blade::SceneManager, 91
Blade::Serializable, 92
Blade::Shader, 92
Blade::ShaderProgram, 92
Blade::ShaderProgramDesc, 93
Blade::ShaderProgramManager, 93
Blade::SimulationComponent, 94
Blade::SimulationComponentState, 94
Blade::SimulationSystem, 95
Initialize, 95
Process, 96
Blade::Socket, 96
Blade::Spotlight, 97
Blade::SpotlightComponent, 97
Blade::SpotlightDesc, 98
Blade::StreamPlaylist, 99
Blade::System, 99
Initialize, 99
Process, 100
Blade::Texture, 100
Blade::ThreadPool, 101
Initialize, 101
Blade::ThumbStick, 101
Blade::Timer, 102
Blade::VBO, 102
Blade::Vertex, 103
Blade::Win32Window, 103

Blade::Window, 104
Blade::WindowFunctionCallbacks, 105
Blade::WindowingService, 105
Blade::XInputDevice, 106

CameraComponent
    Blade::CameraComponent, 28, 29
Component
    Blade::Component, 39

D3D11Viewport
    Blade::D3D11Viewport, 48
DevicePoolQueryType
    Blade::InputManager, 59

EnumerateDevices
    Blade::InputManager, 59
Execute
    Blade::Pipeline, 77
    Blade::PipelineStage, 80

Get
    Blade::PipelineData, 79
GetActiveCamera
    Blade::CameraSystem, 35
GetActiveCameraProjectionMatrtix
    Blade::CameraSystem, 35
GetActiveCameraViewMatrix
    Blade::CameraSystem, 35
GetActiveCameraViewport
    Blade::CameraSystem, 35
GetActiveDevice
    Blade::InputManager, 59
GetCamera
    Blade::CameraSystem, 35
GetClippingPlanes
    Blade::CameraComponent, 30
GetDirectionalLightDescriptions
    Blade::LightSystem, 68
GetFarPlane
    Blade::CameraComponent, 30
GetFov
    Blade::CameraComponent, 30
GetId
    Blade::Component, 39
GetMaterial
    Blade::RenderComponent, 85
GetMesh
    Blade::RenderComponent, 85
GetNearPlane
    Blade::CameraComponent, 30
GetParent
    Blade::Component, 40
GetPointLightDescriptions
    Blade::LightSystem, 69
GetProjectionMatrix
    Blade::CameraComponent, 31
GetRect
    Blade::AbstractViewport, 18
GetSpotlightDescriptions
    Blade::LightSystem, 69
GetType
    Blade::Component, 40
GetViewMatrix
    Blade::CameraComponent, 31
GetViewport
    Blade::CameraComponent, 31

Initialize
    Blade::BehaviourSystem, 25
    Blade::InputManager, 60
    Blade::LightSystem, 69
    Blade::ParticleSystem, 76
    Blade::PipelineStage, 81
    Blade::RenderSystem, 87
    Blade::SimulationSystem, 95
    Blade::System, 99
    Blade::ThreadPool, 101

OnMessage
    Blade::Component, 40

PipelineData
    Blade::PipelineData, 78
PipelineStage
    Blade::PipelineStage, 80
PooledDeviceExists
    Blade::InputManager, 60
Process
    Blade::BehaviourSystem, 25
    Blade::LightSystem, 69
    Blade::ParticleSystem, 76
    Blade::RenderSystem, 87
    Blade::SimulationSystem, 96
    Blade::System, 100

QueryAllKeyStates
    Blade::InputManager, 60
    Blade::KeyboardInput, 65
QueryKeyState
    Blade::InputManager, 60
    Blade::KeyboardInput, 65
QueryMouseButtonState
    Blade::InputManager, 61
QueryMouseMovement
    Blade::InputManager, 61
QueryMouseMovementNormalized
    Blade::InputManager, 61
QueryMousePosition
    Blade::InputManager, 61

RegisterComponent
    Blade::BehaviourSystem, 25
    Blade::CameraSystem, 36
    Blade::LightSystem, 70
    Blade::RenderSystem, 88
RenderComponent
    Blade::RenderComponent, 84

SetActiveCamera
    Blade::CameraSystem, 36
SetClippingPlanes
    Blade::CameraComponent, 31, 32
SetFarPlane
    Blade::CameraComponent, 32
SetFov
    Blade::CameraComponent, 32
SetMaterial
    Blade::RenderComponent, 85
SetMesh
    Blade::RenderComponent, 85
SetNearPlane
    Blade::CameraComponent, 33
SetRect
    Blade::AbstractViewport, 18
SetRenderPassPipeline
    Blade::RenderSystem, 88
SetViewMatrix
    Blade::CameraComponent, 33
SetViewport
    Blade::CameraComponent, 33

UnassignDevice
    Blade::InputManager, 62
UnregisterComponent
    Blade::BehaviourSystem, 26
    Blade::CameraSystem, 36
    Blade::LightSystem, 70
    Blade::RenderSystem, 88
Update
    Blade::BehaviourComponent, 24
    Blade::EmitterComponent, 51
    Blade::InputComponent, 56
    Blade::JoypadInputComponent, 64
    Blade::KeyboardInputComponent, 66