World War Jump

V0.1

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Hierarchical Index

1.1 Class Hierarchy

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

Chapter 2

Class Index

2.1 Class List

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

Chapter 3

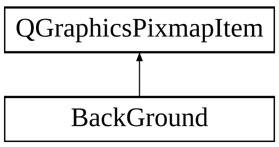
Class Documentation

3.1 BackGround Class Reference

The background class covers the empty circle in the hollow circle in game. - Wang.

`#include <background.h>`

Inheritance diagram for BackGround:



Public Member Functions

- **BackGround** (GameSettings ∗settings, QTimer ∗backGroundRotationTimer)

3.1.1 Detailed Description

The background class covers the empty circle in the hollow circle in game. - Wang.

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

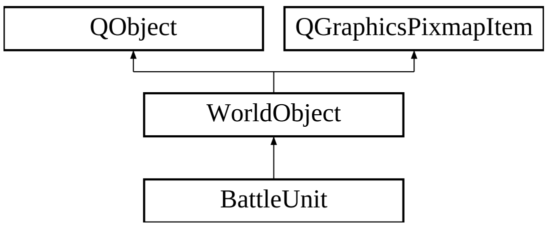
- background.h
- background.cpp

3.2 BattleUnit Class Reference

The BattleUnit class is a subclass of WorldObject and represents the player's fighting units on the field.

```
#include <battleunit.h>
```

Inheritance diagram for BattleUnit:



Public Slots

- void shoot ()

  BattleUnit::shoot spawns projectile when the connected button is pressed. The unit chooses the projectile to choose based on how many times it has been shot before and plays corresponding sound. The ProjectileType is cycled and will changed if the instance of the BattleUnit has hit an enemy.
- void **setShootAble** ()

Public Member Functions

- BattleUnit (GameWorld ∗parentView, Player player, SoundPlayer ∗soundplayer, unitType unittype)

  BattleUnit::BattleUnit constructor. Initializes the center of mass dependent on unit type, initializes the unit parameters and connects the jump and shoot signals with respective slots.
- double getFiredirection ()

  BattleUnit::getFiredirection returns the fire direction of a battleunit.
- void setFiredirection (double direction)

  BattleUnit::setFiredirection sets the fire direction of a battleunit.
- unitType **getUnittype** ()
- void calculateShootingPoint (double ∗Point)

  BattleUnit::calculateShootingPoint calculate the point where the projectile spawns in scene coordinates.

Public Attributes

- SoundPlayer ∗ **soundpointer**

Additional Inherited Members

3.2.1 Detailed Description

The BattleUnit class is a subclass of WorldObject and represents the player's fighting units on the field.

3.2.2 Constructor & Destructor Documentation

3.2.2.1 BattleUnit::BattleUnit (**GameWorld** ∗ *parentView,* Player *player,* **SoundPlayer** ∗ *soundplayer,* unitType *unittype*)

BattleUnit::BattleUnit constructor. Initializes the center of mass dependent on unit type, initializes the unit parameters and connects the jump and shoot signals with respective slots.

Parameters

parentView	pointer to connect() the BattleUnit to the player's input and the game's refresh rate.
player	the player controlling the unit
soundplayer	the pointer to the global sound player
unittype	the enum that gives the battle unit type

The BattleUnit is only allowed to shoot every certain milliseconds, set in GameSettings.

3.2.3 Member Function Documentation

3.2.3.1 void BattleUnit::calculateShootingPoint (double ∗ *Point*)

BattleUnit::calculateShootingPoint calculate the point where the projectile spawns in scene coordinates.

Parameters

Point	the array to be changed into shooting point

3.2.3.2 double BattleUnit::getFiredirection ( )

BattleUnit::getFiredirection returns the fire direction of a battleunit.

Returns

return the fire direction in angles

3.2.3.3 void BattleUnit::setFiredirection (double *direction*)

BattleUnit::setFiredirection sets the fire direction of a battleunit.

Parameters

direction	the fire direction in angles

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

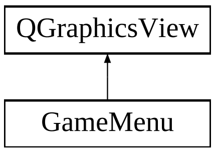
- battleunit.h
- battleunit.cpp

3.3 GameMenu Class Reference

The GameMenu class contains all necessary things for a functional game menu: Pages, buttons and images. It also has parameters which save custom options. - Wang.

```
#include <gamemenu.h>
```

Inheritance diagram for GameMenu:



Public Slots

- void playeronewon ()

  GameMenu::playeronewon() triggers once the physics calculator says the game is over and player red has won. It shows the end-game scene, then deletes the game scene with it's children.
- void playertwowon ()

  GameMenu::playertwowon() triggers once the physics calculator says the game is over and player blue has won. It shows the end-game scene, then deletes the game scene with it's children.
- void changeBGMvolume (int volume)

  GameMenu::changeBGMvolume(int volume) sets the volume of the background music to the given number.
- void changeSEvolume (int volume)

  GameMenu::changeSEvolume(int volume) sets the volume of sound effects to the given number.

Public Member Functions

- GameMenu (SoundPlayer ∗soundplayer)

  GameMenu::GameMenu(SoundPlayer ∗soundplayer) constructor instantiates the setting of the game, startScene, which is the main menu, and several buttons and pictures.
- int getGameMenuSize () const

  GameMenu::getGameMenuSize() returns the set resolution of the game menu.
- void setGameMenuSize (int value)

  GameMenu::setGameMenuSize(int value) sets the resolution of the menu.
- void mousePressEvent (QMouseEvent ∗event)

  GameMenu::mousePressEvent(QMouseEvent ∗event) secures the main functionality of the menu. It detects mouse clicks and compares the QGraphicsItem on which the mouse is currently positioned with buttons, which are inherited from QGraphicsPixmapItem, then acts correspondingly.
- int getPlayer1UnitCount () const
- int getPlayer2UnitCount () const
- int getWhichStage () const

  GameMenu::getWhichStage() returns the index of the currently selected stage.

Public Attributes

- GameSettings ∗ **settings**
- SoundPlayer ∗ soundpointer

  because soundplayer is instantiated in main, we need this as a reference to gain access on it.
- GameWorld ∗ reference

  used to gain access on created game.
- MainWindow ∗ **w** = new MainWindow
- QGraphicsScene ∗ startScene

is the main menu.
- QGraphicsScene ∗ beforeGameScene

  is the scene between main menu and game scene.
- QGraphicsScene ∗ settingsScene

  is the setting menu for sound.
- QGraphicsScene ∗ aboutScene

  is the about page.
- QGraphicsScene ∗ endScene

  is the scene after someone has won.
- QGraphicsPixmapItem ∗ startSceneBackground

  is the background picture for main menu.
- QGraphicsPixmapItem ∗ beforeGameSceneBackground

  is the background picture for pregame settings.
- QGraphicsPixmapItem ∗ endSceneBackground

  is the background picture for winning scene.
- QGraphicsPixmapItem ∗ **startButton**
- QGraphicsPixmapItem ∗ **settingsButton**
- QGraphicsPixmapItem ∗ **aboutButton**
- QGraphicsPixmapItem ∗ **exitButton**
- QGraphicsPixmapItem ∗ **addPlayer1UnitButton**
- QGraphicsPixmapItem ∗ **addPlayer2UnitButton**
- QGraphicsPixmapItem ∗ **addRedTankButton**
- QGraphicsPixmapItem ∗ **addRedShipButton**
- QGraphicsPixmapItem ∗ **removeRedTankButton**
- QGraphicsPixmapItem ∗ **removeRedShipButton**
- QGraphicsPixmapItem ∗ **addBlueTankButton**
- QGraphicsPixmapItem ∗ **addBlueShipButton**
- QGraphicsPixmapItem ∗ **removeBlueTankButton**
- QGraphicsPixmapItem ∗ **removeBlueShipButton**
- QGraphicsPixmapItem ∗ **removePlayer1UnitButton**
- QGraphicsPixmapItem ∗ **removePlayer2UnitButton**
- QGraphicsPixmapItem ∗ **changeStageButton**
- QGraphicsPixmapItem ∗ **startBattleButton**
- QGraphicsPixmapItem ∗ **backButton**
- QGraphicsPixmapItem ∗ **friendlyFireButton**
- QGraphicsPixmapItem ∗ **yesorno**
- QGraphicsPixmapItem ∗ **player1UnitPicture**
- QGraphicsPixmapItem ∗ **player2UnitPicture**
- QGraphicsPixmapItem ∗ **stagePicture**
- QGraphicsPixmapItem ∗ **titlePicture**
- QGraphicsPixmapItem ∗ **player1UnitCountPicture**
- QGraphicsPixmapItem ∗ **player2UnitCountPicture**
- QGraphicsPixmapItem ∗ **playerRedShipCountPicture**
- QGraphicsPixmapItem ∗ **playerRedTankCountPicture**
- QGraphicsPixmapItem ∗ **playerBlueShipCountPicture**
- QGraphicsPixmapItem ∗ **playerBlueTankCountPicture**
- QGraphicsPixmapItem ∗ **redShipPicture**
- QGraphicsPixmapItem ∗ **redTankPicture**
- QGraphicsPixmapItem ∗ **blueShipPicture**
- QGraphicsPixmapItem ∗ **blueTankPicture**
- QGraphicsPixmapItem ∗ **thumbnail**
- QGraphicsPixmapItem ∗ **muteBGMButton**
- QGraphicsPixmapItem ∗ **muteSEButton**

- QGraphicsPixmapItem ∗ **bgmVolume**
- QGraphicsPixmapItem ∗ **seVolume**
- QGraphicsPixmapItem ∗ **volumeHint**
- QSlider ∗ **BGMslider**
- QSlider ∗ **SEslider**
- QGraphicsPixmapItem ∗ **settingsBackground**
- QGraphicsPixmapItem ∗ **aboutBackground**
- QGraphicsPixmapItem ∗ **playeronewinsPic**
- QGraphicsPixmapItem ∗ **playertwowinsPic**

3.3.1 Detailed Description

The GameMenu class contains all necessary things for a functional game menu: Pages, buttons and images. It also has parameters which save custom options. - Wang.

3.3.2 Constructor & Destructor Documentation

3.3.2.1 GameMenu::GameMenu (SoundPlayer ∗ *soundplayer*)

GameMenu::GameMenu(SoundPlayer ∗soundplayer) constructor instantiates the setting of the game, startScene, which is the main menu, and several buttons and pictures.

Parameters

soundplayer	Because the soundplayer is instantiated already in main.cpp, we need to pass it from main to GameMenu.

3.3.3 Member Function Documentation

3.3.3.1 void GameMenu::changeBGMvolume (int *volume*) [slot]

GameMenu::changeBGMvolume(int volume) sets the volume of the background music to the given number.

Parameters

volume	wished volume.

3.3.3.2 void GameMenu::changeSEvolume (int *volume*) [slot]

GameMenu::changeSEvolume(int volume) sets the volume of sound effects to the given number.

Parameters

volume	wished volume

3.3.3.3 int GameMenu::getGameMenuSize ( ) const

GameMenu::getGameMenuSize() returns the set resolution of the game menu.

Returns

the set resolution of the menu

3.3.3.4 int GameMenu::getPlayer1UnitCount ( ) const

GameMenu::getPlayer1UnitCount() returns the unit count of player red (redundant).

3.3.3.5 int GameMenu::getPlayer2UnitCount ( ) const

GameMenu::getPlayer2UnitCount() returns the unit cound of blue player (redundant).

3.3.3.6 int GameMenu::getWhichStage ( ) const

GameMenu::getWhichStage() returns the index of the currently selected stage.

Returns

index of the current stage.

3.3.3.7 void GameMenu::setGameMenuSize (int *value*)

GameMenu::setGameMenuSize(int value) sets the resolution of the menu.

Parameters

value	is the wished resolution

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

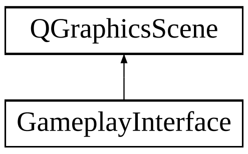
- gamemenu.h
- gamemenu.cpp

3.4 GameplayInterface Class Reference

The GameplayInterface class displays the Terrain, and the players' multiple BattleUnit and Projectile.

```
#include <GameplayInterface.h>
```

Inheritance diagram for GameplayInterface:



Public Member Functions

- GameplayInterface (SoundPlayer ∗soundplayer)

    GameplayInterface::GameplayInterface.

Public Attributes

- PhysicsCalc ∗ **physicsCalulator**

3.4.1 Detailed Description

The GameplayInterface class displays the Terrain, and the players' multiple BattleUnit and Projectile.

Furthermore, the GameplayInterface contains our physical engine PhysicsCalc.

3.4.2 Constructor & Destructor Documentation

3.4.2.1 GameplayInterface::GameplayInterface (SoundPlayer ∗ *soundplayer*)

GameplayInterface::GameplayInterface.

Parameters

soundplayer	static values for the scene's size are fetched from GameSettings

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

- GameplayInterface.h
- GameplayInterface.cpp

3.5 GameSettings Class Reference

GameSettings saves the in-game setting... - Tomas and Wang.

```
#include <gamesettings.h>
```

Public Member Functions

- int **getPlayer1UnitCount** () const
- void **setPlayer1UnitCount** (int value)
- int **getPlayer2UnitCount** () const
- void **setPlayer2UnitCount** (int value)
- bool **getBeforeGameSceneAlreadyCreated** () const
- void **setBeforeGameSceneAlreadyCreated** (bool value)
- bool **getSettingsSceneAlreadyCreated** () const
- void **setSettingsSceneAlreadyCreated** (bool value)
- bool **getFrendlyFire** ()
- void **setFrendlyFire** (bool value)
- int **getMeeleDmg** ()
- void **setMeeleDmg** (int value)

Static Public Member Functions

- static int **getGameWorldSize** ()
- static int **getWhichStage** ()
- static void **setWhichStage** (int value)
- static double **getGravity** ()
- static void **setGravityFromMenu** (double value)
- static double **getTimeStep** ()
- static void **setTimeStep** (double value)
- static int **getSecondsToChangeLevel** ()
- static void **setSecondsToChangeLevel** (int value)
- static bool **getBGMMuted** ()
- static void **setBGMMuted** (bool value)
- static bool **getSEMuted** ()
- static void **setSEMuted** (bool value)
- static int **getPlayerRedTankCount** ()
- static void **setPlayerRedTankCount** (int value)
- static int **getPlayerRedShipCount** ()
- static void **setPlayerRedShipCount** (int value)
- static int **getPlayerBlueShipCount** ()
- static void **setPlayerBlueShipCount** (int value)
- static bool **getUnitcollison** ()
- static int **getPlayerBlueTankCount** ()
- static void **setPlayerBlueTankCount** (int value)
- static int **getJumpCountForDestruction** ()
- static void **setJumpCountForDestruction** (int value)
- static void resetUnitCount ()

    GameSettings::resetUnitCount sets all units count to 0.
- static int **getBGMvolume** ()
- static void **setBGMvolume** (int value)
- static int **getSEvolume** ()
- static void **setSEvolume** (int value)
- static int **getMilisecondsBetweenBattleUnitShots** ()
- static int **getRefreshRate** ()
- static void **setRefreshRate** (int value)

Static Public Attributes

- static bool **BGMMuted** = false
- static bool **SEMuted** = false
- static int **BGMvolume** = 25
- static int **SEvolume** = 35
- static bool **gameCreated** = false

3.5.1 Detailed Description

GameSettings saves the in-game setting... - Tomas and Wang.

All the game's variables are accessible as static member for other classes that include GameSettings 's header.

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

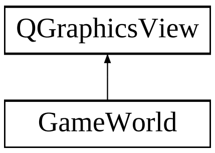
- gamesettings.h
- gamesettings.cpp

3.6 GameWorld Class Reference

container class for Terrain, Input and GameplayInterface. - Wang and ... who else?

```
#include <gameworld.h>
```

Inheritance diagram for GameWorld:



Public Slots

- void **playeronewins** ()
- void **playertwowins** ()
- void rotateBackground ()

    GameWorld::rotateBackground This function rotates the Background.
- void displayMelee ()

    GameWorld::displayMelee This function sets the Meleelabel to visible.
- void hideMelee ()

    GameWorld::hideMelee This sets the Meleelabel to invisible.

Signals

- void **playerOneWinsSignal** ()
- void **playerTwoWinsSignal** ()

Public Member Functions

- GameWorld (SoundPlayer ∗soundplayer)

  GameWorld Constructor.
- void **setGameWorldSize** (int value)
- void **pause** ()
- void **resume** ()

Public Attributes

- Terrain ∗ **terrain**
- Input ∗ **input**
- GameplayInterface ∗ **scene**
- QTimer ∗ **backGroundRotationTimer**
- QGraphicsPixmapItem ∗ **background**
- SoundPlayer ∗ **soundpointer**

3.6.1 Detailed Description

container class for Terrain, Input and GameplayInterface. - Wang and ... who else?

Details: GameWorld contains classes that need to communicate with each other and enables connect() functions between them. It also contains a QTimer to make the background rotate.

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

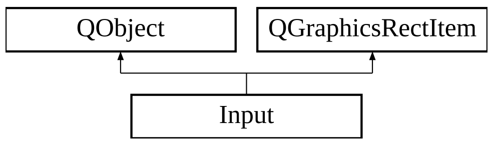
- gameworld.h
- gameworld.cpp

3.7 Input Class Reference

The Input class receives the players' key hits.

`#include <input.h>`

Inheritance diagram for Input:



Signals

- void **playerOneJump** ()
- void **playerOneShoot** ()
- void **playerTwoJump** ()
- void **playerTwoShoot** ()

Public Member Functions

- Input ()

  Input::Input This function is the constructor of the Input class.
- void keyPressEvent (QKeyEvent ∗k)

  Input::keyPressEvent This function reacts on any keyboard input and emit a signal if the control buttons for player one or player two had been pressed.
- ∼Input ()

  Input::∼Input Destructor of the Input class.

Public Attributes

- QTimer ∗ refreshRateTimer

  Gameplay refresh rate.

3.7.1 Detailed Description

The Input class receives the players' key hits.

Detailed: it is the focused QGraphicsPixmapItem in our GameplayInterface scene, and therefore able to receive keyboard input. It receives the input for both players and sends according SIGNALs.

Also because of early architecture decisions, it has the QTimer refreshRateTimer which is connected() with every unit and projectile in our game. This QTimer triggers the move() function in WorldObject every certain amount of milliseconds set in GameSettings. -Tomas

3.7.2 Member Function Documentation

3.7.2.1 void Input::keyPressEvent (QKeyEvent ∗ *k*)

Input::keyPressEvent This function reacts on any keyboard input and emit a signal if the control buttons for player one or player two had been pressed.

Parameters

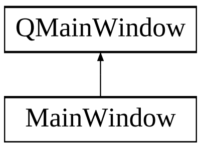
k	is the keyboard button which has been pressed.

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

- input.h
- input.cpp

3.8 MainWindow Class Reference

Inheritance diagram for MainWindow:



Public Member Functions

- **MainWindow** (QWidget ∗parent=0)

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

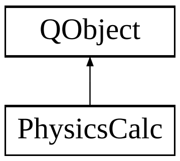
- mainwindow.h
- mainwindow.cpp

3.9 PhysicsCalc Class Reference

Our own physics calculator engine and the core of the game. -Can, Tomas, Sebastian.

```
#include <physicscalc.h>
```

Inheritance diagram for PhysicsCalc:



Signals

- void **playeronewins** ()
- void **playertwowins** ()
- void **meeleDmg** ()

Public Member Functions

- PhysicsCalc (SoundPlayer ∗soundplayer)

  PhysicsCalc::PhysicsCalc. JumpFrameLimit determines how many timesteps the unit is allowed to not collide with the ground before it is able to jump again.
- void calculateNewRotValues (WorldObject ∗worldObject)

  PhysicsCalc::calculateNewRotValues calculates the next orientation of the given WorldObject based on it's current orientation and its current angular velocity. Angular array stores in the following order, the angle and angular velocity. Different calculations on projectiles and battleunits. The projectiles "head" is made to always point the speed vector. The Battleunits are made to slowly stand perpendicular to the gravity vector in stabilization module. The closer they get to the center, the less they are stabilized.
- void updateRotValues (WorldObject ∗worldObject, double ∗angular)

  PhysicsCalc::updateRotValues sets the objects new orientation and new angular velocity.

- void gravVec (WorldObject ∗worldObject, double ∗gravityVector)

  PhysicsCalc::gravityVector gives the gravity vector effecting an objects center of mass at a certain time. First element gives the x and the second gives the y coordinate.
- void **getTopRight** (WorldObject ∗worldObject, double ∗topRight)
- void **getTopLeft** (WorldObject ∗worldObject, double ∗topLeft)
- void **getBottomRight** (WorldObject ∗worldObject, double ∗bottomRight)
- void **getBottomLeft** (WorldObject ∗worldObject, double ∗bottomLeft)
- void getImpactPoint (WorldObject ∗worldObject, double ∗impactPoint)

  PhysicsCalc::getImpactPoint calculates the impact point with the cornerpoints of the given WorldObject.
- double gravityAngleDifference (double rotation, double ∗gravityVector)

  PhysicsCalc::gravityAngleDifference calculates the angle from the gravity vector to the current orientation. The positive direction is clockwise.
- double roundDown (double numberToRound, int digit)

  PhysicsCalc::roundDown calculates the floor of a number from the given digit.
- void calculateNewValues (WorldObject ∗)

  PhysicsCalc::calculateNewValues calculates the next position of the given WorldObject based on it's current position and its current speed.
- double vectorsAbsoluteValue (double ∗vector)

  PhysicsCalc::vectorsAbsoluteValue calculates the absolute value for a vector in R^2.
- void velocityEulerToRadialCoordinates (double ∗eulInputPosition, double ∗inputVelVector, double ∗output↩ VelVector, bool eulerToRadial)

  PhysicsCalc::velocityEulerToRadialCoordinates transforms the velocity of a WorldObject. -Tomas.
- void eulToPol (double ∗eul, double ∗pol, char type)

  PhysicsCalc::eulToPol translates the given cartesian coordinate system to a polar coordinate system and saves them into a given output pointer.
- void polToEul (double ∗pol, double ∗eul, char type)

  PhysicsCalc::polToEul This function transforms polar coordinates into cartesian coordinates.
- QGraphicsItem ∗ CollideWithUnit (WorldObject ∗object)

  PhysicsCalc::CollideWithUnit checks, if an object collides with an other object of the type BattleUnit or Projectile and returns that object.
- void hitUnit (WorldObject ∗worldObject)

  PhysicsCalc::hitUnit calculates the damage, between two colliding objects and checks one of the WorldObject gets destroyed.
- void impuls (WorldObject ∗obj1, WorldObject ∗obj2)

  PhysicsCalc::impuls excecutes the conservation of the linear momentum for the two colliding objects obj1 and obj2.
- void checkHealth (WorldObject ∗obj)

  PhysicsCalc::checkHealth checks if the given object has healtpoint lower or eqaul to zero and destroyes that unit. The unitcounter of the owining player will be decreased too.
- void checkWinCondition ()

  PhysicsCalc::checkWinCondition checks if one of the playes are out of units and than emit a winning signal.
- void inverseSpeed (WorldObject ∗colliding1, WorldObject ∗colliding2)

  PhysicsCalc::inverseSpeed invertes the speed of the first given Worldobject.
- void meeleDamage (WorldObject ∗colliding1, WorldObject ∗colliding2)

  PhysicsCalc::meeleDamage calculates the Meele Damage between two Objects. The unit which has a 10 values higher speed than the other deals the damage.
- bool collideWithAny (WorldObject ∗object)

  PhysicsCalc::collideWithAny checks it the given object collides with either an unit or the terrain.
- void unitUnitCollisionFunc (WorldObject ∗bat1, WorldObject ∗bat2)

  PhysicsCalc::unitUnitCollisionFunc calculates the collision between two objects and chanches the speed of the units. This function is called with BattleUnits.
- bool CollideWithTerrain (WorldObject ∗object)

  CollideWithTerrain checks if one touches the ground and returns a boolean argument. - WANG.

Public Attributes

- int **JumpFrameLimit**
- int **bounceB4Destruction** = settings->getJumpCountForDestruction()
- SoundPlayer ∗ **soundpointer**
- GameSettings ∗ **settings**
- double **gravity** = settings->getGravity()
- double **timeStep** = settings->getTimeStep()

3.9.1 Detailed Description

Our own physics calculator engine and the core of the game. -Can, Tomas, Sebastian.

Detailed: It checks for collisions between units and follows a collision protocol. it checks if any player has won and emits according SIGNALs. Furthermore it calculates and triggers sounds accordingly for:

1. Rotation of WorldObject s
2. Translation of WorldObject s
3. Gravity effects
4. Momentum conservation at collision
5. Recoil triggering at BattleUnit shoot()

3.9.2 Constructor & Destructor Documentation

3.9.2.1 PhysicsCalc::PhysicsCalc (**SoundPlayer** ∗ ***soundplayer***)

PhysicsCalc::PhysicsCalc. JumpFrameLimit determines how many timesteps the unit is allowed to not collide with the ground before it is able to jump again.

Parameters

soundplayer	the global soundplayer pointer

3.9.3 Member Function Documentation

3.9.3.1 void PhysicsCalc::calculateNewRotValues (**WorldObject** ∗ ***worldObject***)

PhysicsCalc::calculateNewRotValues calculates the next orientation of the given WorldObject based on it's current orientation and its current angular velocity. Angular array stores in the following order, the angle and angular velocity. Different calculations on projectiles and battleunits. The projectiles "head" is made to always point the speed vector. The Battleunits are made to slowly stand perpendicular to the gravity vector in stabilization module. The closer they get to the center, the less they are stabilized.

Parameters

worldObject	the worldobject to be calculated

The stabilization module only activates when the object is close to the ground -Can

3.9.3.2 void PhysicsCalc::calculateNewValues (WorldObject * *worldObject*)

PhysicsCalc::calculateNewValues calculates the next position of the given WorldObject based on it's current position and its current speed.

When the WorldObject moves below the ground (collision) the movement speed of the WorldObject in radial direction is set in the direction of the center. Then it sets the object's new position and new speed. -Tomas

Parameters

worldObject	the WorldObject instance for which new position is to be calculated and set. If it is a WorldObject of the type Projectile ,then the Projectile bounce counter is increased.

3.9.3.3 void PhysicsCalc::checkHealth (WorldObject * *obj*)

PhysicsCalc::checkHealth checks if the given object has healtpoint lower or eqaul to zero and destroyes that unit. The unitcounter of the owining player will be decreased too.

Parameters

obj	is the WorldObject whicht should be checked

3.9.3.4 bool PhysicsCalc::collideWithAny (WorldObject * *object*)

PhysicsCalc::collideWithAny checks it the given object collides with either an unit or the terrain.

Parameters

object	is the object, which will checked.

Returns

true if it collides, false if it do not.

3.9.3.5 bool PhysicsCalc::CollideWithTerrain (WorldObject * *object*)

CollideWithTerrain checks if one touches the ground and returns a boolean argument. - WANG.

PhysicsCalc::CollideWithTerrain checks if the given object collides with the terrain and returns true or false.

Parameters

object	is the WorldObject, which will be checked.

Returns

true if it collides, false if it does not.

3.9.3.6 QGraphicsItem ∗ PhysicsCalc::CollideWithUnit (WorldObject ∗ *object*)

PhysicsCalc::CollideWithUnit checks, if an object collides with an other object of the type BattleUnit or Projectile and returns that object.

Parameters

object	is the object, which will be checked.

Returns

is a pointer to the object, the object collides with

3.9.3.7 void PhysicsCalc::eulToPol (double ∗ *eul,* double ∗ *pol,* char *type*)

PhysicsCalc::eulToPol translates the given cartesian coordinate system to a polar coordinate system and saves them into a given output pointer.

Parameters

eul	inputpointer in cartesian coordinates, [0] -> x, [1] -> y.
pol	outputpointer in polar coordinates, [0] -> r, [1] -> phi.
type	type of the translation, v -> velocity, p -> position

3.9.3.8 void PhysicsCalc::getImpactPoint (WorldObject ∗ *worldObject,* double ∗ *impactPoint*)

PhysicsCalc::getImpactPoint calculates the impact point with the cornerpoints of the given WorldObject.

Parameters

worldObject	the object, which impact point should be calculated.
impactPoint	is pointer to the array where the point will be saved.

3.9.3.9 double PhysicsCalc::gravityAngleDifference (double *rotation,* double ∗ *gravityVector*)

PhysicsCalc::gravityAngleDifference calculates the angle from the gravity vector to the current orientation. The positive direction is clockwise.

Parameters

rotation	the rotation of the unit
gravityVector	the gravity vector of the unit

Returns

the difference between the units bottom and the gravity vector

3.9.3.10 void PhysicsCalc::gravVec (WorldObject ∗ *worldObject,* double ∗ *gravityVector*)

PhysicsCalc::gravityVector gives the gravity vector effecting an objects center of mass at a certain time. First element gives the x and the second gives the y coordinate.

Parameters

worldObject	

3.9.3.11 void PhysicsCalc::hitUnit (WorldObject ∗ *worldObject*)

PhysicsCalc::hitUnit calculates the damage, between two colliding objects and checks one of the WorldObject gets destroyed.

Parameters

worldObject	is the WorldObject for which the collision will be calculated.

3.9.3.12 void PhysicsCalc::impuls (WorldObject ∗ *obj1,* WorldObject ∗ *obj2*)

PhysicsCalc::impuls excecutes the conservation of the linear momentum for the two colliding objects obj1 and obj2.

Parameters

obj1	is the first object which collides.
obj2	is the secound object which collides.

3.9.3.13 void PhysicsCalc::inverseSpeed (WorldObject ∗ *colliding1,* WorldObject ∗ *colliding2*)

PhysicsCalc::inverseSpeed invertes the speed of the first given Worldobject.

Parameters

colliding1	is the first WorldObject which speed gets inverted.
colliding2	is the secound WorldObject, which speed remains unchanged.

3.9.3.14 void PhysicsCalc::meeleDamage (WorldObject ∗ *colliding1,* WorldObject ∗ *colliding2*)

PhysicsCalc::meeleDamage calculates the Meele Damage between two Objects. The unit which has a 10 values higher speed than the other deals the damage.

Parameters

colliding1	is the first colliding object.
colliding2	is the secound colliding object.

3.9.3.15 void PhysicsCalc::polToEul (double ∗ *pol*, double ∗ *eul*, char *type*)

PhysicsCalc::polToEul This function transforms polar coordinates into cartesian coordinates.

Parameters

pol	is the inputpointer for polar coordinates, [0] -> x, [1] -> y.
eul	is the outputpointer for the cartesian coordinates, [0] -> r, [1] -> phi.
type	type of the translation, v -> velocity, p -> position.

3.9.3.16 double PhysicsCalc::roundDown (double *numberToRound*, int *digit*)

PhysicsCalc::roundDown calculates the floor of a number from the given digit.

Parameters

numberToRound	the number to be rounded down
digit	the digit after which will be set to zero

Returns

the rounded number

3.9.3.17 void PhysicsCalc::unitUnitCollisionFunc (WorldObject ∗ *bat1*, WorldObject ∗ *bat2*)

PhysicsCalc::unitUnitCollisionFunc calculates the collision between two objects and chanches the speed of the units. This function is called with BattleUnits.

Parameters

bat1	is the first WorldObject which collides.
bat2	is the secound WorldObject which collides.

3.9.3.18 void PhysicsCalc::updateRotValues (WorldObject ∗ *worldObject*, double ∗ *angular*)

PhysicsCalc::updateRotValues sets the objects new orientation and new angular velocity.

Parameters

worldObject	the worldobject to be updated
angular	the angle and angular speed to be set

3.9.3.19 double PhysicsCalc::vectorsAbsoluteValue (double ∗ *vector*)

PhysicsCalc::vectorsAbsoluteValue calculates the absolute value for a vector in R^2.

Parameters

vector	

Returns

absolute value of a vector in R^2.

3.9.3.20 void PhysicsCalc::velocityEulerToRadialCoordinates (double ∗ *eulInputPosition,* double ∗ *inputVelVector,* double ∗ *outputVelVector,* bool *eulerToRadial*)

PhysicsCalc::velocityEulerToRadialCoordinates transforms the velocity of a WorldObject. -Tomas.

Detailed: the new velocity vector is in a coordinate system which always points with the first coordinate from the center of the world through the position of the unit outwards radially. The second coordinate points facing int the same direction to the left.

Parameters

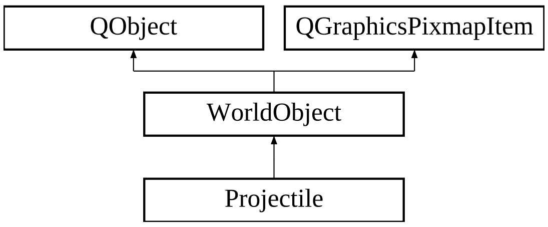
eulInputPosition	objects position to determine what direction is outward.
eulInputVelocity	objects velocity to transform
radialOutput	first coordinate radial, second coordinate is tangential to the Terrain 's circle.
eulerToRadial	true if transforming from Euler coordinates, or false if transforming back to Euler coordinates.

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

- physicscalc.h
- physicscalc.cpp

3.10 Projectile Class Reference

Inheritance diagram for Projectile:



Public Member Functions

- Projectile (GameWorld ∗parentView, BattleUnit ∗shootingUnit, ProjectileType p, SoundPlayer ∗soundplayer, double ∗shootingPoint)

  Projectile::Projectile constructor. Initializes the position, the initial angle , the initial speed ,the projectile type , the weight and the damage and connects the timer It sets the picture and damage depending on the enum Player and ProjectileType.
- ∼Projectile ()

  Projectile::∼Projectile This function is the destructor of the Projectile class.
- void recoil (WorldObject ∗obj1, WorldObject ∗obj2)

  Projectile::recoil This function, creates a recoil on the shooting BattleUnit by using the conservation of the linear momentum.
- void **polToEul** (double ∗pol, double ∗eul, char type)
- WorldObject ∗ getshootingUnit ()

  Projectile::getshootingUnit This function returns the shootingUnit.

Additional Inherited Members

3.10.1 Constructor & Destructor Documentation

3.10.1.1 Projectile::Projectile (**GameWorld** ∗ *parentView,* **BattleUnit** ∗ *shootingUnit,* ProjectileType *p,* **SoundPlayer** ∗ *soundplayer,* double ∗ *shootingPoint*)

Projectile::Projectile constructor. Initializes the position, the initial angle , the initial speed ,the projectile type , the weight and the damage and connects the timer It sets the picture and damage depending on the enum Player and ProjectileType.

Parameters

parentView	pointer to connect() the BattleUnit to the player's input and the game's refresh rate.
shootingUnit	the battle unit shooting the projectile
p	the enum that gives the projectile type
soundplayer	the pointer to the global sound player
shootingPoint	the point in scene coordinates where the projectile should spawn

3.10.2 Member Function Documentation

3.10.2.1 **WorldObject** ∗ Projectile::getshootingUnit ( )

Projectile::getshootingUnit This function returns the shootingUnit.

Returns

the shooting Unit

3.10.2.2 void Projectile::recoil (WorldObject ∗ *obj1*, WorldObject ∗ *obj2*)

Projectile::recoil This function, creates a recoil on the shooting BattleUnit by using the conservation of the linear momentum.

Parameters

obj1	is the Shooting BattleUnit
obj2	is Projectile

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

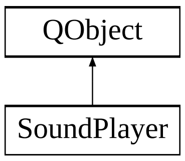
- projectile.h
- projectile.cpp

3.11 SoundPlayer Class Reference

This is our sound system. - Wang and Can.

```
#include <soundplayer.h>
```

Inheritance diagram for SoundPlayer:



Public Member Functions

- SoundPlayer ()

  SoundPlayer::SoundPlayer initializes the sound players and playlists.
- void playProjectileTypeShoot (int type)

  SoundPlayer::playProjectileTypeShoot plays the correct shooting sound queue to the corresponding projectile type. The projectile sounds cut each other if there is one previously playing. It also plays a taunt voice randomly, with diminishing possibiliy each time. The taunt line is not cut.
- void playMenuBGM ()

  SoundPlayer::playMenuBGM play menu music.
- void playGameBGM ()

  SoundPlayer::playGameBGM play game music.
- void playJump ()

  SoundPlayer::playJump plays the jump sound when a unit jumps.
- void playHit ()

  SoundPlayer::playHit plays the hit sound when a unit gets hit.

Public Attributes

- QMediaPlayer ∗ **BGMplayer**
- QMediaPlayer ∗ **Jumpplayer**
- QMediaPlayer ∗ **ShootProjectilePlayer**
- QMediaPlaylist ∗ **Projectileplaylist**
- QMediaPlayer ∗ **ShootTauntplayer**
- QMediaPlaylist ∗ **BGMplaylist**
- QMediaPlayer ∗ **Hitplayer**
- int **randomIndex**

3.11.1 Detailed Description

This is our sound system. - Wang and Can.

3.11.2 Member Function Documentation

3.11.2.1 void SoundPlayer::playProjectileTypeShoot (int *type*)

SoundPlayer::playProjectileTypeShoot plays the correct shooting sound queue to the corresponding projectile type. The projectile sounds cut each other if there is one previously playing. It also plays a taunt voice randomly, with diminishing possibiliy each time. The taunt line is not cut.

Parameters

type	

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

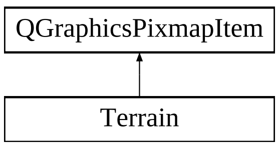
- soundplayer.h
- soundplayer.cpp

3.12 Terrain Class Reference

Terrain, the playground for our battle units in form of an inner circle. - WANG.

```
#include <terrain.h>
```

Inheritance diagram for Terrain:



Public Member Functions

- **Terrain** (GameSettings ∗settings, GameplayInterface ∗scene)

3.12.1 Detailed Description

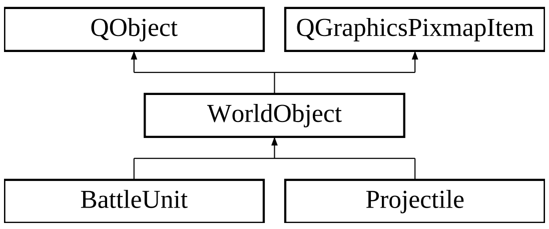
Terrain, the playground for our battle units in form of an inner circle. - WANG.

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

- terrain.h
- terrain.cpp

3.13 WorldObject Class Reference

Inheritance diagram for WorldObject:



Public Slots

- void move ()

  WorldObject::move This function is called every timestep and gets the new position and speed values for the World↩ Object from the physicscalc.
- void jump ()

  WorldObject::jump makes the unit jump in the direction of its head and introduces random rotation. The unit is able to jump in certain proximity to the ground, or when it is colliding with an other unit. The rotation has constant magnitude, but the direction is random.
- void hit ()

  WorldObject::hit This function is called every timestep by ervery Projectile subclass to check if itself hit any World↩ Object.

Signals

- void **sendHealth** (int health)

Public Member Functions

- WorldObject (GameWorld ∗parentView, Player p, SoundPlayer ∗soundplayer)

  WorldObject::WorldObject constructor.
- void setSpeed (double ∗newSpeed)

  WorldObject::setSpeed set the speed of the unit and limit to a max speed.
- void **getPosition** (double ∗outputPointer)
- double ∗ getSpeed ()

  WorldObject::getSpeed returns the speed of the unit.
- void setOrientation (double newOrientation)

  WorldObject::setOrientation set the turning angle of the unit in degrees.
- double getOrientation () const

  WorldObject::getOrientation get the turning angle of the unit in degrees.
- void setRotVel (double newRotVel)

  WorldObject::setRotVel set the rotational velocity in degrees and limit it.
- double getRotVel () const

  WorldObject::getRotVel returns the rotational velocity in degrees.
- void setCenterOfMass (double ∗newCenterOfMass)

  WorldObject::setCenterOfMass sets the position of units center of mass in scene coordinates.
- double ∗ getCenterOfMass ()

  WorldObject::getCenterOfMass gets the position of units center of mass in scene coordinates.
- void setHitCounter (int hit)

  WorldObject::setHitCounter set how many times the unit has hit the ground.
- int getHitCounter ()

  WorldObject::getHitCounter get how many times the unit has hit the ground.
- Player getPlayer () const

  WorldObject::getPlayer returns the player controlling the unit.
- int getWeight ()

  WorldObject::getWeight returns the weight value of the unit.
- void setWeight (int w)

  WorldObject::setWeight sets the weight value of the unit.
- int **getHealthpoints** ()
- int **getDamage** ()
- void **setDamage** (int d)
- void setHealthpoints (int points)

  WorldObject::setHealthpoints This function sets the Healthpoints and emit a signal with the healthpoints to the health-pointsbar.
- void **setProjectile** (int proj)
- int **getProjectile** ()
- char getChar ()

  WorldObject::getChar returns the character indicating the unit type. If it is a battle unit, the character is 'b' If it is a projectile, the character is 'p' If it is neither, the character is 'o'.
- bool getBounced () const

  WorldObject::getBounced returns if the object has bounced before.
- void setBounced (bool value)

  WorldObject::setBounced sets if the object has bounced before.
- bool **getFirstcollide** () const
- void **setFirstcollide** (bool col)

Public Attributes

- SoundPlayer ∗ **soundpointer**
- GameWorld ∗ **parentView**
- bool **collidedBefore**
- bool **okToJump**
- int **jumpCounter**
- bool **orientationChanged**
- int **orientationChangeCount**

Protected Attributes

- Player **p**
- char **ObjectType**

3.13.1 Constructor & Destructor Documentation

3.13.1.1 WorldObject::WorldObject (GameWorld ∗ *parentView*, Player *p*, SoundPlayer ∗ *soundplayer*)

WorldObject::WorldObject constructor.

Parameters

parentView	pointer to connect() the BattleUnit to the player's input and the game's refresh rate.
p	the player controlling the unit
soundplayer	the pointer to the global sound player

3.13.2 Member Function Documentation

3.13.2.1 bool WorldObject::getBounced ( ) const

WorldObject::getBounced returns if the object has bounced before.

Returns

if the object has bounced before

3.13.2.2 double ∗ WorldObject::getCenterOfMass ( )

WorldObject::getCenterOfMass gets the position of units center of mass in scene coordinates.

Returns

the center of mass position

3.13.2.3 char WorldObject::getChar ( )

WorldObject::getChar returns the character indicating the unit type. If it is a battle unit, the character is 'b' If it is a projectile, the character is 'p' If it is neither, the character is 'o'.

Returns

the units type

3.13.2.4 int WorldObject::getHitCounter ( )

WorldObject::getHitCounter get how many times the unit has hit the ground.

Returns

the number of collisions with ground

3.13.2.5 double WorldObject::getOrientation ( ) const

WorldObject::getOrientation get the turning angle of the unit in degrees.

Returns

the turning angle in degrees

3.13.2.6 Player WorldObject::getPlayer ( ) const

WorldObject::getPlayer returns the player controlling the unit.

Returns

the player controlling the unit

3.13.2.7 double WorldObject::getRotVel ( ) const

WorldObject::getRotVel returns the rotational velocity in degrees.

Returns

the rotational velocity in degrees

3.13.2.8 double ∗ WorldObject::getSpeed ( )

WorldObject::getSpeed returns the speed of the unit.

Returns

the pointer to the speed array

3.13.2.9 int WorldObject::getWeight ( )

WorldObject::getWeight returns the weight value of the unit.

Returns

the weight

3.13.2.10 void WorldObject::setBounced (bool *value*)

WorldObject::setBounced sets if the object has bounced before.

Parameters

value	the bool value indicating if the object has bounced before or not

3.13.2.11 void WorldObject::setCenterOfMass (double ∗ *newCenterOfMass*)

WorldObject::setCenterOfMass sets the position of units center of mass in scene coordinates.

Parameters

newCenterOfMass	the new center of mass position

3.13.2.12 void WorldObject::setHealthpoints (int *points*)

WorldObject::setHealthpoints This function sets the Healthpoints and emit a signal with the healthpoints to the healthpointsbar.

Parameters

points	are the lifepoints

3.13.2.13 void WorldObject::setHitCounter (int *hit*)

WorldObject::setHitCounter set how many times the unit has hit the ground.

Parameters

hit	the number of collisions with ground

3.13.2.14 void WorldObject::setOrientation (double *newOrientation*)

WorldObject::setOrientation set the turning angle of the unit in degrees.

Parameters

newOrientation	the new angle in degrees

3.13.2.15 void WorldObject::setRotVel (double *newRotVel*)

WorldObject::setRotVel set the rotational velocity in degrees and limit it.

Parameters

newRotVel	the new rotational velocity in degrees

3.13.2.16 void WorldObject::setSpeed (double ∗ *newSpeed*)

WorldObject::setSpeed set the speed of the unit and limit to a max speed.

Parameters

newSpeed	the pointer to the new speed array

3.13.2.17 void WorldObject::setWeight (int *w*)

WorldObject::setWeight sets the weight value of the unit.

Parameters

w	the new weight value

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

- worldobject.h

- worldobject.cpp