Raytracer Project

0.1

Generated by Doxygen 1.8.14

Contents

Chapter 1

README

This projects goal is to make a simple raytracer with only cubes as 3D models.

Example image

Build

Build the project : make -> Builds the main program (-O3). make run -> Builds and runs the main program (-O3).

make debug -> Builds the main program in debug mode (-g -O0)

make clean -> Cleans the trash files created by make and the main program.

make doc -> Make the html and latex documentation html is in "html/index.html" latex is in "latex/refman.pdf"

Usage

The usage is juste ./main for now.

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Chapter 2

Namespace Index

2.1 Namespace List

Here is a list of all namespaces with brief descriptions:

Chapter 3

Hierarchical Index

3.1 Class Hierarchy

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

Chapter 4

Class Index

4.1 Class List

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

Chapter 5

File Index

5.1 File List

Here is a list of all files with brief descriptions:

Chapter 6

Namespace Documentation

6.1 gameobj Namespace Reference

Classes

- class AmbientLight
- class Cube
- class DirectionalLight
- class FlatShapable
- class Lightable
- class Plan
- class PointLight
- class Shapable
- class Square

6.2 gameui Namespace Reference

Classes

- class UIScreen

  Class to interacte with the user visual output.

Enumerations

- enum WINDOWPARAM { NO_FULLSCREEN = 0, FULLSCREEN = 1, FULLSCREEN_DESKTOP = 2, BORDERLESS = 4 }

  Posible parameters for a window.

6.2.1 Enumeration Type Documentation

6.2.1.1 WINDOWPARAM

`enum gameui::WINDOWPARAM`

Posible parameters for a window.

Enumerator

NO_FULLSCREEN	Size the window to a fixed resolution
FULLSCREEN	Size the window fullscreen but don't change resolution
FULLSCREEN_DESKTOP	Size the window fullscreen and change resolution to sceen resolution
BORDERLESS	Make a borderless window

6.3 raytracer Namespace Reference

Classes

- class Camera
- class Color
- class Landmark
- class Ray
- class Screen
- class Vect2
- class Vect3

Functions

- Color operator∗ (const float num, const Color &color)
- void rotateX (Vect3 &vect, const float angle)
- void rotateY (Vect3 &vect, const float angle)
- void rotateZ (Vect3 &vect, const float angle)
- Vect3 applyAngle (Vect3 &vect, const Vect3 &angles)
- Vect3 vectorFromAngles (const Vect3 &angles)
- Vect3 getAngles (const Vect3 &v1, const Vect3 &v2)
- Vect3 vectorFromPoints (const Vect3 &v1, const Vect3 &v2)
- std::vector< Ray > genRays (const Camera &cam, const Screen &screen)
- int closerToOrigin (Vect3 origin, Vect3 point1, Vect3 point2)
- std::vector< Color > renderFrame (const std::vector< gameobj::Shapable ∗> &objects, const std::vector< Ray > &rays, const std::vector< gameobj::Lightable ∗> &lightList)
- Vect3 operator∗ (const float num, const Vect3 &vect)

  Overload of the product multiplication between a float and a vector.
- Vect2 operator∗ (const float num, const Vect2 &vect)

Variables

- const float pi = std::acos(-1)

6.3.1 Function Documentation

6.3.1.1 applyAngle()

```
raytracer::Vect3 raytracer::applyAngle (
            raytracer::Vect3 & vect,
            const Vect3 & angles )
```

6.3.1.2 closerToOrigin()

```
int raytracer::closerToOrigin (
            raytracer::Vect3 origin,
            raytracer::Vect3 point1,
            raytracer::Vect3 point2 )
```

6.3.1.3 genRays()

```
std::vector< raytracer::Ray > raytracer::genRays (
            const Camera & cam,
            const Screen & screen )
```

6.3.1.4 getAngles()

```
raytracer::Vect3 raytracer::getAngles (
            const Vect3 & v1,
            const Vect3 & v2 )
```

6.3.1.5 operator∗() [1/3]

```
raytracer::Color raytracer::operator* (
            const float num,
            const Color & color )
```

6.3.1.6 operator∗() [2/3]

```
raytracer::Vect3 raytracer::operator* (
            const float num,
            const Vect3 & vect )
```

Overload of the product multiplication between a float and a vector.

Parameters

num	the float to multiply with the vector.
vect	the vector to multiply with the float.

Returns

A new vector.

6.3.1.7 operator*() [3/3]

```
raytracer::Vect2 raytracer::operator* (
            const float num,
            const Vect2 & vect )
```

6.3.1.8 renderFrame()

```
std::vector< raytracer::Color > raytracer::renderFrame (
            const std::vector< gameobj::Shapable *> & objects,
            const std::vector< Ray > & rays,
            const std::vector< gameobj::Lightable *> & lightList )
```

6.3.1.9 rotateX()

```
void raytracer::rotateX (
            raytracer::Vect3 & vect,
            const float angle )
```

6.3.1.10 rotateY()

```
void raytracer::rotateY (
            raytracer::Vect3 & vect,
            const float angle )
```

6.3.1.11 rotateZ()

```
void raytracer::rotateZ (
            raytracer::Vect3 & vect,
            const float angle )
```

6.3.1.12 vectorFromAngles()

```
raytracer::Vect3 raytracer::vectorFromAngles (
            const Vect3 & angles )
```

6.3.1.13 vectorFromPoints()

```
raytracer::Vect3 raytracer::vectorFromPoints (
            const Vect3 & v1,
            const Vect3 & v2 )
```

6.3.2 Variable Documentation

6.3.2.1 pi

```
const float raytracer::pi = std::acos(-1)
```

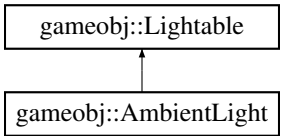
Chapter 7

Class Documentation

7.1 gameobj::AmbientLight Class Reference

`#include <ambientlight.hh>`

Inheritance diagram for gameobj::AmbientLight:



Public Member Functions

- AmbientLight (const raytracer::Color &color, const float brightness)
- raytracer::Color getColor () const
- float getBrightness () const
- void setColor (const raytracer::Color &color)
- void setBrightness (const float brightness)
- virtual raytracer::Color interact (const std::vector< Shapable * > &obj, const raytracer::Vect3 &point, const FlatShapable &) const override

Private Attributes

- raytracer::Color color_
- float brightness_

7.1.1 Constructor & Destructor Documentation

7.1.1.1 AmbientLight()

```
gameobj::AmbientLight::AmbientLight (
            const raytracer::Color & color,
            const float brightness )
```

7.1.2 Member Function Documentation

7.1.2.1 getBrightness()

```
float gameobj::AmbientLight::getBrightness ( ) const
```

7.1.2.2 getColor()

```
raytracer::Color gameobj::AmbientLight::getColor ( ) const
```

7.1.2.3 interact()

```
raytracer::Color gameobj::AmbientLight::interact (
            const std::vector< Shapable *> & obj,
            const raytracer::Vect3 & point,
            const FlatShapable & obj ) const  [override], [virtual]
```

Implements gameobj::Lightable.

7.1.2.4 setBrightness()

```
void gameobj::AmbientLight::setBrightness (
            const float brightness )
```

7.1.2.5 setColor()

```
void gameobj::AmbientLight::setColor (
            const raytracer::Color & color )
```

7.1.3 Member Data Documentation

7.1.3.1 brightness_

```
float gameobj::AmbientLight::brightness_  [private]
```

7.1.3.2 color_

```
raytracer::Color gameobj::AmbientLight::color_  [private]
```

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

- includes/gameobj/ambientlight.hh
- src/gameobj/ambientlight.cc

7.2 raytracer::Camera Class Reference

```
#include <camera.hh>
```

Public Member Functions

- Camera ()
- Camera (Vect3 pos, Vect3 angleVect, float viewAngle)
- Vect3 getPos () const
- Vect3 getAng () const
- float getViewAngle () const

Private Attributes

- Vect3 pos_
- Vect3 angleVect_
- float viewAngle_

7.2.1 Constructor & Destructor Documentation

7.2.1.1 Camera() [1/2]

```
raytracer::Camera::Camera ( )
```

7.2.1.2 Camera() [2/2]

```
raytracer::Camera::Camera (
            raytracer::Vect3 pos,
            raytracer::Vect3 angleVect,
            float viewAngle = raytracer::pi / 2 )
```

7.2.2 Member Function Documentation

7.2.2.1 getAng()

```
raytracer::Vect3 raytracer::Camera::getAng ( ) const
```

7.2.2.2 getPos()

```
raytracer::Vect3 raytracer::Camera::getPos ( ) const
```

7.2.2.3 getViewAngle()

```
float raytracer::Camera::getViewAngle ( ) const
```

7.2.3 Member Data Documentation

7.2.3.1 angleVect_

```
Vect3 raytracer::Camera::angleVect_  [private]
```

7.2.3.2 pos_

```
Vect3 raytracer::Camera::pos_  [private]
```

7.2.3.3 viewAngle_

```
float raytracer::Camera::viewAngle_  [private]
```

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

- includes/raytracer/camera.hh
- src/raytracer/camera.cc

7.3 raytracer::Color Class Reference

```
#include <color.hh>
```

Public Member Functions

- Color ()
- Color (const float r, const float g, const float b)
- float getR () const
- float getG () const
- float getB () const
- void setR (const float v)
- void setG (const float v)
- void setB (const float v)
- void normalize ()
- Color operator+ (const Color &other) const
- Color operator+= (const Color &other)
- Color operator- (const Color &other) const
- Color operator∗ (const float other) const
- Color operator∗ (const Color &other) const

Private Attributes

- float r_
- float g_
- float b_

Friends

- Color operator∗ (const float num, const Color &color)

7.3.1 Constructor & Destructor Documentation

7.3.1.1 Color() [1/2]

```
raytracer::Color::Color ( )
```

7.3.1.2 Color() [2/2]

```
raytracer::Color::Color (
            const float r,
            const float g,
            const float b )
```

7.3.2 Member Function Documentation

7.3.2.1 getB()

```
float raytracer::Color::getB ( ) const
```

7.3.2.2 getG()

```
float raytracer::Color::getG ( ) const
```

7.3.2.3 getR()

```
float raytracer::Color::getR ( ) const
```

7.3.2.4 normalize()

```
void raytracer::Color::normalize ( )
```

7.3.2.5 operator∗() [1/2]

```
raytracer::Color raytracer::Color::operator* (
            const float other ) const
```

7.3.2.6 operator*() [2/2]

```
raytracer::Color raytracer::Color::operator* (
            const Color & other ) const
```

7.3.2.7 operator+()

```
raytracer::Color raytracer::Color::operator+ (
            const Color & other ) const
```

7.3.2.8 operator+=()

```
raytracer::Color raytracer::Color::operator+= (
            const Color & other )
```

7.3.2.9 operator-()

```
raytracer::Color raytracer::Color::operator- (
            const Color & other ) const
```

7.3.2.10 setB()

```
void raytracer::Color::setB (
            const float v )
```

7.3.2.11 setG()

```
void raytracer::Color::setG (
            const float v )
```

7.3.2.12 setR()

```
void raytracer::Color::setR (
            const float v )
```

7.3.3 Friends And Related Function Documentation

7.3.3.1 operator*

```
Color operator* (
            const float num,
            const Color & color )  [friend]
```

7.3.4 Member Data Documentation

7.3.4.1 b_

```
float raytracer::Color::b_  [private]
```

7.3.4.2 g_

```
float raytracer::Color::g_  [private]
```

7.3.4.3 r_

```
float raytracer::Color::r_  [private]
```

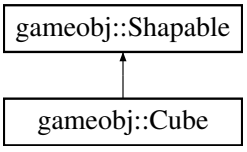
The documentation for this class was generated from the following files:

- includes/raytracer/color.hh
- src/raytracer/color.cc

7.4 gameobj::Cube Class Reference

```
#include <cube.hh>
```

Inheritance diagram for gameobj::Cube:



Public Member Functions

- Cube (const raytracer::Vect3 &center, const float side, const raytracer::Vect3 &angles, const raytracer::Color &color)
- raytracer::Vect3 getCenter () const
- float getSide () const
- raytracer::Vect3 getAngles () const
- raytracer::Landmark getLandmark () const
- raytracer::Color getColor () const
- virtual std::optional< std::tuple< raytracer::Vect3, raytracer::Vect2, FlatShapable * > > intersecte (const raytracer::Ray &ray) override

Private Attributes

- raytracer::Vect3 center_
- float side_
- raytracer::Vect3 angles_
- raytracer::Landmark landmark_
- std::vector< Square > squares_

7.4.1 Constructor & Destructor Documentation

7.4.1.1 Cube()

```
gameobj::Cube::Cube (
            const raytracer::Vect3 & center,
            const float side,
            const raytracer::Vect3 & angles,
            const raytracer::Color & color )
```

7.4.2 Member Function Documentation

7.4.2.1 getAngles()

```
raytracer::Vect3 gameobj::Cube::getAngles ( ) const
```

7.4.2.2 getCenter()

```
raytracer::Vect3 gameobj::Cube::getCenter ( ) const
```

7.4.2.3 getColor()

```
raytracer::Color gameobj::Cube::getColor ( ) const  [virtual]
```

Implements gameobj::Shapable.

7.4.2.4 getLandmark()

```
raytracer::Landmark gameobj::Cube::getLandmark ( ) const
```

7.4.2.5 getSide()

```
float gameobj::Cube::getSide ( ) const
```

7.4.2.6 intersecte()

```
std::optional< std::tuple< raytracer::Vect3, raytracer::Vect2, gameobj::FlatShapable * > >
gameobj::Cube::intersecte (
            const raytracer::Ray & ray )  [override], [virtual]
```

Implements gameobj::Shapable.

7.4.3 Member Data Documentation

7.4.3.1 angles_

```
raytracer::Vect3 gameobj::Cube::angles_  [private]
```

7.4.3.2 center_

```
raytracer::Vect3 gameobj::Cube::center_  [private]
```

7.4.3.3 landmark_

```
raytracer::Landmark gameobj::Cube::landmark_  [private]
```

7.4.3.4 side_

```
float gameobj::Cube::side_  [private]
```

7.4.3.5 squares_

```
std::vector<Square> gameobj::Cube::squares_  [private]
```

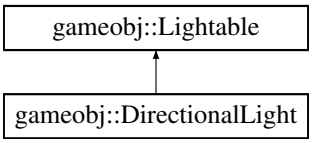
The documentation for this class was generated from the following files:

- includes/gameobj/cube.hh
- src/gameobj/cube.cc

7.5 gameobj::DirectionalLight Class Reference

```
#include <dirlight.hh>
```

Inheritance diagram for gameobj::DirectionalLight:



Public Member Functions

- DirectionalLight (const raytracer::Vect3 &dir, const raytracer::Color &color, const float brightness)
- raytracer::Vect3 getDir () const
- raytracer::Color getColor () const
- float getBrightness () const
- void setDir (const raytracer::Vect3 &dir)
- void setColor (const raytracer::Color &color)
- void setBrightness (const float brightness)
- virtual raytracer::Color interact (const std::vector< Shapable * > &obj, const raytracer::Vect3 &point, const FlatShapable &) const override

Private Attributes

- raytracer::Vect3 dir_
- raytracer::Color color_
- float brightness_

7.5.1 Constructor & Destructor Documentation

7.5.1.1 DirectionalLight()

```
gameobj::DirectionalLight::DirectionalLight (
            const raytracer::Vect3 & dir,
            const raytracer::Color & color,
            const float brightness )
```

7.5.2 Member Function Documentation

7.5.2.1 getBrightness()

```
float gameobj::DirectionalLight::getBrightness ( ) const
```

7.5.2.2 getColor()

```
raytracer::Color gameobj::DirectionalLight::getColor ( ) const
```

7.5.2.3 getDir()

```
raytracer::Vect3 gameobj::DirectionalLight::getDir ( ) const
```

7.5.2.4 interact()

```
raytracer::Color gameobj::DirectionalLight::interact (
            const std::vector< Shapable *> & obj,
            const raytracer::Vect3 & point,
            const FlatShapable &  ) const  [override], [virtual]
```

Implements gameobj::Lightable.

7.5.2.5 setBrightness()

```
void gameobj::DirectionalLight::setBrightness (
            const float brightness )
```

7.5.2.6 setColor()

```
void gameobj::DirectionalLight::setColor (
            const raytracer::Color & color )
```

7.5.2.7 setDir()

```
void gameobj::DirectionalLight::setDir (
            const raytracer::Vect3 & dir )
```

7.5.3 Member Data Documentation

7.5.3.1 brightness_

```
float gameobj::DirectionalLight::brightness_  [private]
```

7.5.3.2 color_

```
raytracer::Color gameobj::DirectionalLight::color_  [private]
```

7.5.3.3 dir_

```
raytracer::Vect3 gameobj::DirectionalLight::dir_  [private]
```

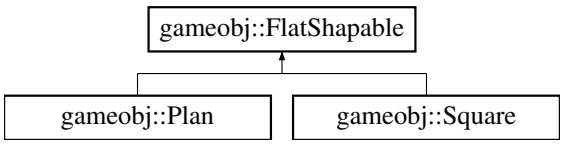
The documentation for this class was generated from the following files:

- includes/gameobj/dirlight.hh
- src/gameobj/dirlight.cc

7.6 gameobj::FlatShapable Class Reference

`#include <flatshapable.hh>`

Inheritance diagram for gameobj::FlatShapable:



Public Member Functions

- virtual raytracer::Color getColor () const =0
- virtual std::optional< std::tuple< raytracer::Vect3, raytracer::Vect2, FlatShapable * > > intersecte (const raytracer::Ray &ray)=0

7.6.1 Member Function Documentation

7.6.1.1 getColor()

```
virtual raytracer::Color gameobj::FlatShapable::getColor ( ) const  [pure virtual]
```

Implemented in gameobj::Square, and gameobj::Plan.

7.6.1.2 intersecte()

```
virtual std::optional<std::tuple<raytracer::Vect3, raytracer::Vect2, FlatShapable*> > gameobj↩
::FlatShapable::intersecte (
            const raytracer::Ray & ray )  [pure virtual]
```

Implemented in gameobj::Square, and gameobj::Plan.

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

- includes/gameobj/flatshapable.hh

7.7 raytracer::Landmark Class Reference

`#include <landmark.hh>`

Public Member Functions

- Landmark ()
- Landmark (const Vect3 &o, const Vect3 &x, const Vect3 &y, const Vect3 &z)
- Vect3 getO () const
- Vect3 getX () const
- Vect3 getY () const
- Vect3 getZ () const
- Vect3 transposePoint (const Vect3 &point) const
- Vect3 transposeVect (const Vect3 &vect) const

Private Attributes

- Vect3 o_
- Vect3 x_
- Vect3 y_
- Vect3 z_

7.7.1 Constructor & Destructor Documentation

7.7.1.1 Landmark() [1/2]

```
raytracer::Landmark::Landmark ( )
```

7.7.1.2 Landmark() [2/2]

```
raytracer::Landmark::Landmark (
            const Vect3 & o,
            const Vect3 & x,
            const Vect3 & y,
            const Vect3 & z )
```

7.7.2 Member Function Documentation

7.7.2.1 getO()

```
raytracer::Vect3 raytracer::Landmark::getO ( ) const
```

7.7.2.2 getX()

```
raytracer::Vect3 raytracer::Landmark::getX ( ) const
```

7.7.2.3 getY()

```
raytracer::Vect3 raytracer::Landmark::getY ( ) const
```

7.7.2.4 getZ()

```
raytracer::Vect3 raytracer::Landmark::getZ ( ) const
```

7.7.2.5 transposePoint()

```
raytracer::Vect3 raytracer::Landmark::transposePoint (
            const Vect3 & point ) const
```

7.7.2.6 transposeVect()

```
raytracer::Vect3 raytracer::Landmark::transposeVect (
            const Vect3 & vect ) const
```

7.7.3 Member Data Documentation

7.7.3.1 o_

```
Vect3 raytracer::Landmark::o_  [private]
```

7.7.3.2 x_

```
Vect3 raytracer::Landmark::x_  [private]
```

7.7.3.3 y_

```
Vect3 raytracer::Landmark::y_  [private]
```

7.7.3.4 z_

```
Vect3 raytracer::Landmark::z_  [private]
```

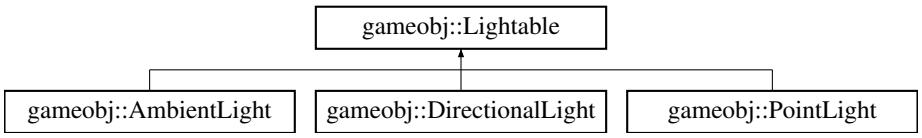
The documentation for this class was generated from the following files:

- includes/raytracer/landmark.hh
- src/raytracer/landmark.cc

7.8 gameobj::Lightable Class Reference

```
#include <lightable.hh>
```

Inheritance diagram for gameobj::Lightable:



Public Member Functions

- raytracer::Color getColor () const
- float getBrightness () const
- void setColor (const raytracer::Color &color)
- void setBrightness (const float brightness)
- virtual raytracer::Color interact (const std::vector< Shapable * > &obj, const raytracer::Vect3 &point, const FlatShapable &) const =0

7.8.1 Member Function Documentation

7.8.1.1 getBrightness()

```
float gameobj::Lightable::getBrightness ( ) const
```

7.8.1.2 getColor()

```
raytracer::Color gameobj::Lightable::getColor ( ) const
```

7.8.1.3 interact()

```
virtual raytracer::Color gameobj::Lightable::interact (
             const std::vector< Shapable *> & obj,
             const raytracer::Vect3 & point,
             const FlatShapable &  ) const  [pure virtual]
```

Implemented in gameobj::DirectionalLight, gameobj::PointLight, and gameobj::AmbientLight.

7.8.1.4 setBrightness()

```
void gameobj::Lightable::setBrightness (
             const float brightness )
```

7.8.1.5 setColor()

```
void gameobj::Lightable::setColor (
             const raytracer::Color & color )
```

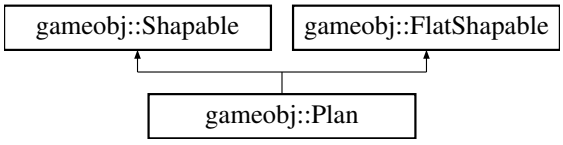
The documentation for this class was generated from the following file:

- includes/gameobj/lightable.hh

7.9 gameobj::Plan Class Reference

```
#include <plan.hh>
```

Inheritance diagram for gameobj::Plan:



Public Member Functions

- Plan ()
- Plan (const Plan &p)
- Plan (const raytracer::Vect3 &norm, const raytracer::Vect3 &point, const raytracer::Color &color)
- raytracer::Vect3 getNorm () const
- float getD () const
- raytracer::Color getColor () const override
- void setColor (const raytracer::Color &color)
- std::optional< std::tuple< raytracer::Vect3, raytracer::Vect2, FlatShapable * > > intersecte (const raytracer::Ray &ray) override

Private Attributes

- float d_
- raytracer::Vect3 norm_
- raytracer::Color color_

7.9.1 Constructor & Destructor Documentation

7.9.1.1 Plan() [1/3]

```
gameobj::Plan::Plan ( )
```

7.9.1.2 Plan() [2/3]

```
gameobj::Plan::Plan (
            const Plan & p )
```

7.9.1.3 Plan() [3/3]

```
gameobj::Plan::Plan (
            const raytracer::Vect3 & norm,
            const raytracer::Vect3 & point,
            const raytracer::Color & color )
```

7.9.2 Member Function Documentation

7.9.2.1 getColor()

```
raytracer::Color gameobj::Plan::getColor ( ) const  [override], [virtual]
```

Implements gameobj::FlatShapable.

7.9.2.2 getD()

```
float gameobj::Plan::getD ( ) const
```

7.9.2.3 getNorm()

```
raytracer::Vect3 gameobj::Plan::getNorm ( ) const
```

7.9.2.4 intersecte()

```
std::optional< std::tuple< raytracer::Vect3, raytracer::Vect2, gameobj::FlatShapable * > >
gameobj::Plan::intersecte (
            const raytracer::Ray & ray )  [override], [virtual]
```

Implements gameobj::FlatShapable.

7.9.2.5 setColor()

```
void gameobj::Plan::setColor (
            const raytracer::Color & color )
```

7.9.3 Member Data Documentation

7.9.3.1 color_

```
raytracer::Color gameobj::Plan::color_  [private]
```

7.9.3.2 d_

```
float gameobj::Plan::d_  [private]
```

7.9.3.3 norm_

```
raytracer::Vect3 gameobj::Plan::norm_  [private]
```

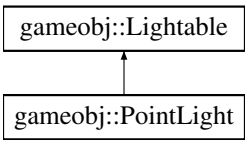
The documentation for this class was generated from the following files:

- includes/gameobj/plan.hh
- src/gameobj/plan.cc

7.10 gameobj::PointLight Class Reference

```
#include <pointlight.hh>
```

Inheritance diagram for gameobj::PointLight:



Public Member Functions

- PointLight (const raytracer::Vect3 &pos, const raytracer::Color &color, const float brightness)
- raytracer::Vect3 getPos () const
- raytracer::Color getColor () const
- float getBrightness () const
- void setPos (const raytracer::Vect3 &pos)
- void setColor (const raytracer::Color &color)
- void setBrightness (const float brightness)
- virtual raytracer::Color interact (const std::vector< Shapable * > &obj, const raytracer::Vect3 &point, const FlatShapable &) const override

Private Attributes

- raytracer::Vect3 pos_
- raytracer::Color color_
- float brightness_

7.10.1 Constructor & Destructor Documentation

7.10.1.1 PointLight()

```
gameobj::PointLight::PointLight (
            const raytracer::Vect3 & pos,
            const raytracer::Color & color,
            const float brightness )
```

7.10.2 Member Function Documentation

7.10.2.1 getBrightness()

```
float gameobj::PointLight::getBrightness ( ) const
```

7.10.2.2 getColor()

```
raytracer::Color gameobj::PointLight::getColor ( ) const
```

7.10.2.3 getPos()

```
raytracer::Vect3 gameobj::PointLight::getPos ( ) const
```

7.10.2.4 interact()

```
raytracer::Color gameobj::PointLight::interact (
            const std::vector< Shapable *> & obj,
            const raytracer::Vect3 & point,
            const FlatShapable & obj ) const  [override], [virtual]
```

Implements gameobj::Lightable.

7.10.2.5 setBrightness()

```
void gameobj::PointLight::setBrightness (
            const float brightness )
```

7.10.2.6 setColor()

```
void gameobj::PointLight::setColor (
            const raytracer::Color & color )
```

7.10.2.7 setPos()

```
void gameobj::PointLight::setPos (
            const raytracer::Vect3 & pos )
```

7.10.3 Member Data Documentation

7.10.3.1 brightness_

```
float gameobj::PointLight::brightness_  [private]
```

7.10.3.2 color_

```
raytracer::Color gameobj::PointLight::color_  [private]
```

7.10.3.3 pos_

```
raytracer::Vect3 gameobj::PointLight::pos_  [private]
```

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

- includes/gameobj/pointlight.hh
- src/gameobj/pointlight.cc

7.11 raytracer::Ray Class Reference

```
#include <ray.hh>
```

Public Member Functions

- Ray (const Vect3 &origin, const Vect3 &vect)
- Vect3 getOrigin () const
- Vect3 getVect () const
- bool colidesBefore (const std::vector< gameobj::Shapable *> &objects, const float dist) const
- bool colides (const std::vector< gameobj::Shapable *> &objects) const

Private Attributes

- Vect3 origin_
- Vect3 vect_

7.11.1 Constructor & Destructor Documentation

7.11.1.1 Ray()

```
raytracer::Ray::Ray (
            const Vect3 & origin,
            const Vect3 & vect )
```

7.11.2 Member Function Documentation

7.11.2.1 colides()

```
bool raytracer::Ray::colides (
            const std::vector< gameobj::Shapable *> & objects ) const
```

7.11.2.2 colidesBefore()

```
bool raytracer::Ray::colidesBefore (
            const std::vector< gameobj::Shapable *> & objects,
            const float dist ) const
```

7.11.2.3 getOrigin()

```
raytracer::Vect3 raytracer::Ray::getOrigin ( ) const
```

7.11.2.4 getVect()

```
raytracer::Vect3 raytracer::Ray::getVect ( ) const
```

7.11.3 Member Data Documentation

7.11.3.1 origin_

```
Vect3 raytracer::Ray::origin_  [private]
```

7.11.3.2 vect_

```
Vect3 raytracer::Ray::vect_  [private]
```

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

- includes/raytracer/ray.hh
- src/raytracer/ray.cc

7.12 raytracer::Screen Class Reference

```
#include <screen.hh>
```

Public Member Functions

- Screen (const Camera &camera, float width, float height)
- float getWidth () const
- float getHeight () const
- float getPixelSize () const
- Vect3 getCenter () const
- Vect3 getI () const
- Vect3 getJ () const

Private Attributes

- float width_
- float height_
- float pixelSize_
- Vect3 center_
- Vect3 i_
- Vect3 j_

7.12.1 Constructor & Destructor Documentation

7.12.1.1 Screen()

```
raytracer::Screen::Screen (
            const Camera & camera,
            float width,
            float height )
```

7.12.2 Member Function Documentation

7.12.2.1 getCenter()

```
raytracer::Vect3 raytracer::Screen::getCenter ( ) const
```

7.12.2.2 getHeight()

```
float raytracer::Screen::getHeight ( ) const
```

7.12.2.3 getI()

```
raytracer::Vect3 raytracer::Screen::getI ( ) const
```

7.12.2.4 getJ()

```
raytracer::Vect3 raytracer::Screen::getJ ( ) const
```

7.12.2.5 getPixelSize()

```
float raytracer::Screen::getPixelSize ( ) const
```

7.12.2.6 getWidth()

```
float raytracer::Screen::getWidth ( ) const
```

7.12.3 Member Data Documentation

7.12.3.1 center_

```
Vect3 raytracer::Screen::center_  [private]
```

7.12.3.2 height_

```
float raytracer::Screen::height_  [private]
```

7.12.3.3 i_

```
Vect3 raytracer::Screen::i_  [private]
```

7.12.3.4 j_

```
Vect3 raytracer::Screen::j_  [private]
```

7.12.3.5 pixelSize_

```
float raytracer::Screen::pixelSize_  [private]
```

7.12.3.6 width_

```
float raytracer::Screen::width_  [private]
```

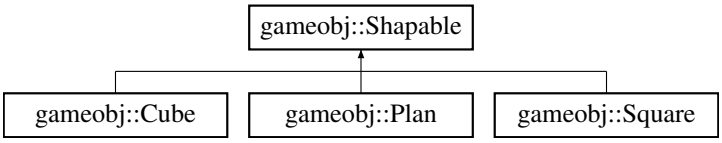
The documentation for this class was generated from the following files:

- includes/raytracer/screen.hh
- src/raytracer/screen.cc

7.13 gameobj::Shapable Class Reference

`#include <shapable.hh>`

Inheritance diagram for gameobj::Shapable:



Public Member Functions

- virtual raytracer::Color getColor () const =0
- virtual std::optional< std::tuple< raytracer::Vect3, raytracer::Vect2, FlatShapable * > > intersecte (const raytracer::Ray &ray)=0

7.13.1 Member Function Documentation

7.13.1.1 getColor()

```
virtual raytracer::Color gameobj::Shapable::getColor ( ) const  [pure virtual]
```

Implemented in gameobj::Cube, gameobj::Square, and gameobj::Plan.

7.13.1.2 intersecte()

```
virtual std::optional<std::tuple<raytracer::Vect3, raytracer::Vect2, FlatShapable*> > gameobj↩
::Shapable::intersecte (
            const raytracer::Ray & ray )  [pure virtual]
```

Implemented in gameobj::Cube, gameobj::Square, and gameobj::Plan.

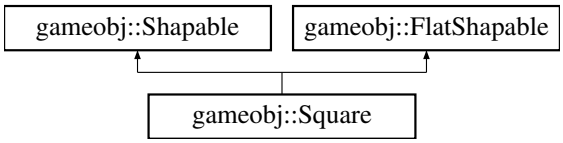
The documentation for this class was generated from the following file:

- includes/gameobj/shapable.hh

7.14 gameobj::Square Class Reference

`#include <square.hh>`

Inheritance diagram for gameobj::Square:



Public Member Functions

- Square (const Square &s)
- Square (const raytracer::Vect3 &A, const raytracer::Vect3 &B, const raytracer::Vect3 &D, const raytracer::Vect3 &norm, const raytracer::Color &color)
- raytracer::Vect3 getPos () const
- raytracer::Vect3 getAB () const
- raytracer::Vect3 getAD () const
- gameobj::Plan getPlan () const
- raytracer::Color getColor () const override
- virtual std::optional< std::tuple< raytracer::Vect3, raytracer::Vect2, FlatShapable * > > intersecte (const raytracer::Ray &ray) override

Private Attributes

- Plan p_
- raytracer::Vect3 pA_
- raytracer::Vect3 vAB_
- raytracer::Vect3 vAD_

7.14.1 Constructor & Destructor Documentation

7.14.1.1 Square() [1/2]

```
gameobj::Square::Square (
            const Square & s )
```

7.14.1.2 Square() [2/2]

```
gameobj::Square::Square (
            const raytracer::Vect3 & A,
            const raytracer::Vect3 & B,
            const raytracer::Vect3 & D,
            const raytracer::Vect3 & norm,
            const raytracer::Color & color )
```

7.14.2 Member Function Documentation

7.14.2.1 getAB()

```
raytracer::Vect3 gameobj::Square::getAB ( ) const
```

7.14.2.2 getAD()

```
raytracer::Vect3 gameobj::Square::getAD ( ) const
```

7.14.2.3 getColor()

```
raytracer::Color gameobj::Square::getColor ( ) const  [override], [virtual]
```

Implements gameobj::FlatShapable.

7.14.2.4 getPlan()

```
gameobj::Plan gameobj::Square::getPlan ( ) const
```

7.14.2.5 getPos()

```
raytracer::Vect3 gameobj::Square::getPos ( ) const
```

7.14.2.6 intersecte()

```
std::optional< std::tuple< raytracer::Vect3, raytracer::Vect2, gameobj::FlatShapable * > >
gameobj::Square::intersecte (
            const raytracer::Ray & ray )  [override], [virtual]
```

Implements gameobj::FlatShapable.

7.14.3 Member Data Documentation

7.14.3.1 p_

```
Plan gameobj::Square::p_  [private]
```

7.14.3.2 pA_

```
raytracer::Vect3 gameobj::Square::pA_  [private]
```

7.14.3.3 vAB_

```
raytracer::Vect3 gameobj::Square::vAB_  [private]
```

7.14.3.4 vAD_

```
raytracer::Vect3 gameobj::Square::vAD_  [private]
```

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

- includes/gameobj/square.hh
- src/gameobj/square.cc

7.15 gameui::UIScreen Class Reference

Class to interacte with the user visual output.

```
#include <gameui.hh>
```

Public Member Functions

- UIScreen (std::string pageTitle, unsigned width, unsigned height, uint32_t windowParam)
  Constructor of the object.
- ~UIScreen ()
- void updateScreen ()
- void loadFrame (std::vector< raytracer::Color > *pixels)

Private Attributes

- unsigned width
- unsigned height
- SDL_Window * window
- SDL_Surface * screenSurface
- SDL_Renderer * renderer

7.15.1 Detailed Description

Class to interacte with the user visual output.

7.15.2 Constructor & Destructor Documentation

7.15.2.1 UIScreen()

```
gameui::UIScreen::UIScreen (
            std::string pageTitle,
            unsigned width,
            unsigned height,
            uint32_t windowParam )
```

Constructor of the object.

Parameters

pageTitle	Title of the page
width	width of the window
height	height of the window
windowParam	Parameter of the window

The windowParam parameter has to be filled using the WINDOWPARAM enum.

7.15.2.2 ~UIScreen()

```
gameui::UIScreen::~UIScreen ( )
```

7.15.3 Member Function Documentation

7.15.3.1 loadFrame()

```
void gameui::UIScreen::loadFrame (
            std::vector< raytracer::Color > * pixels )
```

7.15.3.2 updateScreen()

```
void gameui::UIScreen::updateScreen ( )
```

7.15.4 Member Data Documentation

7.15.4.1 height

```
unsigned gameui::UIScreen::height  [private]
```

7.15.4.2 renderer

```
SDL_Renderer* gameui::UIScreen::renderer  [private]
```

7.15.4.3 screenSurface

```
SDL_Surface* gameui::UIScreen::screenSurface  [private]
```

7.15.4.4 width

```
unsigned gameui::UIScreen::width  [private]
```

7.15.4.5 window

```
SDL_Window* gameui::UIScreen::window  [private]
```

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

- includes/ui/gameui.hh
- src/ui/gameui.cc

7.16 raytracer::Vect2 Class Reference

`#include <vect.hh>`

Public Member Functions

- Vect2 ()
- Vect2 (float x, float y)
- Vect2 (const Vect2 &v)
- float getX () const
- float getY () const
- void setX (const float v)
- void setY (const float v)
- bool isNullVect () const
- float getNorm () const
- float dot (const Vect2 &other) const
- void normalize ()
- Vect2 operator- () const
- Vect2 operator+ (const Vect2 &other) const
- Vect2 operator- (const Vect2 &other) const
- Vect2 operator∗ (const float other) const

Private Attributes

- float x_
- float y_

Friends

- Vect2 operator∗ (const float num, const Vect2 &vect)

7.16.1 Constructor & Destructor Documentation

7.16.1.1 Vect2() [1/3]

```
raytracer::Vect2::Vect2 ( )
```

7.16.1.2 Vect2() [2/3]

```
raytracer::Vect2::Vect2 (
            float x,
            float y )
```

7.16.1.3 Vect2() [3/3]

```
raytracer::Vect2::Vect2 (
            const Vect2 & v )
```

7.16.2 Member Function Documentation

7.16.2.1 dot()

```
float raytracer::Vect2::dot (
            const Vect2 & other ) const
```

7.16.2.2 getNorm()

```
float raytracer::Vect2::getNorm ( ) const
```

7.16.2.3 getX()

```
float raytracer::Vect2::getX ( ) const
```

7.16.2.4 getY()

```
float raytracer::Vect2::getY ( ) const
```

7.16.2.5 isNullVect()

```
bool raytracer::Vect2::isNullVect ( ) const
```

7.16.2.6 normalize()

```
void raytracer::Vect2::normalize ( )
```

7.16.2.7 operator∗()

```
raytracer::Vect2 raytracer::Vect2::operator* (
            const float other ) const
```

7.16.2.8 operator+()

```
raytracer::Vect2 raytracer::Vect2::operator+ (
            const Vect2 & other ) const
```

7.16.2.9 operator-() [1/2]

```
raytracer::Vect2 raytracer::Vect2::operator- ( ) const
```

7.16.2.10 operator-() [2/2]

```
raytracer::Vect2 raytracer::Vect2::operator- (
            const Vect2 & other ) const
```

7.16.2.11 setX()

```
void raytracer::Vect2::setX (
            const float v )
```

7.16.2.12 setY()

```
void raytracer::Vect2::setY (
            const float v )
```

7.16.3 Friends And Related Function Documentation

7.16.3.1 operator*

```
Vect2 operator* (
            const float num,
            const Vect2 & vect )  [friend]
```

7.16.4 Member Data Documentation

7.16.4.1 x_

```
float raytracer::Vect2::x_  [private]
```

7.16.4.2 y_

```
float raytracer::Vect2::y_  [private]
```

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

- includes/raytracer/vect.hh
- src/raytracer/vect.cc

7.17 raytracer::Vect3 Class Reference

```
#include <vect.hh>
```

Public Member Functions

- Vect3 ()
  Default constructor.
- Vect3 (float x, float y, float z)
  Intuitive constructor.
- Vect3 (const Vect3 &v)
  Copy constructor.
- float getX () const
  Getter of x value.
- float getY () const
  Getter of y value.
- float getZ () const
  Getter of z value.
- void setX (const float v)
  Setter of x value.
- void setY (const float v)

Setter of y value.

- void setZ (const float v)

  Setter of z value.
- bool isNullVect () const

  Check if the vector is null.
- float getNorm () const

  Get the norm of the vector.
- float dot (const Vect3 &other) const

  Get the dot product of this vect with an other.
- void normalize ()

  Normalize the vector.
- Vect3 operator- () const

  Overload of the opposite operator.
- Vect3 operator+ (const Vect3 &other) const

  Overload of the addition operator between two vectors.
- Vect3 operator- (const Vect3 &other) const

  Overload of the subtraction operator between two vectors.
- Vect3 operator∗ (const float other) const

  Overload of the product multiplication between a vector and a float.

Private Attributes

- float x_
- float y_
- float z_

Friends

- Vect3 operator∗ (const float num, const Vect3 &vect)

  Overload of the product multiplication between a float and a vector.

7.17.1 Constructor & Destructor Documentation

7.17.1.1 Vect3() [1/3]

```
raytracer::Vect3::Vect3 ( )
```

Default constructor.

7.17.1.2 Vect3() [2/3]

```
raytracer::Vect3::Vect3 (
            float x,
            float y,
            float z )
```

Intuitive constructor.

Parameters

x	value of the x coordinate.
y	value of the y coordinate.
z	value of the z coordinate.

7.17.1.3 Vect3() [3/3]

```
raytracer::Vect3::Vect3 (
            const Vect3 & v )
```

Copy constructor.

Parameters

v	vect to copy.

7.17.2 Member Function Documentation

7.17.2.1 dot()

```
float raytracer::Vect3::dot (
            const Vect3 & other ) const
```

Get the dot product of this vect with an other.

Returns

The dot product of the two vectors.

7.17.2.2 getNorm()

```
float raytracer::Vect3::getNorm ( ) const
```

Get the norm of the vector.

Returns

The norm of the vector.

7.17.2.3 getX()

```
float raytracer::Vect3::getX ( ) const
```

Getter of x value.

Returns

Value of x value.

7.17.2.4 getY()

```
float raytracer::Vect3::getY ( ) const
```

Getter of y value.

Returns

Value of y value.

7.17.2.5 getZ()

```
float raytracer::Vect3::getZ ( ) const
```

Getter of z value.

Returns

Value of z value.

7.17.2.6 isNullVect()

```
bool raytracer::Vect3::isNullVect ( ) const
```

Check if the vector is null.

Returns

True if the vector is null, False otherwise.

7.17.2.7 normalize()

```
void raytracer::Vect3::normalize ( )
```

Normalize the vector.

7.17.2.8 operator∗()

```
raytracer::Vect3 raytracer::Vect3::operator* (
            const float other ) const
```

Overload of the product multiplication between a vector and a float.

Parameters

other	the float to multiply with this vector.

Returns

A new vector.

7.17.2.9 operator+()

```
raytracer::Vect3 raytracer::Vect3::operator+ (
            const Vect3 & other ) const
```

Overload of the addition operator between two vectors.

Parameters

other	the vector to add to this one.

Returns

A new vector.

7.17.2.10 operator-() [1/2]

```
raytracer::Vect3 raytracer::Vect3::operator- ( ) const
```

Overload of the opposite operator.

Returns

The opposite vector of this one.

7.17.2.11 operator-() [2/2]

```
raytracer::Vect3 raytracer::Vect3::operator- (
            const Vect3 & other ) const
```

Overload of the subtraction operator between two vectors.

Parameters

other	the vector to subtract to this one.

Returns

A new vector.

7.17.2.12 setX()

```
void raytracer::Vect3::setX (
            const float v )
```

Setter of x value.

Parameters

v	value to set x with.

7.17.2.13 setY()

```
void raytracer::Vect3::setY (
            const float v )
```

Setter of y value.

Parameters

v	value to set y with.

7.17.2.14 setZ()

```
void raytracer::Vect3::setZ (
            const float v )
```

Setter of z value.

Parameters

v	value to set z with

7.17.3 Friends And Related Function Documentation

7.17.3.1 operator*

```
Vect3 operator* (
            const float num,
            const Vect3 & vect )  [friend]
```

Overload of the product multiplication between a float and a vector.

Parameters

num	the float to multiply with the vector.
vect	the vector to multiply with the float.

Returns

A new vector.

7.17.4 Member Data Documentation

7.17.4.1 x_

```
float raytracer::Vect3::x_  [private]
```

the x coordinate

7.17.4.2 y_

```
float raytracer::Vect3::y_  [private]
```

the y coordinate

7.17.4.3 z_

```
float raytracer::Vect3::z_  [private]
```

the z coordinate

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

- includes/raytracer/vect.hh
- src/raytracer/vect.cc

Chapter 8

File Documentation

8.1 includes/fwd.hh File Reference

Namespaces

- raytracer
- gameobj

8.2 includes/gameobj/ambientlight.hh File Reference

```
#include "fwd.hh"
#include <vector>
#include "color.hh"
#include "lightable.hh"
#include "shapable.hh"
#include "flatshapable.hh"
```

Classes

- class gameobj::AmbientLight

Namespaces

- gameobj

8.3 includes/gameobj/cube.hh File Reference

```
#include "fwd.hh"
#include <vector>
#include <tuple>
#include "ray.hh"
#include "vect.hh"
#include "square.hh"
#include "shapable.hh"
#include "landmark.hh"
#include "color.hh"
#include "flatshapable.hh"
```

Classes

- class gameobj::Cube

Namespaces

- gameobj

8.4 includes/gameobj/dirlight.hh File Reference

```
#include "fwd.hh"
#include <vector>
#include "vect.hh"
#include "color.hh"
#include "shapable.hh"
#include "lightable.hh"
#include "flatshapable.hh"
```

Classes

- class gameobj::DirectionalLight

Namespaces

- gameobj

8.5 includes/gameobj/flatshapable.hh File Reference

```
#include "fwd.hh"
#include <optional>
#include <tuple>
#include "vect.hh"
#include "ray.hh"
#include "color.hh"
```

Classes

- class gameobj::FlatShapable

Namespaces

- gameobj

8.6 includes/gameobj/lightable.hh File Reference

```
#include "fwd.hh"
#include "shapable.hh"
#include "flatshapable.hh"
```

Classes

- class gameobj::Lightable

Namespaces

- gameobj

8.7 includes/gameobj/plan.hh File Reference

```
#include "fwd.hh"
#include <optional>
#include <tuple>
#include "ray.hh"
#include "vect.hh"
#include "shapable.hh"
#include "color.hh"
#include "flatshapable.hh"
```

Classes

- class gameobj::Plan

Namespaces

- gameobj

8.8 includes/gameobj/pointlight.hh File Reference

```
#include "fwd.hh"
#include <vector>
#include "vect.hh"
#include "color.hh"
#include "shapable.hh"
#include "lightable.hh"
#include "flatshapable.hh"
```

Classes

- class gameobj::PointLight

Namespaces

- gameobj

8.9 includes/gameobj/shapable.hh File Reference

```
#include "fwd.hh"
#include <optional>
#include <tuple>
#include "vect.hh"
#include "ray.hh"
#include "color.hh"
#include "shapable.hh"
#include "flatshapable.hh"
```

Classes

- class gameobj::Shapable

Namespaces

- gameobj

8.10 includes/gameobj/square.hh File Reference

```
#include "fwd.hh"
#include <optional>
#include <tuple>
#include "ray.hh"
#include "vect.hh"
#include "plan.hh"
#include "shapable.hh"
#include "color.hh"
#include "flatshapable.hh"
```

Classes

- class gameobj::Square

Namespaces

- gameobj

8.11 includes/raytracer/camera.hh File Reference

```
#include "fwd.hh"
#include "vect.hh"
```

Classes

- class raytracer::Camera

Namespaces

- raytracer

8.12 includes/raytracer/color.hh File Reference

```
#include "fwd.hh"
```

Classes

- class raytracer::Color

Namespaces

- raytracer

Functions

- Color raytracer::operator∗ (const float num, const Color &color)

8.13 includes/raytracer/landmark.hh File Reference

```
#include "fwd.hh"
#include "vect.hh"
```

Classes

- class raytracer::Landmark

Namespaces

- raytracer

8.14 includes/raytracer/ray.hh File Reference

```
#include "fwd.hh"
#include <vector>
#include "vect.hh"
#include "shapable.hh"
```

Classes

- class raytracer::Ray

Namespaces

- raytracer

8.15 includes/raytracer/screen.hh File Reference

```
#include "fwd.hh"
#include "vect.hh"
#include "camera.hh"
```

Classes

- class raytracer::Screen

Namespaces

- raytracer

8.16 includes/raytracer/utils.hh File Reference

```
#include "fwd.hh"
#include <cmath>
#include <vector>
#include "vect.hh"
#include "ray.hh"
#include "screen.hh"
#include "camera.hh"
#include "shapable.hh"
#include "square.hh"
#include "pointlight.hh"
#include "color.hh"
#include "lightable.hh"
```

Namespaces

- raytracer

Functions

- void raytracer::rotateX (Vect3 &vect, const float angle)
- void raytracer::rotateY (Vect3 &vect, const float angle)
- void raytracer::rotateZ (Vect3 &vect, const float angle)
- Vect3 raytracer::applyAngle (Vect3 &vect, const Vect3 &angles)
- Vect3 raytracer::vectorFromAngles (const Vect3 &angles)
- Vect3 raytracer::getAngles (const Vect3 &v1, const Vect3 &v2)
- Vect3 raytracer::vectorFromPoints (const Vect3 &v1, const Vect3 &v2)
- std::vector< Ray > raytracer::genRays (const Camera &cam, const Screen &screen)
- int raytracer::closerToOrigin (Vect3 origin, Vect3 point1, Vect3 point2)
- std::vector< Color > raytracer::renderFrame (const std::vector< gameobj::Shapable *> &objects, const std::vector< Ray > &rays, const std::vector< gameobj::Lightable *> &lightList)

Variables

- const float raytracer::pi = std::acos(-1)

8.17 includes/raytracer/vect.hh File Reference

Vect2 and Vect3 class managing vector operation.

```
#include "fwd.hh"
```

Classes

- class raytracer::Vect3
- class raytracer::Vect2

Namespaces

- raytracer

Functions

- Vect3 raytracer::operator∗ (const float num, const Vect3 &vect)

  Overload of the product multiplication between a float and a vector.
- Vect2 raytracer::operator∗ (const float num, const Vect2 &vect)

8.17.1 Detailed Description

Vect2 and Vect3 class managing vector operation.

8.18 includes/ui/gameui.hh File Reference

Vect2 and Vect3 class managing vector operation.

```
#include "fwd.hh"
#include "color.hh"
#include <SDL2/SDL.h>
#include <vector>
#include <string>
```

Classes

- class gameui::UIScreen

  Class to interacte with the user visual output.

Namespaces

- gameui

Enumerations

- enum gameui::WINDOWPARAM { gameui::NO_FULLSCREEN = 0, gameui::FULLSCREEN = 1, gameui::FULLSCREEN_DESKTOP = 2, gameui::BORDERLESS = 4 }

  Posible parameters for a window.

8.18.1 Detailed Description

Vect2 and Vect3 class managing vector operation.

8.19 README.md File Reference

8.20 src/gameobj/ambientlight.cc File Reference

```
#include "ambientlight.hh"
```

8.21 src/gameobj/cube.cc File Reference

```
#include "cube.hh"
#include "utils.hh"
```

8.22 src/gameobj/dirlight.cc File Reference

```
#include "dirlight.hh"
#include "ray.hh"
```

8.23 src/gameobj/plan.cc File Reference

```
#include "plan.hh"
```

Functions

- float computeD (const raytracer::Vect3 &p, const raytracer::Vect3 &n)

8.23.1 Function Documentation

8.23.1.1 computeD()

```
float computeD (
            const raytracer::Vect3 & p,
            const raytracer::Vect3 & n )
```

8.24 src/gameobj/pointlight.cc File Reference

```
#include "pointlight.hh"
#include "utils.hh"
#include "ray.hh"
```

8.25 src/gameobj/square.cc File Reference

```
#include "square.hh"
#include "utils.hh"
```

8.26 src/main.cc File Reference

```
#include <iostream>
#include <vector>
#include <cmath>
#include <string>
#include <fstream>
#include <SDL2/SDL.h>
#include "ray.hh"
#include "camera.hh"
#include "vect.hh"
#include "screen.hh"
#include "square.hh"
#include "utils.hh"
#include "cube.hh"
#include "color.hh"
#include "pointlight.hh"
#include "shapable.hh"
#include "lightable.hh"
#include "ambientlight.hh"
#include "dirlight.hh"
#include "gameui.hh"
```

Functions

- void writeRender (std::string filename, std::vector< raytracer::Color > &pixels, unsigned width, unsigned height)
- int main (int argc, char *argv[ ])

8.26.1 Function Documentation

8.26.1.1 main()

```
int main (
            int argc,
            char * argv[] )
```

8.26.1.2 writeRender()

```
void writeRender (
            std::string filename,
            std::vector< raytracer::Color > & pixels,
            unsigned width,
            unsigned height )
```

8.27 src/raytracer/camera.cc File Reference

```
#include "camera.hh"
#include "utils.hh"
```

8.28 src/raytracer/color.cc File Reference

```
#include "color.hh"
```

8.29 src/raytracer/landmark.cc File Reference

```
#include "landmark.hh"
```

8.30 src/raytracer/ray.cc File Reference

```
#include "ray.hh"
#include <tuple>
#include <optional>
#include "color.hh"
#include "utils.hh"
```

8.31 src/raytracer/screen.cc File Reference

```
#include "screen.hh"
#include <cmath>
#include "utils.hh"
```

8.32 src/raytracer/utils.cc File Reference

```
#include "utils.hh"
#include <optional>
#include <tuple>
#include "flatshapable.hh"
```

8.33 src/raytracer/vect.cc File Reference

```
#include "vect.hh"
#include <cmath>
```

8.34 src/ui/gameui.cc File Reference

```
#include "gameui.hh"
```

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