

Fast OpenGL Library

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Chapter 1

WIP: FastOGLib - Fast OpenGL Library

Fast and scalable library, able to create OpenGL programs on osx/linux/windows machines.

1.1 Instalation of Library

Actually does not provide plug in solution. Saying that so it's needed to download all source codes of Lib and dependent libs.

```
git stash
git pull
git submodule sync && git submodule update --init
```

1.1.1 Linux/OSX

After checking out the desired version of library building is straight forward:

```
mkdir build
cd build
cmake ..
make
```

1.1.2 Windows

Unfortunately on Windows the GNU compiler with make is required (MVC option is not tested - Feel free to test it will try to help my best). In order to build the app it's needed to select correct compiler:

```
mkdir build
git stash
git pull
git submodule sync && git submodule update --init
cd build
cmake .. -G "MinGW Makefiles"
mingw32-make.exe -j 10 -l 10
```

1.1.3 Developing the application

Actually in order of development on this library the `main.cpp` file has to be modified. In future months I'll be adding more functionality, which can be monitored in issues, and after some time, I'll provide CMake style libraries.

1.2 Contributors

@mwawrzkow - Marcin Wawrzków - owner

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

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

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Primitives::Color< T >	11
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Controller	12
Model	17
View	28
Primitives::Point2D< T >	17
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Lights::SphericalLight	19
OSDL::Subject	25
INPUT::AdapterHandler	7
OSDL::DualLink	13
AEG::Texture	26
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vertexHandler	27
Primitive	18
Primitives::Square	20
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Chapter 3

Class Index

3.1 Class List

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

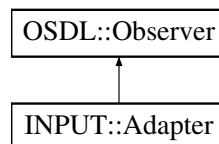
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OSDL::Subject	25
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Chapter 4

Class Documentation

4.1 INPUT::Adapter Class Reference

Inheritance diagram for INPUT::Adapter:



Public Member Functions

- void **Notify** (OSDL::Subject *)
- bool **isKeyPressed** (KeyBoardKey)
- bool **isKeyHold** (KeyBoardKey)

Private Attributes

- std::map< KeyBoardKey, bool > **keyPressed**
- std::map< KeyBoardKey, bool > **keyHold**

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

- Engine/Core/core/InputAdapter.hpp
- Engine/Core/core/InputAdapter.cpp

4.2 INPUT::AdapterHandler Class Reference

Inheritance diagram for INPUT::AdapterHandler:



Public Types

- enum **KeyActionType** { **Hold**, **Press_down**, **Press_Up** }

Public Member Functions

- AdapterHandler** ([AdapterHandler](#) &other)=delete
- void **operator=** (const [AdapterHandler](#) &)=delete
- [AdapterHandler](#) * **getInstance** ()
- KeyBoardKey **getKey** ()
- KeyActionType **getAction** ()

Static Public Member Functions

- static void **onKeyUpDate** (GLFWwindow *window, int key, int status, int action, int mods)

Private Member Functions

- void **UpdateKey** (int)

Private Attributes

- KeyBoardKey **key**
- KeyActionType **Action**

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

- Engine/Core/core/InputAdapter.hpp
- Engine/Core/core/InputAdapter.cpp

4.3 GPU::ArrayHandler Class Reference

Public Member Functions

- bool [areFreeBuffers](#) ()
Check if any buffers are available.
- bool [allocateBuffer](#) (int)
Allocates GPU space for x buffers.
- [GPU_Ref](#) * [getFirstAvailavleBuffer](#) ()
Returns pointer to first Available Buffer.
- void [releaseBuffer](#) (int)
Releases the buffer, if buffer is not taken does nothing.

Private Member Functions

- bool [areRepetitions](#) (unsigned int[], int)
check if are repetitions in Array

Private Attributes

- `std::vector< GPU_Ref > GPUSpace`

4.3.1 Member Function Documentation

4.3.1.1 `allocateBuffer()`

```
bool GPU::ArrayHandler::allocateBuffer (
    int size )
```

Allocates GPU space for x buffers.

Parameters

<i>int</i>	size amount of buffers
------------	------------------------

Note

Return values

<i>bool</i>	if buffers were created
-------------	-------------------------

4.3.1.2 `areFreeBuffers()`

```
bool GPU::ArrayHandler::areFreeBuffers ( )
```

Check if any buffers are available.

Note

Return values

<i>bool</i>	are any buffers free
-------------	----------------------

4.3.1.3 areRepetitions()

```
bool GPU::ArrayHandler::areRepetitions (
    unsigned int array[],
    int size ) [private]
```

check if are repetitions in Array

Note

Parameters

<i>int[]</i>	array
<i>int</i>	size of array

Return values

<i>true</i>	If they're repetiotion
<i>false</i>	if there are no repetitions

4.3.1.4 getFirstAvailavleBuffer()

```
GPU_Ref * GPU::ArrayHandler::getFirstAvailavleBuffer ( )
```

Returns pointer to first Available Buffer.

Note

Return values

<i>GPU_Ref</i>	Pointer to buffer, in not buffers available return nullptr
--------------------------------	--

4.3.1.5 releaseBuffer()

```
void GPU::ArrayHandler::releaseBuffer (
    int idx )
```

Releases the buffer, if buffer is not taken does nothing.

Note

Exceptions

------	--

Return values

None	
------	--

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

- Engine/Core/core/OpenGLArrays/ArrayHandler.hpp
- Engine/Core/core/OpenGLArrays/ArrayHandler.cpp

4.4 Primitives::Color< T > Struct Template Reference

Public Member Functions

- T & **operator[]** (ColorType type)

Public Attributes

- T **r** = 0
- T **g** = 0
- T **b** = 0

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

- Engine/Core/core/base/Point.hpp

4.5 Primitives::ColorRGBA< T > Struct Template Reference

Public Member Functions

- T & **operator[]** (ColorType type)

Public Attributes

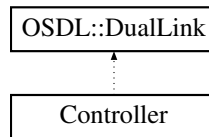
- **Color**< T > **color**
- T **alpha** = 0

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

- Engine/Core/core/base/Point.hpp

4.6 Controller Class Reference

Inheritance diagram for Controller:



Additional Inherited Members

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

- Engine/Core/patterns/MVC/Controller.hpp

4.7 Lights::DirectLight Class Reference

Public Member Functions

- **DirectLight** (float, float, float, float, float, float, float, float, float)
- void **setPosition** (float, float)
- void **Move** (float, float)
- void **setColor** (float, float, float)
- void **setLumen** (float)
- void **setAlpha** (float)
- float **getX** ()
- float **getY** ()
- float **getLumen** ()
- float **getAlpha** ()
- float **getR** ()
- float **getG** ()
- float **getB** ()
- float **getConeAngle** ()
- float **getConeWidth** ()
- float **getConeLength** ()

Private Attributes

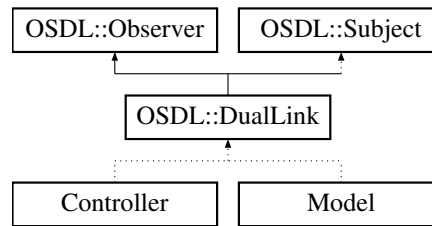
- float **x**
- float **y**
- float **lumen**
- float **alpha** = 1.0f
- float **r**
- float **g**
- float **b**
- float **coneAngle**
- float **coneWidth**
- float **coneLength**

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

- Engine/Core/core/primitives/Light/DirectLight.hpp
- Engine/Core/core/primitives/Light/DirectLight.cpp

4.8 OSDL::DualLink Class Reference

Inheritance diagram for OSDL::DualLink:



Additional Inherited Members

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

- Engine/Core/patterns/ObserverSubject/DualLink.hpp

4.9 Lights::GlobalLight Class Reference

Public Member Functions

- **GlobalLight** (float, float, float, float, float, float)
- void **setPosition** (float, float)
- void **Move** (float, float)
- void **setColor** (float, float, float)
- void **setLumen** (float)
- void **setAlpha** (float)
- float **getX** ()
- float **getY** ()
- float **getLumen** ()
- float **getAlpha** ()
- float **getR** ()
- float **getG** ()
- float **getB** ()

Private Attributes

- float **x**
- float **y**
- float **lumen**
- float **alpha** = 1.0f
- float **r**
- float **g**
- float **b**

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

- Engine/Core/core/primitives/Light/GlobalLight.hpp
- Engine/Core/core/primitives/Light/GlobalLight.cpp

4.10 GPU::GPU_Ref Class Reference

Public Member Functions

- **GPU_Ref** (int, int, int)
- const unsigned int & **getVAO** ()
- const unsigned int & **getVBO** ()
- const unsigned int & **getEBO** ()

Protected Member Functions

- void **Release** ()
- bool & **Taken** ()
- [GPU_Ref](#) * **Take** ()

Private Attributes

- unsigned int **VAO**
- unsigned int **VBO**
- unsigned int **EBO**
- bool **taken**

Friends

- class **ArrayHandler**

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

- Engine/Core/core/OpenGLArrays/ArrayHandler.hpp
- Engine/Core/core/OpenGLArrays/ArrayHandler.cpp

4.11 Lights::LightManager Class Reference

Public Member Functions

- void **addDirectLight** ([DirectLight](#) *)
- void **addSphericalLight** ([SphericalLight](#) *)
- void **addGlobalLight** ([GlobalLight](#) *)
- void **removeDirectLight** ([DirectLight](#) *)
- void **removeSphericalLight** ([SphericalLight](#) *)
- void **removeGlobalLight** ([GlobalLight](#) *)
- void **addDirectLight** (float, float, float, float, float, float, float, float, float)
- void **addSphericalLight** (float, float, float, float, float, float, float)
- void **addGlobalLight** (float, float, float, float, float, float, float)
- void **draw** ([Primitives::PrimitivesManager](#) primitives)

Private Member Functions

- void **drawDirectLights** ([Primitives::PrimitivesManager](#) primitives)
- void **drawSphericalLights** ([Primitives::PrimitivesManager](#) primitives)
- void **drawGlobalLights** ([Primitives::PrimitivesManager](#) primitives)

Private Attributes

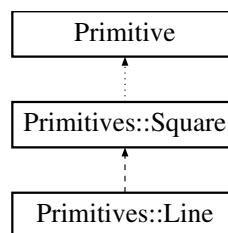
- std::vector< [DirectLight](#) * > **directLights**
- std::vector< [SphericalLight](#) * > **sphericalLights**
- std::vector< [GlobalLight](#) * > **globalLights**

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

- Engine/Core/core/primitives/Lights.hpp
- Engine/Core/core/primitives/Lights.cpp

4.12 Primitives::Line Class Reference

Inheritance diagram for Primitives::Line:



Public Member Functions

- [Line](#) (int x0, int y0, int x1, int y1, int w, int r, int g, int b, float alpha)
Construct a new [Line](#) object.
- void [Display](#) ()
Display the [Line](#).
- bool [isVisible](#) () override
is the [Line](#) visible

Additional Inherited Members

4.12.1 Constructor & Destructor Documentation

4.12.1.1 Line()

```
Primitives::Line::Line (
    int x0,
    int y0,
    int x1,
    int y1,
    int w,
    int r,
    int g,
    int b,
    float alpha )
```

Construct a new [Line](#) object.

Parameters

<i>x0</i>	- x coordinate of first point
<i>y0</i>	- y coordinate of first point
<i>x1</i>	- x coordinate of second point
<i>y1</i>	- y coordinate of second point
<i>w</i>	- width of line
<i>r</i>	- red color component
<i>g</i>	- green color component
<i>b</i>	- blue color component
<i>alpha</i>	- alpha value of line

4.12.2 Member Function Documentation

4.12.2.1 Display()

```
void Primitives::Line::Display ( )
```

Display the [Line](#).

4.12.2.2 isVisible()

```
bool Primitives::Line::isVisible ( ) [override], [virtual]
```

is the [Line](#) visible

Returns

true
false

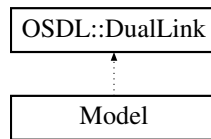
Implements [Primitive](#).

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

- Engine/Core/core/primitives/Line.hpp
- Engine/Core/core/primitives/Line.cpp

4.13 Model Class Reference

Inheritance diagram for Model:



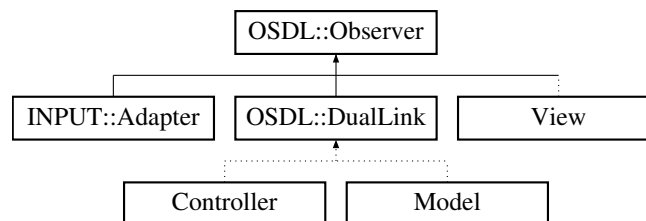
Additional Inherited Members

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

- Engine/Core/patterns/MVC/Model.hpp

4.14 OSDL::Observer Class Reference

Inheritance diagram for OSDL::Observer:



Public Member Functions

- virtual void **Notify** ([Subject](#) *)

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

- Engine/Core/patterns/ObserverSubject/Observer.hpp

4.15 Primitives::Point2D< T > Struct Template Reference

Public Attributes

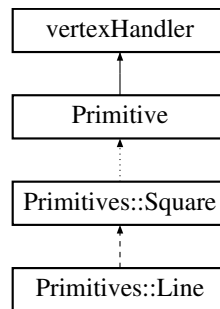
- T **x** = 0
- T **y** = 0

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

- Engine/Core/core/base/Point.hpp

4.16 Primitive Class Reference

Inheritance diagram for Primitive:



Public Member Functions

- **Primitive** (prim_type)
- **Primitive** (const [Primitive](#) &p)
- float **sin** (float r)
- float **cos** (float r)
- virtual bool **isVisible** ()=0
- virtual bool **isNear** (float, float, float)=0

Protected Types

- enum **prim_type** { RECTANAGLE, TRIANGLE, SQUARE }

Protected Attributes

- enum **Primitive::prim_type TYPE**

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

- Engine/Core/core/base/Primitive.hpp
- Engine/Core/core/base/Primitive.cpp

4.17 Primitives::PrimitivesManager Class Reference

Public Member Functions

- void **addPrimitive** ([Primitive](#) *)
- void **removePrimitive** ([Primitive](#) *)
- void **removePrimitive** (int)
- void **removeAllPrimitives** ()
- void **DisplayAll** ()
- [PrimitivesRef](#) **getPrimitives** ()
- [Primitives](#) **getPrimitivesNear** (float, float, float)

Private Attributes

- Primitives **primitives**

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

- Engine/Core/core/primitives/PrimitivesManager.hpp
- Engine/Core/core/primitives/PrimitivesManager.cpp

4.18 Lights::SphericalLight Class Reference

Public Member Functions

- **SphericalLight** (float x, float y, float lumen, float r, float g, float b)
- void **setPosition** (float, float)
- void **Move** (float, float)
- void **setColor** (float, float, float)
- void **setLumen** (float)
- void **setAlpha** (float)
- float **getX** ()
- float **getY** ()
- float **getLumen** ()
- float **getAlpha** ()
- float **getR** ()
- float **getG** ()
- float **getB** ()

Private Attributes

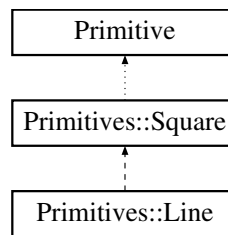
- float **x**
- float **y**
- float **lumen**
- float **alpha** = 1.0f
- float **r**
- float **g**
- float **b**

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

- Engine/Core/core/primitives/Light/SphericalLight.hpp
- Engine/Core/core/primitives/Light/SphericalLight.cpp

4.19 Primitives::Square Class Reference

Inheritance diagram for Primitives::Square:



Public Member Functions

- **Square** (float, float, float, float=1.0f)
- **Square** (const [Square](#) &s)
- [Square](#) & **operator=** (const [Square](#) &s)
- void [setPosition](#) (float, float)
Set the Position object.
- void [Move](#) (float, float)
move the square relative to the current position
- void [setTexture](#) (std::string)
Set the Texture object.
- bool [isVisible](#) () override
is Object on the screen
- void [Display](#) ()
Draw the square.
- float **getX** ()
- float **getY** ()
- void [setAlpha](#) (float)
Set the Alpha value.
- bool [isNear](#) (float, float, float) override
is the Object int the radius
- void [setRotation](#) (float)
Set the rotation of the square.
- float **getRotation** ()
- void [rotate](#) (float)
rotate the square relative to the current rotation
- void [setR](#) (float)
Set R color value.
- void [setG](#) (float)
Set G color value.
- void **setB** (float)
- void [setColor](#) (float, float, float, float=1.0f)
Set the Color value.
- void **SetVerticeColor** (int, float, ColorType=ERROR)

Private Types

- typedef std::array< [PointF](#), 4 > **verticies_array**
- typedef std::array< [ColorRGBAf](#), 4 > **colors_array**

Private Member Functions

- void **calculateMatrixes** ()
- vertices_array **rotateVertices** ()
Rotate the vertices of the square.
- void **calculateVerticesArr** ()

Private Attributes

- [Global::WindowProperties](#) * **window**
- float **x**
- float **y**
- float **size**
- vertices_array **vertices_arr** = {}
- colors_array **color_arr** = {}
- float **angle** = 0.0f
- unsigned int **inc** [6] = {0, 1, 2, 0, 2, 3}

4.19.1 Member Function Documentation

4.19.1.1 isNear()

```
bool Primitives::Square::isNear (
    float x,
    float y,
    float radius ) [override], [virtual]
```

is the Object int the radius

Parameters

<i>float</i>	x - x coordinate of the center of the circle
<i>float</i>	y - y coordinate of the center of the circle
<i>float</i>	radius - radius of the circle

Returns

- true - if object is in the radius
- false - if object is not in the radius

Implements [Primitive](#).

4.19.1.2 isVisible()

```
bool Primitives::Square::isVisible ( ) [override], [virtual]
```

is Object on the screen

Returns

true - if object is on the screen

false - if object is not on the screen

Implements [Primitive](#).

4.19.1.3 Move()

```
void Primitives::Square::Move (
    float x,
    float y )
```

move the square relative to the current position

Parameters

<i>float</i>	x - offset in x direction
<i>float</i>	y - offset in y direction

4.19.1.4 rotate()

```
void Primitives::Square::rotate (
    float angle )
```

rotate the square relative to the current rotation

Parameters

<i>float</i>	angle - angle in radians
--------------	--------------------------

4.19.1.5 rotateVertices()

```
Square::verticies_array Primitives::Square::rotateVertices ( ) [private]
```

Rotate the vertices of the square.

Parameters

<i>vertices</i>	- vertices of the square
<i>rot</i>	- rotation matrix

4.19.1.6 setAlpha()

```
void Primitives::Square::setAlpha (
    float alpha )
```

Set the Alpha value.

Parameters

<i>float</i>	alpha - alpha value
--------------	---------------------

4.19.1.7 setColor()

```
void Primitives::Square::setColor (
    float r,
    float g,
    float b,
    float alpha = 1.0f )
```

Set the [Color](#) value.

Parameters

<i>float</i>	r - red value
<i>float</i>	g - green value
<i>float</i>	b - blue value
<i>float</i>	alpha - alpha value

4.19.1.8 setG()

```
void Primitives::Square::setG (
    float g )
```

Set G color value.

Parameters

<i>g</i>	- green value
----------	---------------

4.19.1.9 setPosition()

```
void Primitives::Square::setPosition (
    float x,
    float y )
```

Set the Position object.

Parameters

<i>float</i>	x - x coordinate of the center of the square
<i>float</i>	y - y coordinate of the center of the square

4.19.1.10 setR()

```
void Primitives::Square::setR (
    float r )
```

Set R color value.

Parameters

<i>r</i>	- red value
----------	-------------

4.19.1.11 setRotation()

```
void Primitives::Square::setRotation (
    float angle )
```

Set the rotation of the square.

Parameters

<i>float</i>	angle - angle in radians of the square
--------------	--

4.19.1.12 `setTexture()`

```
void Primitives::Square::setTexture (
    std::string data )
```

Set the Texture object.

Parameters

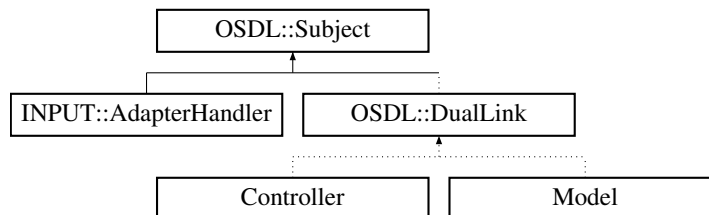
<code>std::string</code>	data - path to the texture
--------------------------	----------------------------

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

- Engine/Core/core/primitives/Square.hpp
- Engine/Core/core/primitives/Square.cpp

4.20 OSDL::Subject Class Reference

Inheritance diagram for OSDL::Subject:



Public Member Functions

- void **addObserver** ([Observer](#) &)
- void **Notify** ()
- void **NotifyObserver** ([Observer](#) &)
- void **removeObserver** ([Observer](#) &)

Private Attributes

- `std::vector< Observer * >` **observers**

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

- Engine/Core/patterns/ObserverSubject/Subject.hpp
- Engine/Core/patterns/ObserverSubject/Subject.cpp

4.21 AEG::Texture Class Reference

Public Member Functions

- **Texture** (std::string, unsigned int)
- const unsigned int & **getTextureID** ()

Protected Member Functions

- const std::string & **getLocation** ()
- void **setTextureLocation** (std::string)
- void **setTextureID** (unsigned int)
- void **Clear** ()

Private Attributes

- unsigned int **ID**
- std::string **location**

Friends

- class **Textures**

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

- Engine/Core/core/base/Texture.hpp
- Engine/Core/core/base/Texture.cpp

4.22 AEG::Textures Class Reference

Public Member Functions

- void **allocateTextureSpace** (unsigned int)
- const unsigned int & **getTextureIndex** (const std::string &)
- void **loadTexture** (const std::string &)
- void **unloadTexture** (const std::string &)
- void **unloadTexture** (unsigned int)

Private Member Functions

- void **LoadTexture** (int, const std::string &)

Private Attributes

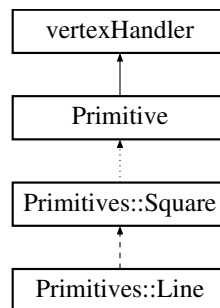
- `std::vector< Texture > TextureMap`

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

- `Engine/Core/core/base/Texture.hpp`
- `Engine/Core/core/base/Texture.cpp`

4.23 vertexHandler Class Reference

Inheritance diagram for vertexHandler:



Public Member Functions

- **vertexHandler** (const [vertexHandler](#) &other)
- void **setVertexHandler** (float vertices[], int VerticesSize, unsigned int indices[], int indicesSize)
- void **setTextureData** (const std::string)
- int **getTexture** ()
- int **getVBO** ()
- int **getEBO** ()
- int **getVAO** ()

Private Attributes

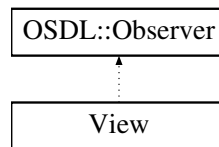
- unsigned int **VBO**
- unsigned int **VAO**
- unsigned int **EBO**
- unsigned int **texture**

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

- `Engine/Core/core/base/vertexHandler.hpp`
- `Engine/Core/core/base/vertexHandler.cpp`

4.24 View Class Reference

Inheritance diagram for View:



Additional Inherited Members

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

- Engine/Core/patterns/MVC/View.hpp

4.25 Global::WindowProperties Class Reference

Public Member Functions

- [WindowProperties](#) ([WindowProperties](#) &other)=delete
ArrayHandler for All GPU bindings.
- void **operator=** (const [WindowProperties](#) &)=delete
- [GPU::ArrayHandler](#) * **getAH** ()
- [AEG::Textures](#) * **getTextures** ()
- const int & **getWindowHeight** ()
- const int & **getWindowWidth** ()
- void **setWindowWidth** (int)
- void **setWindowHeight** (int)

Static Public Member Functions

- static [WindowProperties](#) & **getInstance** ()

Private Attributes

- int **windowHeight**
- int **windowWidth**

4.25.1 Constructor & Destructor Documentation

4.25.1.1 WindowProperties()

```
Global::WindowProperties::WindowProperties (
    WindowProperties & other ) [delete]
```

ArrayHandler for All GPU bindings.

Note

Return values

<i>None</i>	
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The documentation for this class was generated from the following files:

- Engine/Core/core/WindowProperties.hpp
- Engine/Core/core/WindowProperties.cpp

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