# Bitter Birds

Generated by Doxygen 1.9.1

Chapter 1

# Angry Birds

## 1.1 Group

- Luukas Karihtala
- Ray Sointula
- Onni Komulainen
- Daniel Granström

## 1.2 Repository organization

Your project implementation should follow the skelaton organization in this repository. See readme.md files in each folder.

## 1.3 Project Implementation

You must use git repository for the work on the project, making frequent enough commits so that the project group (and course staff) can follow the progress.

The completed project work will be demonstrated to the group's advisor at a demo session. The final demonstrations are arranged on week 50. After the final demonstrations project group evaluates another project, and self-evaluates own project. In addition, project members will give a confidential individual assessment of each group member

The course staff should be able to easily compile the project work using makefile and related instructions provided in the git repository. The final output should be in the **master branch** of the git repository.

## 1.4 Working practices

Each project group is assigned an advisor from the project teaching personnel. There will be a dedicated Teams channel for each project topic to facilitate discussion between the groups in the same topic and the advisor.

**The group should meet weekly.** The weekly meeting does not need to be long if there are no special issues to discuss, and can be taken remotely as voice/video chat on the group Teams channel (or Zoom or other similar tool), preferably at a regular weekly time. In the meeting the group updates:

- What each member has done during the week
- Are there challenges or problems? Discuss the possible solutions
- Plan for the next week for everyone
- Deviations and changes to the project plan, if any
- After the meetings, the meeting notes will be committed to the project repository in the `Meeting-notes.md` file.
  - The commits within the week should have some commit messages referring to the meeting notes so that the project advisor can follow the progress.
  - **The meeting notes should be in English.**

  Everyone may not be able to participate to all meetings, but at least a couple of members should be present in each meeting. Regular absence from meetings will affect in individual evaluation.

## 1.5 Source code documentation

The source code is documented using doxygen style comments. If you do not have doxygen yet installed it can be installed using the following command.

```
apt-get install doxygen
apt-get install graphviz
apt-get install texlive-latex-base
apt-get install texlive-fonts-recommended
apt-get install texlive-fonts-extra
apt-get install texlive-latex-extra
```

Generating the documentation can be done by running

```
doxygen Doxyfile
```

Open the html document `html/index.html` generated by doxygen in your browser to view the documentation.

To generate a PDF file

```
cd latex
make
```

Now there is a PDF `latex/refman.pdf`

## 1.6 TODOs (updated 27.10.2023)

List of todo tasks in the following format

- [TASK]. Assigned to <Member name>

#### 1.6.0.1 Tasks

- ...

# Chapter 2

# Contents

The actual project documentation in PDF format must be commited in this folder before the deadline. Separate PDF document needs to be provided also if your project uses Doxygen for inline documentation.

The document should contain the following parts:

1. **Overview:** what the software does, what it doesn't do? (this can be taken/updated from the project plan)
2. **Software structure:** overall architecture, class relationships (diagram very strongly recommended), interfaces to external libraries
3. **Instructions** for building and using the software
4. **How to compile the program** ('make' should be sufficient), as taken from git repository. If external libraries are needed, describe the requirements here
5. How to use the software: a basic user guide
6. **Testing:** how the different modules in software were tested, description of the methods and outcomes
7. **Work log:** This might be a simplified/restructured version of the weekly meeting notes file.
8. Detailed description of division of work and everyone's responsibilities
9. For each week, description of what was done and roughly how many hours were used, for each project member.

# Chapter 3

# Meeting Notes

In this file, you are required to take notes for your weekly meetings. In each meeting, you are required to discuss:

1. What each member has done during the week?
2. Are there challenges or problems? Discuss the possible solutions
3. Plan for the next week for everyone
4. Deviations and changes to the project plan, if any

## 3.1 Meeting 27.10.2023 16:00

**Participants**:

1. Luukas Karihtala
2. Ray Sointula
3. Onni Komulainen
4. Daniel Granström

### 3.1.1 Summary of works

Started work on project by developing project plan. Initial work environment with SFML and box2d for building project.

### 3.1.2 Challenges

1. Game architecture

### 3.1.3 Actions

1. Team: Complete the project plan

### 3.1.4 Project status

Working on initial project plan

#### 3.1.4.1 TODOs

1. Complete the project plan

## 3.2 Meeting 8.11.2023 14:30

**Participants**:

1. Luukas Karihtala
2. Ray Sointula
3. Daniel Granström

### 3.2.1 Summary of works

Participated in plan review with our advisor.

Daniel: Made some textures for game and started work on soundtrack. Luukas: Created GUI, Scene and MenuScene classes Ray: Created individual issues for tasks. Worked level ReaderWriter class. Onni: Worked on Level, Entity and Bird classes

### 3.2.2 Challenges

Ray can't continue on readerwriter until other work gets done. Finding meeting times difficult (everyone is not available at the same times).

### 3.2.3 Actions

Start documentation process with doxygen. Implement testing infrastructure and start writing tests for features.

### 3.2.4 Project status

Windowing works. Simple button UI for main menu. Beginnings of ReadWriter class. Beginnings of level and entity classes.

#### 3.2.4.1 TODOs

1. Start working on issues described in gitlab.
2. Tests
3. Documentation

## 3.3 Meeting 20.11.2023 14:55

**Participants**:

1. Luukas Karihtala
2. Ray Sointula
3. Daniel Granström
4. Onni Komulainen

### 3.3.1 Summary of works

Luukas has implemented some PlayScene features

### 3.3.2 Challenges

Scheduling and communication has been challenging/lacking.

### 3.3.3 Actions

1. Increase work effort
2. Make progress in class structures
3. Plan work-session(s)
4. Finish ReaderWriter

### 3.3.4 Project status

Start of playScene, mainMenu and physics.

#### 3.3.4.1 TODOs

1. Continue work on GitLab issues.

## 3.4 Meeting 10.12.2023 14:30

**Participants**:

1. Luukas Karihtala
2. Ray Sointula

### 3.4.1 Summary of works

Doxygen setup/tweaking and commenting code Camera animations, better textures

### 3.4.2 Challenges

-

### 3.4.3 Actions

-

### 3.4.4 Project status

Unaccounting for some finishing touches, the project is done.

#### 3.4.4.1 TODOs

Finishing touches, documentation etc.

# Chapter 4

# Contents

Project plan is a PDF document describing the scope of the project, major architectural decisions, preliminary schedule and distribution of roles in the group, design rationale and so on. The document should be roughly five pages long, with a couple of diagrams illustrating the program design (for example, the planned class relationships).

You are required commit your project plan in this folder before the deadline. The plan should contain the following information:

- Scope of the work: what features and functionalities will be implemented, how is the program used, and how does it work
- High-level structure of the software: main modules, main classes (according to current understanding)
- Planned use of external libraries
- Division of work and responsibilities between the group
- Planned schedule and milestones before the final deadline of the project

  It is not uncommon that as the project progresses, there may be changes relative to project plan, and that is fine. The final outcome will be described in the final documentation, that can be based on the project plan.

# Chapter 5

# Bitter Birds savefile format

This file explains the structure and formats of saved levels in this project.

## 5.1 Bolded characters are headers:

### 5.1.1 SST:

SoundFX vector Start, indicates that starting from the next line until line with SEN are soundFX paths

### 5.1.2 SEN:

SoundFX vector End, indicates end of soundFX paths

### 5.1.3 EST:

Entity vector Start, indicates that starting from the next line until line with EEN are Entities

### 5.1.4 EEN:

Entity vector End, indicates end of Entity vector

### 5.1.5 BST:

Birds vector Start, indicates that starting from the next line until line with BEN are Birds

### 5.1.6 BEN:

Birds vector End, indicates end of Birds vector

### 5.1.7 NME:

Level name, Level constructor variable name

### 5.1.8 BGR:

Background image path, Level constructor variable backgroundPath

### 5.1.9 STD:

Soundtrack path, Level constructor variable soundtrackPath

### 5.1.10 UNKNOWN:

For when something goes wrong

## 5.2 File format:

```
BitterBirds v.0
SST
<sound1Path>
<sound2Path>
...
<soundNPath>
SEN
EST
<Entity1>
<Entity2>
...
<EntityN>
EEN
BST
<Bird1Type>
<Bird2Type>
...
<BirdNType>
BEN
NME<String>
BGR<Path>
SDT<Path>
```

Entity and Bird formats will be discussed in this file when they are done. Bird format, N refers to birds type, N = 0, 1, 2, ...:

N

BGR and SDT contain paths which will be strings.

# Chapter 6

# Source content

This folder should contain only hpp/cpp files of your implementation. You can also place hpp files in a separate directory `include`.

You can create a summary of files here. It might be useful to describe file relations, and brief summary of their content.

# Chapter 7

# Hierarchical Index

## 7.1 Class Hierarchy

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

# Chapter 8

# Class Index

## 8.1 Class List

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

# Chapter 9

# File Index

## 9.1 File List

Here is a list of all files with brief descriptions:

# Chapter 10

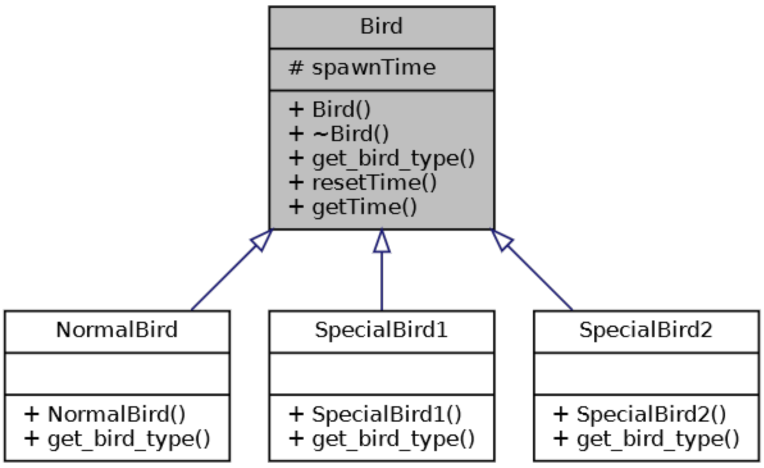
# Class Documentation

## 10.1 Bird Class Reference

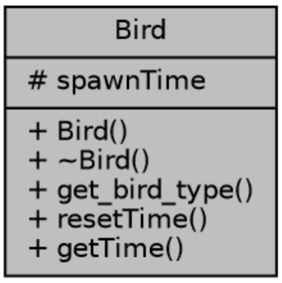
Base class for Bird objects.

```
#include <bird.hpp>
```

Inheritance diagram for Bird:



Collaboration diagram for Bird:



## Public Member Functions

- Bird ()

  *Construct a new Bird object.*
- ∼Bird ()

  *Destroy the Bird object.*
- virtual birdType get_bird_type () const =0

  *Get the bird type object.*
- void resetTime ()

  *Reset spawn timer.*
- sf::Time getTime () const

  *Get the spawn time object.*

## Protected Attributes

- sf::Clock spawnTime

### 10.1.1 Detailed Description

Base class for Bird objects.

### 10.1.2 Constructor & Destructor Documentation

#### 10.1.2.1 Bird()

```
Bird::Bird ( )
```

Construct a new Bird object.

#### 10.1.2.2 ∼Bird()

```
Bird::∼Bird ( )
```

Destroy the Bird object.

### 10.1.3 Member Function Documentation

#### 10.1.3.1 get_bird_type()

```
virtual birdType Bird::get_bird_type ( ) const  [pure virtual]
```

Get the bird type object.

**Returns**

birdType

Implemented in SpecialBird2, SpecialBird1, and NormalBird.

#### 10.1.3.2 getTime()

```
sf::Time Bird::getTime ( ) const
```

Get the spawn time object.

**Returns**

sf::Time

#### 10.1.3.3 resetTime()

```
void Bird::resetTime ( )
```

Reset spawn timer.

### 10.1.4 Member Data Documentation

#### 10.1.4.1 spawnTime

```
sf::Clock Bird::spawnTime  [protected]
```

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

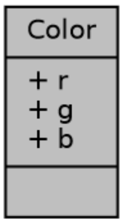
- src/bird.hpp
- src/bird.cpp

## 10.2 Color Struct Reference

Color object r is red in range 0 to 1 g is green in range 0 to 1 b is blue in range 0 to 1.

```
#include <GUI.hpp>
```

Collaboration diagram for Color:



### Public Attributes

- float r
- float g
- float b

### 10.2.1 Detailed Description

Color object r is red in range 0 to 1 g is green in range 0 to 1 b is blue in range 0 to 1.

### 10.2.2 Member Data Documentation

#### 10.2.2.1 b

```
float Color::b
```

#### 10.2.2.2 g

```
float Color::g
```

#### 10.2.2.3 r

```
float Color::r
```

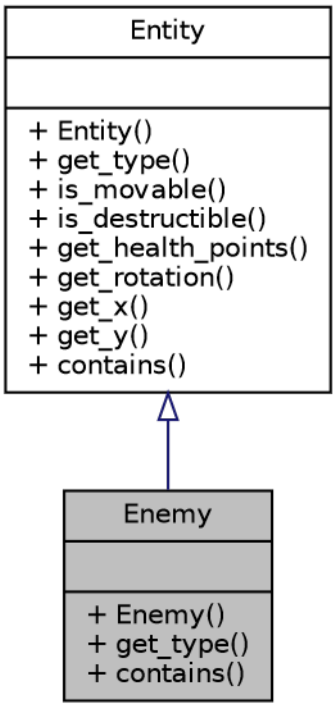
The documentation for this struct was generated from the following file:

- src/GUI.hpp

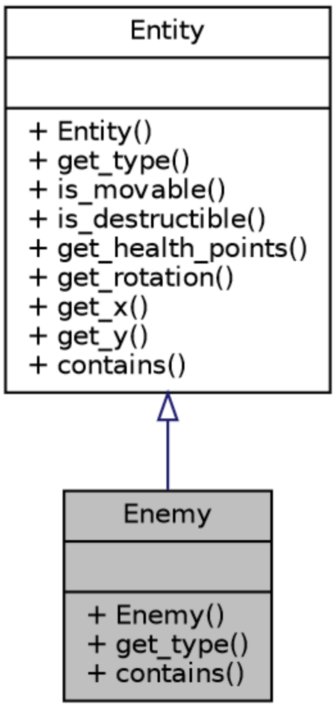
## 10.3 Enemy Class Reference

```
#include <enemy.hpp>
```

Inheritance diagram for Enemy:



Collaboration diagram for Enemy:



## Public Member Functions

- Enemy (int healthPoints, double initRotation, double x, double y)

  *Construct a new Enemy object.*
- bodyType get_type () const override

  *Get the type object, in this case bodyType::Enemy.*
- bool contains (double x, double y)

## 10.3.1 Constructor & Destructor Documentation

### 10.3.1.1 Enemy()

```
Enemy::Enemy (
            int healthPoints,
            double initRotation,
            double x,
            double y )
```

Construct a new Enemy object.

**Parameters**

| | |
|---|---|
| *healthPoints* | Initial HP of this object |
| *initRotation* | Initial rotation of this object |
| *x* | x-component of this object's location |
| *y* | y-component of this object's location |

## 10.3.2 Member Function Documentation

### 10.3.2.1 contains()

```
bool Enemy::contains (
            double x,
            double y )  [virtual]
```

**Parameters**

| | |
|---|---|
| *x* | |
| *y* | |

**Returns**

bool

Implements Entity.

### 10.3.2.2 get_type()

```
bodyType Enemy::get_type ( ) const  [override], [virtual]
```

Get the type object, in this case bodyType::Enemy.

**Returns**

bodyType

Implements Entity.

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

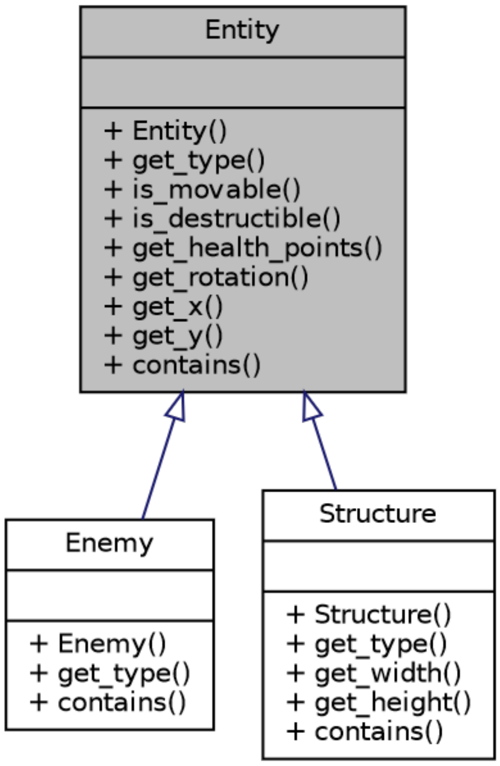
- src/enemy.hpp
- src/enemy.cpp

## 10.4 Entity Class Reference

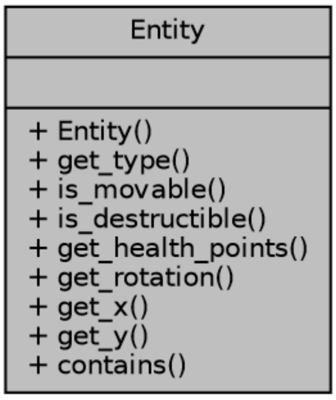
Entity class to handle entity data loaded from levels.

```
#include <entity.hpp>
```

Inheritance diagram for Entity:



Collaboration diagram for Entity:



## Public Member Functions

- Entity (bool movable, bool destructible, int healthPoints, double initRotation, double x, double y)

  *Construct a new Entity object.*
- virtual bodyType get_type () const =0

  *Get the type object.*
- bool is_movable () const

  *Is entity movable.*
- bool is_destructible () const

  *Is entity destructible.*
- int get_health_points () const

  *Get the initial health points.*
- double get_rotation () const

  *Get the initial rotation.*
- double get_x () const

  *Get the initial x pos.*
- double get_y () const

  *Get the initial y pos.*
- virtual bool contains (double x, double y)=0

  *Is a point contained inside the entity.*

### 10.4.1 Detailed Description

Entity class to handle entity data loaded from levels.

### 10.4.2 Constructor & Destructor Documentation

#### 10.4.2.1 Entity()

```
Entity::Entity (
             bool movable,
             bool destructible,
             int healthPoints,
             double initRotation,
             double x,
             double y )
```

Construct a new Entity object.

**Parameters**

| | |
|---|---|
| *movable* | |
| *destructible* | |
| *healthPoints* | |
| *initRotation* | |
| *x* | |
| *y* | |

### 10.4.3 Member Function Documentation

#### 10.4.3.1 contains()

```
virtual bool Entity::contains (
             double x,
             double y ) [pure virtual]
```

Is a point contained inside the entity.

**Parameters**

| | |
|---|---|
| *x* | |
| *y* | |

**Returns**

true Is contained

false Not contained

Implemented in Structure, and Enemy.

### 10.4.3.2 get_health_points()

```
int Entity::get_health_points ( ) const
```

Get the initial health points.

**Returns**

int

### 10.4.3.3 get_rotation()

```
double Entity::get_rotation ( ) const
```

Get the initial rotation.

**Returns**

double

### 10.4.3.4 get_type()

```
virtual bodyType Entity::get_type ( ) const  [pure virtual]
```

Get the type object.

**Returns**

bodyType

Implemented in Structure, and Enemy.

### 10.4.3.5 get_x()

```
double Entity::get_x ( ) const
```

Get the initial x pos.

**Returns**

double

#### 10.4.3.6 get_y()

```
double Entity::get_y ( ) const
```

Get the initial y pos.

**Returns**

double

#### 10.4.3.7 is_destructible()

```
bool Entity::is_destructible ( ) const
```

Is entity destructible.

**Returns**

true

false

#### 10.4.3.8 is_movable()

```
bool Entity::is_movable ( ) const
```

Is entity movable.

**Returns**

true

false

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

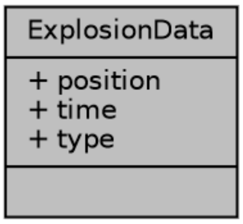
- src/entity.hpp
- src/entity.cpp

## 10.5 ExplosionData Struct Reference

Structure to store data for each explosion instance.

```
#include <playScene.hpp>
```

Collaboration diagram for ExplosionData:



### Public Attributes

- b2Vec2 position
- float time
- explosionType type

### 10.5.1 Detailed Description

Structure to store data for each explosion instance.

### 10.5.2 Member Data Documentation

#### 10.5.2.1 position

```
b2Vec2 ExplosionData::position
```

#### 10.5.2.2 time

```
float ExplosionData::time
```

#### 10.5.2.3 type

```
explosionType ExplosionData::type
```

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

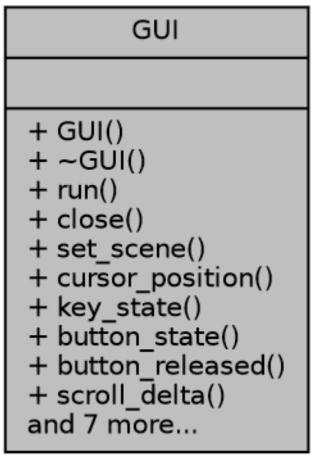
- src/playScene.hpp

## 10.6 GUI Class Reference

GUI Class to create window and run the game.

```
#include <GUI.hpp>
```

Collaboration diagram for GUI:



### Public Member Functions

- GUI ()

    *Construct a new GUI object.*
- ∼GUI ()

    *Destroy the GUI object.*
- void run ()

    *Start the application.*
- void close ()
- template<typename SceneType , typename... Params>
  void set_scene (Params...params)

    *Set the current Scene object to be replaced at start of next frame.*
- std::pair< float, float > cursor_position () const

  *Get current cursor position.*
- bool key_state (sf::Keyboard::Key key) const

  *Return state of keyboard key.*
- bool button_state (sf::Mouse::Button btn) const

  *Return state of mouse button.*
- bool button_released (sf::Mouse::Button btn) const
- int scroll_delta () const
- float get_aspect_ratio () const
- void set_viewport (float x, float y, float w, float h)
- void draw_sprite (float x, float y, float w, float h, float angle, const Image &img)

  *Draw a rectangular sprite on screen.*
- void draw_rect (float x, float y, float w, float h, float angle, Color color)

  *Draw a rectangle with a color.*
- void draw_text (float x, float y, float h, const std::string &text, Alignment align=Alignment::Center, sf::Color color=sf::Color::White)

  *Draw text to screen with text centering.*
- bool draw_button (const std::string &text, float x, float y, float w, float h)

  *Draw a button on screen. When mouse is hovered and pressed over button returns true.*
- void play_sound (std::string path, int vol=100)

  *Play sound from given path. Caches sound file inside class.*

### 10.6.1 Detailed Description

GUI Class to create window and run the game.

### 10.6.2 Constructor & Destructor Documentation

#### 10.6.2.1 GUI()

```
GUI::GUI ( )
```

Construct a new GUI object.

#### 10.6.2.2 ∼GUI()

```
GUI::∼GUI ( )
```

Destroy the GUI object.

### 10.6.3 Member Function Documentation

#### 10.6.3.1 button_released()

```
bool GUI::button_released (
             sf::Mouse::Button btn ) const
```

#### 10.6.3.2 button_state()

```
bool GUI::button_state (
             sf::Mouse::Button btn ) const
```

Return state of mouse button.

**Parameters**

| | |
|---|---|
| *btn* | Button id |

**Returns**

true Button is pressed

false Button is released

#### 10.6.3.3 close()

```
void GUI::close ( )
```

#### 10.6.3.4 cursor_position()

```
std::pair< float, float > GUI::cursor_position ( ) const
```

Get current cursor position.

**Returns**

std::pair<float, float> position in [0, 1] range

#### 10.6.3.5 draw_button()

```
bool GUI::draw_button (
             const std::string & text,
             float x,
             float y,
             float w,
             float h )
```

Draw a button on screen. When mouse is hovered and pressed over button returns true.

**Parameters**

| | |
|---|---|
| *text* | |
| *x* | |
| *y* | |
| *w* | |
| *h* | |
| *button_image* | |

**Returns**

true Button is released

false otherwise

### 10.6.3.6 draw_rect()

```
void GUI::draw_rect (
             float x,
             float y,
             float w,
             float h,
             float angle,
             Color color )
```

Draw a rectangle with a color.

**Parameters**

| | |
|---|---|
| *x* | |
| *y* | |
| *w* | |
| *h* | |
| *angle* | |
| *color* | |

### 10.6.3.7 draw_sprite()

```
void GUI::draw_sprite (
             float x,
             float y,
             float w,
             float h,
             float angle,
             const Image & img )
```

Draw a rectangular sprite on screen.

**Parameters**

| | |
|---|---|
| *x* | |
| *y* | |
| *w* | |
| *h* | |
| *angle* | |
| *img* | |

### 10.6.3.8 draw_text()

```
void GUI::draw_text (
             float x,
             float y,
             float h,
             const std::string & text,
             Alignment align = Alignment::Center,
             sf::Color color = sf::Color::White )
```

Draw text to screen with text centering.

**Parameters**

| | |
|---|---|
| *x* | xpos |
| *y* | ypos |
| *h* | text scale |
| *text* | text string |

### 10.6.3.9 get_aspect_ratio()

```
float GUI::get_aspect_ratio ( ) const
```

### 10.6.3.10 key_state()

```
bool GUI::key_state (
             sf::Keyboard::Key key ) const
```

Return state of keyboard key.

**Parameters**

| | |
|---|---|
| *key* | |

**Returns**

true Key is pressed

false Key is released

#### 10.6.3.11 play_sound()

```
void GUI::play_sound (
             std::string path,
             int vol = 100 )
```

Play sound from given path. Caches sound file inside class.

**Parameters**

| | |
|---|---|
| *path* | Path to file |
| *vol* | Volume to play at |

#### 10.6.3.12 run()

```
void GUI::run ( )
```

Start the application.

#### 10.6.3.13 scroll_delta()

```
int GUI::scroll_delta ( ) const
```

#### 10.6.3.14 set_scene()

```
template<typename SceneType , typename...  Params>
void GUI::set_scene (
             Params...  params )  [inline]
```

Set the current Scene object to be replaced at start of next frame.

**Template Parameters**

| | |
|---|---|
| *SceneType* | scene class type |
| *Params* | argument types of SceneType constructor |

**Parameters**

| | |
|---|---|
| *params* | arguments for constructing new class of SceneType |

#### 10.6.3.15 set_viewport()

```
void GUI::set_viewport (
            float x,
            float y,
            float w,
            float h )
```

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

- src/GUI.hpp
- src/GUI.cpp

## 10.7 Image Class Reference

```
#include <image.hpp>
```

Collaboration diagram for Image:

### Public Member Functions

- Image (const std::string &path)

  *Construct a new Image object.*

### Friends

- class GUI

### 10.7.1 Constructor & Destructor Documentation

#### 10.7.1.1 Image()

```
Image::Image (
            const std::string & path )
```

Construct a new Image object.

**Parameters**

| | |
|---|---|
| *path* | Path to image |

### 10.7.2 Friends And Related Function Documentation

#### 10.7.2.1 GUI

```
friend class GUI  [friend]
```

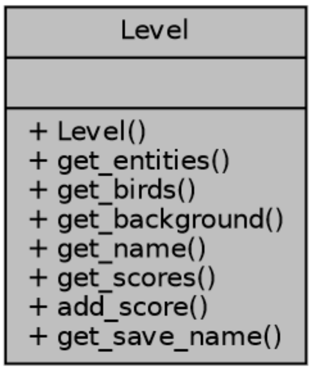
The documentation for this class was generated from the following files:

- src/image.hpp
- src/image.cpp

## 10.8 Level Class Reference

```
#include <level.hpp>
```

Collaboration diagram for Level:



## Public Member Functions

- Level (std::vector< std::shared_ptr< Entity >> entities, std::vector< std::shared_ptr< Bird >> birds, std↩ ::string backgroundPath, std::string name, std::vector< ScoreBoardEntry > scores, std::string save_name)

  *Construct a new Level object.*
- std::vector< std::shared_ptr< Entity > > get_entities () const

  *Get the list of entities in level.*
- std::vector< std::shared_ptr< Bird > > get_birds () const

  *Get the list of bird objects.*
- std::string get_background () const

  *Get path to the background file.*
- std::string get_name () const

  *Get the name of the Level.*
- std::vector< ScoreBoardEntry > get_scores () const

  *Get the scores reached in the level.*
- void add_score (std::string name, int score)

  *Register a new score to the level.*
- std::string get_save_name () const

  *Get the path to the level.*

### 10.8.1 Constructor & Destructor Documentation

#### 10.8.1.1 Level()

```
Level::Level (
            std::vector< std::shared_ptr< Entity >> entities,
            std::vector< std::shared_ptr< Bird >> birds,
            std::string backgroundPath,
            std::string name,
            std::vector< ScoreBoardEntry > scores,
            std::string save_name )
```

Construct a new Level object.

**Parameters**

| | |
|---|---|
| *entities* | List of entities |
| *birds* | List of birds |
| *backgroundPath* | Path to background |
| *name* | Name of level |
| *scores* | List of scores reached in level |
| *save_name* | Path to save file |

### 10.8.2 Member Function Documentation

#### 10.8.2.1 add_score()

```
void Level::add_score (
             std::string name,
             int score )
```

Register a new score to the level.

**Parameters**

| | |
|---|---|
| *name* | Name of player |
| *score* | Score reached |

#### 10.8.2.2 get_background()

```
std::string Level::get_background ( ) const
```

Get path to the background file.

**Returns**

std::string Path to file

#### 10.8.2.3 get_birds()

```
std::vector< std::shared_ptr< Bird > > Level::get_birds ( ) const
```

Get the list of bird objects.

**Returns**

std::vector<std::shared_ptr<Bird>>

#### 10.8.2.4 get_entities()

```
std::vector< std::shared_ptr< Entity > > Level::get_entities ( ) const
```

Get the list of entities in level.

**Returns**

std::vector<std::shared_ptr<Entity>> The list of entities

#### 10.8.2.5 get_name()

```
std::string Level::get_name ( ) const
```

Get the name of the Level.

**Returns**

std::string

#### 10.8.2.6 get_save_name()

```
std::string Level::get_save_name ( ) const
```

Get the path to the level.

**Returns**

std::string Path

#### 10.8.2.7 get_scores()

```
std::vector< ScoreBoardEntry > Level::get_scores ( ) const
```

Get the scores reached in the level.

**Returns**

std::vector<ScoreBoardEntry> List of scores

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

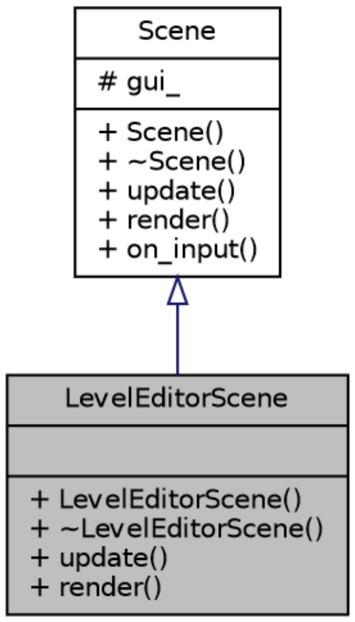
- src/level.hpp
- src/level.cpp

## 10.9 LevelEditorScene Class Reference

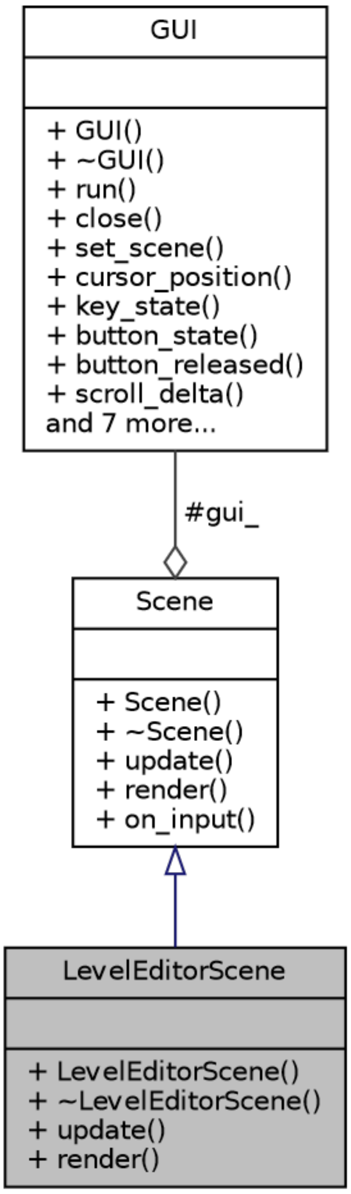
A scene for editing the playable levels in the game.

```
#include <levelEditorScene.hpp>
```

Inheritance diagram for LevelEditorScene:



Collaboration diagram for LevelEditorScene:



## Public Member Functions

- LevelEditorScene (GUI &gui, Level &level, const std::string current_player)

  *Construct a new Level Editor Scene.*
- ∼LevelEditorScene ()

  *Destroy the Level Editor Scene object.*
- void update (float ts) override

  *Update function to update everything required in level editor.*
- void render () override

  *Render the level editor.*

## Additional Inherited Members

## 10.9.1 Detailed Description

A scene for editing the playable levels in the game.

## 10.9.2 Constructor & Destructor Documentation

### 10.9.2.1 LevelEditorScene()

```
LevelEditorScene::LevelEditorScene (
            GUI & gui,
            Level & level,
            const std::string current_player )
```

Construct a new Level Editor Scene.

**Parameters**

| | |
|---|---|
| *gui* | Reference to GUI |
| *level* | Path to level to edit |
| *current_player* | Current player name |

### 10.9.2.2 ∼LevelEditorScene()

```
LevelEditorScene::∼LevelEditorScene ( )
```

Destroy the Level Editor Scene object.

## 10.9.3 Member Function Documentation

### 10.9.3.1 render()

```
void LevelEditorScene::render ( )  [override], [virtual]
```

Render the level editor.

Implements Scene.

### 10.9.3.2 update()

```
void LevelEditorScene::update (
             float ts )  [override], [virtual]
```

Update function to update everything required in level editor.

**Parameters**

| | |
|---|---|
| *ts* | Timestep |

Implements Scene.

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

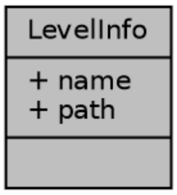
- src/levelEditorScene.hpp
- src/levelEditorScene.cpp

## 10.10 LevelInfo Struct Reference

Information about levels.

```
#include <readerWriter.hpp>
```

Collaboration diagram for LevelInfo:



### Public Attributes

- std::string name
- std::string path

### 10.10.1 Detailed Description

Information about levels.

### 10.10.2 Member Data Documentation

#### 10.10.2.1 name

```
std::string LevelInfo::name
```

#### 10.10.2.2 path

```
std::string LevelInfo::path
```

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

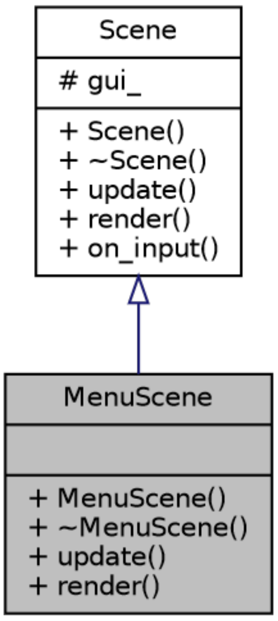
- src/readerWriter.hpp

## 10.11 MenuScene Class Reference

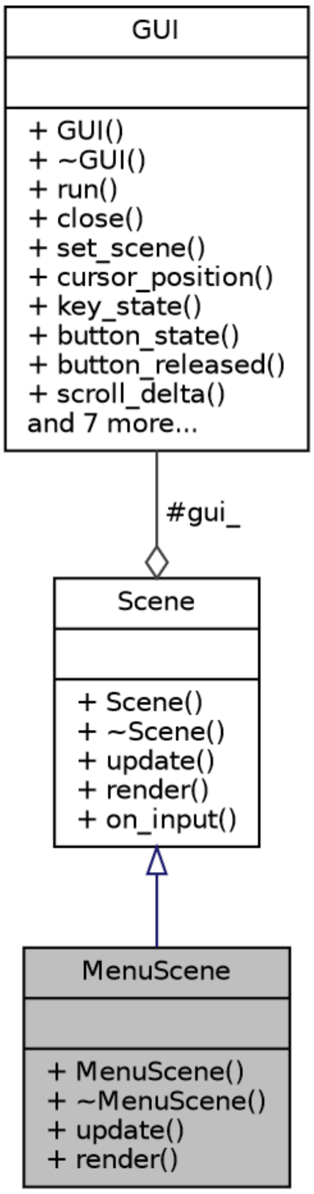
Scene to handle the main menu.

```
#include <menuScene.hpp>
```

Inheritance diagram for MenuScene:



Collaboration diagram for MenuScene:



## Public Member Functions

- MenuScene (GUI &gui, std::string current_player)

    *Construct a new Menu Scene.*
- ∼MenuScene ()

    *Destroy the Menu Scene object.*
- void update (float ts) override

    *Update everything required in the main menu.*
- void render () override

    *Render the MenuScene.*

## Additional Inherited Members

## 10.11.1 Detailed Description

Scene to handle the main menu.

## 10.11.2 Constructor & Destructor Documentation

### 10.11.2.1 MenuScene()

```
MenuScene::MenuScene (
             GUI & gui,
             std::string current_player )
```

Construct a new Menu Scene.

**Parameters**

| | |
|---|---|
| *gui* | Reference to GUI |
| *current_player* | Name of current player |

### 10.11.2.2 ∼MenuScene()

```
MenuScene::∼MenuScene ( )
```

Destroy the Menu Scene object.

## 10.11.3 Member Function Documentation

### 10.11.3.1 render()

```
void MenuScene::render ( )  [override], [virtual]
```

Render the MenuScene.

Implements Scene.

### 10.11.3.2 update()

```
void MenuScene::update (
             float ts )  [override], [virtual]
```

Update everything required in the main menu.

**Parameters**

| | |
|---|---|
| *ts* | Timestep |

Implements Scene.

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

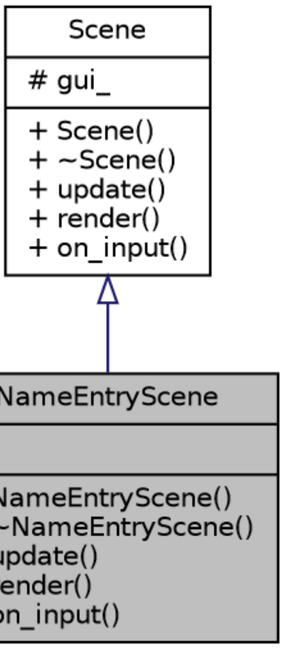
- src/menuScene.hpp
- src/menuScene.cpp

## 10.12 NameEntryScene Class Reference

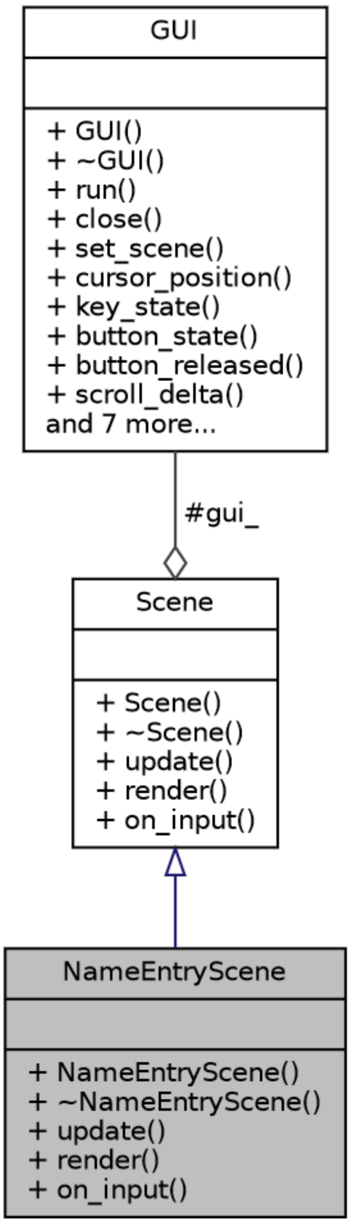
A scene for the user to enter their name from.

```
#include <nameEntryScene.hpp>
```

Inheritance diagram for NameEntryScene:



Collaboration diagram for NameEntryScene:



## Public Member Functions

- NameEntryScene (GUI &gui)

  *Construct a new Name Entry Scene object.*
- ∼NameEntryScene ()

  *Destroy the Name Entry Scene object.*
- void update (float ts) override

  *Function to update required.*

- void render () override

  *Function to render scene.*
- void on_input (char c) override

  *Handle input events.*

## Additional Inherited Members

## 10.12.1 Detailed Description

A scene for the user to enter their name from.

## 10.12.2 Constructor & Destructor Documentation

### 10.12.2.1 NameEntryScene()

```
NameEntryScene::NameEntryScene (
             GUI & gui )
```

Construct a new Name Entry Scene object.

**Parameters**

| | |
|---|---|
| *gui* | Reference to GUI |

### 10.12.2.2 ∼NameEntryScene()

```
NameEntryScene::∼NameEntryScene ( )
```

Destroy the Name Entry Scene object.

## 10.12.3 Member Function Documentation

### 10.12.3.1 on_input()

```
void NameEntryScene::on_input (
             char c )  [override], [virtual]
```

Handle input events.

**Parameters**

| | |
|---|---|
| *c* | Character entered |

Reimplemented from Scene.

#### 10.12.3.2 render()

```
void NameEntryScene::render ( )  [override], [virtual]
```

Function to render scene.

Implements Scene.

#### 10.12.3.3 update()

```
void NameEntryScene::update (
             float ts )  [override], [virtual]
```

Function to update required.

**Parameters**

| | |
|---|---|
| *ts* | Timestep |

Implements Scene.

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

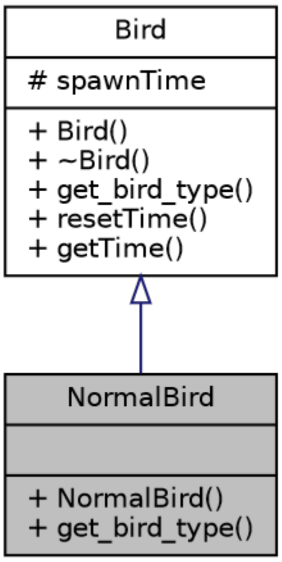
- src/nameEntryScene.hpp
- src/nameEntryScene.cpp

## 10.13 NormalBird Class Reference

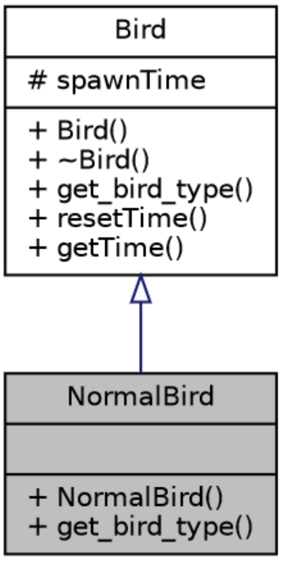
Normal bird class No special effects.

```
#include <bird.hpp>
```

Inheritance diagram for NormalBird:



Collaboration diagram for NormalBird:



## Public Member Functions

- NormalBird ()

  *Construct a new Normal Bird object.*
- birdType get_bird_type () const override

  *Get the bird type object.*

## Additional Inherited Members

### 10.13.1 Detailed Description

Normal bird class No special effects.

### 10.13.2 Constructor & Destructor Documentation

#### 10.13.2.1 NormalBird()

```
NormalBird::NormalBird ( )
```

Construct a new Normal Bird object.

### 10.13.3 Member Function Documentation

#### 10.13.3.1 get_bird_type()

```
birdType NormalBird::get_bird_type ( ) const  [override], [virtual]
```

Get the bird type object.

**Returns**

birdType::normal

Implements Bird.

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

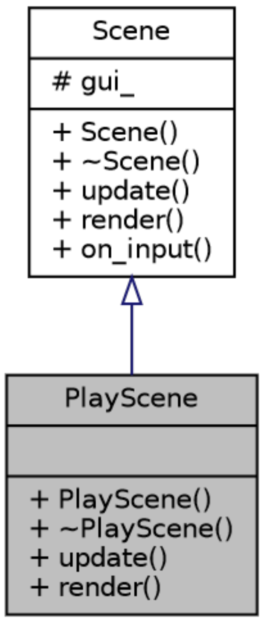
- src/bird.hpp
- src/bird.cpp

## 10.14 PlayScene Class Reference

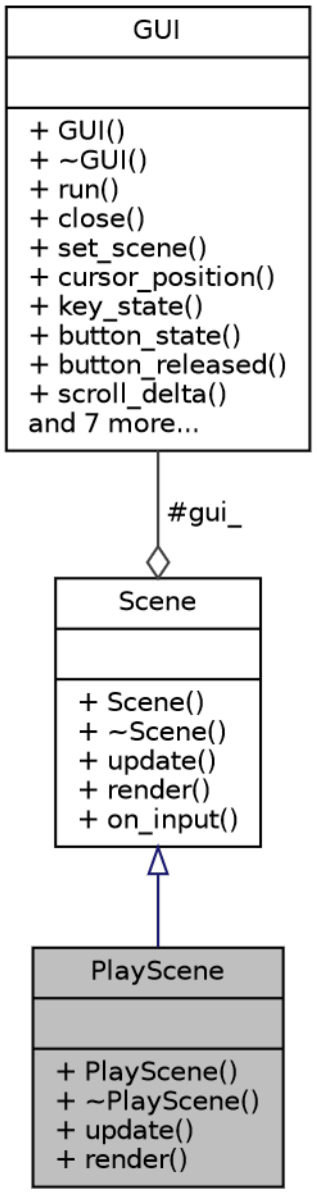
The game play scene to play the levels in the game.

```
#include <playScene.hpp>
```

Inheritance diagram for PlayScene:



Collaboration diagram for PlayScene:



## Public Member Functions

- PlayScene (GUI &gui, const Level &level, std::string current_player)

  *Construct a new Play Scene object.*
- ∼PlayScene ()

  *Destroy the Play Scene object.*
- void update (float ts) override

  *Update everything required by the PlayScene.*
- void render () override

  *Render everything in the PlayScene.*

## Additional Inherited Members

### 10.14.1 Detailed Description

The game play scene to play the levels in the game.

### 10.14.2 Constructor & Destructor Documentation

#### 10.14.2.1 PlayScene()

```
PlayScene::PlayScene (
            GUI & gui,
            const Level & level,
            std::string current_player )
```

Construct a new Play Scene object.

**Parameters**

| | |
|---|---|
| *gui* | Reference to GUI |
| *level* | Level object to play |
| *current_player* | Name of current player |

#### 10.14.2.2 ∼PlayScene()

```
PlayScene::∼PlayScene ( )
```

Destroy the Play Scene object.

### 10.14.3 Member Function Documentation

#### 10.14.3.1 render()

```
void PlayScene::render ( ) [override], [virtual]
```

Render everything in the PlayScene.

Implements Scene.

#### 10.14.3.2 update()

```
void PlayScene::update (
             float ts )  [override], [virtual]
```

Update everything required by the PlayScene.

**Parameters**

| | |
|---|---|
| *ts* | Timestep |

Implements Scene.

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

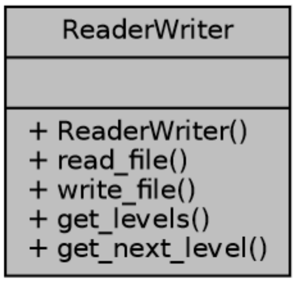
- src/playScene.hpp
- src/playScene.cpp

## 10.15 ReaderWriter Class Reference

A class for loading/reading and saving/writing levels in forms of Level objects and .txt files.

```
#include <readerWriter.hpp>
```

Collaboration diagram for ReaderWriter:



### Public Member Functions

- ReaderWriter ()

  *Constructor.*
- std::optional< Level > read_file (std::string fileName) const

  *Given the file name as the parameter loads the level.*
- void write_file (Level level, std::string fileName) const

  *Saves the provided level into a file named fileName.*
- std::vector< LevelInfo > get_levels () const

  *Returns a list of levels that can be loaded.*
- std::optional< std::string > get_next_level (std::string) const

  *Get the name of the next level in sequence.*

### 10.15.1 Detailed Description

A class for loading/reading and saving/writing levels in forms of Level objects and .txt files.

### 10.15.2 Constructor & Destructor Documentation

#### 10.15.2.1 ReaderWriter()

```
ReaderWriter::ReaderWriter ( )  [inline]
```

Constructor.

### 10.15.3 Member Function Documentation

#### 10.15.3.1 get_levels()

```
std::vector< LevelInfo > ReaderWriter::get_levels ( ) const
```

Returns a list of levels that can be loaded.

#### 10.15.3.2 get_next_level()

```
std::optional< std::string > ReaderWriter::get_next_level (
             std::string path ) const
```

Get the name of the next level in sequence.

**Returns**

std::optional<std::string> Name of level if there is a next level

#### 10.15.3.3 read_file()

```
std::optional< Level > ReaderWriter::read_file (
             std::string fileName ) const
```

Given the file name as the parameter loads the level.

**Returns**

std::optional<Level> Loaded level

#### 10.15.3.4 write_file()

```
void ReaderWriter::write_file (
            Level level,
            std::string fileName ) const
```

Saves the provided level into a file named fileName.

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

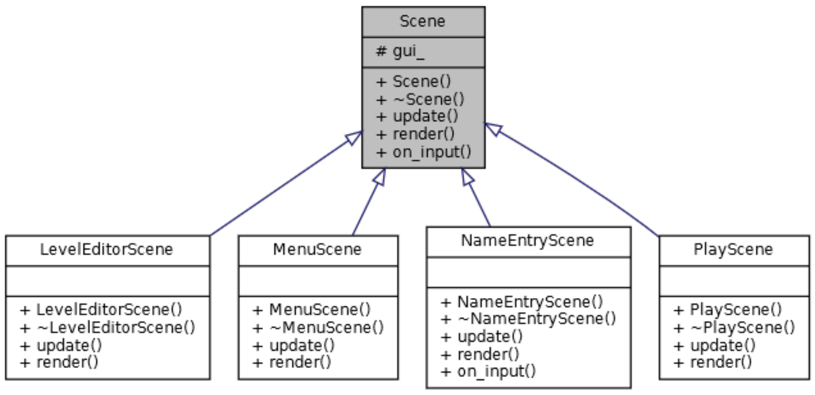
- src/readerWriter.hpp
- src/readerWriter.cpp

## 10.16 Scene Class Reference

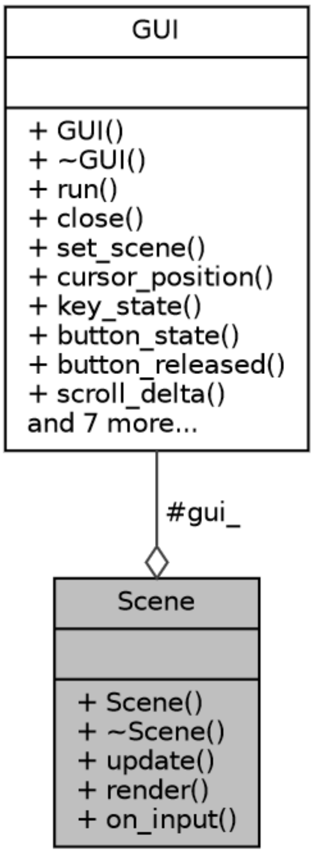
Base Scene class to represent different states the game can be in. Ex. Play state can be implemented with PlayScene. Menu can be implemented with MenuScene etc.

```
#include <scene.hpp>
```

Inheritance diagram for Scene:



Collaboration diagram for Scene:



## Public Member Functions

- Scene (GUI &gui)

  *Construct a new Scene.*
- virtual ∼Scene ()

  *Destroy the Scene object.*
- virtual void update (float ts)=0

  *Called on an interval to update state of scene.*
- virtual void render ()=0
- virtual void on_input (char c)

  *Called when input has been entered and should be passed to scene.*

## Protected Attributes

- GUI & gui_

### 10.16.1 Detailed Description

Base Scene class to represent different states the game can be in. Ex. Play state can be implemented with PlayScene. Menu can be implemented with MenuScene etc.

### 10.16.2 Constructor & Destructor Documentation

#### 10.16.2.1 Scene()

```
Scene::Scene (
             GUI & gui )
```

Construct a new Scene.

**Parameters**

| | |
|---|---|
| *gui* | Reference to GUI |

#### 10.16.2.2 ∼Scene()

```
Scene::∼Scene ( )  [virtual]
```

Destroy the Scene object.

### 10.16.3 Member Function Documentation

#### 10.16.3.1 on_input()

```
virtual void Scene::on_input (
             char c )  [inline], [virtual]
```

Called when input has been entered and should be passed to scene.

**Parameters**

| | |
|---|---|
| *c* | Character |

Reimplemented in NameEntryScene.

#### 10.16.3.2 render()

```
virtual void Scene::render ( )  [pure virtual]
```

Implemented in PlayScene, NameEntryScene, MenuScene, and LevelEditorScene.

#### 10.16.3.3 update()

```
virtual void Scene::update (
             float ts )  [pure virtual]
```

Called on an interval to update state of scene.

**Parameters**

| | |
|---|---|
| *ts* | Timestep since last update |

Implemented in PlayScene, NameEntryScene, MenuScene, and LevelEditorScene.

### 10.16.4 Member Data Documentation

#### 10.16.4.1 gui_

```
GUI& Scene::gui_  [protected]
```

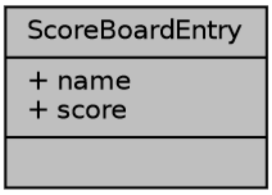
The documentation for this class was generated from the following files:

- src/scene.hpp
- src/scene.cpp

## 10.17 ScoreBoardEntry Struct Reference

```
#include <level.hpp>
```

Collaboration diagram for ScoreBoardEntry:



## Public Attributes

- std::string name
- int score

### 10.17.1 Member Data Documentation

#### 10.17.1.1 name

```
std::string ScoreBoardEntry::name
```

#### 10.17.1.2 score

```
int ScoreBoardEntry::score
```

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

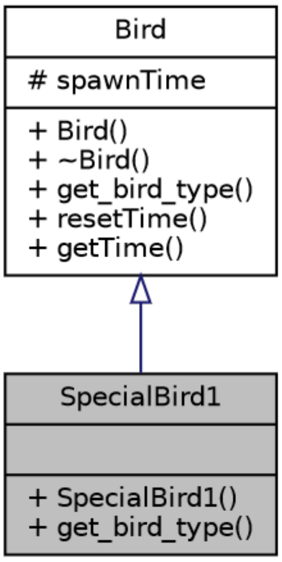
- src/level.hpp

## 10.18 SpecialBird1 Class Reference

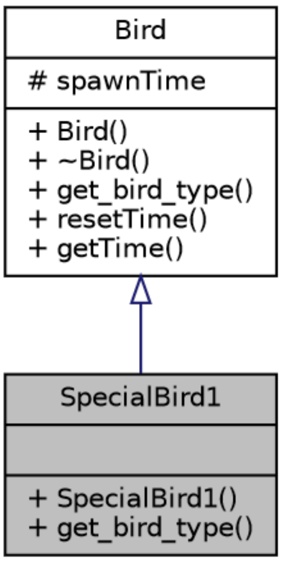
Special Bird 1 class Has speed up effect.

```
#include <bird.hpp>
```

Inheritance diagram for SpecialBird1:



Collaboration diagram for SpecialBird1:



## Public Member Functions

- SpecialBird1 ()

  *Construct a new Special Bird 1 object.*
- birdType get_bird_type () const override

  *Get the bird type object.*

## Additional Inherited Members

### 10.18.1 Detailed Description

Special Bird 1 class Has speed up effect.

### 10.18.2 Constructor & Destructor Documentation

#### 10.18.2.1 SpecialBird1()

```
SpecialBird1::SpecialBird1 ( )
```

Construct a new Special Bird 1 object.

### 10.18.3 Member Function Documentation

#### 10.18.3.1 get_bird_type()

```
birdType SpecialBird1::get_bird_type ( ) const  [override], [virtual]
```

Get the bird type object.

**Returns**

birdType::special1

Implements Bird.

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

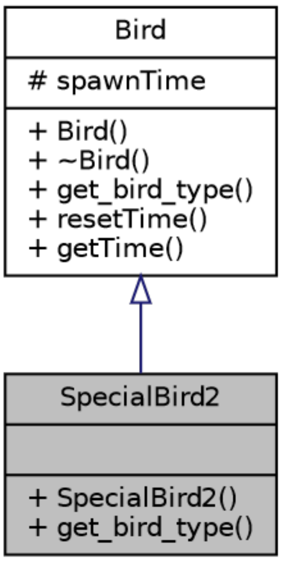
- src/bird.hpp
- src/bird.cpp

## 10.19 SpecialBird2 Class Reference

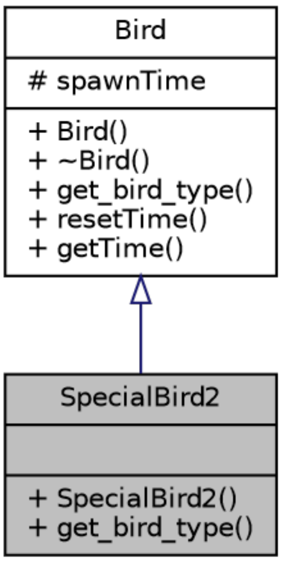
Special Bird 2 class Has explosion effect.

```
#include <bird.hpp>
```

Inheritance diagram for SpecialBird2:



Collaboration diagram for SpecialBird2:



## Public Member Functions

- SpecialBird2 ()

    *Construct a new Special Bird 2 object.*
- birdType get_bird_type () const override

    *Get the bird type object.*

## Additional Inherited Members

## 10.19.1 Detailed Description

Special Bird 2 class Has explosion effect.

## 10.19.2 Constructor & Destructor Documentation

### 10.19.2.1 SpecialBird2()

```
SpecialBird2::SpecialBird2 ( )
```

Construct a new Special Bird 2 object.

### 10.19.3 Member Function Documentation

#### 10.19.3.1 get_bird_type()

```
birdType SpecialBird2::get_bird_type ( ) const  [override], [virtual]
```

Get the bird type object.

**Returns**

birdType::special2

Implements Bird.

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

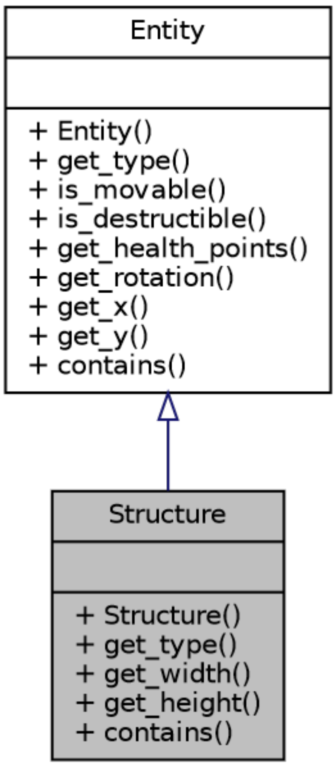
- src/bird.hpp
- src/bird.cpp

## 10.20 Structure Class Reference

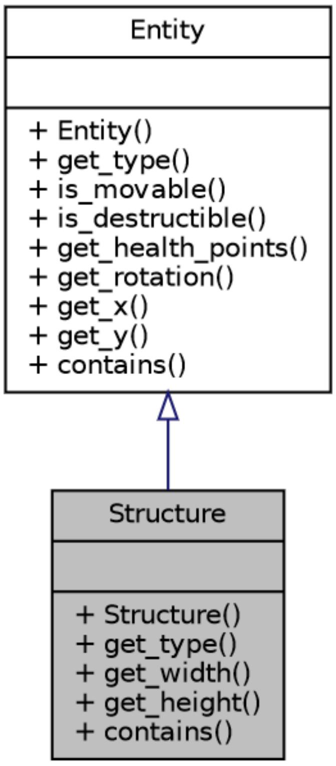
Structure type to represent walls in the game.

```
#include <structure.hpp>
```

Inheritance diagram for Structure:



Collaboration diagram for Structure:



### Public Member Functions

- Structure (int healthPoints, double initRotation, double x, double y, double height, double width)

  *Construct a new Structure.*
- bodyType get_type () const override

  *Get the type object.*
- double get_width () const

  *Get the width of structure.*
- double get_height () const

  *Get the height the strucutre.*
- bool contains (double x, double y)

  *Returns true if contains the coordinate passed.*

### 10.20.1 Detailed Description

Structure type to represent walls in the game.

## 10.20.2 Constructor & Destructor Documentation

### 10.20.2.1 Structure()

```
Structure::Structure (
            int healthPoints,
            double initRotation,
            double x,
            double y,
            double height,
            double width )
```

Construct a new Structure.

**Parameters**

| | |
|---|---|
| *healthPoints* | HP |
| *initRotation* | Rotation |
| *x* | X position |
| *y* | Y position |
| *height* | Height of structure |
| *width* | Width of structure |

## 10.20.3 Member Function Documentation

### 10.20.3.1 contains()

```
bool Structure::contains (
            double x,
            double y ) [virtual]
```

Returns true if contains the coordinate passed.

**Parameters**

| | |
|---|---|
| *x* | X-coord |
| *y* | Y-coord |

**Returns**

true Contained

false Not contained

Implements Entity.

#### 10.20.3.2 get_height()

```
double Structure::get_height ( ) const
```

Get the height the strucutre.

**Returns**

double Height

#### 10.20.3.3 get_type()

```
bodyType Structure::get_type ( ) const  [override], [virtual]
```

Get the type object.

**Returns**

bodyType::structure

Implements Entity.

#### 10.20.3.4 get_width()

```
double Structure::get_width ( ) const
```

Get the width of structure.

**Returns**

double Width

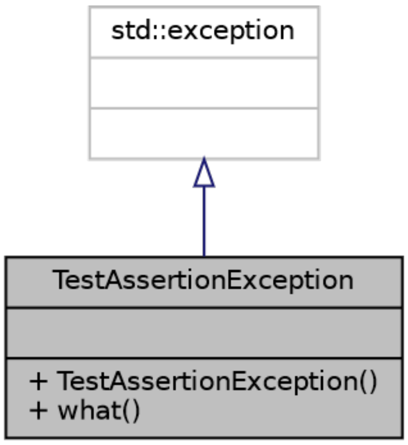
The documentation for this class was generated from the following files:

- src/structure.hpp
- src/structure.cpp

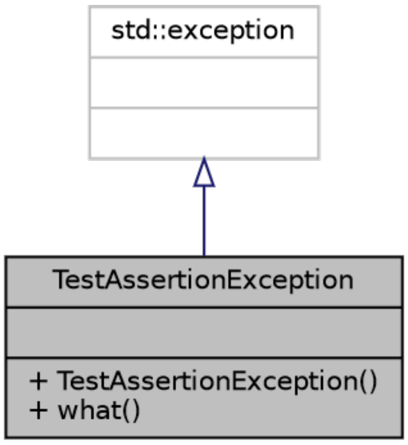
## 10.21 TestAssertionException Class Reference

```
#include <test_utils.hpp>
```

Inheritance diagram for TestAssertionException:



Collaboration diagram for TestAssertionException:



### Public Member Functions

- TestAssertionException (const std::string &message)
- const char ∗ what () const noexcept override

### 10.21.1 Constructor & Destructor Documentation

#### 10.21.1.1 TestAssertionException()

```
TestAssertionException::TestAssertionException (
            const std::string & message )  [inline]
```

### 10.21.2 Member Function Documentation

#### 10.21.2.1 what()

```
const char* TestAssertionException::what ( ) const  [inline], [override], [noexcept]
```

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

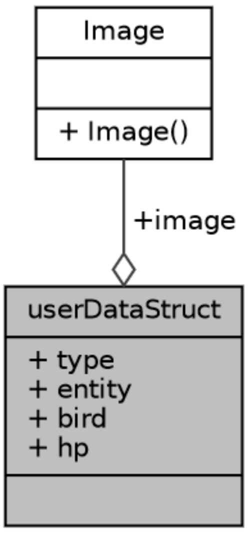
- tests/test_utils.hpp

## 10.22 userDataStruct Struct Reference

Physics entities hold a copy of userDataStruct they can reference.

`#include <playScene.hpp>`

Collaboration diagram for userDataStruct:



## Public Attributes

- Image ∗ image
- bodyType type
- std::shared_ptr< Entity > entity
- std::shared_ptr< Bird > bird
- int hp

## 10.22.1 Detailed Description

Physics entities hold a copy of userDataStruct they can reference.

## 10.22.2 Member Data Documentation

### 10.22.2.1 bird

```
std::shared_ptr<Bird> userDataStruct::bird
```

### 10.22.2.2 entity

```
std::shared_ptr<Entity> userDataStruct::entity
```

### 10.22.2.3 hp

```
int userDataStruct::hp
```

### 10.22.2.4 image

```
Image* userDataStruct::image
```

### 10.22.2.5 type

```
bodyType userDataStruct::type
```

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

- src/playScene.hpp

# Chapter 11

# File Documentation

## 11.1 build/CMakeFiles/3.22.1/CompilerIdC/CMakeCCompilerId.c File Reference

### Macros

- #define __has_include(x) 0
- #define COMPILER_ID ""
- #define STRINGIFY_HELPER(X) #X
- #define STRINGIFY(X) STRINGIFY_HELPER(X)
- #define PLATFORM_ID
- #define ARCHITECTURE_ID
- #define DEC(n)
- #define HEX(n)
- #define C_VERSION

### Functions

- int main (int argc, char ∗argv[ ])

### Variables

- char const ∗ info_compiler = "INFO" ":" "compiler[" COMPILER_ID "]"
- char const ∗ info_platform = "INFO" ":" "platform[" PLATFORM_ID "]"
- char const ∗ info_arch = "INFO" ":" "arch[" ARCHITECTURE_ID "]"
- const char ∗ info_language_standard_default
- const char ∗ info_language_extensions_default

### 11.1.1 Macro Definition Documentation

#### 11.1.1.1 __has_include

```
#define __has_include(
              x ) 0
```

#### 11.1.1.2 ARCHITECTURE_ID

```
#define ARCHITECTURE_ID
```

#### 11.1.1.3 C_VERSION

```
#define C_VERSION
```

#### 11.1.1.4 COMPILER_ID

```
#define COMPILER_ID ""
```

#### 11.1.1.5 DEC

```
#define DEC(
              n )
```

**Value:**

```
  ('0' + (((n) / 10000000)%10)), \
  ('0' + (((n) / 1000000)%10)),  \
  ('0' + (((n) / 100000)%10)),   \
  ('0' + (((n) / 10000)%10)),    \
  ('0' + (((n) / 1000)%10)),     \
  ('0' + (((n) / 100)%10)),      \
  ('0' + (((n) / 10)%10)),       \
  ('0' +  ((n) % 10))
```

#### 11.1.1.6 HEX

```
#define HEX(
              n )
```

**Value:**

```
  ('0' + ((n)»28 & 0xF)), \
  ('0' + ((n)»24 & 0xF)), \
  ('0' + ((n)»20 & 0xF)), \
  ('0' + ((n)»16 & 0xF)), \
  ('0' + ((n)»12 & 0xF)), \
  ('0' + ((n)»8  & 0xF)), \
  ('0' + ((n)»4  & 0xF)), \
  ('0' + ((n)     & 0xF))
```

#### 11.1.1.7 PLATFORM_ID

```
#define PLATFORM_ID
```

#### 11.1.1.8 STRINGIFY

```
#define STRINGIFY(
              X ) STRINGIFY_HELPER(X)
```

#### 11.1.1.9 STRINGIFY_HELPER

```
#define STRINGIFY_HELPER(
              X ) #X
```

### 11.1.2 Function Documentation

#### 11.1.2.1 main()

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

### 11.1.3 Variable Documentation

#### 11.1.3.1 info_arch

```
char const* info_arch = "INFO" ":" "arch[" ARCHITECTURE_ID "]"
```

#### 11.1.3.2 info_compiler

```
char const* info_compiler = "INFO" ":" "compiler[" COMPILER_ID "]"
```

#### 11.1.3.3 info_language_extensions_default

```
const char* info_language_extensions_default
```

**Initial value:**
```
= "INFO" ":" "extensions_default["
  "OFF"
"]"
```

#### 11.1.3.4 info_language_standard_default

```
const char* info_language_standard_default
```

**Initial value:**
```
=
  "INFO" ":" "standard_default[" C_VERSION "]"
```

#### 11.1.3.5 info_platform

```
char const* info_platform = "INFO" ":" "platform[" PLATFORM_ID "]"
```

## 11.2 build/CMakeFiles/3.22.1/CompilerIdCXX/CMakeCXXCompilerId.cpp File Reference

### Macros

- #define __has_include(x) 0
- #define COMPILER_ID ""
- #define STRINGIFY_HELPER(X) #X
- #define STRINGIFY(X) STRINGIFY_HELPER(X)
- #define PLATFORM_ID
- #define ARCHITECTURE_ID
- #define DEC(n)
- #define HEX(n)
- #define CXX_STD __cplusplus

### Functions

- int main (int argc, char ∗argv[ ])

### Variables

- char const ∗ info_compiler = "INFO" ":" "compiler[" COMPILER_ID "]"
- char const ∗ info_platform = "INFO" ":" "platform[" PLATFORM_ID "]"
- char const ∗ info_arch = "INFO" ":" "arch[" ARCHITECTURE_ID "]"
- const char ∗ info_language_standard_default
- const char ∗ info_language_extensions_default

### 11.2.1 Macro Definition Documentation

#### 11.2.1.1 __has_include

```
#define __has_include(
              x ) 0
```

#### 11.2.1.2 ARCHITECTURE_ID

```
#define ARCHITECTURE_ID
```

#### 11.2.1.3 COMPILER_ID

```
#define COMPILER_ID ""
```

#### 11.2.1.4 CXX_STD

```
#define CXX_STD __cplusplus
```

#### 11.2.1.5 DEC

```
#define DEC(
              n )
```

**Value:**

```
  ('0' + (((n) / 10000000)%10)), \
  ('0' + (((n) / 1000000)%10)),  \
  ('0' + (((n) / 100000)%10)),   \
  ('0' + (((n) / 10000)%10)),    \
  ('0' + (((n) / 1000)%10)),     \
  ('0' + (((n) / 100)%10)),      \
  ('0' + (((n) / 10)%10)),       \
  ('0' +  ((n) % 10))
```

#### 11.2.1.6 HEX

```
#define HEX(
              n )
```

**Value:**

```
  ('0' + ((n)»28 & 0xF)), \
  ('0' + ((n)»24 & 0xF)), \
  ('0' + ((n)»20 & 0xF)), \
  ('0' + ((n)»16 & 0xF)), \
  ('0' + ((n)»12 & 0xF)), \
  ('0' + ((n)»8  & 0xF)), \
  ('0' + ((n)»4  & 0xF)), \
  ('0' + ((n)     & 0xF))
```

#### 11.2.1.7 PLATFORM_ID

```
#define PLATFORM_ID
```

#### 11.2.1.8 STRINGIFY

```
#define STRINGIFY(
              X ) STRINGIFY_HELPER(X)
```

#### 11.2.1.9 STRINGIFY_HELPER

```
#define STRINGIFY_HELPER(
              X ) #X
```

### 11.2.2 Function Documentation

#### 11.2.2.1 main()

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

### 11.2.3 Variable Documentation

#### 11.2.3.1 info_arch

```
char const* info_arch = "INFO" ":" "arch[" ARCHITECTURE_ID "]"
```

#### 11.2.3.2 info_compiler

```
char const* info_compiler = "INFO" ":" "compiler[" COMPILER_ID "]"
```

#### 11.2.3.3 info_language_extensions_default

```
const char* info_language_extensions_default
```

**Initial value:**
```
= "INFO" ":" "extensions_default["
  "OFF"
"]"
```

#### 11.2.3.4 info_language_standard_default

```
const char* info_language_standard_default
```

**Initial value:**
```
= "INFO" ":" "standard_default["
  "98"
"]"
```

#### 11.2.3.5 info_platform

```
char const* info_platform = "INFO" ":" "platform[" PLATFORM_ID "]"
```

## 11.3 doc/readme.md File Reference

## 11.4 plan/readme.md File Reference

## 11.5 src/readme.md File Reference

## 11.6 Meeting-notes.md File Reference

## 11.7 README.md File Reference

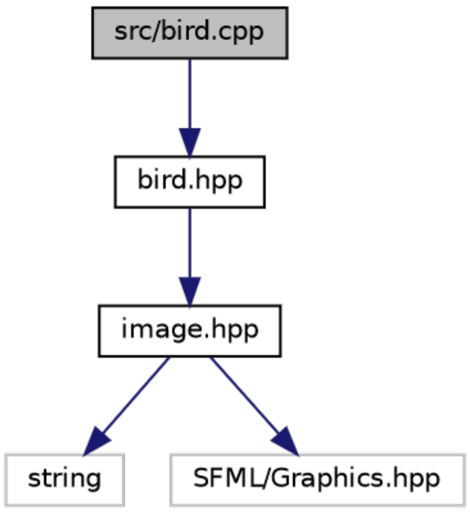
## 11.8 res/README.md File Reference

## 11.9 SavefileFormat.md File Reference

## 11.10 src/bird.cpp File Reference

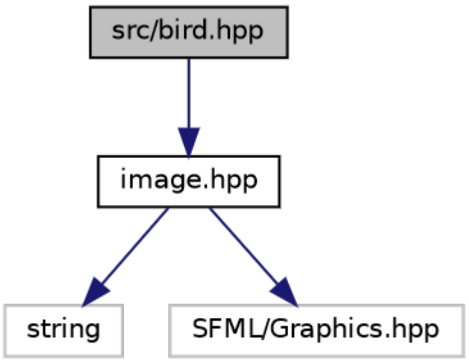
```
#include "bird.hpp"
```

Include dependency graph for bird.cpp:

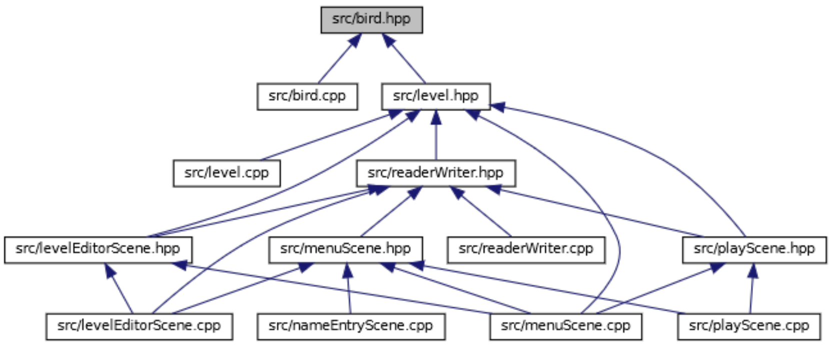


## 11.11 src/bird.hpp File Reference

```
#include "image.hpp"
```
Include dependency graph for bird.hpp:



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



### Classes

- class Bird

  *Base class for Bird objects.*
- class NormalBird

  *Normal bird class No special effects.*
- class SpecialBird1

  *Special Bird 1 class Has speed up effect.*
- class SpecialBird2

  *Special Bird 2 class Has explosion effect.*

## Enumerations

- enum class birdType { normal , special1 , special2 }

  *Enumeration of all different bird types.*

### 11.11.1 Enumeration Type Documentation

#### 11.11.1.1 birdType

`enum birdType  [strong]`

Enumeration of all different bird types.

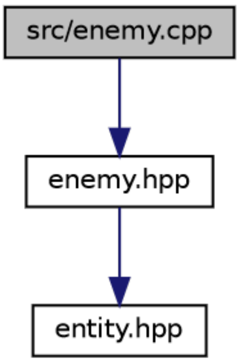
**Enumerator**

| | |
|---|---|
| normal | |
| special1 | |
| special2 | |

## 11.12 src/enemy.cpp File Reference

```
#include "enemy.hpp"
```

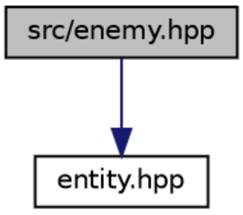
Include dependency graph for enemy.cpp:



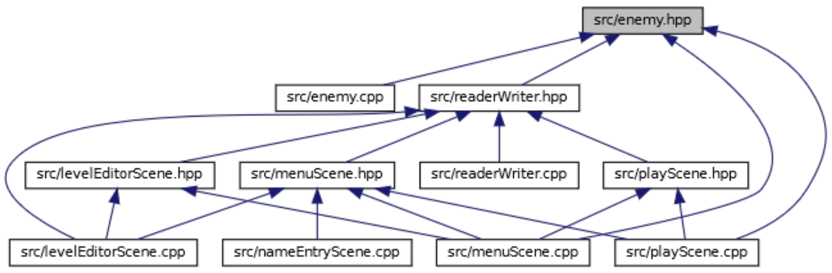
## 11.13 src/enemy.hpp File Reference

```
#include "entity.hpp"
```

Include dependency graph for enemy.hpp:



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

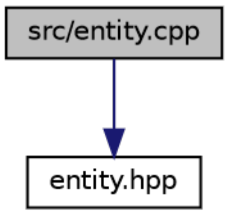


## Classes

- class Enemy

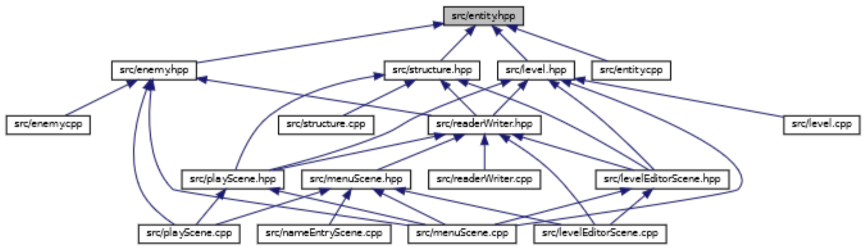
## 11.14 src/entity.cpp File Reference

```
#include "entity.hpp"
```
Include dependency graph for entity.cpp:



## 11.15 src/entity.hpp File Reference

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



### Classes

- class Entity

  *Entity class to handle entity data loaded from levels.*

### Enumerations

- enum class bodyType { structure , enemy , ground , bird }

  *Type of entity.*

### 11.15.1 Enumeration Type Documentation

#### 11.15.1.1 bodyType

```
enum bodyType  [strong]
```

Type of entity.

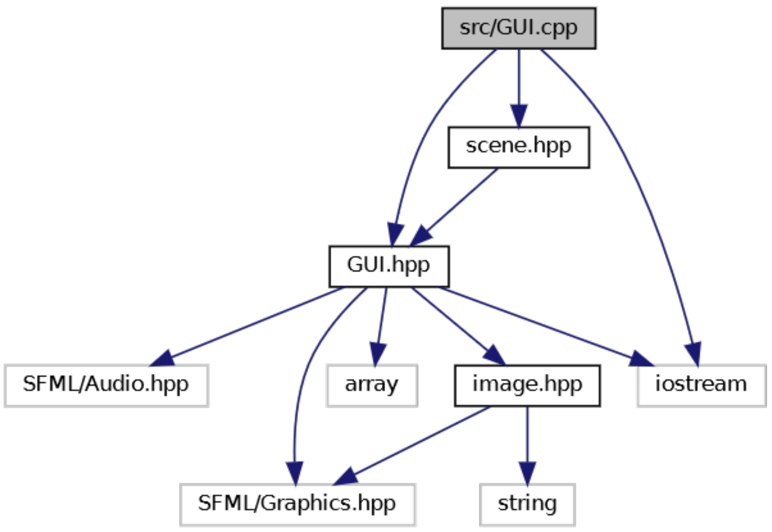
**Enumerator**

| | |
|---|---|
| structure | |
| enemy | |
| ground | |
| bird | |

## 11.16 src/GUI.cpp File Reference

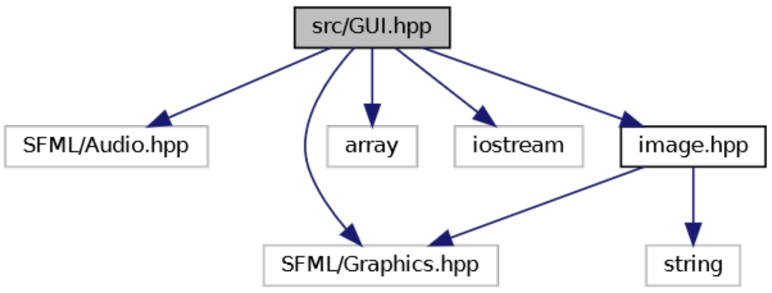
```
#include "GUI.hpp"
#include "scene.hpp"
```

```
#include <iostream>
```
Include dependency graph for GUI.cpp:

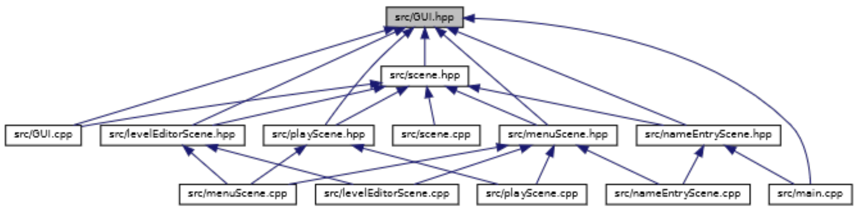


## 11.17 src/GUI.hpp File Reference

```
#include <SFML/Audio.hpp>
#include <SFML/Graphics.hpp>
#include <array>
#include <iostream>
#include "image.hpp"
```
Include dependency graph for GUI.hpp:



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



## Classes

- struct Color

  *Color object r is red in range 0 to 1 g is green in range 0 to 1 b is blue in range 0 to 1.*
- class GUI

  *GUI Class to create window and run the game.*

## Enumerations

- enum class Alignment { LeftCenter , Center , RightCenter }

  *Enumeration for alignment types.*

### 11.17.1 Enumeration Type Documentation

#### 11.17.1.1 Alignment

```
enum Alignment  [strong]
```

Enumeration for alignment types.

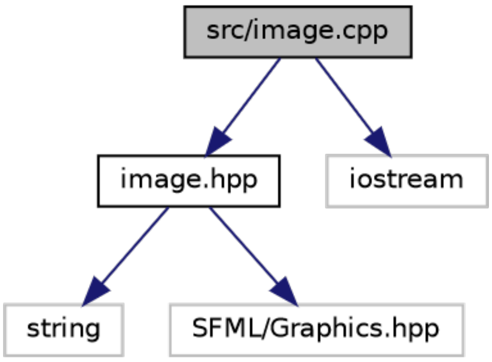
**Enumerator**

| | |
|---|---|
| LeftCenter | |
| Center | |
| RightCenter | |

## 11.18 src/image.cpp File Reference

```
#include "image.hpp"
#include <iostream>
```

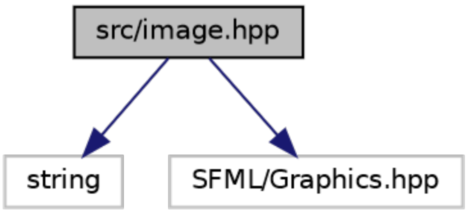
Include dependency graph for image.cpp:



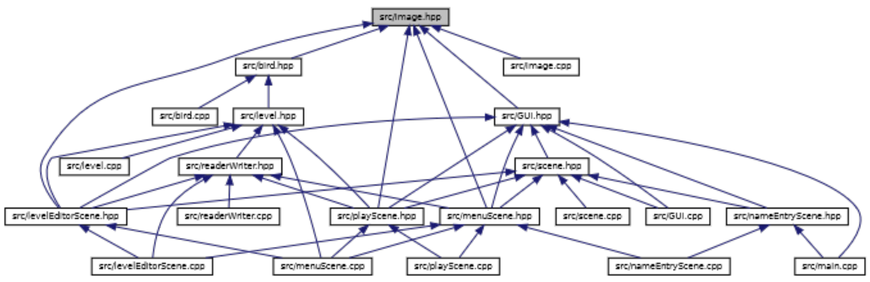
## 11.19 src/image.hpp File Reference

```
#include <string>
#include <SFML/Graphics.hpp>
```

Include dependency graph for image.hpp:



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



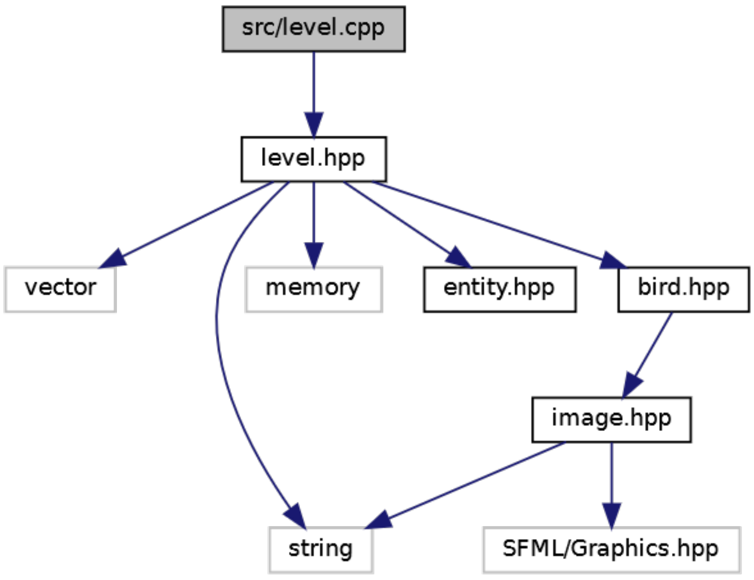
## Classes

- class Image

## 11.20 src/level.cpp File Reference

```
#include "level.hpp"
```

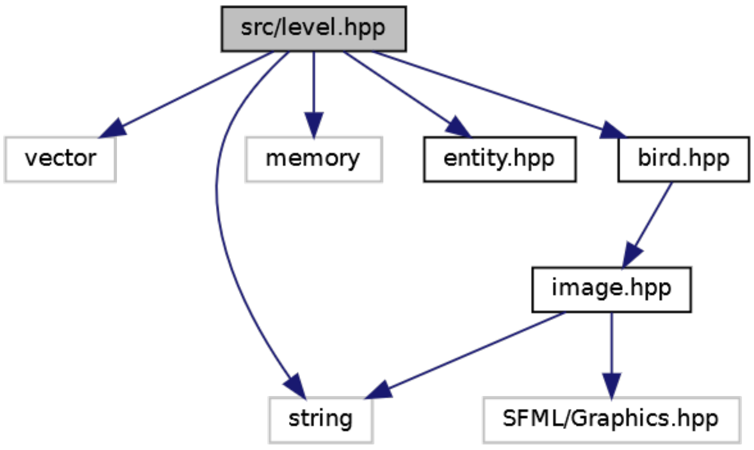
Include dependency graph for level.cpp:



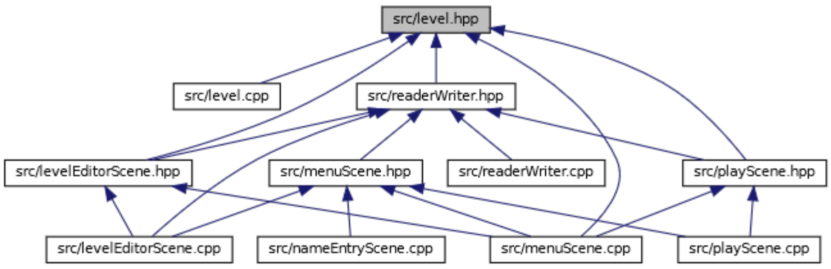
## 11.21 src/level.hpp File Reference

```
#include <vector>
#include <string>
#include <memory>
#include "entity.hpp"
#include "bird.hpp"
```

Include dependency graph for level.hpp:



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



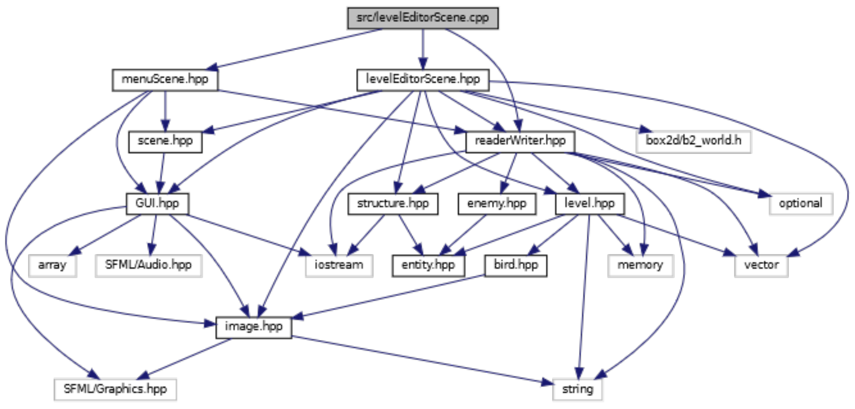
## Classes

- struct ScoreBoardEntry
- class Level

## 11.22 src/levelEditorScene.cpp File Reference

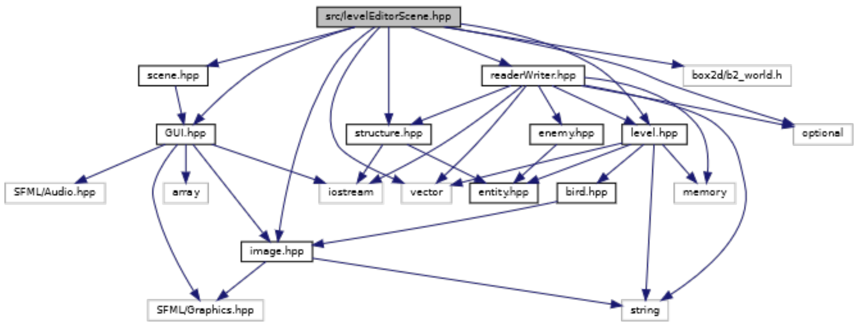
```
#include "levelEditorScene.hpp"
#include "menuScene.hpp"
```

```
#include "readerWriter.hpp"
```
Include dependency graph for levelEditorScene.cpp:

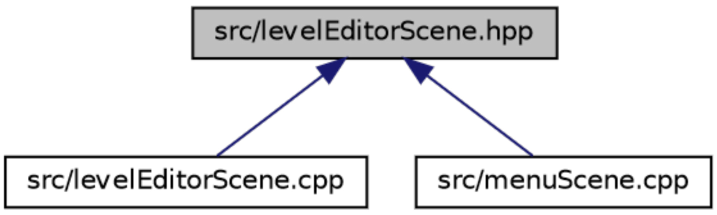


## 11.23 src/levelEditorScene.hpp File Reference

```
#include "GUI.hpp"
#include "scene.hpp"
#include "image.hpp"
#include "level.hpp"
#include "structure.hpp"
#include "readerWriter.hpp"
#include <box2d/b2_world.h>
#include <optional>
#include <vector>
```
Include dependency graph for levelEditorScene.hpp:



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



## Classes

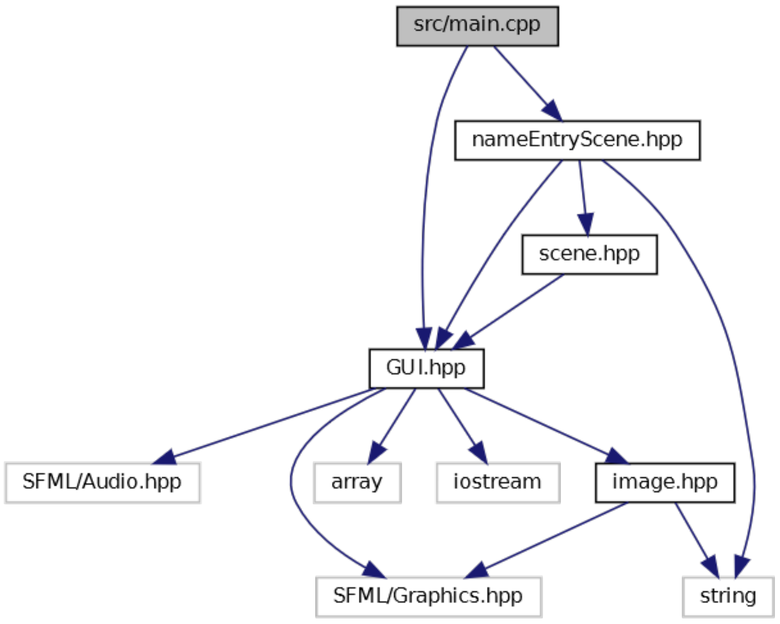
- class LevelEditorScene

  *A scene for editing the playable levels in the game.*

## 11.24 src/main.cpp File Reference

```
#include "GUI.hpp"
#include "nameEntryScene.hpp"
```

Include dependency graph for main.cpp:



## Functions

- int main ()

### 11.24.1 Function Documentation

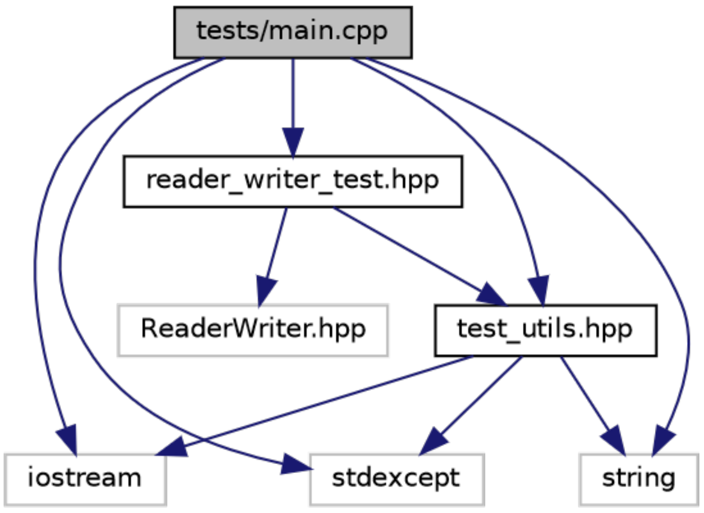
#### 11.24.1.1 main()

```
int main ( )
```

## 11.25 tests/main.cpp File Reference

```
#include <iostream>
#include <stdexcept>
#include <string>
#include "test_utils.hpp"
#include "reader_writer_test.hpp"
```

Include dependency graph for main.cpp:



## Functions

- void dummytest1 ()
- int main ()

### 11.25.1 Function Documentation

#### 11.25.1.1 dummytest1()

```
void dummytest1 ( )
```

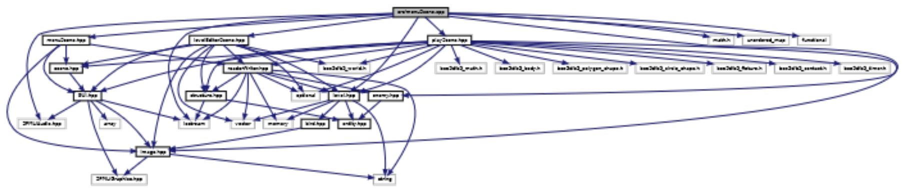
#### 11.25.1.2 main()

```
int main ( )
```

## 11.26 src/menuScene.cpp File Reference

```
#include "menuScene.hpp"
#include <iostream>
#include <math.h>
#include <unordered_map>
#include <functional>
#include <SFML/Audio.hpp>
#include "levelEditorScene.hpp"
#include "playScene.hpp"
#include "level.hpp"
#include "enemy.hpp"
```

Include dependency graph for menuScene.cpp:

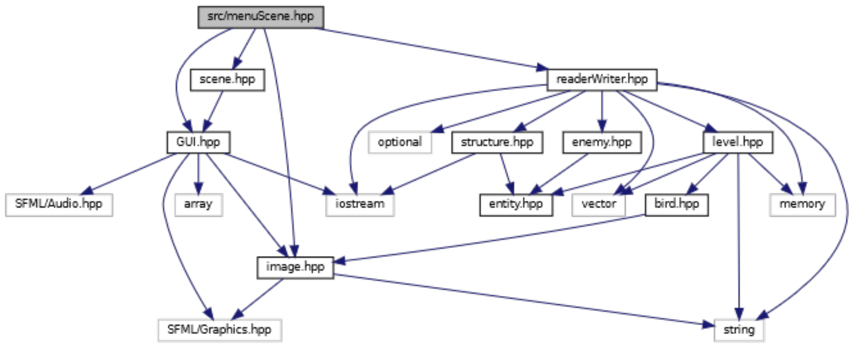


## 11.27 src/menuScene.hpp File Reference

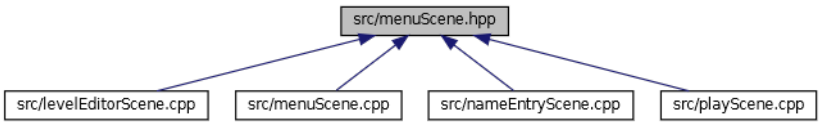
```
#include "GUI.hpp"
#include "scene.hpp"
#include "image.hpp"
```

```
#include "readerWriter.hpp"
```

Include dependency graph for menuScene.hpp:



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



## Classes

- class MenuScene

    *Scene to handle the main menu.*

## Enumerations

- enum class MenuState {
  MainMenu , PlayLevelSelector , EditorLevelSelector , LevelSelector ,
  Help }

    *The different states a user can be in the main menu.*

## 11.27.1 Enumeration Type Documentation

### 11.27.1.1 MenuState

```
enum MenuState  [strong]
```

The different states a user can be in the main menu.

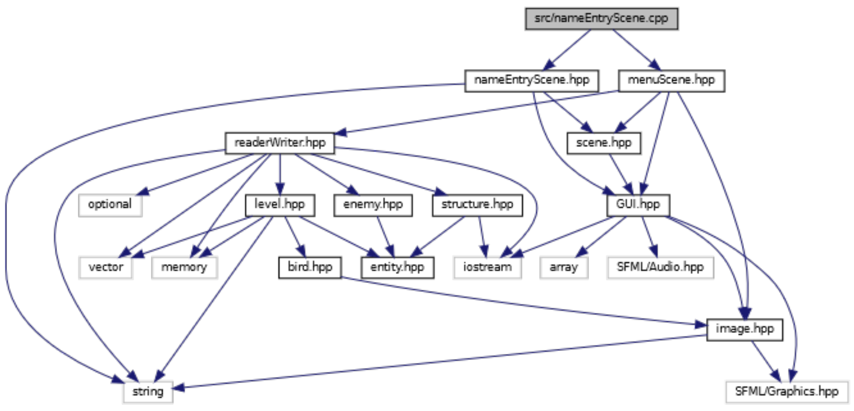
**Enumerator**

| | |
|---|---|
| MainMenu | |
| PlayLevelSelector | |
| EditorLevelSelector | |
| LevelSelector | |
| Help | |

## 11.28 src/nameEntryScene.cpp File Reference

```
#include "nameEntryScene.hpp"
#include "menuScene.hpp"
```

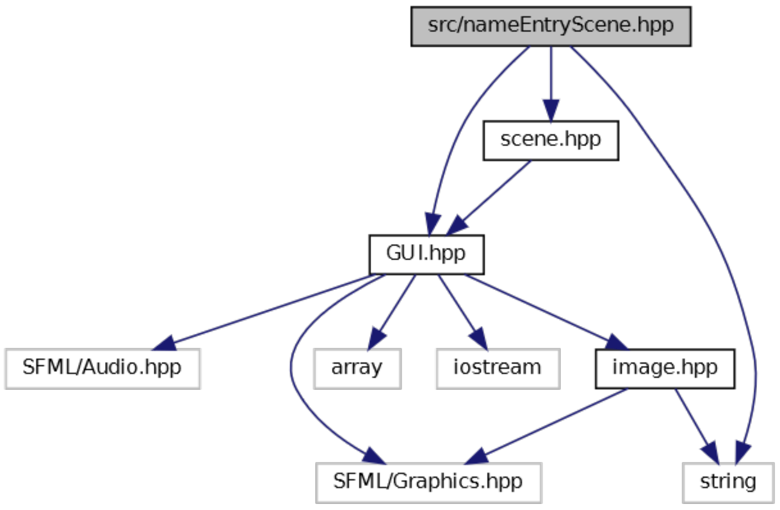
Include dependency graph for nameEntryScene.cpp:



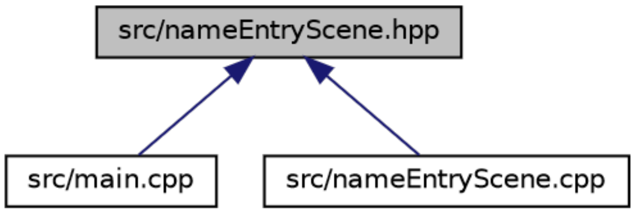
## 11.29 src/nameEntryScene.hpp File Reference

```
#include "GUI.hpp"
#include "scene.hpp"
#include <string>
```

Include dependency graph for nameEntryScene.hpp:



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



## Classes

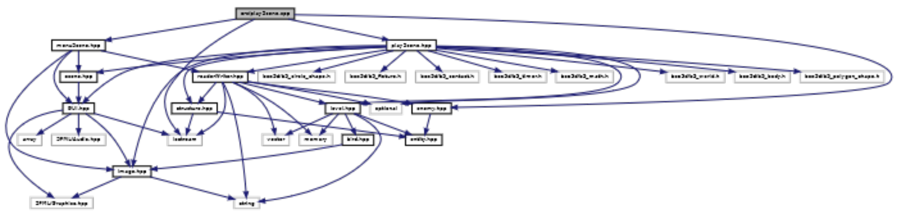
- class NameEntryScene

  *A scene for the user to enter their name from.*

## 11.30 src/playScene.cpp File Reference

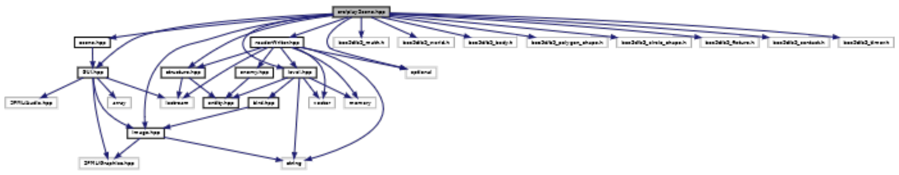
```
#include "playScene.hpp"
#include <iostream>
#include "menuScene.hpp"
```

```
#include "enemy.hpp"
```
Include dependency graph for playScene.cpp:

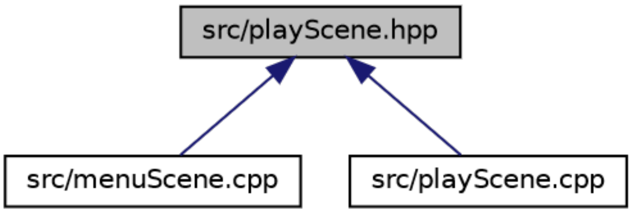


## 11.31 src/playScene.hpp File Reference

```
#include "GUI.hpp"
#include "scene.hpp"
#include "image.hpp"
#include "level.hpp"
#include "structure.hpp"
#include <optional>
#include <box2d/b2_math.h>
#include <box2d/b2_world.h>
#include <box2d/b2_body.h>
#include <box2d/b2_polygon_shape.h>
#include <box2d/b2_circle_shape.h>
#include <box2d/b2_fixture.h>
#include <box2d/b2_contact.h>
#include <box2d/b2_timer.h>
#include "readerWriter.hpp"
```
Include dependency graph for playScene.hpp:



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



## Classes

- struct userDataStruct

  *Physics entities hold a copy of userDataStruct they can reference.*
- struct ExplosionData

  *Structure to store data for each explosion instance.*
- class PlayScene

  *The game play scene to play the levels in the game.*

## Enumerations

- enum class gameState { won , lost , playing }

  *Different states the game can be in.*
- enum class explosionType { cloud , fireball }

  *Enumeration for different types of explosions in the game.*

## 11.31.1 Enumeration Type Documentation

### 11.31.1.1 explosionType

```
enum explosionType  [strong]
```

Enumeration for different types of explosions in the game.

**Enumerator**

| | |
|---|---|
| cloud | |
| fireball | |

### 11.31.1.2 gameState

```
enum gameState  [strong]
```

Different states the game can be in.

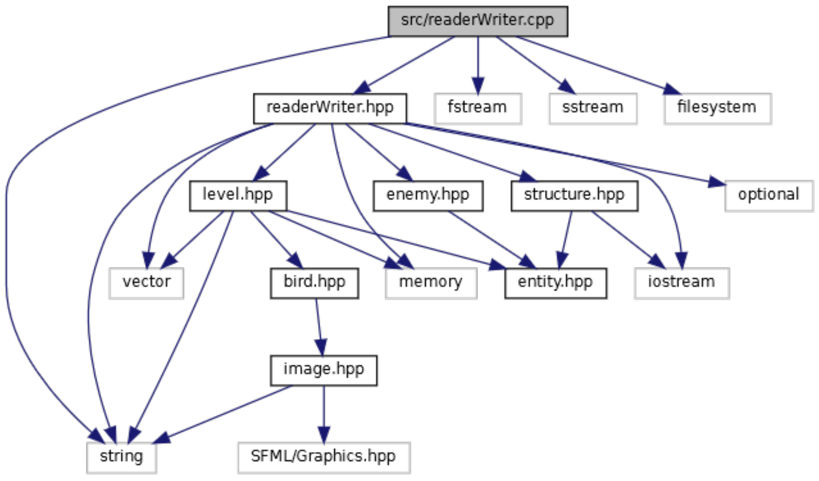
**Enumerator**

| | |
|---|---|
| won | |
| lost | |
| playing | |

## 11.32 src/readerWriter.cpp File Reference

```
#include "readerWriter.hpp"
#include <fstream>
#include <sstream>
#include <filesystem>
#include <string>
```

Include dependency graph for readerWriter.cpp:



### Macros

- #define RW_LOG(msg)

### Functions

- std::vector< std::string > split_string (std::string str, char delim=' ')

### 11.32.1 Macro Definition Documentation

#### 11.32.1.1 RW_LOG

```
#define RW_LOG(
                msg )
```

### 11.32.2 Function Documentation

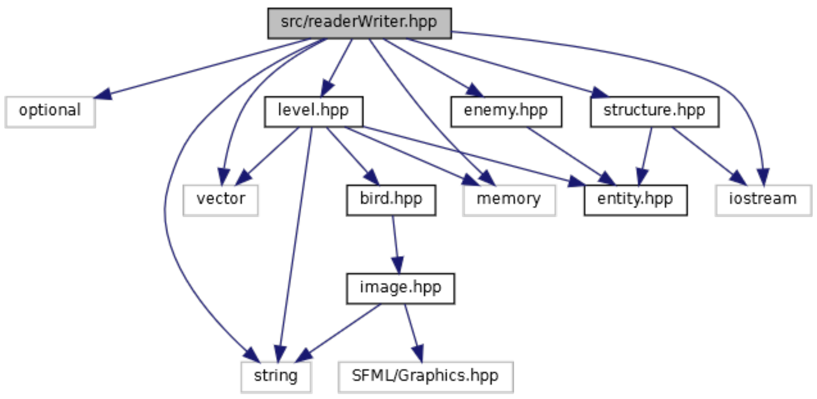
#### 11.32.2.1 split_string()

```
std::vector<std::string> split_string (
            std::string str,
            char delim = ' ' )
```

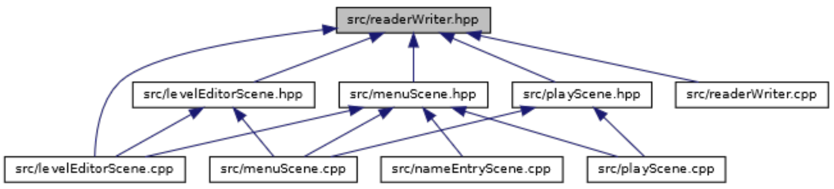
## 11.33 src/readerWriter.hpp File Reference

```
#include <optional>
#include <string>
#include <vector>
#include <iostream>
#include <memory>
#include "level.hpp"
#include "enemy.hpp"
#include "structure.hpp"
```

Include dependency graph for readerWriter.hpp:



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



### Classes

- struct LevelInfo

  *Information about levels.*
- class ReaderWriter

  *A class for loading/reading and saving/writing levels in forms of Level objects and .txt files.*

## Enumerations

- enum class Header {
  levelName , backgroundPath , soundtrackPath , soundFXStart ,
  soundFXEnd , EntityStart , EntityEnd , BirdsStart ,
  BirdsEnd , ScoresStart , ScoresEnd , unknown }

  *Different types of Headers, Allows us to use switch case with headers.*

### 11.33.1 Enumeration Type Documentation

#### 11.33.1.1 Header

```
enum Header  [strong]
```

Different types of Headers, Allows us to use switch case with headers.

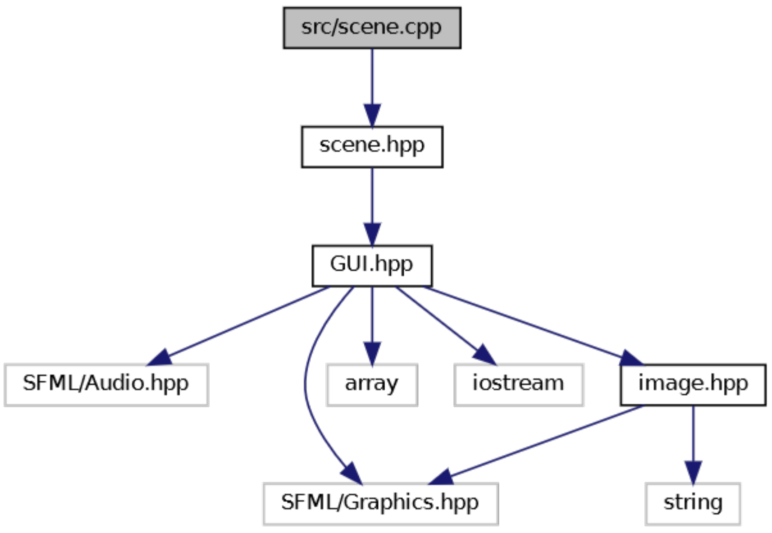
**Enumerator**

| | |
|---|---|
| levelName | |
| backgroundPath | |
| soundtrackPath | |
| soundFXStart | |
| soundFXEnd | |
| EntityStart | |
| EntityEnd | |
| BirdsStart | |
| BirdsEnd | |
| ScoresStart | |
| ScoresEnd | |
| unknown | |

## 11.34 src/scene.cpp File Reference

```
#include "scene.hpp"
```

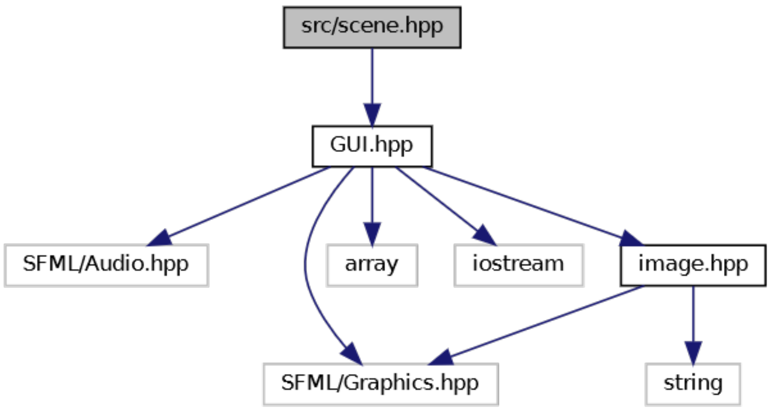
Include dependency graph for scene.cpp:



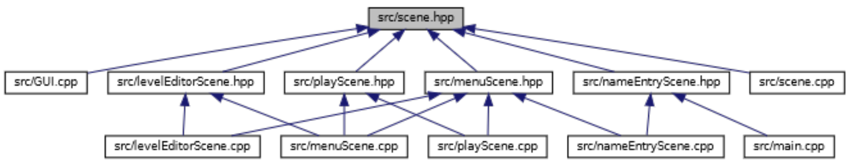
## 11.35 src/scene.hpp File Reference

```
#include "GUI.hpp"
```

Include dependency graph for scene.hpp:



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



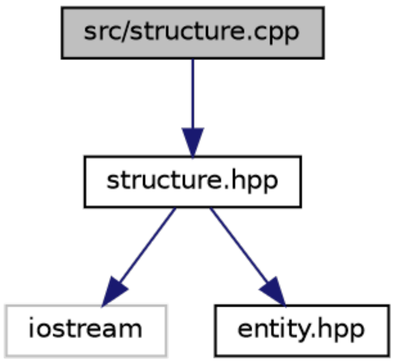
## Classes

- class Scene

    *Base Scene class to represent different states the game can be in. Ex. Play state can be implemented with PlayScene. Menu can be implemented with MenuScene etc.*

## 11.36 src/structure.cpp File Reference

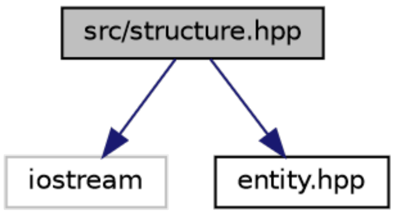
```
#include "structure.hpp"
```
Include dependency graph for structure.cpp:



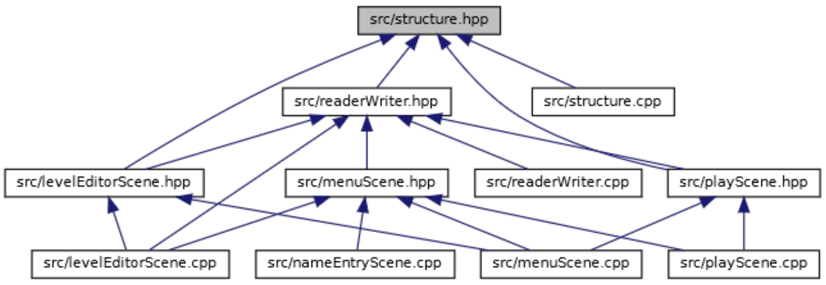
## 11.37 src/structure.hpp File Reference

```
#include <iostream>
#include "entity.hpp"
```

Include dependency graph for structure.hpp:



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



### Classes

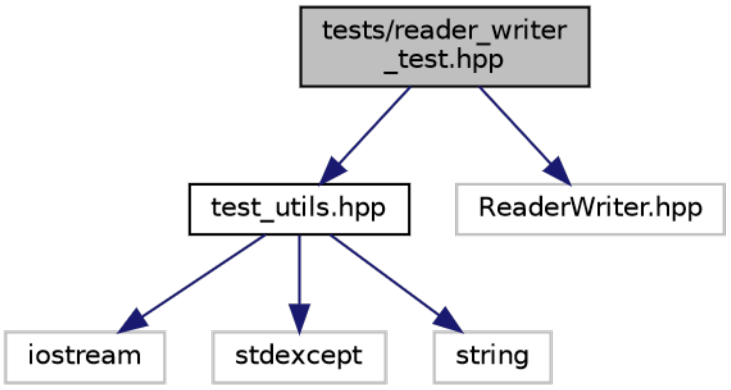
- class Structure

  *Structure type to represent walls in the game.*

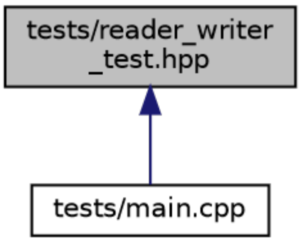
## 11.38 tests/reader_writer_test.hpp File Reference

```
#include "test_utils.hpp"
#include "ReaderWriter.hpp"
```

Include dependency graph for reader_writer_test.hpp:



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



## Functions

- void test_ReaderWriter_read_file ()
- void test_ReaderWriter_write_file ()
- void tests_reader_writer ()

### 11.38.1 Function Documentation

#### 11.38.1.1 test_ReaderWriter_read_file()

```
void test_ReaderWriter_read_file ( )  [inline]
```

#### 11.38.1.2 test_ReaderWriter_write_file()

```
void test_ReaderWriter_write_file ( )  [inline]
```

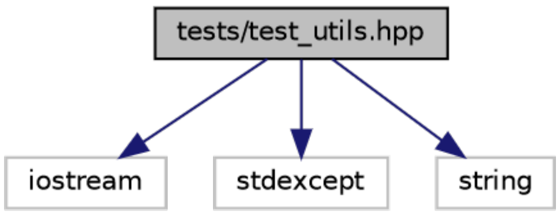
#### 11.38.1.3 tests_reader_writer()

```
void tests_reader_writer ( )  [inline]
```

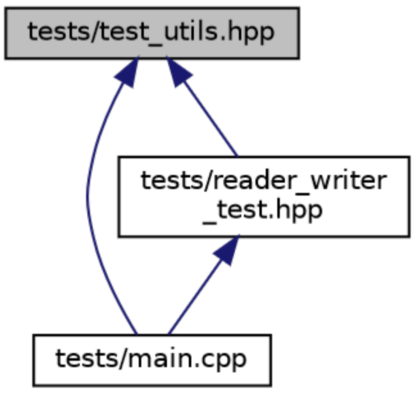
## 11.39 tests/test_utils.hpp File Reference

```
#include <iostream>
#include <stdexcept>
#include <string>
```

Include dependency graph for test_utils.hpp:



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



## Classes

- class TestAssertionException

## Functions

- void verify (bool condition, const std::string &message)

## 11.39.1 Function Documentation

### 11.39.1.1 verify()

```
void verify (
            bool condition,
            const std::string & message )  [inline]
```

# Index