EvolutionProject

1.9.953

Generated by Doxygen 1.8.14

Contents

Chapter 1

Evolution WildFire

1.1 Introduction

This is a 3D evolution simulator. The hope is that in future, you will be able to control evolved 3D creatures in a dynamic environment. Their evolution will change their morphology and their neural network brain to accomplish the goals you set out for them. This includes fighting other creatures, navigating a complex landscape, and completing meta-challenges to collect evolution points and evolve the best creature!

1.2 Usage

The program can be run immediately once the copy has been obtained by running the .exe in the bin/debug folder. Right now, there is no game play at all, as the software is in development.

Chapter 2

Todo List

Class Audio

This class does not clear sounds when they are done. This means that the sounds vector will grow unbounded. This is wastefull and should be resolved.

Protect / warn against using stero sounds in 3D. (not allowed according to SFML).

Class Camera

In future, the camera implementation should be removed from the graphics class and put here.

Class Config

Allow changes to config file based on program state.

Class Logger

Right now, there isn't a way to propogate warning and error messages to the screen. Maybe this could be a variable "lastLogged" or "lastError" or "lastWarning" OR "lastSignificantLog".

Chapter 3

Bug List

Member glutCB::renderScene ()

The frame rate has some issues and is not consistent on some other machines.

Chapter 4

Namespace Index

4.1 Namespace List

Here is a list of all namespaces with brief descriptions:

Chapter 5

Hierarchical Index

5.1 Class Hierarchy

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

Chapter 6

Class Index

6.1 Class List

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

Chapter 7

File Index

7.1 File List

Here is a list of all files with brief descriptions:

Chapter 8

Namespace Documentation

8.1 AutoVersion Namespace Reference

Variables

- static const char DATE [ ] = "24"
- static const char MONTH [ ] = "01"
- static const char YEAR [ ] = "2018"
- static const char UBUNTU_VERSION_STYLE [ ] = "18.01"
- static const char STATUS [ ] = "Alpha"
- static const char STATUS_SHORT [ ] = "a"
- static const long MAJOR = 0
- static const long MINOR = 0
- static const long BUILD = 0
- static const long REVISION = 0
- static const long BUILDS_COUNT = 1
- static const char FULLVERSION_STRING [ ] = "0.0.0.0"
- static const long BUILD_HISTORY = 0

8.1.1 Variable Documentation

8.1.1.1 BUILD

```
const long AutoVersion::BUILD = 0  [static]
```

8.1.1.2 BUILD_HISTORY

```
const long AutoVersion::BUILD_HISTORY = 0  [static]
```

8.1.1.3 BUILDS_COUNT

```
const long AutoVersion::BUILDS_COUNT = 1  [static]
```

8.1.1.4 DATE

```
const char AutoVersion::DATE[] = "24"  [static]
```

8.1.1.5 FULLVERSION_STRING

```
const char AutoVersion::FULLVERSION_STRING[] = "0.0.0.0"  [static]
```

8.1.1.6 MAJOR

```
const long AutoVersion::MAJOR = 0  [static]
```

8.1.1.7 MINOR

```
const long AutoVersion::MINOR = 0  [static]
```

8.1.1.8 MONTH

```
const char AutoVersion::MONTH[] = "01"  [static]
```

8.1.1.9 REVISION

```
const long AutoVersion::REVISION = 0  [static]
```

8.1.1.10 STATUS

```
const char AutoVersion::STATUS[] = "Alpha"  [static]
```

8.1.1.11 STATUS_SHORT

```
const char AutoVersion::STATUS_SHORT[] = "a"  [static]
```

8.1.1.12 UBUNTU_VERSION_STYLE

```
const char AutoVersion::UBUNTU_VERSION_STYLE[] = "18.01"  [static]
```

8.1.1.13 YEAR

```
const char AutoVersion::YEAR[] = "2018"  [static]
```

8.2 ConfigValueConverters Namespace Reference

This namespace contains the functions which convert values to their respective type.

Functions

- template<typename T >
  T getValue_ (std::string value)
  Templated function to return the value as the specified type T.
- template<>
  bool getValue_< bool > (std::string value)
  Template specialization, returns value as boolean.
- template<>
  int getValue_< int > (std::string value)
  Template specialization, returns value as boolean.
- template<>
  double getValue_< double > (std::string value)
  Template specialization, returns value as boolean.
- template<>
  std::string getValue_< std::string > (std::string value)
  Template specialization, returns value as boolean.

8.2.1 Detailed Description

This namespace contains the functions which convert values to their respective type.

In the Config class, a key is specified which is looked up in the Config file. In these functions, the value is converted from a std::string to the specified template type.

Warning

This should not be used outside of the Config class.

Note

Ideally these functions would be in the config class, however for templating reaons, it must be in a seperate namespace.

See also

Config

8.2.2 Function Documentation

8.2.2.1 getValue_()

```
template<typename T >
T ConfigValueConverters::getValue_ (
            std::string value )
```

Templated function to return the value as the specified type T.

Parameters

value	const std::string The value to convert.

Returns

bool The value as a boolean.

See also

Config::getFileValue

Note

This should only be called by Config::getValue.

8.2.2.2 getValue_< bool >()

```
template<>
bool ConfigValueConverters::getValue_< bool > (
            std::string value )
```

Template specialization, returns value as boolean.

Parameters

value	const std::string The value to convert.

Returns

bool The value as a boolean.

See also

Config::getFileValue, ConfigValueConverters::getValue_

Note

This should only be called by Config::getValue.

8.2.2.3 getValue_< double >()

```
template<>
double ConfigValueConverters::getValue_< double > (
            std::string value )
```

Template specialization, returns value as boolean.

Parameters

value	const std::string The value to convert.

Returns

double The value as a double.

See also

Config::getFileValue, ConfigValueConverters::getValue_

Note

This should only be called by Config::getValue.

8.2.2.4 getValue_< int >()

```
template<>
int ConfigValueConverters::getValue_< int > (
            std::string value )
```

Template specialization, returns value as boolean.

Parameters

value	const std::string The value to convert.

Returns

int The value as an integer.

See also

Config::getFileValue, ConfigValueConverters::getValue_

Note

This should only be called by Config::getValue.

8.2.2.5 getValue_< std::string >()

```
template<>
std::string ConfigValueConverters::getValue_< std::string > (
            std::string value )
```

Template specialization, returns value as boolean.

Parameters

value	const std::string The value to convert.

Returns

std::string The value as a std::string.

See also

Config::getFileValue, ConfigValueConverters::getValue_

Note

This should only be called by Config::getValue.

8.3 glutCB Namespace Reference

This namespace contains the glut callback functions.

Functions

- void renderScene ()

  Prepares the drawing state, then calls the simulation at a constant FPS.
- void update ()

  Updates the audio, window size, userfunctions (ie: calls them), and camera.
- void changeSize (int w, int h)

  Updates the opengl viewport etc on window resize.
- void callMouse (int button, int state, int mx, int my)

  Is called on mouse click.
- void mouseMove (int mx, int my)

  Is called on mouse movement.
- void passiveMouse (int mx, int my)

  Continuously called to update details about the mouse.
- void keyPressed (unsigned char key, int x, int y)

  Sets the state of the UserInput keystates for the pressed key and calls its associated pressed function.
- void keyUp (unsigned char key, int x, int y)

  Resets the state of the UserInput keystates for the released key and calls its associated release function.
- void pressSpecialKey (int key, int kxx, int kyy)

  Calls special key (ex: Arrow keys) press functions.
- void releaseSpecialKey (int key, int kx, int ky)

  Calls the special key (ex: Arrow keys) release functions.

8.3.1 Detailed Description

This namespace contains the glut callback functions.

These must be bound functions and therefore cannot appear inside of a class. They are used once in the GFramework class.

8.3.2 Function Documentation

8.3.2.1 callMouse()

```
void glutCB::callMouse (
            int button,
            int state,
            int mx,
            int my )
```

Is called on mouse click.

Possible buttons include GLUT_LEFT_BUTTON, GLUT_MIDDLE_BUTTON, and GLUT_RIGHT_BUTTON.

Parameters

button	int Which mouse button is clicked.
state	int The state of the click (release, or press).
mx	int The x position of the mouse.
my	int The y position of the mouse.

Returns

void

Warning

Not yet implemented.

8.3.2.2 changeSize()

```
void glutCB::changeSize (
            int w,
            int h )
```

Updates the opengl viewport etc on window resize.

Parameters

w	int The new width of the window.
h	int The new height of the window.

Returns

void

8.3.2.3 keyPressed()

```
void glutCB::keyPressed (
            unsigned char key,
            int x,
            int y )
```

Sets the state of the UserInput keystates for the pressed key and calls its associated pressed function.

Parameters

key	unsigned char
x	int
y	int

Returns

void

Note

This only works for 'normal', ascii characters.

See also

pressSpecialKey for handling special characters.

8.3.2.4 keyUp()

```
void glutCB::keyUp (
            unsigned char key,
            int x,
            int y )
```

Resets the state of the UserInput keystates for the released key and calls its associated release function.

Parameters

key	unsigned char
x	int
y	int

Returns

void

Note

This only works for 'normal', ascii characters.

See also

pressSpecialKey for handling special characters.

8.3.2.5 mouseMove()

```
void glutCB::mouseMove (
            int mx,
            int my )
```

Is called on mouse movement.

Parameters

mx	int The x position of the mouse.
my	int The y position of the mouse.

Returns

void

Warning

Not yet implemented.

8.3.2.6 passiveMouse()

```
void glutCB::passiveMouse (
            int mx,
            int my )
```

Continuously called to update details about the mouse.

Specifically it update the GFramework mouse, and resets the GFramework camera.del in the case that the mouse is used to control the camera.

Parameters

mx	int The x position of the mouse.
my	int The y position of the mouse.

Returns

void

Note

Not fully implemented.

8.3.2.7 pressSpecialKey()

```
void glutCB::pressSpecialKey (
            int key,
            int kxx,
            int kyy )
```

Calls special key (ex: Arrow keys) press functions.

Parameters

key	int The glut key pressed.
kxx	int The y position of the mouse at the time the key is pressed.
kyy	int The y position of the mouse at the time the key is pressed.

Returns

void

See also

https://www.opengl.org/resources/libraries/glut/spec3/node54.html for the avaible special keys.

8.3.2.8 releaseSpecialKey()

```
void glutCB::releaseSpecialKey (
            int key,
            int kx,
            int ky )
```

Calls the special key (ex: Arrow keys) release functions.

Parameters

key	int The glut key released.
kx	int The x position of the mouse at the time the key is pressed.
ky	int The y position of the mouse at the time the key is pressed.

Returns

void

See also

https://www.opengl.org/resources/libraries/glut/spec3/node54.html for the avaible special keys.

8.3.2.9 renderScene()

```
void glutCB::renderScene ( )
```

Prepares the drawing state, then calls the simulation at a constant FPS.

Returns

void

Bug The frame rate has some issues and is not consistent on some other machines.

8.3.2.10 update()

```
void glutCB::update ( )
```

Updates the audio, window size, userfunctions (ie: calls them), and camera.

Returns

void

Note

Kind of messy, needs clean up.

8.4 utility Namespace Reference

This namespace contains functions which you might expect to be standard in cpp.

Functions

- std::string toUpper (std::string str)

  Converts a std::string to upper case.
- std::string toLower (std::string str)

  Converts a std::string to lower case.
- std::string replaceString (std::string subject, const std::string &search, const std::string &replace)

  Returns a string with the desired text replaced.
- std::string replaceCharSet (std::string subject, const std::string &charSet, const std::string &replace)

  Replaces a set of characters with a string.
- template<typename T >
  std::string numToStr (T Number)

  Returns a number as its string representation.
- std::vector< std::string > split (std::string stringToBeSplit, std::string delimiter)

  Splits a string based on a supplied delimiter.
- std::string getCurrentTime ()

  Returns the current time.
- std::string getCurrentDate ()

  Returns the current date.

8.4.1 Detailed Description

This namespace contains functions which you might expect to be standard in cpp.

Specifically functions in the standard libraries. If you ever ask "why isnt that function standard?" then it should be here.

8.4.2 Function Documentation

8.4.2.1 getCurrentDate()

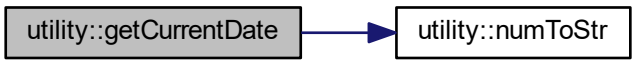
```
std::string utility::getCurrentDate ( )
```

Returns the current date.

Returns

std::string The current date as a string in the format: mmm/dd/yyyy

Here is the call graph for this function:



8.4.2.2 getCurrentTime()

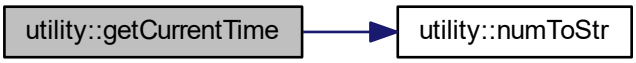
```
std::string utility::getCurrentTime ( )
```

Returns the current time.

Returns

std::string The current time as a string in the format: hh:mm:ss

Here is the call graph for this function:



8.4.2.3 numToStr()

```
template<typename T >
std::string utility::numToStr (
             T Number )
```

Returns a number as its string representation.

Template Parameters

T	The number type (eg: float, double, int, etc.)

Parameters

Number	The value to be converted to a string.

Returns

A string representation of a number.

8.4.2.4 replaceCharSet()

```
std::string utility::replaceCharSet (
             std::string subject,
             const std::string & charSet,
             const std::string & replace )
```

Replaces a set of characters with a string.

This replacement string can often be just a character. This will the replace a set of characters with one character.

Parameters

subject	std::string The string to be returned with replacement.
charSet	const std::string& The set of characters to be replaced.
replace	const std::string& The text to replace with.

Returns

std::string The string with the character set replaced.

Here is the call graph for this function:

8.4.2.5 replaceString()

```
std::string utility::replaceString (
            std::string subject,
            const std::string & search,
            const std::string & replace )
```

Returns a string with the desired text replaced.

Parameters

subject	std::string The string to be returned with replacement.
search	const std::string& The text to replace.
replace	const std::string& The text to replace with.

Returns

std::string The replaced string

8.4.2.6 split()

```
std::vector< std::string > utility::split (
            std::string stringToBeSplit,
            std::string delimiter )
```

Splits a string based on a supplied delimiter.

Parameters

stringToBeSplit	std::string The string to be split.
delimiter	std::string The delimiter to split the string on.

Returns

std::vector<std::string> A vector of the split strings.

8.4.2.7 toLower()

```
std::string utility::toLower (
            std::string str )
```

Converts a std::string to lower case.

Parameters

str	std::string The string to convert the case of.

Returns

std::string The string represented as lower case.

8.4.2.8 toUpper()

```
std::string utility::toUpper (
            std::string str )
```

Converts a std::string to upper case.

Parameters

str	std::string The string to convert the case of.

Returns

std::string The string represented as lower case.

Chapter 9

Class Documentation

9.1 Audio Class Reference

The audio engine.

`#include <Audio.h>`

Public Member Functions

- Audio ()
- ~Audio ()
- void playSound (std::string soundFile, double x, double y, double z)
- void playSound (std::string soundFile, Vec position)
- void playSound (std::string soundFile)
- void clearStoppedSounds ()

Public Attributes

- sf::Music music
- std::map< std::string, sf::SoundBuffer > soundBuffers
- std::vector< sf::Sound > sounds

Static Private Attributes

- static char constexpr const * AUDIO_DIRECTORY = "assets/Audio/"
- static char constexpr const * COULD_NOT_LOAD_MUSIC_MESSAGE = "Failed to open music file: "
- static char constexpr const * COULD_NOT_LOAD_SOUND_MESSAGE = "Failed to open sound file: "

9.1.1 Detailed Description

The audio engine.

This class is incomplete. It needs more options! Mono vs Stereo, disable spatialization, loop, attenuation, min distance, CLEAR WHEN DONE.

Todo This class does not clear sounds when they are done. This means that the sounds vector will grow unbounded. This is wastefull and should be resolved.

Protect / warn against using stero sounds in 3D. (not allowed according to SFML).

9.1.2 Constructor & Destructor Documentation

9.1.2.1 Audio()

```
Audio::Audio ( )
```

9.1.2.2 ~Audio()

```
Audio::~Audio ( )
```

9.1.3 Member Function Documentation

9.1.3.1 clearStoppedSounds()

```
void Audio::clearStoppedSounds ( )
```

9.1.3.2 playSound() [1/3]

```
void Audio::playSound (
            std::string soundFile,
            double x,
            double y,
            double z )
```

Parameters

soundFile	std::string
x	double
y	double
z	double

Returns

void

Warning

Sterio sounds will not be rendered in 3D space.

9.1.3.3 playSound() [2/3]

```
void Audio::playSound (
            std::string soundFile,
            Vec position )
```

9.1.3.4 playSound() [3/3]

```
void Audio::playSound (
            std::string soundFile )
```

Here is the call graph for this function:

9.1.4 Member Data Documentation

9.1.4.1 AUDIO_DIRECTORY

```
char constexpr const* Audio::AUDIO_DIRECTORY = "assets/Audio/"  [static], [private]
```

9.1.4.2 COULD_NOT_LOAD_MUSIC_MESSAGE

```
char constexpr const* Audio::COULD_NOT_LOAD_MUSIC_MESSAGE = "Failed to open music file:  "
[static], [private]
```

9.1.4.3 COULD_NOT_LOAD_SOUND_MESSAGE

```
char constexpr const* Audio::COULD_NOT_LOAD_SOUND_MESSAGE = "Failed to open sound file:  "
[static], [private]
```

9.1.4.4 music

```
sf::Music Audio::music
```

9.1.4.5 soundBuffers

```
std::map<std::string, sf::SoundBuffer> Audio::soundBuffers
```

9.1.4.6 sounds

```
std::vector<sf::Sound> Audio::sounds
```

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

- Audio.h
- Audio.cpp

9.2 Camera Struct Reference

This class describes the camera placed at the head of the user.

```
#include <GFramework.h>
```

Public Member Functions

- Camera ()

Public Attributes

- double translationSpeed

  How fast the camera moves forward.
- double rotationSpeed

  How fast the camera rotates.
- Vec pos

  The global coordinates of the camera.
- Vec mov

  The next frame movement of the camera.
- Vec dir

  The direction the camera is pointing to.
- Vec ang

  The angle around the z axis, starting at +x. (I think)
- Vec del

  The next frame rotation of the camera.

Static Public Attributes

- static double constexpr DEFAULT_T_SPEED = 1.0

  The default translation speed.
- static double constexpr DEFAULT_R_SPEED = 0.04

  The default rotation speed.
- static double constexpr DEFAULT_HEIGHT = 1.8

  The default height of the camera (wrt z=0)

9.2.1 Detailed Description

This class describes the camera placed at the head of the user.

Todo In future, the camera implementation should be removed from the graphics class and put here.

9.2.2 Constructor & Destructor Documentation

9.2.2.1 Camera()

```
Camera::Camera ( )  [inline]
```

9.2.3 Member Data Documentation

9.2.3.1 ang

```
Vec Camera::ang
```

The angle around the z axis, starting at +x. (I think)

9.2.3.2 DEFAULT_HEIGHT

```
double constexpr Camera::DEFAULT_HEIGHT = 1.8  [static]
```

The default height of the camera (wrt z=0)

9.2.3.3 DEFAULT_R_SPEED

```
double constexpr Camera::DEFAULT_R_SPEED = 0.04  [static]
```

The default rotation speed.

9.2.3.4 DEFAULT_T_SPEED

```
double constexpr Camera::DEFAULT_T_SPEED = 1.0  [static]
```

The default translation speed.

9.2.3.5 del

```
Vec Camera::del
```

The next frame rotation of the camera.

9.2.3.6 dir

```
Vec Camera::dir
```

The direction the camera is pointing to.

9.2.3.7 mov

```
Vec Camera::mov
```

The next frame movement of the camera.

9.2.3.8 pos

```
Vec Camera::pos
```

The global coordinates of the camera.

9.2.3.9 rotationSpeed

```
double Camera::rotationSpeed
```

How fast the camera rotates.

9.2.3.10 translationSpeed

```
double Camera::translationSpeed
```

How fast the camera moves forward.

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

- GFramework.h

9.3 Config Class Reference

This class allows variables to be loaded from a file.

```
#include <Config.h>
```

Public Member Functions

- ~Config ()
  Empty destructor.

Static Public Member Functions

- template<typename T >
  static T getValue (std::string key)
  Returns the value associated with the key as the specified type.

Protected Member Functions

- Config ()
  Empty constructor.

Static Private Member Functions

- static std::string getFileValue (std::string key)
  Returns the corresponding value to the key provided from the config file.

Static Private Attributes

- static constexpr const char * CONFIG_FILE = "assets/config.config"

  The file containing the configuration data.

9.3.1 Detailed Description

This class allows variables to be loaded from a file.

This is very useful to set the state of the program on start up. To add a new config parameter, just append it to the config file with an associated value. Values can be parsed as boolean, int, double, std::string. Then the value can be retrieved from the key as:

```
std::string value = Config::getValue<std::string>("STRING_TEST")
```

Todo Allow changes to config file based on program state.

9.3.2 Constructor & Destructor Documentation

9.3.2.1 ~Config()

```
Config::~Config ( )
```

Empty destructor.

9.3.2.2 Config()

```
Config::Config ( )  [protected]
```

Empty constructor.

9.3.3 Member Function Documentation

9.3.3.1 getFileValue()

```
std::string Config::getFileValue (
            std::string key )  [static], [private]
```

Returns the corresponding value to the key provided from the config file.

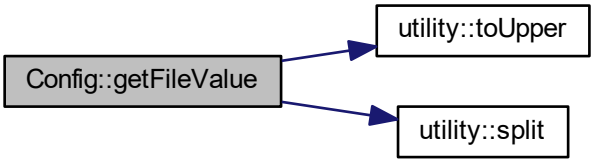
Parameters

key	std::string The string to be found in the configuration file.

Returns

std::string The value of the configuration variable.

Here is the call graph for this function:



9.3.3.2 getValue()

```
template<typename T >
static T Config::getValue (
            std::string key )  [inline], [static]
```

Returns the value associated with the key as the specified type.

Parameters

key	std::string The key to be found.

Returns

T templated parameter can be one of bool, int, double, std::string.

Warning

Fatal error if key cannot be found since configuration parameters are required.

Here is the call graph for this function:

9.3.4 Member Data Documentation

9.3.4.1 CONFIG_FILE

```
constexpr const char* Config::CONFIG_FILE = "assets/config.config"  [static], [private]
```

The file containing the configuration data.

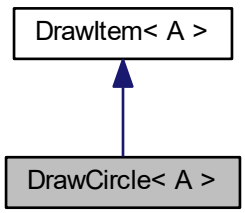
The documentation for this class was generated from the following files:

- Config.h
- Config.cpp

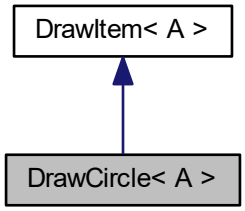
9.4 DrawCircle< A > Struct Template Reference

```
#include <Shapes.h>
```

Inheritance diagram for DrawCircle< A >:



Collaboration diagram for DrawCircle< A >:



Public Member Functions

- DrawCircle (double x, double y, double r)
- DrawCircle (double x, double y, double r, int numSegments)

Static Public Attributes

- static Drawing::Dimension constexpr dimension = static_cast<Drawing::Dimension>(2)

Private Member Functions

- void draw (double x, double y, double r, int numSegments)

Additional Inherited Members

9.4.1 Constructor & Destructor Documentation

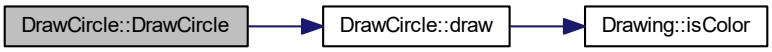
9.4.1.1 DrawCircle() [1/2]

```
template<Appearance A>
DrawCircle< A >::DrawCircle (
            double x,
            double y,
            double r )  [inline]
```

9.4.1.2 DrawCircle() [2/2]

```
template<Appearance A>
DrawCircle< A >::DrawCircle (
            double x,
            double y,
            double r,
            int numSegments )  [inline]
```

Here is the call graph for this function:



9.4.2 Member Function Documentation

9.4.2.1 draw()

```
template<Appearance A>
void DrawCircle< A >::draw (
            double x,
            double y,
            double r,
            int numSegments )  [inline], [private]
```

Here is the call graph for this function:

9.4.3 Member Data Documentation

9.4.3.1 dimension

```
template<Appearance A>
Drawing::Dimension constexpr DrawCircle< A >::dimension = static_cast<Drawing::Dimension>(2)
[static]
```

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

- Shapes.h

9.5 Drawing Struct Reference

```
#include <Draw.h>
```

Public Types

- enum Dimension : unsigned int { Dimension::NONE =0, Dimension::TWO =2, Dimension::THREE =3 }

Static Public Member Functions

- static void enableND (Dimension d)

  Prepares drawing for the specified dimension.
- static void enable2D ()

  Prepares the drawing for 2 dimensional drawing.
- static void enable3D ()

  Prepares the drawing for 2 dimensional drawing.
- static void changeColor (Vec c)

  Specifies the color for drawing.
- static void changeColor (Appearance C)

  Specifies the color for drawing.
- static void changeTexture (Tex textureID)

  Specifies the texture for drawing.
- static void changeTexture (Appearance C)

  Specfies the texture for drawing.
- static bool isColor (Appearance A)

  Determines if the specified Appearance is a color.
- static bool isTexture (Appearance A)

  Determines if the specified Appearance is a texture.

Static Public Attributes

- static constexpr const char * UNKNOWN_DIMENSION_MESSAGE = "Invalid number of dimensions, defaulting to 2D."
- static constexpr const char * INVALID_DRAWING_ORDER_MESSAGE = "Cannot render 2D GFramework before 3D."
- static constexpr const char * INVALID_COLOR_MESSAGE = "Color is not valid."
- static constexpr const char * INVALID_TEXTURE_MESSAGE = "Texture is not valid."
- static constexpr const char * UNKNOWN_APPROVED_COLOR_MESSAGE = "Approved color not found."
- static constexpr const char * UNKNOWN_APPROVED_TEXTURE_MESSAGE = "Approved texture not found."

9.5.1 Member Enumeration Documentation

9.5.1.1 Dimension

```
enum Drawing::Dimension :  unsigned int  [strong]
```

Enumerator

NONE	
TWO	
THREE	

9.5.2 Member Function Documentation

9.5.2.1 changeColor() [1/2]

```
void Drawing::changeColor (
            Vec c )  [static]
```

Specifies the color for drawing.

Parameters

c	Vec The (r,g,b) values for the color.

Returns

void

9.5.2.2 changeColor() [2/2]

```
void Drawing::changeColor (
            Appearance C )  [static]
```

Specifies the color for drawing.

Parameters

C	Appearance The Appearance enum for the color.

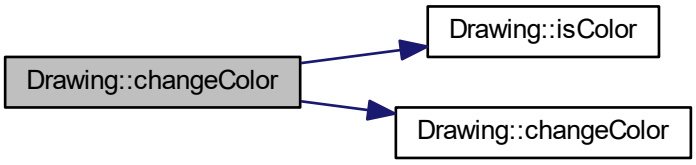
Returns

void

See also

Appearance

Here is the call graph for this function:



9.5.2.3 changeTexture() [1/2]

```
void Drawing::changeTexture (
            Tex textureID )  [static]
```

Specifies the texture for drawing.

Parameters

textureID	Tex The id corresponding to the texture to draw with.

Returns

void

9.5.2.4 changeTexture() [2/2]

```
void Drawing::changeTexture (
            Appearance C )  [static]
```

Specfies the texture for drawing.

Parameters

C	Appearance The Appearance enum corresponding to the texture to draw with.

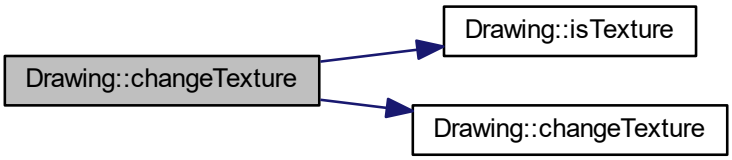
Returns

void

See also

Appearance

Here is the call graph for this function:



9.5.2.5 enable2D()

```
void Drawing::enable2D ( )  [static]
```

Prepares the drawing for 2 dimensional drawing.

Returns

void

9.5.2.6 enable3D()

```
void Drawing::enable3D ( )  [static]
```

Prepares the drawing for 2 dimensional drawing.

Returns

void

9.5.2.7 enableND()

```
void Drawing::enableND (
            Dimension d )  [static]
```

Prepares drawing for the specified dimension.

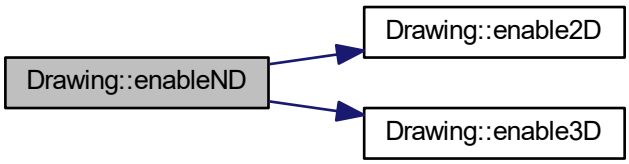
Parameters

d	Dimension The desired drawing dimension.

Returns

void

Here is the call graph for this function:



9.5.2.8 isColor()

```
bool Drawing::isColor (
            Appearance A )  [static]
```

Determines if the specified Appearance is a color.

Parameters

A	Appearance The Appearance to check.

Returns

bool True if the Appearance is a color. False otherwise.

9.5.2.9 isTexture()

```
bool Drawing::isTexture (
            Appearance A )  [static]
```

Determines if the specified Appearance is a texture.

Parameters

A	Appearance The Appearance to check.

Returns

bool True if the Appearance is a texture. False otherwise.

9.5.3 Member Data Documentation

9.5.3.1 INVALID_COLOR_MESSAGE

```
constexpr const char* Drawing::INVALID_COLOR_MESSAGE = "Color is not valid."  [static]
```

9.5.3.2 INVALID_DRAWING_ORDER_MESSAGE

```
constexpr const char* Drawing::INVALID_DRAWING_ORDER_MESSAGE = "Cannot render 2D GFramework
before 3D."  [static]
```

9.5.3.3 INVALID_TEXTURE_MESSAGE

```
constexpr const char* Drawing::INVALID_TEXTURE_MESSAGE = "Texture is not valid."  [static]
```

9.5.3.4 UNKNOWN_APPROVED_COLOR_MESSAGE

```
constexpr const char* Drawing::UNKNOWN_APPROVED_COLOR_MESSAGE = "Approved color not found."
[static]
```

9.5.3.5 UNKNOWN_APPROVED_TEXTURE_MESSAGE

```
constexpr const char* Drawing::UNKNOWN_APPROVED_TEXTURE_MESSAGE = "Approved texture not found."
[static]
```

9.5.3.6 UNKNOWN_DIMENSION_MESSAGE

```
constexpr const char* Drawing::UNKNOWN_DIMENSION_MESSAGE = "Invalid number of dimensions,
defaulting to 2D."  [static]
```

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

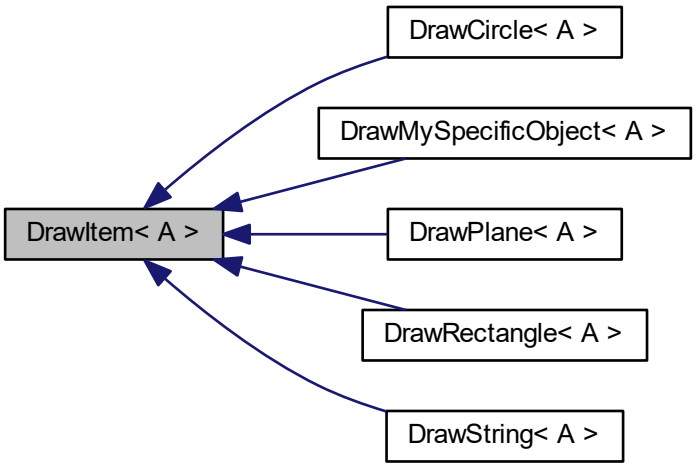
- Draw.h
- Draw.cpp

9.6 DrawItem< A > Class Template Reference

The parent class of items which can drawn.

`#include <Draw.h>`

Inheritance diagram for DrawItem< A >:



Protected Member Functions

- DrawItem (Drawing::Dimension dim)

  Applies the appearance. The subclass is used to perform the drawing.

Static Private Attributes

- static constexpr const char * INVALID_APPEARANCE_MESSAGE = "Appearance is not valid."

9.6.1 Detailed Description

template<Appearance A>
class DrawItem< A >

The parent class of items which can drawn.

Template Parameters

A	The appearance to be used when drawing.

Warning

Not all children will know how to use textures. This may be fine, but it might also log a warning or crash the program.

9.6.2 Constructor & Destructor Documentation

9.6.2.1 DrawItem()

```
template<Appearance A>
DrawItem< A >::DrawItem (
            Drawing::Dimension dim )  [inline], [protected]
```

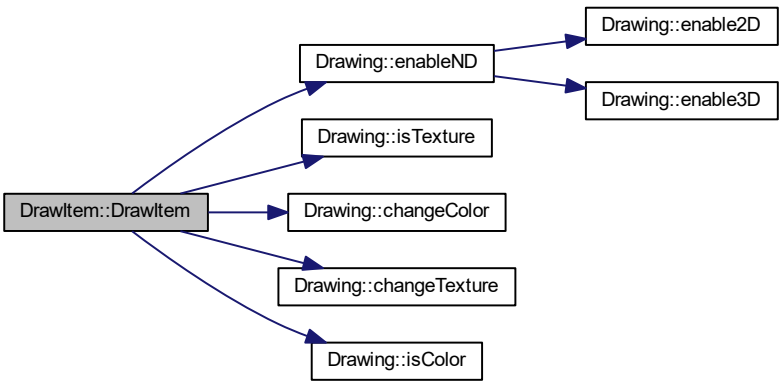
Applies the appearance. The subclass is used to perform the drawing.

Constructor is used as decorator. This will apply the texture before the drawing is performed.

Parameters

dim	Drawing::Dimension

Here is the call graph for this function:



9.6.3 Member Data Documentation

9.6.3.1 INVALID_APPEARANCE_MESSAGE

```
template<Appearance A>
constexpr const char* DrawItem< A >::INVALID_APPEARANCE_MESSAGE = "Appearance is not valid."
[static], [private]
```

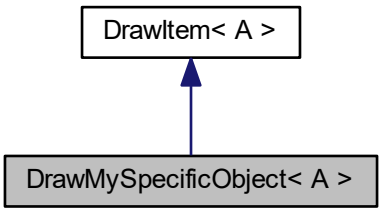
The documentation for this class was generated from the following file:

- Draw.h

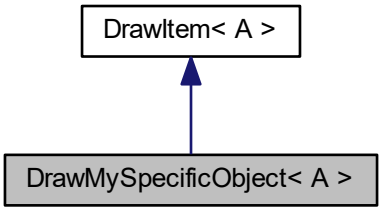
9.7 DrawMySpecificObject< A > Struct Template Reference

```
#include <Objects.h>
```

Inheritance diagram for DrawMySpecificObject< A >:



Collaboration diagram for DrawMySpecificObject< A >:



Public Member Functions

- DrawMySpecificObject (double x, double y, double X, double Y)

Static Public Attributes

- static Drawing::Dimension constexpr dimension = static_cast<Drawing::Dimension>(3)

Private Member Functions

- void draw (double x, double y, double X, double Y)

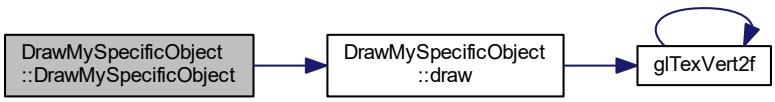
Additional Inherited Members

9.7.1 Constructor & Destructor Documentation

9.7.1.1 DrawMySpecificObject()

```
template<Appearance A>
DrawMySpecificObject< A >::DrawMySpecificObject (
            double x,
            double y,
            double X,
            double Y )  [inline]
```

Here is the call graph for this function:

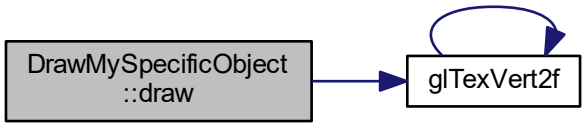


9.7.2 Member Function Documentation

9.7.2.1 draw()

```
template<Appearance A>
void DrawMySpecificObject< A >::draw (
            double x,
            double y,
            double X,
            double Y )  [inline], [private]
```

Here is the call graph for this function:



9.7.3 Member Data Documentation

9.7.3.1 dimension

```
template<Appearance A>
Drawing::Dimension constexpr DrawMySpecificObject< A >::dimension = static_cast<Drawing::Dimension>(3)
[static]
```

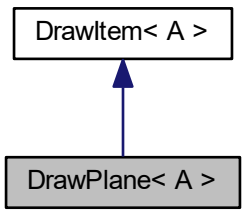
The documentation for this struct was generated from the following file:

- Objects.h

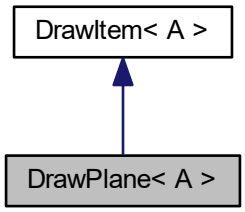
9.8 DrawPlane< A > Struct Template Reference

```
#include <Shapes.h>
```

Inheritance diagram for DrawPlane< A >:



Collaboration diagram for DrawPlane< A >:



Public Member Functions

- DrawPlane (double length)
- DrawPlane (double length, double xAngle)
- DrawPlane (Vec pos, double length)
- DrawPlane (double x, double y, double z, double length)
- DrawPlane (double x, double y, double z, double length, double xAngle)
- DrawPlane (Vec pos, double length, double xAngle)

Static Public Attributes

- static Drawing::Dimension constexpr dimension = static_cast<Drawing::Dimension>(3)

Private Member Functions

- void draw (Vec pos, double length, double xAngle)

Additional Inherited Members

9.8.1 Constructor & Destructor Documentation

9.8.1.1 DrawPlane() [1/6]

```
template<Appearance A>
DrawPlane< A >::DrawPlane (
            double length )  [inline]
```

9.8.1.2 DrawPlane() [2/6]

```
template<Appearance A>
DrawPlane< A >::DrawPlane (
            double length,
            double xAngle )  [inline]
```

9.8.1.3 DrawPlane() [3/6]

```
template<Appearance A>
DrawPlane< A >::DrawPlane (
            Vec pos,
            double length )  [inline]
```

9.8.1.4 DrawPlane() [4/6]

```
template<Appearance A>
DrawPlane< A >::DrawPlane (
            double x,
            double y,
            double z,
            double length )  [inline]
```

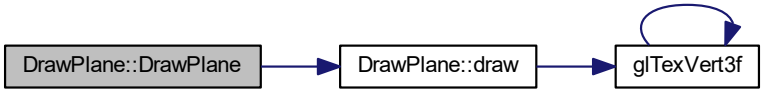
9.8.1.5 DrawPlane() [5/6]

```
template<Appearance A>
DrawPlane< A >::DrawPlane (
            double x,
            double y,
            double z,
            double length,
            double xAngle )  [inline]
```

9.8.1.6 DrawPlane() [6/6]

```
template<Appearance A>
DrawPlane< A >::DrawPlane (
            Vec pos,
            double length,
            double xAngle )  [inline]
```

Here is the call graph for this function:

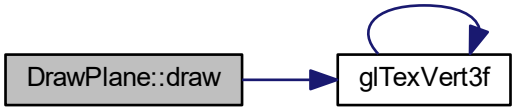


9.8.2 Member Function Documentation

9.8.2.1 draw()

```
template<Appearance A>
void DrawPlane< A >::draw (
            Vec pos,
            double length,
            double xAngle )  [inline], [private]
```

Here is the call graph for this function:



9.8.3 Member Data Documentation

9.8.3.1 dimension

```
template<Appearance A>
Drawing::Dimension constexpr DrawPlane< A >::dimension = static_cast<Drawing::Dimension>(3)
[static]
```

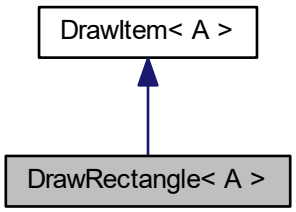
The documentation for this struct was generated from the following file:

- Shapes.h

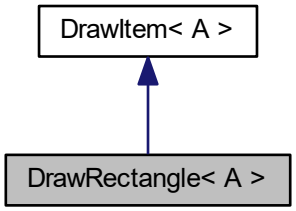
9.9 DrawRectangle< A > Struct Template Reference

`#include <Shapes.h>`

Inheritance diagram for DrawRectangle< A >:



Collaboration diagram for DrawRectangle< A >:



Public Member Functions

- DrawRectangle (double x, double y, double X, double Y)

Static Public Attributes

- static Drawing::Dimension constexpr dimension = static_cast<Drawing::Dimension>(2)

Private Member Functions

- void draw (double x, double y, double X, double Y)

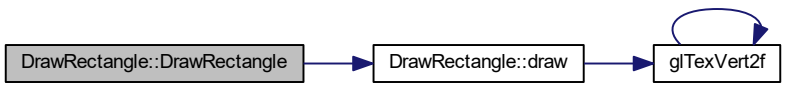
Additional Inherited Members

9.9.1 Constructor & Destructor Documentation

9.9.1.1 DrawRectangle()

```
template<Appearance A>
DrawRectangle< A >::DrawRectangle (
            double x,
            double y,
            double X,
            double Y )  [inline]
```

Here is the call graph for this function:

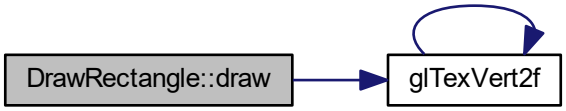


9.9.2 Member Function Documentation

9.9.2.1 draw()

```
template<Appearance A>
void DrawRectangle< A >::draw (
             double x,
             double y,
             double X,
             double Y )  [inline], [private]
```

Here is the call graph for this function:



9.9.3 Member Data Documentation

9.9.3.1 dimension

```
template<Appearance A>
Drawing::Dimension constexpr DrawRectangle< A >::dimension = static_cast<Drawing::Dimension>(2)
[static]
```

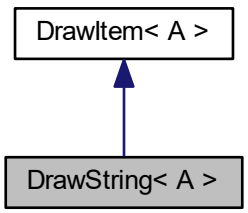
The documentation for this struct was generated from the following file:

- Shapes.h

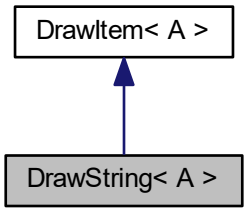
9.10 DrawString< A > Struct Template Reference

```
#include <Text.h>
```

Inheritance diagram for DrawString< A >:



Collaboration diagram for DrawString< A >:



Public Member Functions

- DrawString (std::string s, float x, float y, bool centerX=true, bool centerY=true)

Static Public Attributes

- static Drawing::Dimension constexpr dimension = static_cast<Drawing::Dimension>(2)

Private Member Functions

- draw (std::string s, float x, float y, bool centerX=true, bool centerY=true)

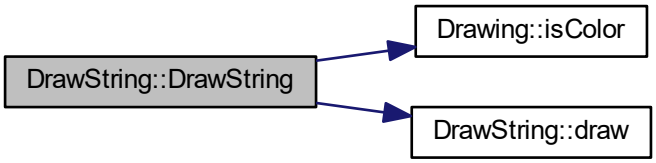
Additional Inherited Members

9.10.1 Constructor & Destructor Documentation

9.10.1.1 DrawString()

```
template<Appearance A>
DrawString< A >::DrawString (
            std::string s,
            float x,
            float y,
            bool centerX = true,
            bool centerY = true )  [inline]
```

Here is the call graph for this function:



9.10.2 Member Function Documentation

9.10.2.1 draw()

```
template<Appearance A>
DrawString< A >::draw (
            std::string s,
            float x,
            float y,
            bool centerX = true,
            bool centerY = true )  [inline], [private]
```

9.10.3 Member Data Documentation

9.10.3.1 dimension

```
template<Appearance A>
Drawing::Dimension constexpr DrawString< A >::dimension = static_cast<Drawing::Dimension>(2)
[static]
```

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

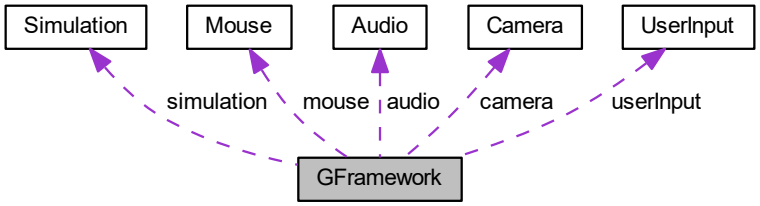
- Text.h

9.11 GFramework Class Reference

This class holds all the functions required for a 3D simulator to be run.

`#include <GFramework.h>`

Collaboration diagram for GFramework:



Public Member Functions

- void startup ()
  Initialize simulation and start the glutmainloop.
- void showScene ()
  Sets the proper display settings & calls glutswapbuffers.
- ~GFramework ()
  Destructor deletes singleton instance.
- GFramework (GFramework const &)=delete
  Copy constructor is deleted in singleton.
- void operator= (GFramework const &)=delete
  Assignment operator is deleted in singleton.

Public Attributes

- Vec2 windowSize
  (width, height) dimensions of the window.
- Drawing::Dimension drawingState
  What dimension the GFramework is prepared to draw in.
- Camera camera
  The camera on the users head.
- Mouse mouse
  The mouse the user controls.
- UserInput userInput
  Set of user inputs.
- Audio * audio
  Audio system for the engine.
- Simulation * simulation
  The simulation to be run in this framework.
- bool display = true
  Whether the scene is being shown to the user. (set to false for maximum speed)
- std::map< enum Appearance, Tex > textureMap = {}
  Maps an appearance to a texture for drawing.
- std::map< enum Appearance, Vec > colorMap = {}
  Maps an appearance to a color for drawing.

Static Public Attributes

- static double constexpr FPS = 60

  Frames per second for the simulation to run at.
- static int constexpr RENDERING_DISTANCE = 1000

  How far objects should be rendered.
- static std::unique_ptr< GFramework > const get

  Singleton instance. Unique_ptr insures destruction.

Private Member Functions

- GFramework ()

  Constructor initializes freeglut and loads appearances into maps. Private for singleton pattern.
- void initializeGlut ()

  Intializes all the freeglut functions with callbacks.
- void loadTextures ()

  Loads all the textures into the framework.
- void loadColors ()

  Loads all the colors into the framework.

Static Private Attributes

- static char constexpr const * WINDOW_TITLE = "Evolution WildFire"

  Name of the window / game.
- static int constexpr INIT_WINDOW_X = 600

  Initial x position of the window on start up.
- static int constexpr INIT_WINDOW_Y = 100

  Initial y position of the window on start up.
- static int constexpr INIT_WINDOW_WIDTH = 1920 / 2.0

  Initial width of the window on start up.
- static int constexpr INIT_WINDOW_HEIGHT = 1080 / 2.0

  Initial height of the window on start up.

9.11.1 Detailed Description

This class holds all the functions required for a 3D simulator to be run.

It includes camera, audio, user input amoung other things. This class implements the singleton pattern and as a result only one instance is ever allowed.

9.11.2 Constructor & Destructor Documentation

9.11.2.1 ~GFramework()

```
GFramework::~GFramework ( )
```

Destructor deletes singleton instance.

9.11.2.2 GFramework() [1/2]

```
GFramework::GFramework (
            GFramework const &  )  [delete]
```

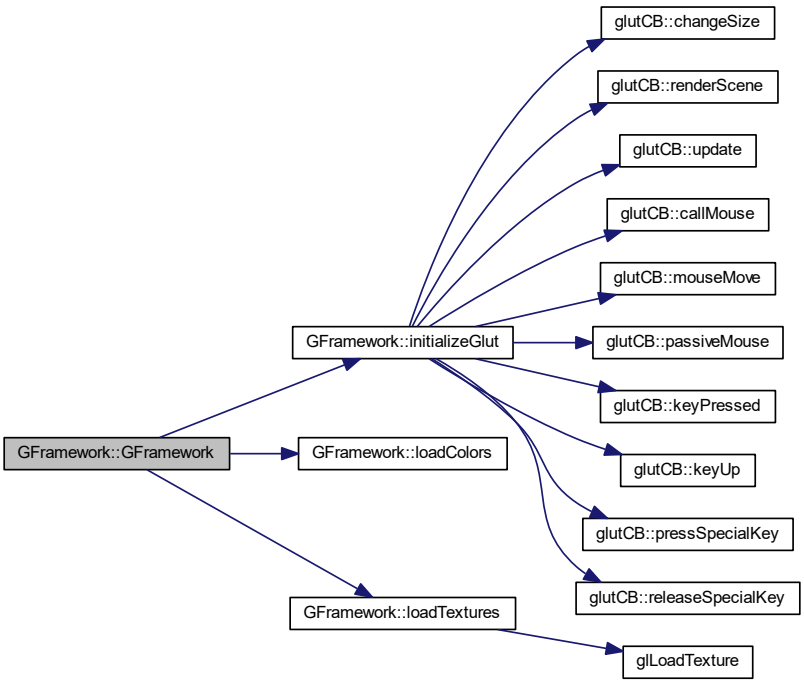
Copy constructor is deleted in singleton.

9.11.2.3 GFramework() [2/2]

```
GFramework::GFramework ( )  [private]
```

Constructor initializes freeglut and loads appearances into maps. Private for singleton pattern.

Here is the call graph for this function:



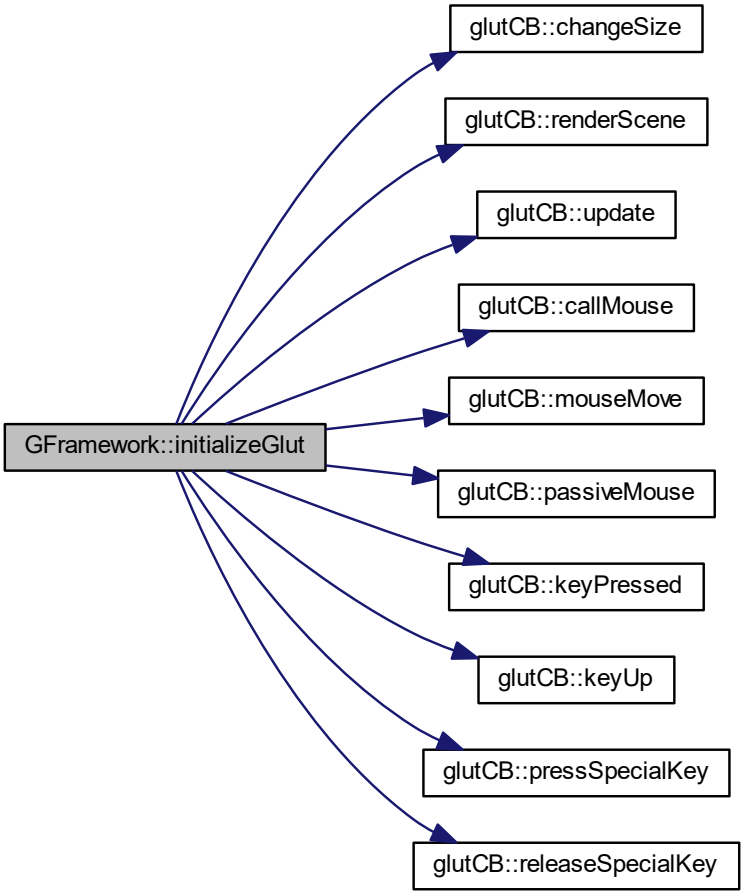
9.11.3 Member Function Documentation

9.11.3.1 initializeGlut()

```
void GFramework::initializeGlut ( )  [private]
```

Intializes all the freeglut functions with callbacks.

Here is the call graph for this function:



9.11.3.2 loadColors()

```
void GFramework::loadColors ( )  [private]
```

Loads all the colors into the framework.

9.11.3.3 loadTextures()

```
void GFramework::loadTextures ( )  [private]
```

Loads all the textures into the framework.

Here is the call graph for this function:

9.11.3.4 operator=()

```
void GFramework::operator= (
            GFramework const &  )  [delete]
```

Assignment operator is deleted in singleton.

9.11.3.5 showScene()

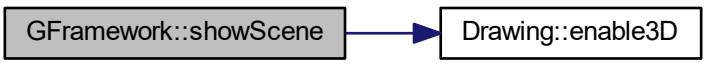
```
void GFramework::showScene ( )
```

Sets the proper display settings & calls glutswapbuffers.

Returns

void

Here is the call graph for this function:



9.11.3.6 startup()

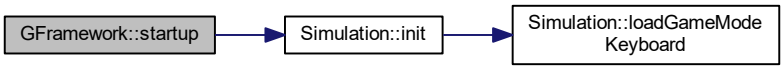
```
void GFramework::startup ( )
```

Initialize simulation and start the glutmainloop.

Returns

void

Here is the call graph for this function:



9.11.4 Member Data Documentation

9.11.4.1 audio

```
Audio* GFramework::audio
```

Audio system for the engine.

9.11.4.2 camera

```
Camera GFramework::camera
```

The camera on the users head.

9.11.4.3 colorMap

```
std::map<enum Appearance, Vec> GFramework::colorMap = {}
```

Maps an appearance to a color for drawing.

9.11.4.4 display

```
bool GFramework::display = true
```

Whether the scene is being shown to the user. (set to false for maximum speed)

9.11.4.5 drawingState

```
Drawing::Dimension GFramework::drawingState
```

What dimension the GFramework is prepared to draw in.

9.11.4.6 FPS

```
double constexpr GFramework::FPS = 60  [static]
```

Frames per second for the simulation to run at.

9.11.4.7 get

```
std::unique_ptr< GFramework > const GFramework::get  [static]
```

Singleton instance. Unique_ptr insures destruction.

9.11.4.8 INIT_WINDOW_HEIGHT

```
int constexpr GFramework::INIT_WINDOW_HEIGHT = 1080 / 2.0  [static], [private]
```

Initial height of the window on start up.

9.11.4.9 INIT_WINDOW_WIDTH

```
int constexpr GFramework::INIT_WINDOW_WIDTH = 1920 / 2.0  [static], [private]
```

Initial width of the window on start up.

9.11.4.10 INIT_WINDOW_X

```
int constexpr GFramework::INIT_WINDOW_X = 600  [static], [private]
```

Initial x position of the window on start up.

9.11.4.11 INIT_WINDOW_Y

```
int constexpr GFramework::INIT_WINDOW_Y = 100  [static], [private]
```

Initial y position of the window on start up.

9.11.4.12 mouse

```
Mouse GFramework::mouse
```

The mouse the user controls.

9.11.4.13 RENDERING_DISTANCE

```
int constexpr GFramework::RENDERING_DISTANCE = 1000  [static]
```

How far objects should be rendered.

9.11.4.14 simulation

```
Simulation* GFramework::simulation
```

The simulation to be run in this framework.

9.11.4.15 textureMap

```
std::map<enum Appearance, Tex> GFramework::textureMap = {}
```

Maps an appearance to a texture for drawing.

9.11.4.16 userInput

```
UserInput GFramework::userInput
```

Set of user inputs.

9.11.4.17 WINDOW_TITLE

```
char constexpr const* GFramework::WINDOW_TITLE = "Evolution WildFire"  [static], [private]
```

Name of the window / game.

9.11.4.18 windowSize

```
Vec2 GFramework::windowSize
```

(width, height) dimensions of the window.

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

- GFramework.h
- LoadColors.cpp
- LoadTextures.cpp
- GFramework.cpp

9.12 Logger Class Reference

This class houses the logging functionality.

```
#include <Logger.h>
```

Public Member Functions

- void log (int line, std::string file, std::string func, std::string msg, LogDegree d=DEFAULT_DEGREE, LogType t=DEFAULT_TYPE)

  Logs a descriptive message to the appropriate stream.
- void normalExit (int line, std::string file, std::string func)

  Logs a descriptive normal exit message.
- ~Logger ()

  Cleans up the logger.
- Logger (Logger const &)=delete

  Deleted for singleton pattern.
- void operator= (Logger const &)=delete

  Deleted for singleton pattern.

Static Public Member Functions

- static Logger & get ()

  Returns the singleton instance.

Private Member Functions

- Logger ()

  Private constructor for singleton pattern.
- void logMessage (std::string msg, bool writeToConsole=true)

  Logs the message to the approriate stream.
- std::string getTimeStamp ()

  Returns the current time.
- std::string toString (LogDegree s)

  Converts a LogDegree to a string (Verbatim)
- std::string toString (LogType e)

  Converts a LogType to a string (Verbatim)

Private Attributes

- std::unordered_set< std::string > logs

  Stores the unique warning log messages.
- std::ofstream logFile

  The ofsteam corresponding to the logging file.

Static Private Attributes

- static constexpr const LogDegree DEFAULT_DEGREE = LogDegree::DEBUG

  The LogDegree to use if none is specified.
- static constexpr const LogType DEFAULT_TYPE = LogType::GENERAL

  The LogType to use if none is specified.
- static constexpr const char * LOG_FILE_TITLE = "assets/logger.log"
- static constexpr const char * PROGRAM_EXIT_MESSAGE = "The program has exited successfully."
- static constexpr const char * OPENED_LOG_AFTER_FAILURE_MESSAGE = "Initialization could not open logging file. Succeeded in reopening.\n"
- static constexpr const char * FAILED_TO_OPEN_AFTER_FAILURE_MESSAGE = "Initialization could not open logging file. Failed in reopening.\n"
- static constexpr const char * UNKNOWN_LOG_DEGREE_MESSAGE = "Invalid Log Degree Specified.\n"

9.12.1 Detailed Description

This class houses the logging functionality.

It allows you to log messages of various severity (degree) and provides detailed output which is very useful for debugging.

Todo Right now, there isn't a way to propogate warning and error messages to the screen. Maybe this could be a variable "lastLogged" or "lastError" or "lastWarning" OR "lastSignificantLog".

9.12.2 Constructor & Destructor Documentation

9.12.2.1 ~Logger()

```
Logger::~Logger ( )
```

Cleans up the logger.

Closes the log file.

9.12.2.2 Logger() [1/2]

```
Logger::Logger (
            Logger const &  )  [delete]
```

Deleted for singleton pattern.

9.12.2.3 Logger() [2/2]

```
Logger::Logger ( )  [private]
```

Private constructor for singleton pattern.

9.12.3 Member Function Documentation

9.12.3.1 get()

```
static Logger& Logger::get ( )  [inline], [static]
```

Returns the singleton instance.

Returns

Logger& Reference to the Logger singleton instance.

9.12.3.2 getTimeStamp()

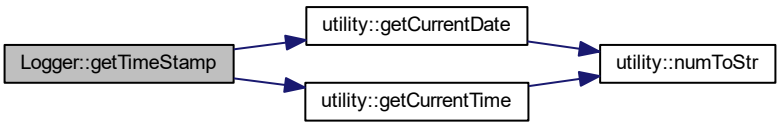
```
std::string Logger::getTimeStamp ( )  [private]
```

Returns the current time.

Returns

std::string Time in the format MMM/dd/yyyy-(hh:mm:ss)

Here is the call graph for this function:



9.12.3.3 log()

```
void Logger::log (
            int line,
            std::string file,
            std::string func,
            std::string msg,
            LogDegree d = DEFAULT_DEGREE,
            LogType t = DEFAULT_TYPE )
```

Logs a descriptive message to the appropriate stream.

The logged string is in the format [msg] [line] [file] [function] [date] [time] in a human readable format. The LogDegree specifies where and how the message should logged.

- **`Debug:`** `Show` to console, log to file
- **`Warning:`** `Show` to console, log to file, display to user (blocks input until user dismisses message). Only logs unique warnings.
- **`Fatal:`** `Show` to console, log to file, display to user (EXIT_FAILURE on dismissal)

Parameters

line	int The line that called the logger.
file	std::string The file that called the logger.
func	std::string The function that called the logger.
msg	std::string The message to be logged.
d	LogDegree The specified LogDegree.
t	LogType The specified LogType.

Returns

void

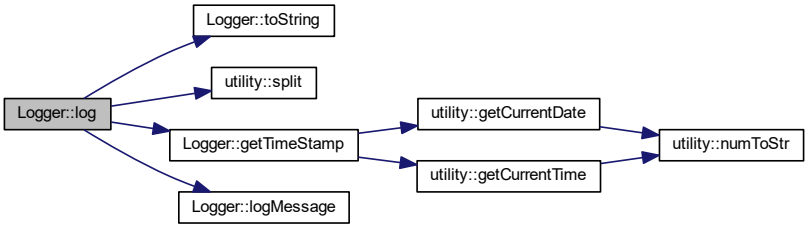
Warning

This function is not meant to be called manually. It should be called through the LOG macro.

See also

LOG

Here is the call graph for this function:



9.12.3.4 logMessage()

```
void Logger::logMessage (
            std::string msg,
            bool writeToConsole = true )  [private]
```

Logs the message to the approriate stream.

Tries to open the log file for writting. If it is unsucessful, every next log attempt will try to reopen the file. Warnings and Errors will only be logged once. Errors should alert the user and terminate the program. Warnings should just prompt the user. This handling is implemented in the simulation. Debug messages are written to the console based on Config file parameter "DEBUG_LOG_TO_CONSOLE", while Warnings and Errors are.

Parameters

msg	std::string The message to be logged.
writeToConsole	bool Should the message print to the console.

Returns

void

Note

Default arguments are not obvious. I always have to come back here. Maybe fix this?

9.12.3.5 normalExit()

```
void Logger::normalExit (
            int line,
            std::string file,
            std::string func )
```

Logs a descriptive normal exit message.

The logged string is in the format [msg] [line] [file] [function] [date] [time] in a human readable format. Normal exit is logged as debug message.

Parameters

line	int The line that called the logger.
file	std::string The file that called the logger.
func	std::string The function that called the logger.

Returns

void

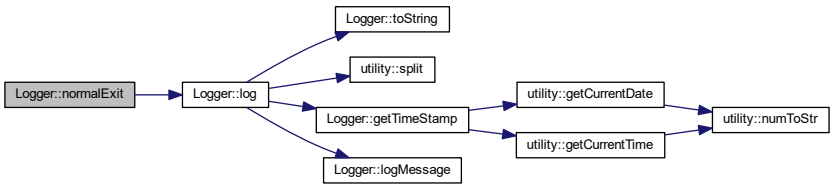
Warning

This function is not meant to be called manually. It should be called through the NORMAL_EXIT macro.

See also

NORMAL_EXIT

Here is the call graph for this function:



9.12.3.6 operator=()

```
void Logger::operator= (
            Logger const &  )  [delete]
```

Deleted for singleton pattern.

9.12.3.7 toString() [1/2]

```
std::string Logger::toString (
            LogDegree s )  [private]
```

Converts a LogDegree to a string (Verbatim)

9.12.3.8 toString() [2/2]

```
std::string Logger::toString (
            LogType e )  [private]
```

Converts a LogType to a string (Verbatim)

9.12.4 Member Data Documentation

9.12.4.1 DEFAULT_DEGREE

```
constexpr const LogDegree Logger::DEFAULT_DEGREE = LogDegree::DEBUG  [static], [private]
```

The LogDegree to use if none is specified.

9.12.4.2 DEFAULT_TYPE

```
constexpr const LogType Logger::DEFAULT_TYPE = LogType::GENERAL  [static], [private]
```

The LogType to use if none is specified.

9.12.4.3 FAILED_TO_OPEN_AFTER_FAILURE_MESSAGE

```
constexpr const char* Logger::FAILED_TO_OPEN_AFTER_FAILURE_MESSAGE = "Initialization could not
open logging file.  Failed in reopening.\n"  [static], [private]
```

9.12.4.4 LOG_FILE_TITLE

```
constexpr const char* Logger::LOG_FILE_TITLE = "assets/logger.log"  [static], [private]
```

9.12.4.5 logFile

```
std::ofstream Logger::logFile  [private]
```

The ofsteam corresponding to the logging file.

9.12.4.6 logs

```
std::unordered_set<std::string> Logger::logs  [private]
```

Stores the unique warning log messages.

This is used to prevent duplicate warnings which would likely lead to spam.

9.12.4.7 OPENED_LOG_AFTER_FAILURE_MESSAGE

```
constexpr const char* Logger::OPENED_LOG_AFTER_FAILURE_MESSAGE = "Initialization could not
open logging file.  Succeeded in reopening.\n"  [static], [private]
```

9.12.4.8 PROGRAM_EXIT_MESSAGE

```
constexpr const char* Logger::PROGRAM_EXIT_MESSAGE = "The program has exited successfully."
[static], [private]
```

9.12.4.9 UNKNOWN_LOG_DEGREE_MESSAGE

```
constexpr const char* Logger::UNKNOWN_LOG_DEGREE_MESSAGE = "Invalid Log Degree Specified.\n"
[static], [private]
```

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

- Logger.h
- Logger.cpp

9.13 Mouse Struct Reference

This class contains information about the user's mouse.

```
#include <GFramework.h>
```

Public Member Functions

- Mouse ()

Public Attributes

- int x

  x coordinate of mouse (from left to right)
- int y

  y coordinate of mouse (from top to bottom)
- bool clicked

  Is the mouse clicked?
- bool heldDown

  Is the mouse button held down?

9.13.1 Detailed Description

This class contains information about the user's mouse.

Specifically, its position, whether is had been clicked, and if its held down. It is not fully implemented.

9.13.2 Constructor & Destructor Documentation

9.13.2.1 Mouse()

```
Mouse::Mouse ( )  [inline]
```

9.13.3 Member Data Documentation

9.13.3.1 clicked

```
bool Mouse::clicked
```

Is the mouse clicked?

9.13.3.2 heldDown

```
bool Mouse::heldDown
```

Is the mouse button held down?

9.13.3.3 x

```
int Mouse::x
```

x coordinate of mouse (from left to right)

9.13.3.4 y

```
int Mouse::y
```

y coordinate of mouse (from top to bottom)

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

- GFramework.h

9.14 Simulation Class Reference

```
#include <Simulation.h>
```

Public Member Functions

- void run ()
- void init ()
- void setGameMode (GameMode g)
- void setInputType (InputType t)
- Simulation ()
- ~Simulation ()

Public Attributes

- GameMode gameMode
- InputType inputType

Private Member Functions

- void setInputTypeKeyboard ()
- void loadGameModeKeyboard ()

Static Private Attributes

- static constexpr GameMode INITIAL_GAME_MODE = GameMode::SIMULATION
- static constexpr InputType INITIAL_INPUT_TYPE = InputType::DEFAULT
- static constexpr const char * UNKNOWN_INPUT_TYPE_MESSAGE = "UNKNOWN INPUT TYPE KEYB↩ OARD SELECTED."
- static constexpr const char * UNKNOWN_GAME_MODE_MESSAGE = "UNKNOWN GAMEMODE SELE↩ CTED."

9.14.1 Constructor & Destructor Documentation

9.14.1.1 Simulation()

```
Simulation::Simulation ( )
```

9.14.1.2 ~Simulation()

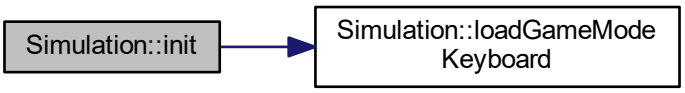
```
Simulation::~Simulation ( )
```

9.14.2 Member Function Documentation

9.14.2.1 init()

```
void Simulation::init ( )
```

Here is the call graph for this function:



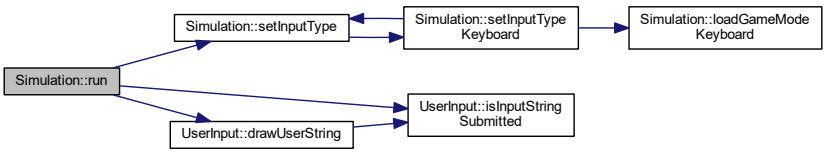
9.14.2.2 loadGameModeKeyboard()

```
void Simulation::loadGameModeKeyboard ( )  [private]
```

9.14.2.3 run()

```
void Simulation::run ( )
```

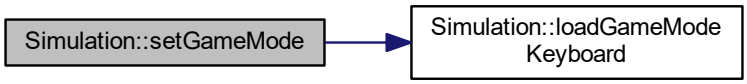
Here is the call graph for this function:



9.14.2.4 setGameMode()

```
void Simulation::setGameMode (
            GameMode g )
```

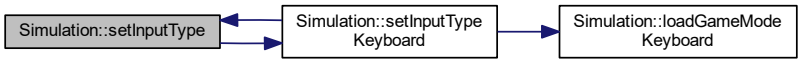
Here is the call graph for this function:



9.14.2.5 setInputType()

```
void Simulation::setInputType (
            InputType t )
```

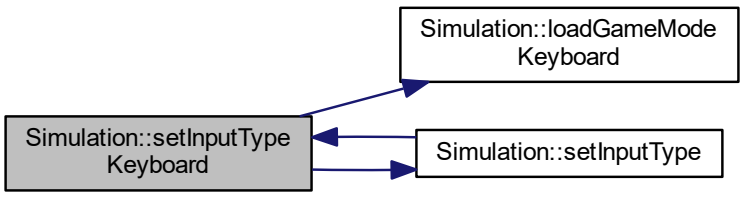
Here is the call graph for this function:



9.14.2.6 setInputTypeKeyboard()

```
void Simulation::setInputTypeKeyboard ( )  [private]
```

Here is the call graph for this function:



9.14.3 Member Data Documentation

9.14.3.1 gameMode

```
GameMode Simulation::gameMode
```

9.14.3.2 INITIAL_GAME_MODE

```
constexpr GameMode Simulation::INITIAL_GAME_MODE = GameMode::SIMULATION  [static], [private]
```

9.14.3.3 INITIAL_INPUT_TYPE

```
constexpr InputType Simulation::INITIAL_INPUT_TYPE = InputType::DEFAULT  [static], [private]
```

9.14.3.4 inputType

```
InputType Simulation::inputType
```

9.14.3.5 UNKNOWN_GAME_MODE_MESSAGE

```
constexpr const char* Simulation::UNKNOWN_GAME_MODE_MESSAGE = "UNKNOWN GAMEMODE SELECTED."
[static], [private]
```

9.14.3.6 UNKNOWN_INPUT_TYPE_MESSAGE

```
constexpr const char* Simulation::UNKNOWN_INPUT_TYPE_MESSAGE = "UNKNOWN INPUT TYPE KEYBOARD S↩
ELECTED."  [static], [private]
```

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

- Simulation.h
- Simulation.cpp

9.15 UserFunction Struct Reference

`#include <UserFunction.h>`

Public Member Functions

- UserFunction ()
- UserFunction (char key_t, Action action_t)
- UserFunction (int specialKey_t, Action action_t)
- UserFunction (int specialKey_t, Action action_t, Action release_t)
- ~UserFunction ()

Public Attributes

- int specialKey
- char key
- Action action
- Action release

9.15.1 Constructor & Destructor Documentation

9.15.1.1 UserFunction() [1/4]

```
UserFunction::UserFunction ( )
```

9.15.1.2 UserFunction() [2/4]

```
UserFunction::UserFunction (
            char key_t,
            Action action_t )
```

9.15.1.3 UserFunction() [3/4]

```
UserFunction::UserFunction (
            int specialKey_t,
            Action action_t )
```

9.15.1.4 UserFunction() [4/4]

```
UserFunction::UserFunction (
            int specialKey_t,
            Action action_t,
            Action release_t )
```

9.15.1.5 ~UserFunction()

```
UserFunction::~UserFunction ( )
```

9.15.2 Member Data Documentation

9.15.2.1 action

```
Action UserFunction::action
```

9.15.2.2 key

```
char UserFunction::key
```

9.15.2.3 release

```
Action UserFunction::release
```

9.15.2.4 specialKey

```
int UserFunction::specialKey
```

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

- UserFunction.h
- UserFunction.cpp

9.16 UserInput Class Reference

`#include <UserInput.h>`

Public Member Functions

- UserInput ()
- ~UserInput ()
- void setToDefault ()
- bool isInputStringSubmitted ()
- void submitInputString ()
- void drawUserString (double x, double y, bool xCenter=true, bool yCenter=true)

Public Attributes

- std::string inputString
- std::vector< UserFunction > functions
- bool keyStates [NUM_KEYS] = {false}
- bool keyInputIsHeld

Static Private Attributes

- static int constexpr NUM_KEYS = 256
- static char constexpr TERMINATING_CHAR = '#'

9.16.1 Constructor & Destructor Documentation

9.16.1.1 UserInput()

`UserInput::UserInput ( )`

9.16.1.2 ~UserInput()

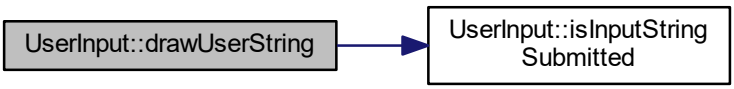
`UserInput::~UserInput ( )`

9.16.2 Member Function Documentation

9.16.2.1 drawUserString()

```
void UserInput::drawUserString (
            double x,
            double y,
            bool xCenter = true,
            bool yCenter = true )
```

Here is the call graph for this function:



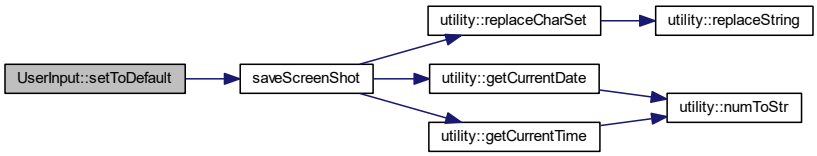
9.16.2.2 isInputStringSubmitted()

```
bool UserInput::isInputStringSubmitted ( )
```

9.16.2.3 setToDefault()

```
void UserInput::setToDefault ( )
```

Here is the call graph for this function:



9.16.2.4 submitInputString()

```
void UserInput::submitInputString ( )
```

9.16.3 Member Data Documentation

9.16.3.1 functions

```
std::vector<UserFunction> UserInput::functions
```

9.16.3.2 inputString

```
std::string UserInput::inputString
```

9.16.3.3 keyInputIsHeld

```
bool UserInput::keyInputIsHeld
```

9.16.3.4 keyStates

```
bool UserInput::keyStates[NUM_KEYS] = {false}
```

9.16.3.5 NUM_KEYS

```
int constexpr UserInput::NUM_KEYS = 256  [static], [private]
```

9.16.3.6 TERMINATING_CHAR

```
char constexpr UserInput::TERMINATING_CHAR = '#'  [static], [private]
```

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

- UserInput.h
- UserInput.cpp

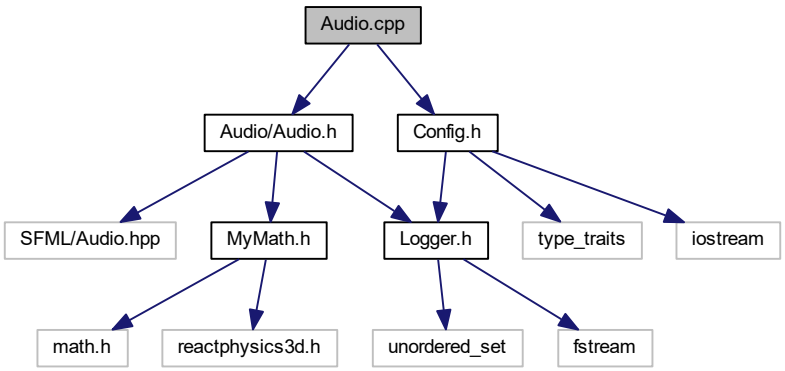
Chapter 10

File Documentation

10.1 Audio.cpp File Reference

```
#include "Audio/Audio.h"
#include "Config.h"
```

Include dependency graph for Audio.cpp:

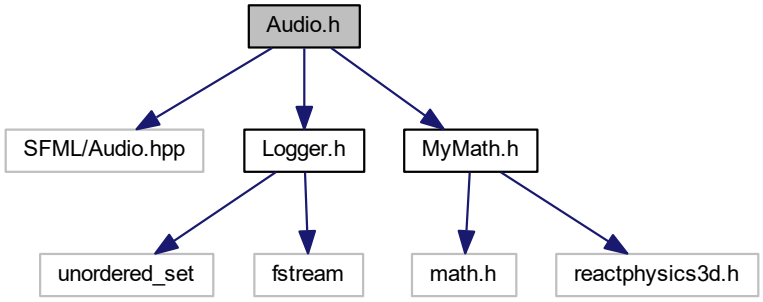


10.2 Audio.h File Reference

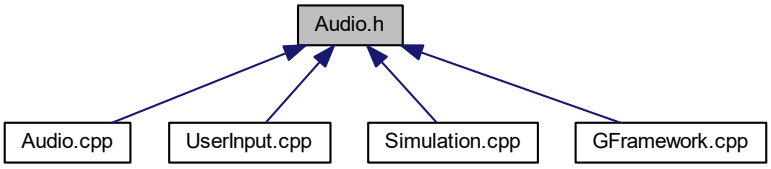
```
#include <SFML/Audio.hpp>
#include "Logger.h"
```

```
#include "MyMath.h"
```

Include dependency graph for Audio.h:



This graph shows which files directly or indirectly include this file:



Classes

- class Audio

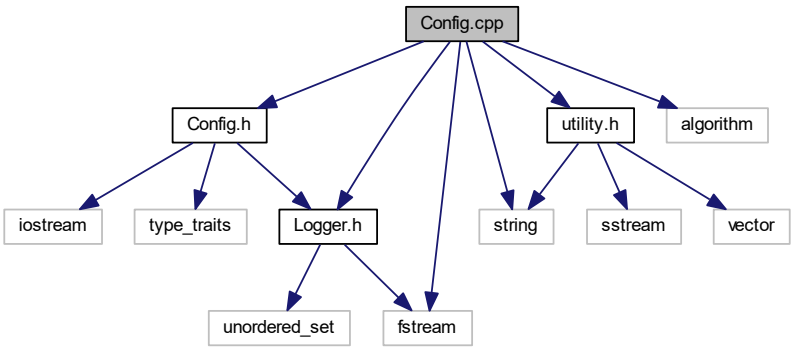
  The audio engine.

10.3 Config.cpp File Reference

```
#include "Config.h"
#include "Logger.h"
#include "utility.h"
#include <fstream>
#include <algorithm>
```

```
#include <string>
```

Include dependency graph for Config.cpp:



Namespaces

- ConfigValueConverters

  This namespace contains the functions which convert values to their respective type.

Functions

- template<>
  bool ConfigValueConverters::getValue_< bool > (std::string value)

  Template specialization, returns value as boolean.
- template<>
  int ConfigValueConverters::getValue_< int > (std::string value)

  Template specialization, returns value as boolean.
- template<>
  double ConfigValueConverters::getValue_< double > (std::string value)

  Template specialization, returns value as boolean.
- template<>
  std::string ConfigValueConverters::getValue_< std::string > (std::string value)

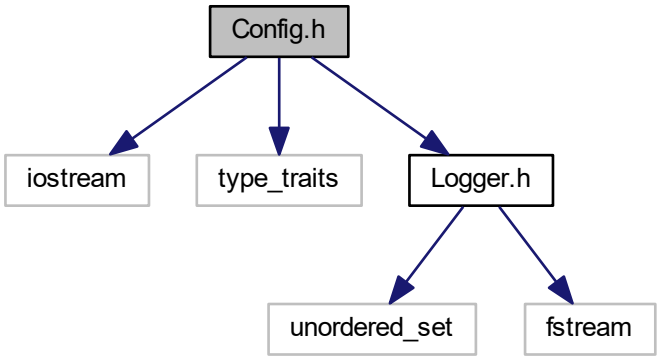
  Template specialization, returns value as boolean.

10.4 Config.h File Reference

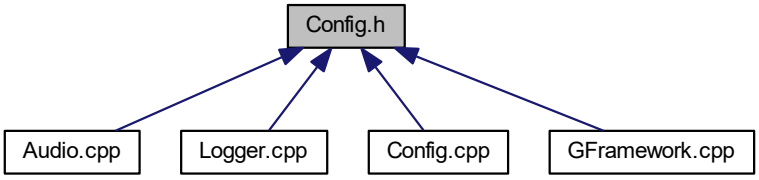
```
#include <iostream>
#include <type_traits>
```

```
#include "Logger.h"
```

Include dependency graph for Config.h:



This graph shows which files directly or indirectly include this file:



Classes

- class Config

  This class allows variables to be loaded from a file.

Namespaces

- ConfigValueConverters

  This namespace contains the functions which convert values to their respective type.

Functions

- template<typename T >
  T ConfigValueConverters::getValue_ (std::string value)

  Templated function to return the value as the specified type T.

- template<>
  bool ConfigValueConverters::getValue_< bool > (std::string value)

  Template specialization, returns value as boolean.
- template<>
  int ConfigValueConverters::getValue_< int > (std::string value)

  Template specialization, returns value as boolean.
- template<>
  double ConfigValueConverters::getValue_< double > (std::string value)

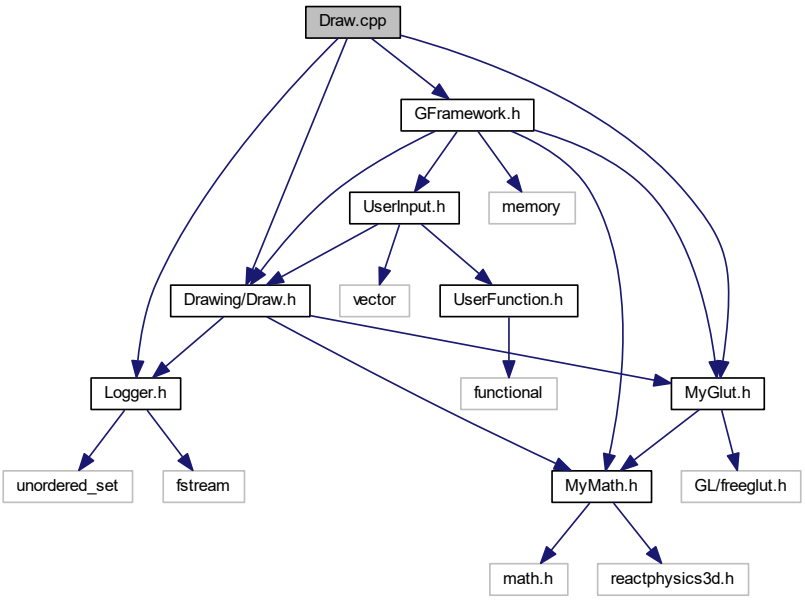
  Template specialization, returns value as boolean.
- template<>
  std::string ConfigValueConverters::getValue_< std::string > (std::string value)

  Template specialization, returns value as boolean.

10.5 Draw.cpp File Reference

```
#include "Drawing/Draw.h"
#include "MyGlut.h"
#include "GFramework.h"
#include "Logger.h"
```

Include dependency graph for Draw.cpp:

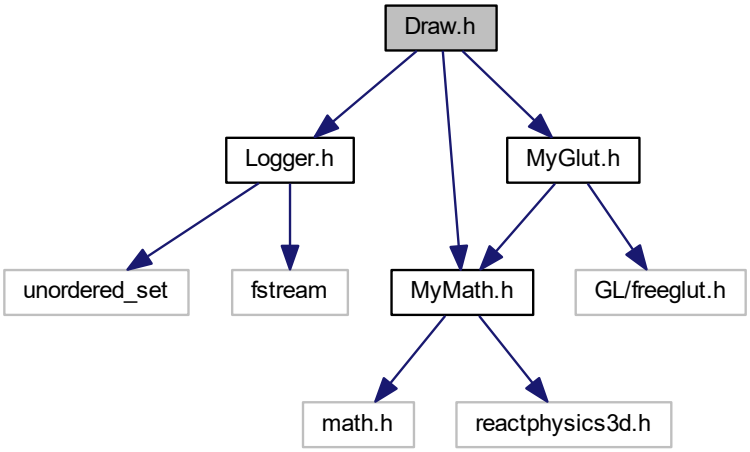


10.6 Draw.h File Reference

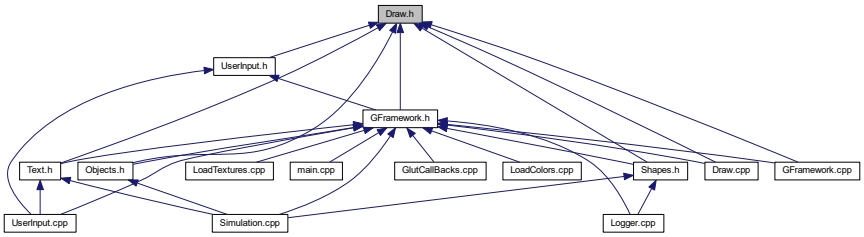
```
#include "Logger.h"
#include "MyMath.h"
```

```
#include "MyGlut.h"
```

Include dependency graph for Draw.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct Drawing
- class DrawItem< A >

  The parent class of items which can drawn.

Enumerations

- enum Appearance {
  MAROON, DARK_RED, BROWN, FIREBRICK,
  CRIMSON, RED, TOMATO, CORAL,
  INDIAN_RED, LIGHT_CORAL, DARK_SALMON, SALMON,
  LIGHT_SALMON, ORANGE_RED, DARK_ORANGE, ORANGE,
  GOLD, DARK_GOLDEN_ROD, GOLDEN_ROD, PALE_GOLDEN_ROD,
  DARK_KHAKI, KHAKI, OLIVE, YELLOW,
  YELLOW_GREEN, DARK_OLIVE_GREEN, OLIVE_DRAB, LAWN_GREEN,

CHART_REUSE, GREEN_YELLOW, DARK_GREEN, GREEN,
FOREST_GREEN, LIME, LIME_GREEN, LIGHT_GREEN,
PALE_GREEN, DARK_SEA_GREEN, MEDIUM_SPRING_GREEN, SPRING_GREEN,
SEA_GREEN, MEDIUM_AQUA_MARINE, MEDIUM_SEA_GREEN, LIGHT_SEA_GREEN,
DARK_SLATE_GRAY, TEAL, DARK_CYAN, AQUA,
CYAN, LIGHT_CYAN, DARK_TURQUOISE, TURQUOISE,
MEDIUM_TURQUOISE, PALE_TURQUOISE, AQUA_MARINE, POWDER_BLUE,
CADET_BLUE, STEEL_BLUE, CORN_FLOWER_BLUE, DEEP_SKY_BLUE,
DODGER_BLUE, LIGHT_BLUE, SKY_BLUE, LIGHT_SKY_BLUE,
MIDNIGHT_BLUE, NAVY, DARK_BLUE, MEDIUM_BLUE,
BLUE, ROYAL_BLUE, BLUE_VIOLET, INDIGO,
DARK_SLATE_BLUE, SLATE_BLUE, MEDIUM_SLATE_BLUE, MEDIUM_PURPLE,
DARK_MAGENTA, DARK_VIOLET, DARK_ORCHID, MEDIUM_ORCHID,
PURPLE, THISTLE, PLUM, VIOLET,
MAGENTA, ORCHID, MEDIUM_VIOLET_RED, PALE_VIOLET_RED,
DEEP_PINK, HOT_PINK, LIGHT_PINK, PINK,
ANTIQUE_WHITE, BEIGE, BISQUE, BLANCHED_ALMOND,
WHEAT, CORN_SILK, LEMON_CHIFFON, LIGHT_GOLDEN_ROD_YELLOW,
LIGHT_YELLOW, SADDLE_BROWN, SIENNA, CHOCOLATE,
PERU, SANDY_BROWN, BURLY_WOOD, TAN,
ROSY_BROWN, MOCCASIN, NAVAJO_WHITE, PEACH_PUFF,
MISTY_ROSE, LAVENDER_BLUSH, LINEN, OLD_LACE,
PAPAYA_WHIP, SEA_SHELL, MINT_CREAM, SLATE_GRAY,
LIGHT_SLATE_GRAY, LIGHT_STEEL_BLUE, LAVENDER, FLORAL_WHITE,
ALICE_BLUE, GHOST_WHITE, HONEYDEW, IVORY,
AZURE, SNOW, BLACK, DIM_GRAY,
GRAY, DARK_GRAY, SILVER, LIGHT_GRAY,
GAINSBORO, WHITE_SMOKE, WHITE, LAST_COLOR__,
GRASS, BUTTON, LAST_TEXTURE__ }

Enums corresponding to the appearance of drawn objects.

10.6.1 Enumeration Type Documentation

10.6.1.1 Appearance

`enum Appearance`

Enums corresponding to the appearance of drawn objects.

The desired drawing call is

```
DrawObject<Appearance::STYLE>(...)
```

To allow for this, these appearances are stored in this enum and are passed to drawing functions as a template parameter. I'm not sure if this is the ideal implementation method.

To allow for both colors and textures to be applied, they are stored in the same enum despite being treated differently. The enums "LAST_COLOR__" and "LAST_TEXTURE__" are ONLY to be used by the Drawing::isColor, and Drawing::isTexture methods. Unfortunately this implementation detail can't be hidden with this infrastructure.

See also

Drawing::isColor, Drawing::isTexture.

Enumerator

MAROON	
DARK_RED	
BROWN	
FIREBRICK	
CRIMSON	
RED	
TOMATO	
CORAL	
INDIAN_RED	
LIGHT_CORAL	
DARK_SALMON	
SALMON	
LIGHT_SALMON	
ORANGE_RED	
DARK_ORANGE	
ORANGE	
GOLD	
DARK_GOLDEN_ROD	
GOLDEN_ROD	
PALE_GOLDEN_ROD	
DARK_KHAKI	
KHAKI	
OLIVE	
YELLOW	
YELLOW_GREEN	
DARK_OLIVE_GREEN	
OLIVE_DRAB	
LAWN_GREEN	
CHART_REUSE	
GREEN_YELLOW	
DARK_GREEN	
GREEN	
FOREST_GREEN	
LIME	
LIME_GREEN	
LIGHT_GREEN	
PALE_GREEN	
DARK_SEA_GREEN	
MEDIUM_SPRING_GREEN	
SPRING_GREEN	
SEA_GREEN	
MEDIUM_AQUA_MARINE	
MEDIUM_SEA_GREEN	
LIGHT_SEA_GREEN	
DARK_SLATE_GRAY	
TEAL	
DARK_CYAN	
AQUA	
CYAN	
LIGHT_CYAN	

Enumerator

DARK_TURQUOISE	
TURQUOISE	
MEDIUM_TURQUOISE	
PALE_TURQUOISE	
AQUA_MARINE	
POWDER_BLUE	
CADET_BLUE	
STEEL_BLUE	
CORN_FLOWER_BLUE	
DEEP_SKY_BLUE	
DODGER_BLUE	
LIGHT_BLUE	
SKY_BLUE	
LIGHT_SKY_BLUE	
MIDNIGHT_BLUE	
NAVY	
DARK_BLUE	
MEDIUM_BLUE	
BLUE	
ROYAL_BLUE	
BLUE_VIOLET	
INDIGO	
DARK_SLATE_BLUE	
SLATE_BLUE	
MEDIUM_SLATE_BLUE	
MEDIUM_PURPLE	
DARK_MAGENTA	
DARK_VIOLET	
DARK_ORCHID	
MEDIUM_ORCHID	
PURPLE	
THISTLE	
PLUM	
VIOLET	
MAGENTA	
ORCHID	
MEDIUM_VIOLET_RED	
PALE_VIOLET_RED	
DEEP_PINK	
HOT_PINK	
LIGHT_PINK	
PINK	
ANTIQUE_WHITE	
BEIGE	
BISQUE	
BLANCHED_ALMOND	
WHEAT	
CORN_SILK	
LEMON_CHIFFON	
LIGHT_GOLDEN_ROD_YELLOW	

Enumerator

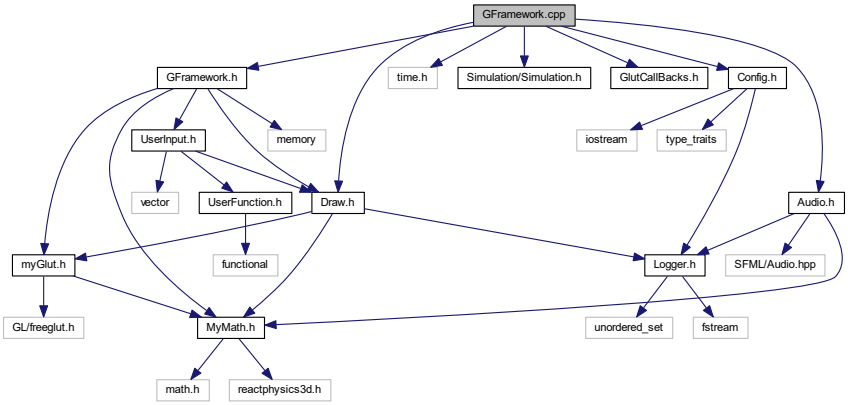
LIGHT_YELLOW	
SADDLE_BROWN	
SIENNA	
CHOCOLATE	
PERU	
SANDY_BROWN	
BURLY_WOOD	
TAN	
ROSY_BROWN	
MOCCASIN	
NAVAJO_WHITE	
PEACH_PUFF	
MISTY_ROSE	
LAVENDER_BLUSH	
LINEN	
OLD_LACE	
PAPAYA_WHIP	
SEA_SHELL	
MINT_CREAM	
SLATE_GRAY	
LIGHT_SLATE_GRAY	
LIGHT_STEEL_BLUE	
LAVENDER	
FLORAL_WHITE	
ALICE_BLUE	
GHOST_WHITE	
HONEYDEW	
IVORY	
AZURE	
SNOW	
BLACK	
DIM_GRAY	
GRAY	
DARK_GRAY	
SILVER	
LIGHT_GRAY	
GAINSBORO	
WHITE_SMOKE	
WHITE	
LAST_COLOR__	
GRASS	
BUTTON	
LAST_TEXTURE__	

10.7 GFramework.cpp File Reference

```
#include "GFramework.h"
#include <time.h>
```

```
#include "Simulation/Simulation.h"
#include "GlutCallBacks.h"
#include "Drawing/Draw.h"
#include "Config.h"
#include "Audio.h"
```

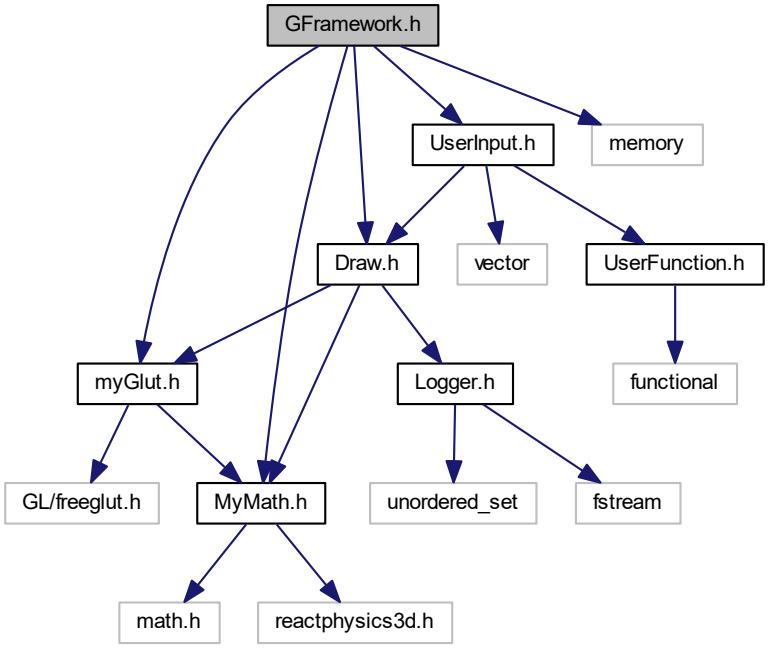
Include dependency graph for GFramework.cpp:



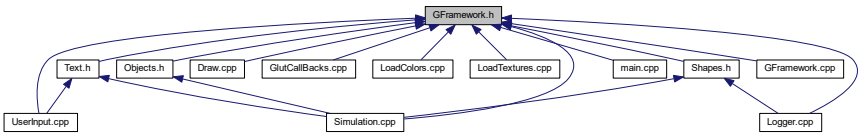
10.8 GFramework.h File Reference

```
#include "myGlut.h"
#include "Math/MyMath.h"
#include "UserInput.h"
#include "Drawing/Draw.h"
#include <memory>
```

Include dependency graph for GFramework.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct Camera

  This class describes the camera placed at the head of the user.
- struct Mouse

  This class contains information about the user's mouse.
- class GFramework

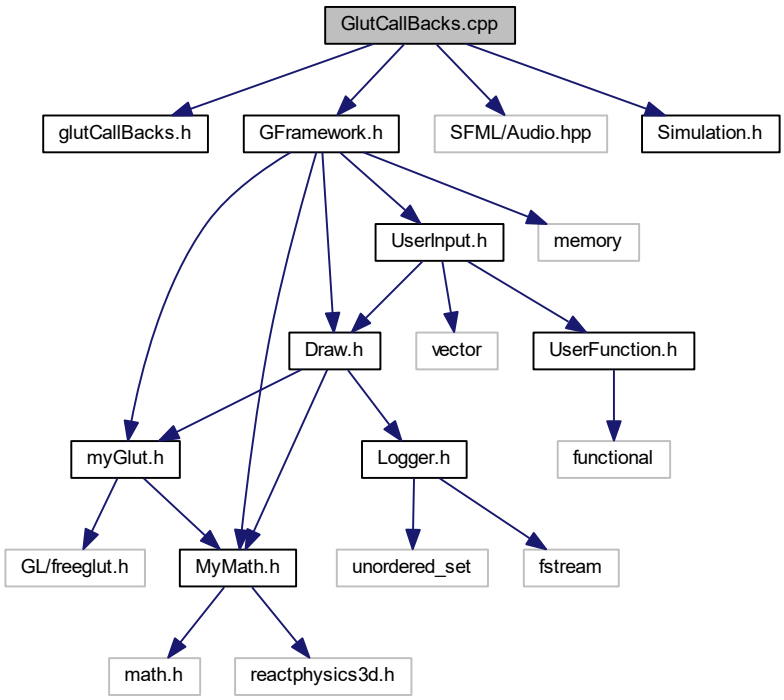
  This class holds all the functions required for a 3D simulator to be run.

10.9 GlutCallBacks.cpp File Reference

```
#include "glutCallBacks.h"
#include "GFramework.h"
```

```
#include <SFML/Audio.hpp>
#include "Simulation.h"
```

Include dependency graph for GlutCallBacks.cpp:



Namespaces

- glutCB

  This namespace contains the glut callback functions.

Functions

- void glutCB::changeSize (int w, int h)

  Updates the opengl viewport etc on window resize.
- void glutCB::renderScene ()

  Prepares the drawing state, then calls the simulation at a constant FPS.
- void glutCB::update ()

  Updates the audio, window size, userfunctions (ie: calls them), and camera.
- void glutCB::callMouse (int button, int state, int mx, int my)

  Is called on mouse click.
- void glutCB::mouseMove (int mx, int my)

  Is called on mouse movement.
- void glutCB::passiveMouse (int mx, int my)

  Continuously called to update details about the mouse.
- void glutCB::keyPressed (unsigned char key, int x, int y)

  Sets the state of the UserInput keystates for the pressed key and calls its associated pressed function.

- void glutCB::keyUp (unsigned char key, int x, int y)

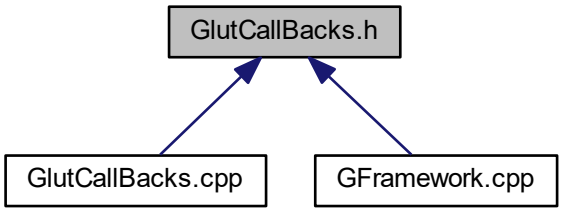
  Resets the state of the UserInput keystates for the released key and calls its associated release function.
- void glutCB::pressSpecialKey (int key, int kxx, int kyy)

  Calls special key (ex: Arrow keys) press functions.
- void glutCB::releaseSpecialKey (int key, int kx, int ky)

  Calls the special key (ex: Arrow keys) release functions.

10.10 GlutCallBacks.h File Reference

This graph shows which files directly or indirectly include this file:



Namespaces

- glutCB

  This namespace contains the glut callback functions.

Functions

- void glutCB::renderScene ()

  Prepares the drawing state, then calls the simulation at a constant FPS.
- void glutCB::update ()

  Updates the audio, window size, userfunctions (ie: calls them), and camera.
- void glutCB::changeSize (int w, int h)

  Updates the opengl viewport etc on window resize.
- void glutCB::callMouse (int button, int state, int mx, int my)

  Is called on mouse click.
- void glutCB::mouseMove (int mx, int my)

  Is called on mouse movement.
- void glutCB::passiveMouse (int mx, int my)

  Continuously called to update details about the mouse.
- void glutCB::keyPressed (unsigned char key, int x, int y)

  Sets the state of the UserInput keystates for the pressed key and calls its associated pressed function.
- void glutCB::keyUp (unsigned char key, int x, int y)

  Resets the state of the UserInput keystates for the released key and calls its associated release function.
- void glutCB::pressSpecialKey (int key, int kxx, int kyy)

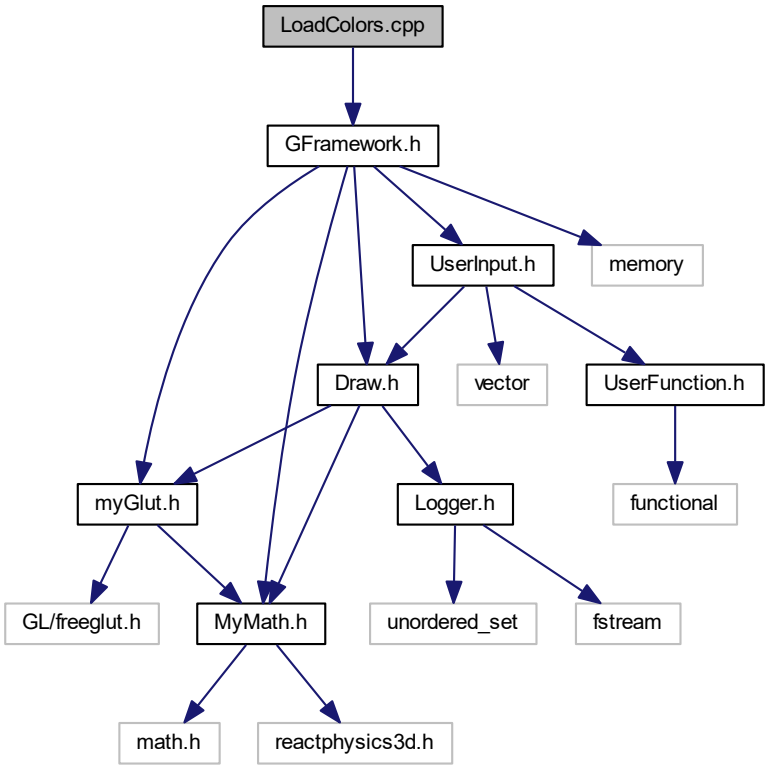
  Calls special key (ex: Arrow keys) press functions.
- void glutCB::releaseSpecialKey (int key, int kx, int ky)

  Calls the special key (ex: Arrow keys) release functions.

10.11 LoadColors.cpp File Reference

```
#include "GFramework.h"
```

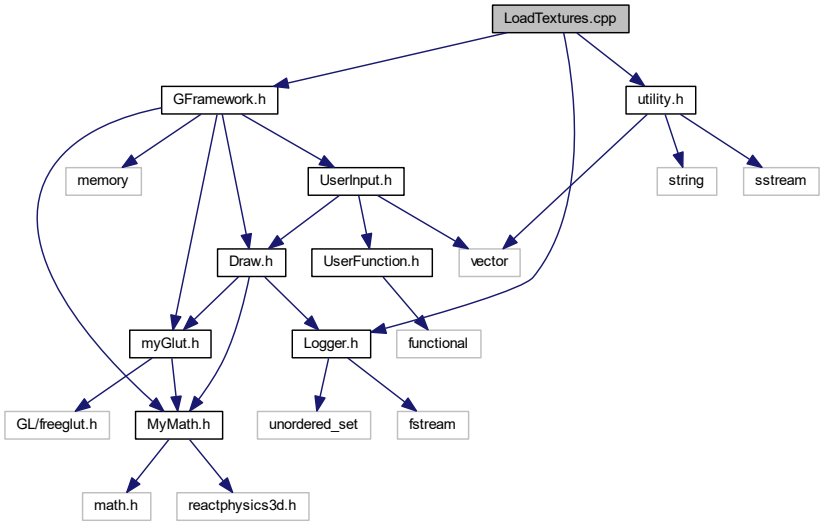
Include dependency graph for LoadColors.cpp:



10.12 LoadTextures.cpp File Reference

```
#include "GFramework.h"
#include "Logger.h"
#include "utility.h"
```

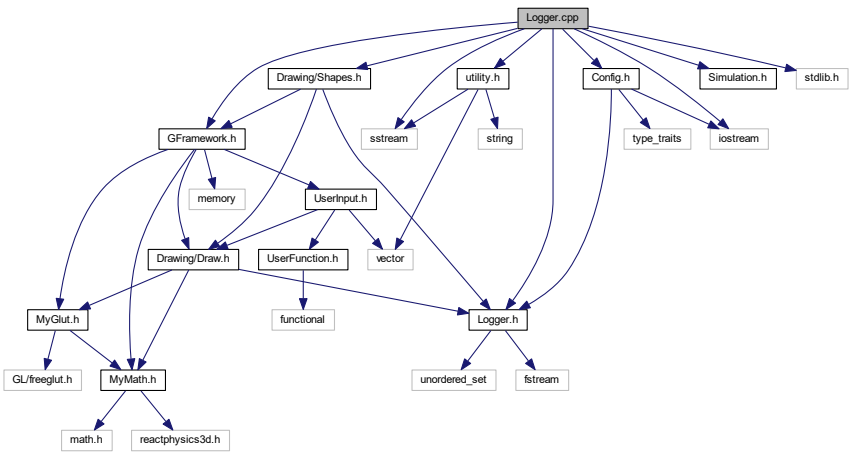
Include dependency graph for LoadTextures.cpp:



10.13 Logger.cpp File Reference

```
#include "Logger.h"
#include "Drawing/Shapes.h"
#include "GFramework.h"
#include "utility.h"
#include "Config.h"
#include "Simulation.h"
#include <iostream>
#include <stdlib.h>
#include <sstream>
```

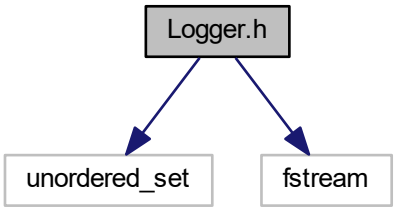
Include dependency graph for Logger.cpp:



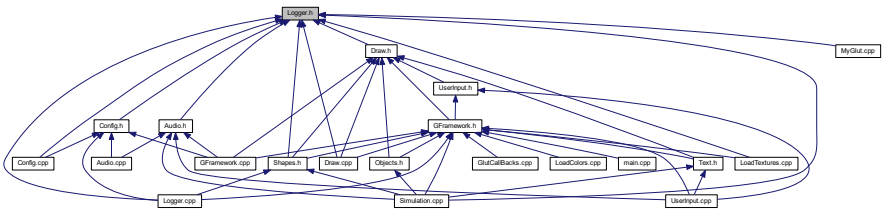
10.14 Logger.h File Reference

```
#include <unordered_set>
#include <fstream>
```

Include dependency graph for Logger.h:



This graph shows which files directly or indirectly include this file:



Classes

- class Logger

  This class houses the logging functionality.

Macros

- #define LOG(...) Logger::get().log(__LINE__, __FILE__, __FUNCTION__, __VA_ARGS__)

  This macro passes the line, file, and function to the logger, along with additional parameters.
- #define NORMAL_EXIT() Logger::get().normalExit(__LINE__, __FILE__, __FUNCTION__)

  Exits the program normally, but also logs the line, file and function where the exiting call came from.

Enumerations

- enum LogDegree : unsigned int { LogDegree::DEBUG, LogDegree::WARNING, LogDegree::FATAL }

  Used to specify different levels of logging severity.
- enum LogType : unsigned int {
  LogType::GENERAL, LogType::GRAPHICS, LogType::DISPLAY, LogType::INPUT,
  LogType::AUDIO, LogType::CONFIG }

  Used to specify different types of logging message (ie: the reason for the log).

10.14.1 Macro Definition Documentation

10.14.1.1 LOG

```
#define LOG(
              ...  ) Logger::get().log(__LINE__, __FILE__, __FUNCTION__, __VA_ARGS__)
```

This macro passes the line, file, and function to the logger, along with additional parameters.

It effectively acts like a decorator and allows more detailed logging information to be passed to the logger. Should be called like so (the last two parameters are optional):

```
LOG("This is my message.", LogDegree::DEBUG, LogType::GENERAL);
```

Parameters

msg	The message to be printed with the log.
You	may optionally pass a LogDegree, and also LogType.

Returns

void

Warning

Type and argument checking is lacking due to macro implementation. It may be difficult to determine the incorrect call to this macro if incorrect parameters are passed. This is because the compiler redirects you to this definition instead of the culprite.

See also

Logger::log

Note

Although the input is '...' you a required to specify a message. This is to prevent 'c99 requires rest arguments to be used' error.

10.14.1.2 NORMAL_EXIT

```
#define NORMAL_EXIT( ) Logger::get().normalExit(__LINE__, __FILE__, __FUNCTION__)
```

Exits the program normally, but also logs the line, file and function where the exiting call came from.

Returns

void

Warning

Type and argument checking is lacking due to macro implementation. It may be difficult to determine the incorrect call to this macro if incorrect parameters are passed. This is because the compiler redirects you to this definition instead of the culprite.

See also

Logger::normalExit

10.14.2 Enumeration Type Documentation

10.14.2.1 LogDegree

`enum LogDegree : unsigned int [strong]`

Used to specify different levels of logging severity.

See also

Logger::log

Enumerator

DEBUG	
WARNING	
FATAL	

10.14.2.2 LogType

`enum LogType : unsigned int [strong]`

Used to specify different types of logging message (ie: the reason for the log).

See also

Logger::log

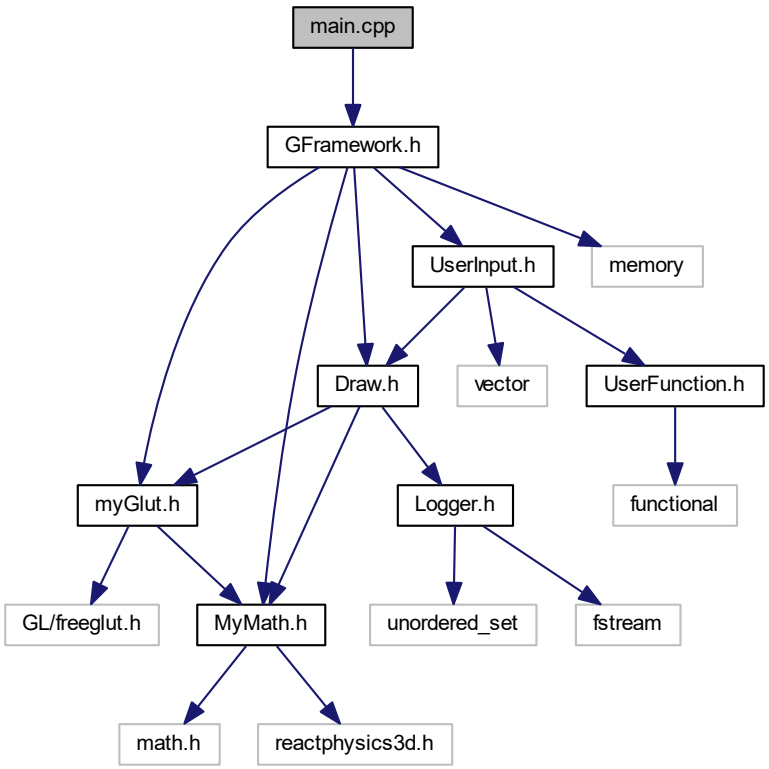
Enumerator

GENERAL	
GRAPHICS	
DISPLAY	
INPUT	
AUDIO	
CONFIG	

10.15 main.cpp File Reference

```
#include "GFramework.h"
```

Include dependency graph for main.cpp:



Functions

- int main ()

  Starts up the glutmainloop through GFramework startup().

10.15.1 Function Documentation

10.15.1.1 main()

```
int main ( )
```

Starts up the glutmainloop through GFramework startup().

The opengl framework works by running a set of disconnected functions in a loop. To do this, the functions are divided and only specific variables can be passed between them. This forces a new way of programming moving away from the typical gameloop constructs. Instead the use of (a attempted minimal) usage of singletons, static and global variables must be implemented. It seems that the best way forward is to create a singleton instance (of the GFramework class) which encapsulates all the opengl callbacks. This class effectively acts as a new main.

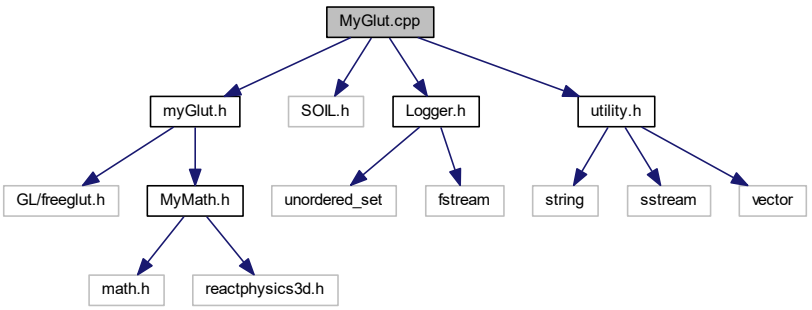
Returns

int Exit code, 0 for normal termination, non-zero value otherwise.

10.16 MyGlut.cpp File Reference

```
#include "myGlut.h"
#include "SOIL.h"
#include "Logger.h"
#include "utility.h"
```

Include dependency graph for MyGlut.cpp:



Functions

- Tex glLoadTexture (std::string fileName)

  Loads a texture using SOIL and returns a reference to it.
- void saveScreenShot ()

  Saves the current scene as a .png and stores it in the screenshots folder.
- void glTexVert2f (double tx, double ty, double vx, double vy)

  Draws a 2D textured vertex.

- void glTexVert2f (Vec2 t, double vx, double vy)

  Draws a 2D textured vertex.
- void glTexVert2f (double tx, double ty, Vec2 v)

  Draws a 2D textured vertex.
- void glTexVert2f (Vec2 t, Vec2 v)

  Draws a 2D textured vertex.
- void glTexVert3f (double tx, double ty, double vx, double vy, double vz)

  Draws a 2D textured vertex.
- void glTexVert3f (Vec2 t, double vx, double vy, double vz)

  Draws a 2D textured vertex.
- void glTexVert3f (double tx, double ty, Vec v)

  Draws a 2D textured vertex.
- void glTexVert3f (Vec2 t, Vec v)

  Draws a 3D textured vertex.

10.16.1 Function Documentation

10.16.1.1 glLoadTexture()

```
Tex glLoadTexture (
            std::string fileName )
```

Loads a texture using SOIL and returns a reference to it.

Parameters

fileName	std::string The name (path) of the image file to be loaded.

Returns

Tex The reference to the texture.

10.16.1.2 glTexVert2f() [1/4]

```
void glTexVert2f (
            double tx,
            double ty,
            double vx,
            double vy )
```

Draws a 2D textured vertex.

Parameters

tx	double The x texture coordinate (should be [0, 1]).
ty	double The y texture coordinate (should be [0, 1]).
vx	double The relative window x coordinate of the vertex (should be within the window width).
vy	double The relative window y coordinates of the vertex (should be within the window height).

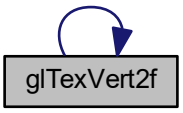
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.16.1.3 glTexVert2f() [2/4]

```
void glTexVert2f (
            Vec2 t,
            double vx,
            double vy )
```

Draws a 2D textured vertex.

Parameters

t	Vec2 The texture coordinates (both should be [0, 1]).
vx	double The relative window x coordinate of the vertex (should be within the window width).
vy	double The relative window y coordinates of the vertex (should be within the window height).

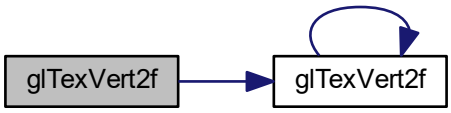
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.16.1.4 glTexVert2f() [3/4]

```
void glTexVert2f (
            double tx,
            double ty,
            Vec2 v )
```

Draws a 2D textured vertex.

Parameters

tx	double The x texture coordinate (should be [0, 1]).
ty	double The y texture coordinate (should be [0, 1]).
v	Vec2 The relative window coordinates of the vertex (should be within the window dimensions).

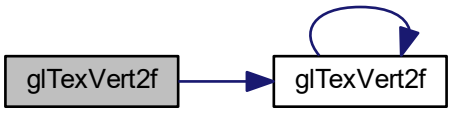
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.16.1.5 glTexVert2f() [4/4]

```
void glTexVert2f (
            Vec2 t,
            Vec2 v )
```

Draws a 2D textured vertex.

Parameters

t	Vec2 The texture coordinates (both should be [0, 1]).
v	Vec2 The relative window coordinates (should be within the window dimensions).

Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

10.16.1.6 glTexVert3f() [1/4]

```
void glTexVert3f (
            double tx,
            double ty,
            double vx,
            double vy,
            double vz )
```

Draws a 2D textured vertex.

Parameters

tx	double The x texture coordinates (should be [0, 1]).
ty	double The y texture coordinates (should be [0, 1]).
vx	double The x world coordinate of the vertex.
vy	double The y world coordinate of the vertex.
vz	double The z world coordinate of the vertex.

Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:

10.16.1.7 glTexVert3f() [2/4]

```
void glTexVert3f (
            Vec2 t,
            double vx,
            double vy,
            double vz )
```

Draws a 2D textured vertex.

Parameters

t	Vec2 The texture coordinates (both should be [0, 1]).
vx	double The x world coordinate of the vertex.
vy	double The y world coordinate of the vertex.
vz	double The z world coordinate of the vertex.

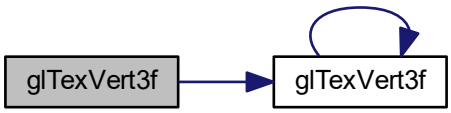
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.16.1.8 glTexVert3f() [3/4]

```
void glTexVert3f (
            double tx,
            double ty,
            Vec v )
```

Draws a 2D textured vertex.

Parameters

tx	double The texture x coordinates (both should be [0, 1]).
ty	double The texture y coordinates (both should be [0, 1]).
v	Vec3 The world coordinates of the vertex.

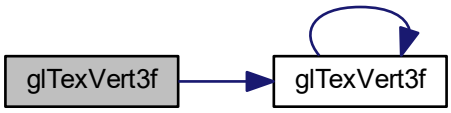
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.16.1.9 glTexVert3f() [4/4]

```
void glTexVert3f (
            Vec2 t,
            Vec v )
```

Draws a 3D textured vertex.

Parameters

t	Vec2 The texture coordinates (both should be [0, 1]).
v	Vec3 The world coordinates of the vertex.

Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

10.16.1.10 saveScreenShot()

```
void saveScreenShot ( )
```

Saves the current scene as a .png and stores it in the screenshots folder.

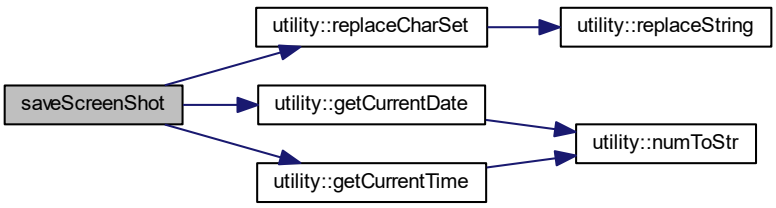
Returns

void

Note

Although it is saved as a .png, the SOIL implementation saves it as a BMP. This doesn't seem to cause any problems.

Here is the call graph for this function:

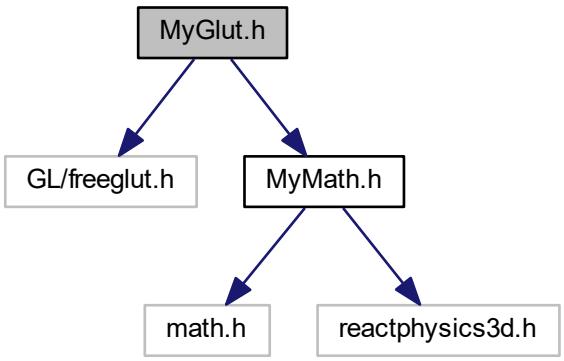


10.17 MyGlut.h File Reference

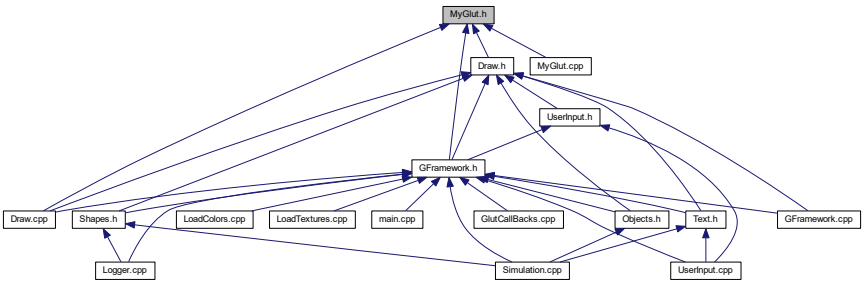
This file contains some useful extension for glut.

```
#include <GL/freeglut.h>
#include "MyMath.h"
```

Include dependency graph for MyGlut.h:



This graph shows which files directly or indirectly include this file:



Typedefs

- typedef GLuint Tex

  Used to refer to textures (used in the SOIL library).

Functions

- Tex glLoadTexture (std::string fileName)

  Loads a texture using SOIL and returns a reference to it.
- void saveScreenShot ()

  Saves the current scene as a .png and stores it in the screenshots folder.
- void glTexVert2f (Vec2 t, Vec2 v)

  Draws a 2D textured vertex.
- void glTexVert2f (double tx, double ty, Vec2 v)

  Draws a 2D textured vertex.
- void glTexVert2f (Vec2 t, double vx, double vy)

  Draws a 2D textured vertex.
- void glTexVert2f (double tx, double ty, double vx, double vy)

  Draws a 2D textured vertex.
- void glTexVert3f (Vec2 t, Vec v)

  Draws a 3D textured vertex.
- void glTexVert3f (double tx, double ty, Vec v)

  Draws a 2D textured vertex.
- void glTexVert3f (Vec2 t, double vx, double vy, double vz)

  Draws a 2D textured vertex.
- void glTexVert3f (double tx, double ty, double vx, double vy, double vz)

  Draws a 2D textured vertex.

10.17.1 Detailed Description

This file contains some useful extension for glut.

Specifically SOIL and texture wrappers which make certain tasks much easier.

10.17.2 Typedef Documentation

10.17.2.1 Tex

```
typedef GLuint Tex
```

Used to refer to textures (used in the SOIL library).

10.17.3 Function Documentation

10.17.3.1 glLoadTexture()

```
Tex glLoadTexture (
            std::string fileName )
```

Loads a texture using SOIL and returns a reference to it.

Parameters

fileName	std::string The name (path) of the image file to be loaded.

Returns

Tex The reference to the texture.

10.17.3.2 glTexVert2f() [1/4]

```
void glTexVert2f (
            Vec2 t,
            Vec2 v )
```

Draws a 2D textured vertex.

Parameters

t	Vec2 The texture coordinates (both should be [0, 1]).
v	Vec2 The relative window coordinates (should be within the window dimensions).

Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

10.17.3.3 glTexVert2f() [2/4]

```
void glTexVert2f (
            double tx,
            double ty,
            Vec2 v )
```

Draws a 2D textured vertex.

Parameters

tx	double The x texture coordinate (should be [0, 1]).
ty	double The y texture coordinate (should be [0, 1]).
v	Vec2 The relative window coordinates of the vertex (should be within the window dimensions).

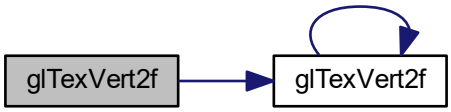
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.17.3.4 glTexVert2f() [3/4]

```
void glTexVert2f (
            Vec2 t,
            double vx,
            double vy )
```

Draws a 2D textured vertex.

Parameters

t	Vec2 The texture coordinates (both should be [0, 1]).
vx	double The relative window x coordinate of the vertex (should be within the window width).
vy	double The relative window y coordinates of the vertex (should be within the window height).

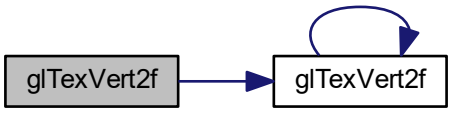
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.17.3.5 glTexVert2f() [4/4]

```
void glTexVert2f (
            double tx,
            double ty,
            double vx,
            double vy )
```

Draws a 2D textured vertex.

Parameters

tx	double The x texture coordinate (should be [0, 1]).
ty	double The y texture coordinate (should be [0, 1]).
vx	double The relative window x coordinate of the vertex (should be within the window width).
vy	double The relative window y coordinates of the vertex (should be within the window height).

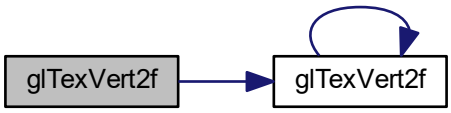
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.17.3.6 glTexVert3f() [1/4]

```
void glTexVert3f (
            Vec2 t,
            Vec v )
```

Draws a 3D textured vertex.

Parameters

t	Vec2 The texture coordinates (both should be [0, 1]).
v	Vec3 The world coordinates of the vertex.

Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

10.17.3.7 glTexVert3f() [2/4]

```
void glTexVert3f (
            double tx,
            double ty,
            Vec v )
```

Draws a 2D textured vertex.

Parameters

tx	double The texture x coordinates (both should be [0, 1]).
ty	double The texture y coordinates (both should be [0, 1]).
v	Vec3 The world coordinates of the vertex.

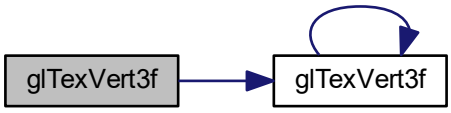
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.17.3.8 glTexVert3f() [3/4]

```
void glTexVert3f (
            Vec2 t,
            double vx,
            double vy,
            double vz )
```

Draws a 2D textured vertex.

Parameters

t	Vec2 The texture coordinates (both should be [0, 1]).
vx	double The x world coordinate of the vertex.
vy	double The y world coordinate of the vertex.
vz	double The z world coordinate of the vertex.

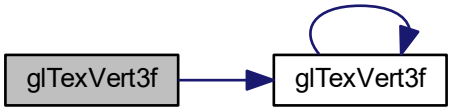
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.17.3.9 glTexVert3f() [4/4]

```
void glTexVert3f (
             double tx,
             double ty,
             double vx,
             double vy,
             double vz )
```

Draws a 2D textured vertex.

Parameters

tx	double The x texture coordinates (should be [0, 1]).
ty	double The y texture coordinates (should be [0, 1]).
vx	double The x world coordinate of the vertex.
vy	double The y world coordinate of the vertex.
vz	double The z world coordinate of the vertex.

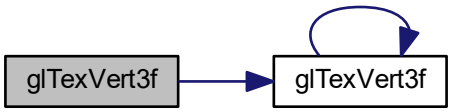
Returns

void

Note

No bounds checking on input parameters since shapes might start out of bounds for a reason, but still be drawn in the scene.

Here is the call graph for this function:



10.17.3.10 saveScreenShot()

```
void saveScreenShot ( )
```

Saves the current scene as a .png and stores it in the screenshots folder.

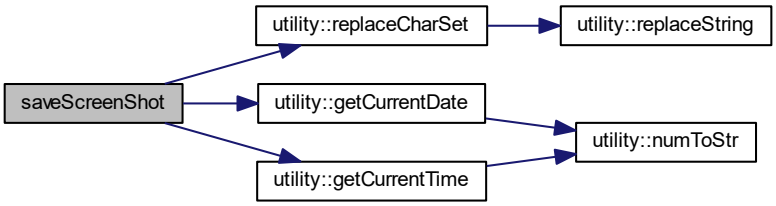
Returns

void

Note

Although it is saved as a .png, the SOIL implementation saves it as a BMP. This doesn't seem to cause any problems.

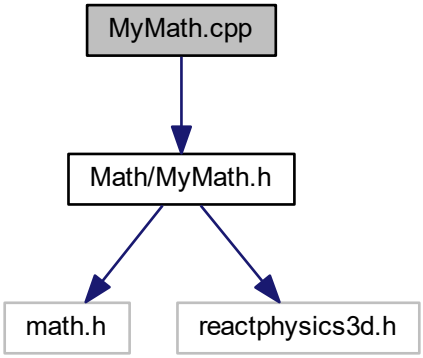
Here is the call graph for this function:



10.18 MyMath.cpp File Reference

```
#include "Math/MyMath.h"
```

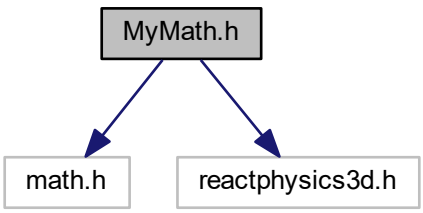
Include dependency graph for MyMath.cpp:



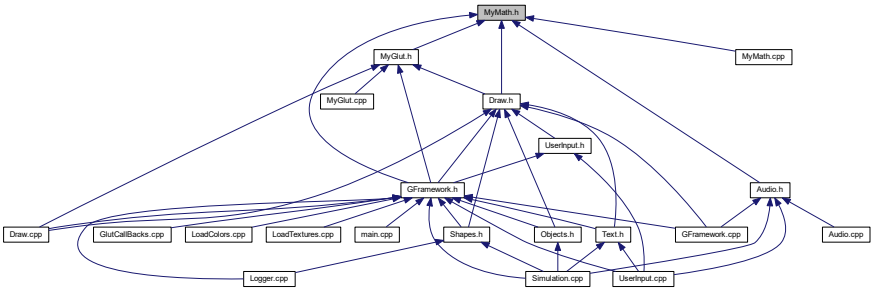
10.19 MyMath.h File Reference

```
#include <math.h>
#include "reactphysics3d.h"
```

Include dependency graph for MyMath.h:



This graph shows which files directly or indirectly include this file:



Macros

- #define PI 3.14159265358979323846

Typedefs

- typedef reactphysics3d::Matrix3x3 Matrix
- typedef reactphysics3d::Matrix2x2 Matrix2
- typedef reactphysics3d::Vector3 Vec
- typedef reactphysics3d::Vector2 Vec2

10.19.1 Macro Definition Documentation

10.19.1.1 PI

```
#define PI 3.14159265358979323846
```

10.19.2 Typedef Documentation

10.19.2.1 Matrix

```
typedef reactphysics3d::Matrix3x3 Matrix
```

10.19.2.2 Matrix2

```
typedef reactphysics3d::Matrix2x2 Matrix2
```

10.19.2.3 Vec

```
typedef reactphysics3d::Vector3 Vec
```

10.19.2.4 Vec2

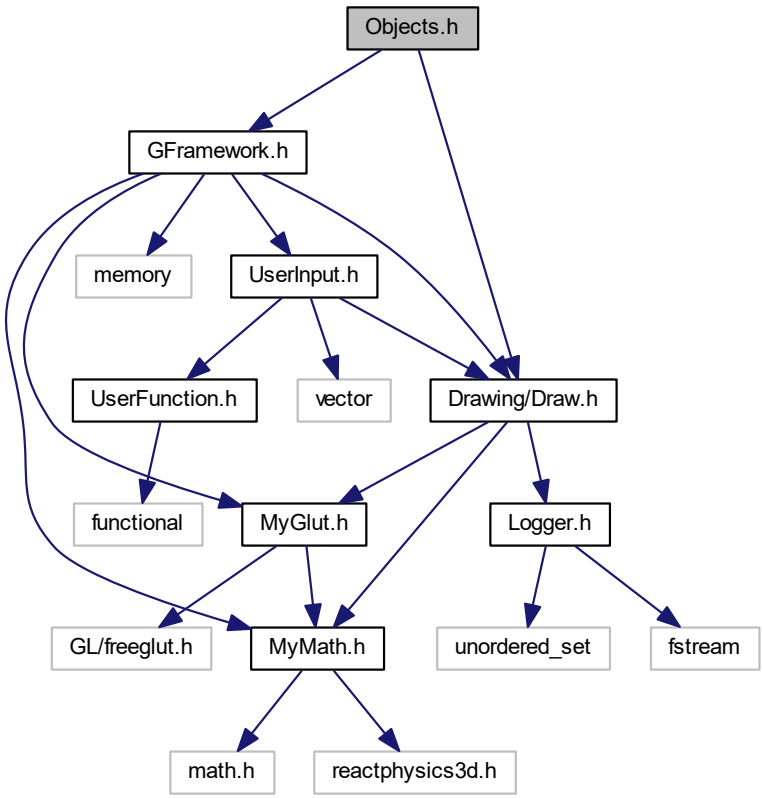
```
typedef reactphysics3d::Vector2 Vec2
```

10.20 Objects.cpp File Reference

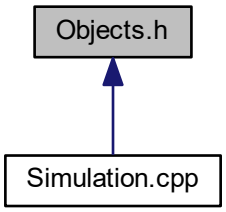
10.21 Objects.h File Reference

```
#include "Drawing/Draw.h"
#include "GFramework.h"
```

Include dependency graph for Objects.h:



This graph shows which files directly or indirectly include this file:



Classes

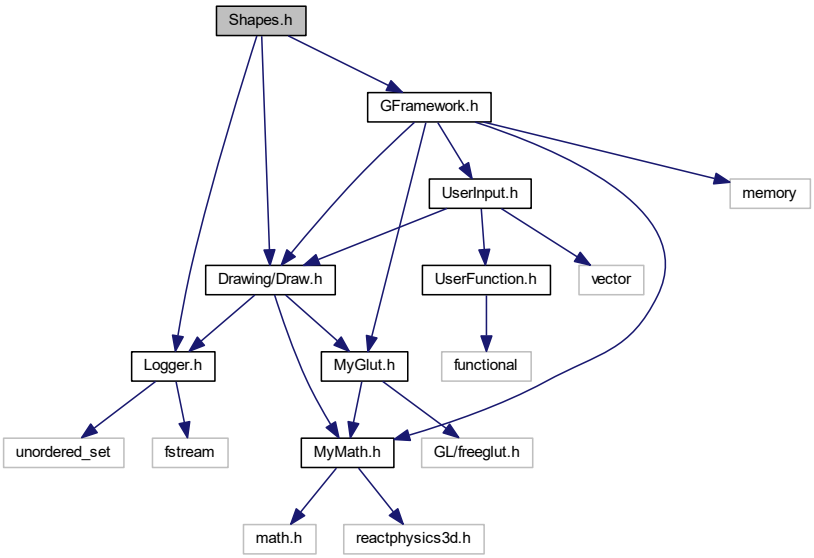
- struct DrawMySpecificObject< A >

10.22 Shapes.cpp File Reference

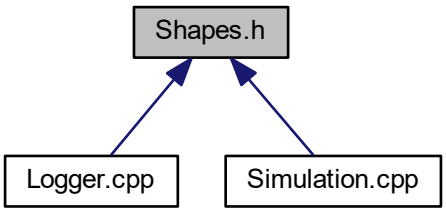
10.23 Shapes.h File Reference

```
#include "Drawing/Draw.h"
#include "Logger.h"
#include "GFramework.h"
```

Include dependency graph for Shapes.h:



This graph shows which files directly or indirectly include this file:



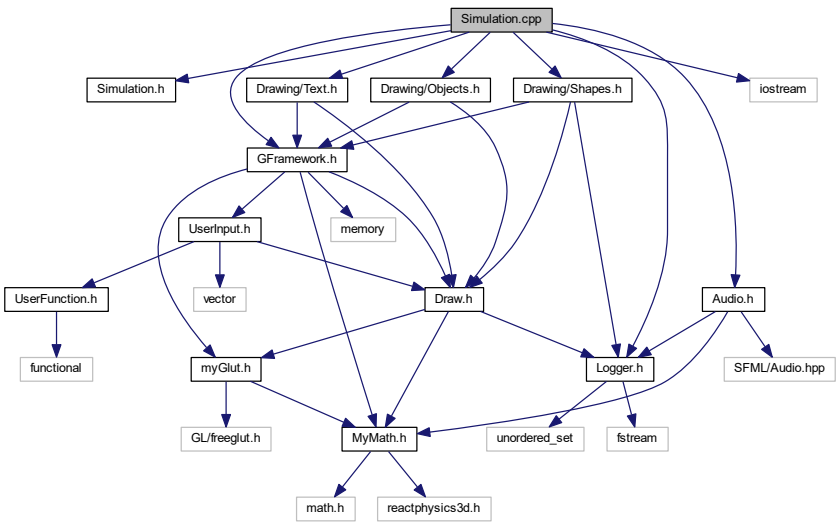
Classes

- struct DrawRectangle< A >
- struct DrawCircle< A >
- struct DrawPlane< A >

10.24 Simulation.cpp File Reference

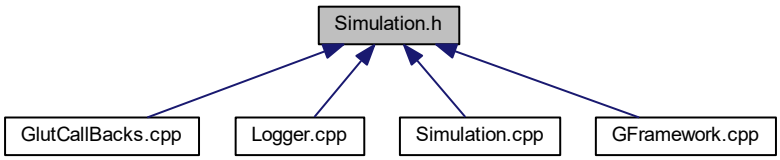
```
#include "Simulation.h"
#include "GFramework.h"
#include "Drawing/Shapes.h"
#include "Drawing/Text.h"
#include "Drawing/Objects.h"
#include "Logger.h"
#include "Audio.h"
#include <iostream>
```

Include dependency graph for Simulation.cpp:



10.25 Simulation.h File Reference

This graph shows which files directly or indirectly include this file:



Classes

- class Simulation

Enumerations

- enum GameMode : unsigned int { GameMode::MAIN_MENU, GameMode::SIMULATION }
- enum InputType : unsigned int { InputType::DEFAULT, InputType::BLOCKING_MESSAGE, InputType::FATAL_MESSAGE, InputType::NUMERIC_INPUT, InputType::ALPHA_NUMERIC_INPUT }

10.25.1 Enumeration Type Documentation

10.25.1.1 GameMode

```
enum GameMode :  unsigned int  [strong]
```

Enumerator

MAIN_MENU	
SIMULATION	

10.25.1.2 InputType

```
enum InputType :  unsigned int  [strong]
```

Enumerator

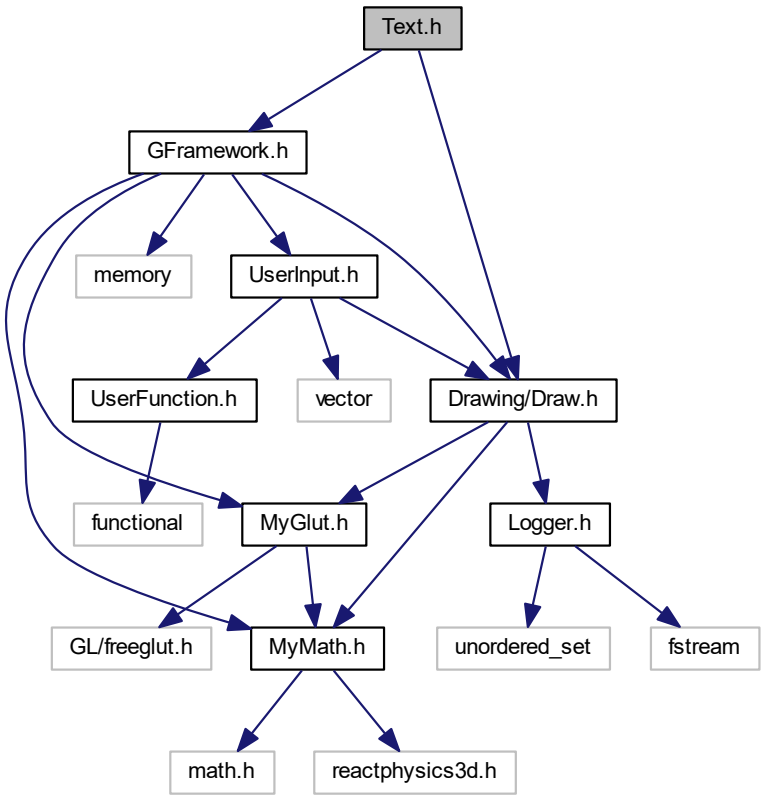
DEFAULT	
BLOCKING_MESSAGE	
FATAL_MESSAGE	
NUMERIC_INPUT	
ALPHA_NUMERIC_INPUT	

10.26 Text.cpp File Reference

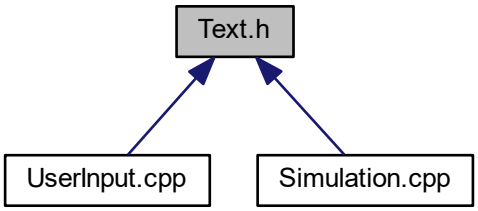
10.27 Text.h File Reference

```
#include "Drawing/Draw.h"
#include "GFramework.h"
```

Include dependency graph for Text.h:



This graph shows which files directly or indirectly include this file:



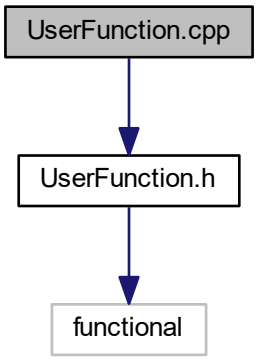
Classes

- struct DrawString< A >

10.28 UserFunction.cpp File Reference

```
#include "UserFunction.h"
```

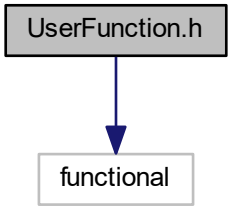
Include dependency graph for UserFunction.cpp:



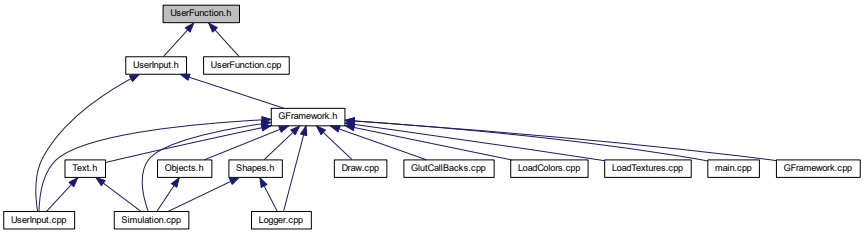
10.29 UserFunction.h File Reference

```
#include <functional>
```

Include dependency graph for UserFunction.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct UserFunction

Macros

- #define ESC (char) 27
- #define TAB (char) 9
- #define BACKSPACE (char) 8
- #define ENTER (char) 13

Typedefs

- typedef std::function< void()> Action

10.29.1 Macro Definition Documentation

10.29.1.1 BACKSPACE

```
#define BACKSPACE (char) 8
```

10.29.1.2 ENTER

```
#define ENTER (char) 13
```

10.29.1.3 ESC

```
#define ESC (char) 27
```

10.29.1.4 TAB

```
#define TAB (char) 9
```

10.29.2 Typedef Documentation

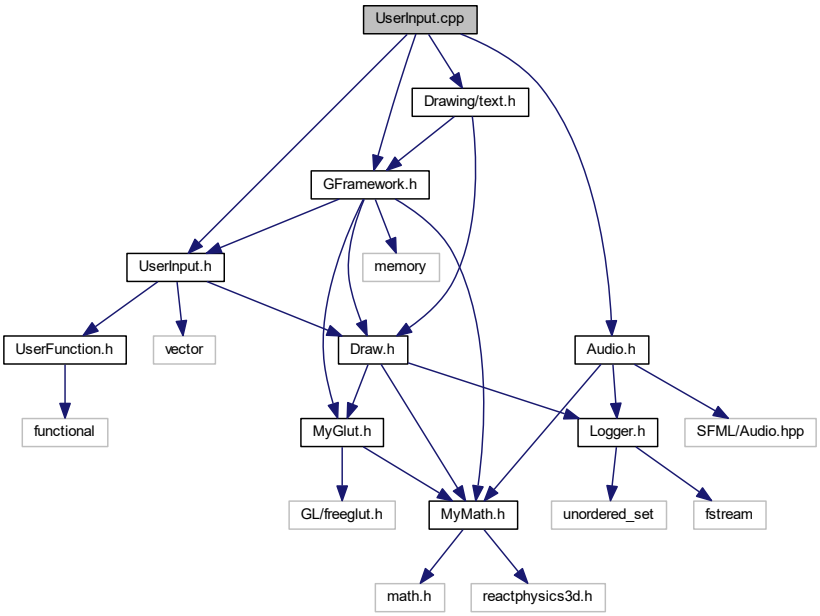
10.29.2.1 Action

```
typedef std::function<void()> Action
```

10.30 UserInput.cpp File Reference

```
#include "UserInput.h"
#include "GFramework.h"
#include "Drawing/text.h"
#include "Audio.h"
```

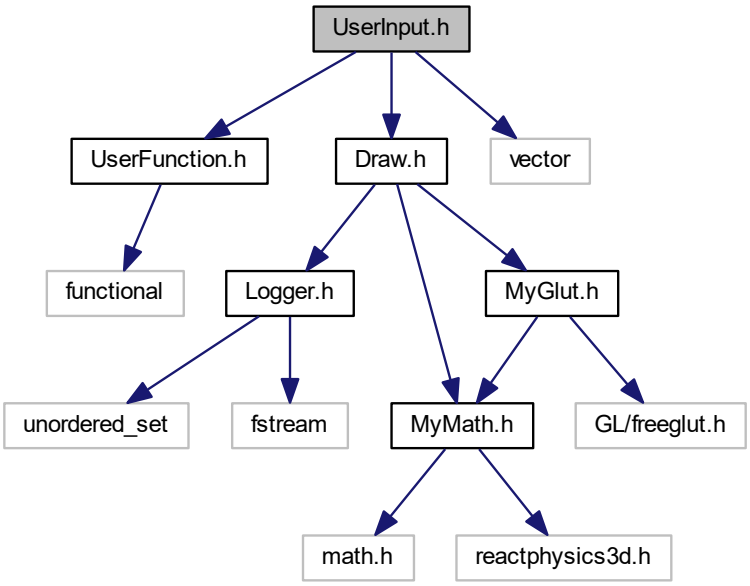
Include dependency graph for UserInput.cpp:



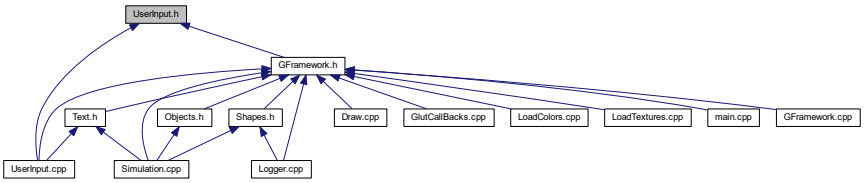
10.31 UserInput.h File Reference

```
#include "UserFunction.h"
#include "Draw.h"
#include <vector>
```

Include dependency graph for UserInput.h:



This graph shows which files directly or indirectly include this file:



Classes

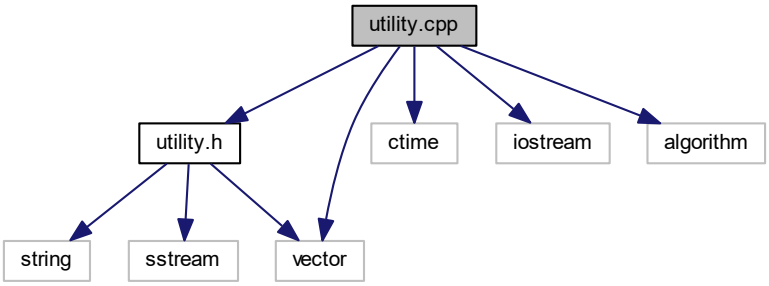
- class UserInput

10.32 utility.cpp File Reference

```
#include "utility.h"
#include <ctime>
#include <vector>
#include <iostream>
```

```
#include <algorithm>
```

Include dependency graph for utility.cpp:



Namespaces

- utility

  This namespace contains functions which you might expect to be standard in cpp.

Functions

- std::string utility::toUpper (std::string str)

  Converts a std::string to upper case.
- std::string utility::toLower (std::string str)

  Converts a std::string to lower case.
- std::string utility::replaceString (std::string subject, const std::string &search, const std::string &replace)

  Returns a string with the desired text replaced.
- std::string utility::replaceCharSet (std::string subject, const std::string &charSet, const std::string &replace)

  Replaces a set of characters with a string.
- std::vector< std::string > utility::split (std::string stringToBeSplit, std::string delimiter)

  Splits a string based on a supplied delimiter.
- std::string utility::getCurrentDate ()

  Returns the current date.
- std::string utility::getCurrentTime ()

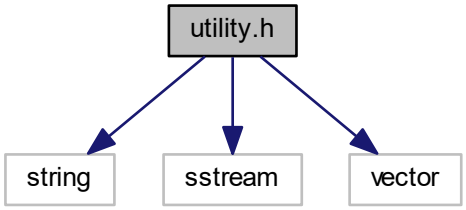
  Returns the current time.

10.33 utility.h File Reference

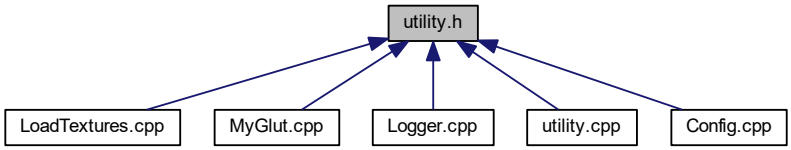
```
#include <string>
#include <sstream>
```

```
#include <vector>
```

Include dependency graph for utility.h:



This graph shows which files directly or indirectly include this file:



Namespaces

- utility

  This namespace contains functions which you might expect to be standard in cpp.

Functions

- std::string utility::toUpper (std::string str)

  Converts a std::string to upper case.
- std::string utility::toLower (std::string str)

  Converts a std::string to lower case.
- std::string utility::replaceString (std::string subject, const std::string &search, const std::string &replace)

  Returns a string with the desired text replaced.
- std::string utility::replaceCharSet (std::string subject, const std::string &charSet, const std::string &replace)

  Replaces a set of characters with a string.
- template<typename T >
  std::string utility::numToStr (T Number)

  Returns a number as its string representation.
- std::vector< std::string > utility::split (std::string stringToBeSplit, std::string delimiter)

  Splits a string based on a supplied delimiter.
- std::string utility::getCurrentTime ()

  Returns the current time.
- std::string utility::getCurrentDate ()

  Returns the current date.

10.34 version.h File Reference

Namespaces

- AutoVersion

Macros

- #define RC_FILEVERSION 0,0,0,0
- #define RC_FILEVERSION_STRING "0, 0, 0, 0\0"

Variables

- static const char AutoVersion::DATE [ ] = "24"
- static const char AutoVersion::MONTH [ ] = "01"
- static const char AutoVersion::YEAR [ ] = "2018"
- static const char AutoVersion::UBUNTU_VERSION_STYLE [ ] = "18.01"
- static const char AutoVersion::STATUS [ ] = "Alpha"
- static const char AutoVersion::STATUS_SHORT [ ] = "a"
- static const long AutoVersion::MAJOR = 0
- static const long AutoVersion::MINOR = 0
- static const long AutoVersion::BUILD = 0
- static const long AutoVersion::REVISION = 0
- static const long AutoVersion::BUILDS_COUNT = 1
- static const char AutoVersion::FULLVERSION_STRING [ ] = "0.0.0.0"
- static const long AutoVersion::BUILD_HISTORY = 0

10.34.1 Macro Definition Documentation

10.34.1.1 RC_FILEVERSION

```
#define RC_FILEVERSION 0,0,0,0
```

10.34.1.2 RC_FILEVERSION_STRING

```
#define RC_FILEVERSION_STRING "0, 0, 0, 0\0"
```

Index