My Project

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Chapter 1

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 2

Namespace Index

2.1 Namespace List

Here is a list of all namespaces with brief descriptions:

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Chapter 3

Hierarchical Index

3.1 Class Hierarchy

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

QGraphicsPixmapItem
- BuildBasicTowerIcon . . . 15
- BuildMachineGunTowerIcon . . . 16
- BuildShotgunTowerIcon . . . 17
- Bullet . . . 19
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- Cockroach . . . 22
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- ItemNotPlacebleTile . . . 42
- ItemPlacebleTile . . . 43
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QGraphicsView
- Game . . . 31

QMainWindow
- MainWindow . . . 46

QObject
- Bullet . . . 19
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- ItemNotPlacebleTile . . . 42
- ItemPlacebleTile . . . 43
- Tower . . . 51

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- Game . . . 31

Chapter 4

Class Index

4.1 Class List

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

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BasicTower . . . 14
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BuildMachineGunTowerIcon . . . 16
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File Index

5.1 File List

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Chapter 6

Namespace Documentation

6.1 Ui Namespace Reference

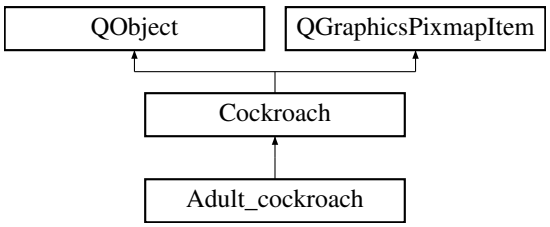
Chapter 7

Class Documentation

7.1 Adult_cockroach Class Reference

`#include <adult_cockroach.h>`

Inheritance diagram for Adult_cockroach:



Public Member Functions

- Adult_cockroach (int health, int speed, int value, QList< QPointF >pointsToFollow, QGraphicsItem *parent=0)

  Construct a new Adult_cockroach::Adult_cockroach object This subclass defines the adult cockroach object, it defines the speed, value, enemy path, the initial location and position offset appear on the map.

Additional Inherited Members

7.1.1 Constructor & Destructor Documentation

7.1.1.1 Adult_cockroach()

```
Adult_cockroach::Adult_cockroach (
            int health,
            int speed,
            int value,
            QList< QPointF > pointsToFollow,
            QGraphicsItem * parent = 0 )
```

Construct a new Adult_cockroach::Adult_cockroach object This subclass defines the adult cockroach object, it defines the speed, value, enemy path, the initial location and position offset appear on the map.

Parameters

health	Cockroach health
speed	Speed
value	Price of Cockroach
points_ToFollow	Coordinates the cockroach will follow
parent	QGraphicsItem

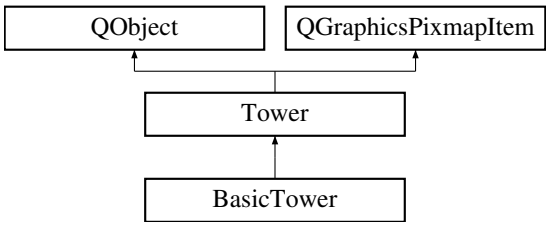
The documentation for this class was generated from the following files:

- src/include/adult_cockroach.h
- src/adult_cockroach.cpp

7.2 BasicTower Class Reference

`#include <basic_tower.h>`

Inheritance diagram for BasicTower:



Public Slots

- void AcquireTarget ()

  BasicTower::AcquireTarget Uses Tower::AcquireTarget()

Public Member Functions

- BasicTower (QGraphicsItem ∗parent=0)

  Constructor BasicTower Sets graphics, creates area_of_effect and sets barrel lenght.

Additional Inherited Members

7.2.1 Constructor & Destructor Documentation

7.2.1.1 BasicTower()

```
BasicTower::BasicTower (
            QGraphicsItem * parent = 0 )
```

Constructor BasicTower Sets graphics, creates area_of_effect and sets barrel lenght.

Parameters

parent	An optional parent

7.2.2 Member Function Documentation

7.2.2.1 AcquireTarget

```
void BasicTower::AcquireTarget ( )  [slot]
```

BasicTower::AcquireTarget Uses Tower::AcquireTarget()

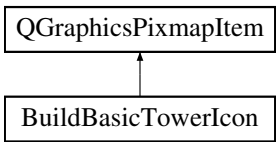
The documentation for this class was generated from the following files:

- src/include/basic_tower.h
- src/basic_tower.cpp

7.3 BuildBasicTowerIcon Class Reference

```
#include <build_basic_tower_icon.hpp>
```

Inheritance diagram for BuildBasicTowerIcon:



Public Member Functions

- BuildBasicTowerIcon (QGraphicsItem ∗parent=0)

  Constructor BuildBasicTowerIcon Builds basic tower icon.
- void mousePressEvent (QGraphicsSceneMouseEvent ∗event)

  Add basic tower and add icon to cursor.

7.3.1 Constructor & Destructor Documentation

7.3.1.1 BuildBasicTowerIcon()

```
BuildBasicTowerIcon::BuildBasicTowerIcon (
            QGraphicsItem * parent = 0 )
```

Constructor BuildBasicTowerIcon Builds basic tower icon.

Parameters

parent	An optional parent

7.3.2 Member Function Documentation

7.3.2.1 mousePressEvent()

```
void BuildBasicTowerIcon::mousePressEvent (
            QGraphicsSceneMouseEvent * event )
```

Add basic tower and add icon to cursor.

Parameters

event	QGraphicsSceneMouseEvent pointer

Returns

None

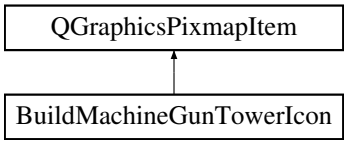
The documentation for this class was generated from the following files:

- src/include/build_basic_tower_icon.hpp
- src/build_basic_tower_icon.cpp

7.4 BuildMachineGunTowerIcon Class Reference

```
#include <build_machine_gun_tower_icon.hpp>
```

Inheritance diagram for BuildMachineGunTowerIcon:



Public Member Functions

- BuildMachineGunTowerIcon (QGraphicsItem *parent=0)

  Constructor BuildMachineGunTowerIcon Builds machine tower icon.
- void mousePressEvent (QGraphicsSceneMouseEvent *event)

  Add machine tower and add icon to cursor.

7.4.1 Constructor & Destructor Documentation

7.4.1.1 BuildMachineGunTowerIcon()

```
BuildMachineGunTowerIcon::BuildMachineGunTowerIcon (
            QGraphicsItem * parent = 0 )
```

Constructor BuildMachineGunTowerIcon Builds machine tower icon.

Parameters

parent	An optional parent

7.4.2 Member Function Documentation

7.4.2.1 mousePressEvent()

```
void BuildMachineGunTowerIcon::mousePressEvent (
            QGraphicsSceneMouseEvent * event )
```

Add machine tower and add icon to cursor.

Parameters

event	QGraphicsSceneMouseEvent pointer

Returns

None

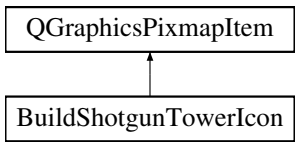
The documentation for this class was generated from the following files:

- src/include/build_machine_gun_tower_icon.hpp
- src/build_machine_gun_tower_icon.cpp

7.5 BuildShotgunTowerIcon Class Reference

```
#include <build_shotgun_tower_icon.hpp>
```

Inheritance diagram for BuildShotgunTowerIcon:



Public Member Functions

- BuildShotgunTowerIcon (QGraphicsItem ∗parent=0)

  Constructor BuildShotgunTowerIcon Builds shot tower icon.
- void mousePressEvent (QGraphicsSceneMouseEvent ∗event)

  Add machine tower and add icon to cursor.

7.5.1 Constructor & Destructor Documentation

7.5.1.1 BuildShotgunTowerIcon()

```
BuildShotgunTowerIcon::BuildShotgunTowerIcon (
            QGraphicsItem * parent = 0 )
```

Constructor BuildShotgunTowerIcon Builds shot tower icon.

Parameters

parent	An optional parent

7.5.2 Member Function Documentation

7.5.2.1 mousePressEvent()

```
void BuildShotgunTowerIcon::mousePressEvent (
            QGraphicsSceneMouseEvent * event )
```

Add machine tower and add icon to cursor.

Parameters

event	QGraphicsSceneMouseEvent pointer

Returns

None

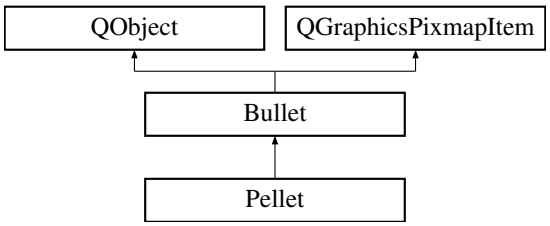
The documentation for this class was generated from the following files:

- src/include/build_shotgun_tower_icon.hpp
- src/build_shotgun_tower_icon.cpp

7.6 Bullet Class Reference

`#include <bullet.h>`

Inheritance diagram for Bullet:



Public Slots

- void move ()

  Timer connected slot that makes the bullet move along its current angle A bullet ill only travel as far as the range allowes. Checks for collisions with cockroaches and if it hits, it will cause damage to the cockroach and destroy itself.
- double get_max_range ()

  Bullet::get_max_range Get function for max_range.
- double get_distance_travelled ()

  Bullet::get_distance_travelled Get function for distance_travelled.
- void set_distance_travelled (double distance)

  Bullet::set_distance_travelled Set function for distance_travelled.

Public Member Functions

- Bullet (int damage, double range)
- ~Bullet ()
- int GetDamage ()

7.6.1 Constructor & Destructor Documentation

7.6.1.1 Bullet()

```
Bullet::Bullet (
            int damage,
            double range )
```

7.6.1.2 ~Bullet()

```
Bullet::~Bullet ( )
```

7.6.2 Member Function Documentation

7.6.2.1 get_distance_travelled

```
double Bullet::get_distance_travelled ( )  [slot]
```

Bullet::get_distance_travelled Get function for distance_travelled.

Returns

distance_travelled Returns the distance the bullet has travelled

7.6.2.2 get_max_range

```
double Bullet::get_max_range ( )  [slot]
```

Bullet::get_max_range Get function for max_range.

Returns

max_range Returns max_range

7.6.2.3 GetDamage()

```
int Bullet::GetDamage ( )  [inline]
```

7.6.2.4 move

```
void Bullet::move ( )  [slot]
```

Timer connected slot that makes the bullet move along its current angle A bullet ill only travel as far as the range allowes. Checks for collisions with cockroaches and if it hits, it will cause damage to the cockroach and destroy itself.

Returns

None

7.6.2.5 set_distance_travelled

```
void Bullet::set_distance_travelled (
            double distance )  [slot]
```

Bullet::set_distance_travelled Set function for distance_travelled.

Parameters

distance	

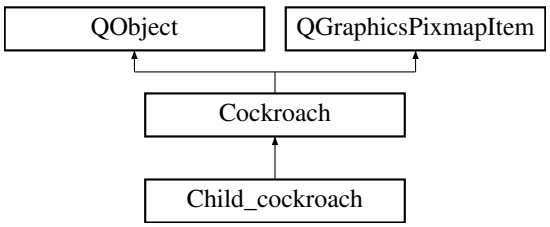
The documentation for this class was generated from the following files:

- src/include/bullet.h
- src/bullet.cpp

7.7 Child_cockroach Class Reference

```
#include <child_cockroach.h>
```

Inheritance diagram for Child_cockroach:



Public Member Functions

- Child_cockroach (int health, int speed, int value, QList< QPointF > pointsToFollow, int posit_index, QPointF q_offset, QGraphicsItem *parent=0)

  Construct a new Child_cockroach::Child_cockroach object it defines the speed, value, enemy path, the initial location and position offset appear on the map.

Additional Inherited Members

7.7.1 Constructor & Destructor Documentation

7.7.1.1 Child_cockroach()

```
Child_cockroach::Child_cockroach (
            int health,
            int speed,
            int value,
            QList< QPointF > pointsToFollow,
            int posit_index,
            QPointF q_offset,
            QGraphicsItem * parent = 0 )
```

Construct a new Child_cockroach::Child_cockroach object it defines the speed, value, enemy path, the initial location and position offset appear on the map.

Parameters

health	Cockroach health
speed	Speed
value	Price of Cockroach
points_ToFollow	Coordinates the cockroach will follow
posit_index	Index in enemy path Qlist
q_offset	Position offset appear on the map
parent	QGraphicsItem

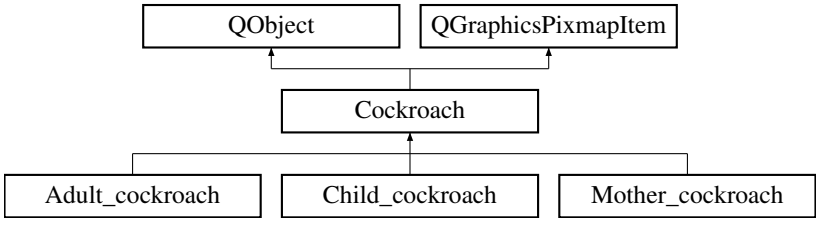
The documentation for this class was generated from the following files:

- src/include/child_cockroach.h
- src/child_cockroach.cpp

7.8 Cockroach Class Reference

```
#include <cockroach.h>
```

Inheritance diagram for Cockroach:



Public Slots

- virtual void Move ()

  Defines how cockroach move, when cockroach get close to destination, set destination to the next.
- virtual void GotHit (int damage)

  When croach receive hit, decrease health.

Public Member Functions

- Cockroach ()=default
- Cockroach (int health, int speed, int value, QList< QPointF > pointsToFollow, QGraphicsItem *parent=0)

  Construct a new Cockroach:: Cockroach object This Cockroach is the base class of all three kinds of Cockroach It initialize the health, speed, value and enemy path The function move() and GotHit are overwritten by the subclasses.
- Cockroach (const Cockroach &Coch)=delete
- Cockroach & operator= (Cockroach &coch)=delete
- ~Cockroach ()=default
- int GetValue () const

  Get the cockroach value.
- int GetHealth () const

  Get the cockroach health.
- int GetSpeed () const

  Get the cockroach speed.
- int GetDestIndex () const

  Find the location of the current destination.
- QPointF GetDest () const
- QList< QPointF > GetPointList () const

Protected Member Functions

- void PreventCollide ()

  Defines actions when cockroach collide.
- void PreventCollidedToCocsh ()

  Defines actions when cockroach collide to other cockroach.
- void PreventOutOfBoundry ()

  Defines actions when cockroach collide to boundary.
- void BounceToWall ()

  Defines actions when cockroach collide to wall.
- void WalkTo (QPointF)

  Defines how cockroach take steps to the destination.
- bool IsDead ()

  Checks if cockroach is dead.
- int RotateToPoint (QPointF p)

  Defines how enemy change its direction.

Protected Attributes

- QList< QPointF > points_
- QPointF dest_
- int destList_index_
- int health_
- int speed_
- int value_
- double dx
- double dy
- int assB
- qreal variant_ = 0
- QTimer * timer_ = nullptr
- QList< QGraphicsItem * > colliding_items

7.8.1 Constructor & Destructor Documentation

7.8.1.1 Cockroach() [1/3]

```
Cockroach::Cockroach ( )  [default]
```

7.8.1.2 Cockroach() [2/3]

```
Cockroach::Cockroach (
            int health,
            int speed,
            int value,
            QList< QPointF > pointsToFollow,
            QGraphicsItem * parent = 0 )
```

Construct a new Cockroach:: Cockroach object This Cockroach is the base class of all three kinds of Cockroach It initialize the health, speed, value and enemy path The function move() and GotHit are overwritten by the subclasses.

Parameters

health	Cockroach health
speed	Speed
value	Price of Cockroach
points_ToFollow	Cooridnated the cockroach will follow
parent	QGraphicsItem

7.8.1.3 Cockroach() [3/3]

```
Cockroach::Cockroach (
            const Cockroach & Coch )  [delete]
```

7.8.1.4 ~Cockroach()

```
Cockroach::~Cockroach ( )  [default]
```

7.8.2 Member Function Documentation

7.8.2.1 BounceToWall()

```
void Cockroach::BounceToWall ( )  [protected]
```

Defines actions when cockroach collide to wall.

Parameters

None	

Returns

None

7.8.2.2 GetDest()

```
QPointF Cockroach::GetDest ( ) const  [inline]
```

7.8.2.3 GetDestIndex()

```
int Cockroach::GetDestIndex ( ) const
```

Find the location of the current destination.

Parameters

None	

Returns

index int

7.8.2.4 GetHealth()

```
int Cockroach::GetHealth ( ) const
```

Get the cockroach health.

Parameters

None	

Returns

health_ health of cockroach

7.8.2.5 GetPointList()

```
QList< QPointF > Cockroach::GetPointList ( ) const  [inline]
```

7.8.2.6 GetSpeed()

```
int Cockroach::GetSpeed ( ) const
```

Get the cockroach speed.

Parameters

None	

Returns

speed_ speed of cockroach

7.8.2.7 GetValue()

```
int Cockroach::GetValue ( ) const
```

Get the cockroach value.

Parameters

None	

Returns

value_ value of cockroach

7.8.2.8 GotHit

```
void Cockroach::GotHit (
            int damage )  [virtual], [slot]
```

When croach receive hit, decrease health.

Parameters

damage	

7.8.2.9 IsDead()

```
bool Cockroach::IsDead ( )  [protected]
```

Checks if cockroach is dead.

Returns

true

false

7.8.2.10 Move

```
void Cockroach::Move ( )  [virtual], [slot]
```

Defines how cockroach move, when cockroach get close to destination, set destination to the next.

Parameters

None	

Returns

None

7.8.2.11 operator=()

```
Cockroach & Cockroach::operator= (
            Cockroach & coch )  [delete]
```

7.8.2.12 PreventCollide()

```
void Cockroach::PreventCollide ( )  [protected]
```

Defines actions when cockroach collide.

Parameters

None	

Returns

None

7.8.2.13 PreventCollidedToCocsh()

```
void Cockroach::PreventCollidedToCocsh ( )  [protected]
```

Defines actions when cockroach collide to other cockroach.

Parameters

None	

Returns

None

7.8.2.14 PreventOutOfBoundry()

```
void Cockroach::PreventOutOfBoundry ( )  [protected]
```

Defines actions when cockroach collide to boundary.

Parameters

None	

Returns

None

7.8.2.15 RotateToPoint()

```
int Cockroach::RotateToPoint (
            QPointF p )  [protected]
```

Defines how enemy change its direction.

Parameters

p	The destination point

Returns

ln.length() the distance to next point

7.8.2.16 WalkTo()

```
void Cockroach::WalkTo (
            QPointF nextPoint )  [protected]
```

Defines how cockroach take steps to the destination.

Parameters

nextPoint	destination point

Returns

None

7.8.3 Member Data Documentation

7.8.3.1 assB

```
int Cockroach::assB  [protected]
```

7.8.3.2 colliding_items

```
QList<QGraphicsItem *> Cockroach::colliding_items  [protected]
```

7.8.3.3 dest_

```
QPointF Cockroach::dest_  [protected]
```

7.8.3.4 destList_index_

```
int Cockroach::destList_index_  [protected]
```

7.8.3.5 dx

```
double Cockroach::dx  [protected]
```

7.8.3.6 dy

```
double Cockroach::dy  [protected]
```

7.8.3.7 health_

```
int Cockroach::health_  [protected]
```

7.8.3.8 points_

```
QList<QPointF> Cockroach::points_  [protected]
```

7.8.3.9 speed_

```
int Cockroach::speed_  [protected]
```

7.8.3.10 timer_

```
QTimer* Cockroach::timer_ = nullptr  [protected]
```

7.8.3.11 value_

```
int Cockroach::value_  [protected]
```

7.8.3.12 variant_

```
qreal Cockroach::variant_ = 0  [protected]
```

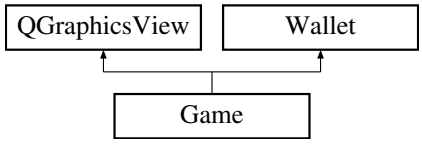
The documentation for this class was generated from the following files:

- src/include/cockroach.h
- src/cockroach.cpp

7.9 Game Class Reference

```
#include <game.hpp>
```

Inheritance diagram for Game:



Public Slots

- void SpawnChild ()

  Slot for spawning child cockroaches.
- void SpawnAdult ()

  Slot for spawning adult cockroaches.
- void SpawnMother ()

  Slot for spawning mother cockroaches.
- void StartWave ()

  Slot starting the wave and creating the enemies.
- void IsWaveComplete ()

  Slot for checking if the current wave is complete.
- void WaveComplete ()

  Slot for handling when wave is complete.
- void WaitForPlayer ()

  Slot for Waiting for the player to start the wave again.
- void ResetLevel ()

  Waiting for player ot start the wave again.
- void CreateNewLevel ()

  Create map layout based on the current level.
- void UpdateBalance ()

  Slot updating player balance in game view.

Signals

- void StartNextWave (void)
- void GameOver (void)

Public Member Functions

- Game (int tile_width, int tile_height, int player_balance)

  Construct a new Game:: Game object.
- ∼Game ()

  Destroy the Game:: Game object.
- void createEnemies (int child_ammount, int adult_ammount, int mother_ammount, int interval)

  Create enemies and set their spawn time.
- void setCursor (QString filename)

  Change the cursor to the picture given as parameter.
- void mouseMoveEvent (QMouseEvent ∗event)

  Cursor follows the mouse.
- void mousePressEvent (QMouseEvent ∗event)

  Tracks the items pressed by the mouse.
- void LevelTwo ()

Public Attributes

- QGraphicsScene * scene
- QGraphicsView * view
- QGraphicsPixmapItem * cursor
- Tower * building
- QTimer * SpawnChildTimer
- QTimer * SpawnAdultTimer
- QTimer * SpawnMotherTimer
- QTimer * WaveCheckTimer
- QTimer * BalanceUpdateTimer
- QList< QPointF > pointsToFollow
- QPushButton * done_button
- QMessageBox * WaveCompleteMsgBox
- QMessageBox * GameOverMsgBox
- QMessageBox * LevelCompleteMsgBox
- QGraphicsTextItem * CurrentBalanceText
- BuildBasicTowerIcon * basic_tower_icon
- BuildMachineGunTowerIcon * machine_gun_tower_icon
- BuildShotgunTowerIcon * shotgun_tower_icon
- int child_killed
- int adult_killed
- int mother_killed
- int child_spawmed
- int adult_spawmed
- int mother_spawmed
- int spawn_interval
- int total_spawned
- bool game_over_flag = false

7.9.1 Constructor & Destructor Documentation

7.9.1.1 Game()

```
Game::Game (
            int tile_width,
            int tile_height,
            int player_balance )
```

Construct a new Game:: Game object.

Parameters

tile_width	Tile width for the game view
tile_height	Tile height for the game view
player_balance	Player balance at the start return None

7.9.1.2 ~Game()

```
Game::~Game ( )
```

Destroy the Game:: Game object.

7.9.2 Member Function Documentation

7.9.2.1 createEnemies()

```
void Game::createEnemies (
            int child_ammount,
            int adult_ammount,
            int mother_ammount,
            int interval )
```

Create enemies and set their spawn time.

Parameters

child_ammount	Number of child cockroached to spawn
adult_ammount	Number of adult cockroached to spawn
mother_ammount	Number of mother cockroached to spawn
interval	Interval for cockroach spawn

Returns

NONE

7.9.2.2 CreateNewLevel

```
void Game::CreateNewLevel ( )  [slot]
```

Create map layout based on the current level.

Create New game settings for user based on the current level

Parameters

None	

Returns

None

7.9.2.3 GameOver

```
void Game::GameOver (
            void  )  [signal]
```

7.9.2.4 IsWaveComplete

```
void Game::IsWaveComplete ( )  [slot]
```

Slot for checking if the current wave is complete.

Check if all enemies were killed or not

Parameters

None	

Returns

None

7.9.2.5 LevelTwo()

```
void Game::LevelTwo ( )
```

7.9.2.6 mouseMoveEvent()

```
void Game::mouseMoveEvent (
            QMouseEvent * event )
```

Cursor follows the mouse.

Parameters

event	tracks the position of mouse movement

Returns

None

7.9.2.7 mousePressEvent()

```
void Game::mousePressEvent (
            QMouseEvent * event )
```

Tracks the items pressed by the mouse.

Parameters

event	tracks the position of mouse movement

Returns

None

7.9.2.8 ResetLevel

```
void Game::ResetLevel ( )  [slot]
```

Waiting for player ot start the wave again.

7.9.2.9 setCursor()

```
void Game::setCursor (
            QString filename )
```

Change the cursor to the picture given as parameter.

Parameters

filename	points to the filename

Returns

None

7.9.2.10 SpawnAdult

```
void Game::SpawnAdult ( )  [slot]
```

Slot for spawning adult cockroaches.

Parameters

NONE	

Returns

NONE

7.9.2.11 SpawnChild

```
void Game::SpawnChild ( )  [slot]
```

Slot for spawning child cockroaches.

Parameters

NONE	

Returns

NONE

7.9.2.12 SpawnMother

```
void Game::SpawnMother ( )  [slot]
```

Slot for spawning mother cockroaches.

Parameters

NONE	

Returns

NONE

7.9.2.13 StartNextWave

```
void Game::StartNextWave (
            void  )  [signal]
```

7.9.2.14 StartWave

```
void Game::StartWave ( )  [slot]
```

Slot starting the wave and creating the enemies.

Create numbers of enemies

Parameters

None	

Returns

None

7.9.2.15 UpdateBalance

```
void Game::UpdateBalance ( )  [slot]
```

Slot updating player balance in game view.

Check user banking balance again

Parameters

None	

Returns

None

7.9.2.16 WaitForPlayer

```
void Game::WaitForPlayer ( )  [slot]
```

Slot for Waiting for the player to start the wave again.

7.9.2.17 WaveComplete

```
void Game::WaveComplete ( )  [slot]
```

Slot for handling when wave is complete.

Parameters

None	

Returns

None

7.9.3 Member Data Documentation

7.9.3.1 adult_killed

```
int Game::adult_killed
```

7.9.3.2 adult_spawmed

```
int Game::adult_spawmed
```

7.9.3.3 BalanceUpdateTimer

```
QTimer* Game::BalanceUpdateTimer
```

7.9.3.4 basic_tower_icon

```
BuildBasicTowerIcon* Game::basic_tower_icon
```

7.9.3.5 building

```
Tower* Game::building
```

7.9.3.6 child_killed

```
int Game::child_killed
```

7.9.3.7 child_spawmed

```
int Game::child_spawmed
```

7.9.3.8 CurrentBalanceText

```
QGraphicsTextItem* Game::CurrentBalanceText
```

7.9.3.9 cursor

```
QGraphicsPixmapItem* Game::cursor
```

7.9.3.10 done_button

```
QPushButton* Game::done_button
```

7.9.3.11 game_over_flag

```
bool Game::game_over_flag = false
```

7.9.3.12 GameOverMsgBox

```
QMessageBox* Game::GameOverMsgBox
```

7.9.3.13 LevelCompleteMsgBox

```
QMessageBox* Game::LevelCompleteMsgBox
```

7.9.3.14 machine_gun_tower_icon

```
BuildMachineGunTowerIcon* Game::machine_gun_tower_icon
```

7.9.3.15 mother_killed

```
int Game::mother_killed
```

7.9.3.16 mother_spawmed

```
int Game::mother_spawmed
```

7.9.3.17 pointsToFollow

```
QList<QPointF> Game::pointsToFollow
```

7.9.3.18 scene

```
QGraphicsScene* Game::scene
```

7.9.3.19 shotgun_tower_icon

```
BuildShotgunTowerIcon* Game::shotgun_tower_icon
```

7.9.3.20 spawn_interval

```
int Game::spawn_interval
```

7.9.3.21 SpawnAdultTimer

```
QTimer* Game::SpawnAdultTimer
```

7.9.3.22 SpawnChildTimer

```
QTimer* Game::SpawnChildTimer
```

7.9.3.23 SpawnMotherTimer

```
QTimer* Game::SpawnMotherTimer
```

7.9.3.24 total_spawned

```
int Game::total_spawned
```

7.9.3.25 view

```
QGraphicsView* Game::view
```

7.9.3.26 WaveCheckTimer

```
QTimer* Game::WaveCheckTimer
```

7.9.3.27 WaveCompleteMsgBox

```
QMessageBox* Game::WaveCompleteMsgBox
```

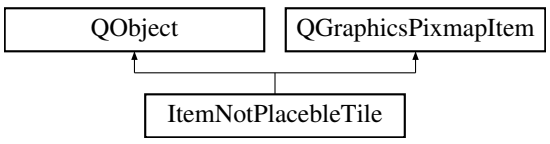
The documentation for this class was generated from the following files:

- src/include/game.hpp
- src/game.cpp

7.10 ItemNotPlacebleTile Class Reference

```
#include <item_not_placeble_tile.h>
```

Inheritance diagram for ItemNotPlacebleTile:



Public Member Functions

- ItemNotPlacebleTile (QString file_path, int width, int heigth, QPointF coord)

  Construct a new Item Not Placeble Tile:: Item Not Placeble Tile object Create a tile where items can not be placed.
- virtual ~ItemNotPlacebleTile ()

7.10.1 Constructor & Destructor Documentation

7.10.1.1 ItemNotPlacebleTile()

```
ItemNotPlacebleTile::ItemNotPlacebleTile (
            QString file_path,
            int width,
            int height,
            QPointF coord )
```

Construct a new Item Not Placeble Tile:: Item Not Placeble Tile object Create a tile where items can not be placed.

Parameters

file_path	File path for the image
width	Width the image need to fit in the tile
height	Height the image need to fit in the tile
coord	Corrdinate where to set tile once created

7.10.1.2 ~ItemNotPlacebleTile()

```
virtual ItemNotPlacebleTile::~ItemNotPlacebleTile ( )  [inline], [virtual]
```

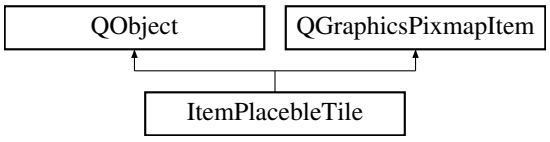
The documentation for this class was generated from the following files:

- src/include/item_not_placeble_tile.h
- src/item_not_placeble_tile.cpp

7.11 ItemPlacebleTile Class Reference

```
#include <item_placeble_tile.h>
```

Inheritance diagram for ItemPlacebleTile:



Public Member Functions

- ItemPlacebleTile (QString file_path, int width, int heigth, QPointF coord)

  Construct a new Item Placeble Tile:: Item Placeble Tile object Create a tile where items can be placed.
- virtual ~ItemPlacebleTile ()

7.11.1 Constructor & Destructor Documentation

7.11.1.1 ItemPlacebleTile()

```
ItemPlacebleTile::ItemPlacebleTile (
            QString file_path,
            int width,
            int height,
            QPointF coord )
```

Construct a new Item Placeble Tile:: Item Placeble Tile object Create a tile where items can be placed.

Parameters

file_path	File path for the image
width	Width the image need to fit in the tile
height	Height the image need to fit in the tile
coord	Corrdinate where to set tile once created

7.11.1.2 ~ItemPlacebleTile()

```
virtual ItemPlacebleTile::~ItemPlacebleTile ( )  [inline], [virtual]
```

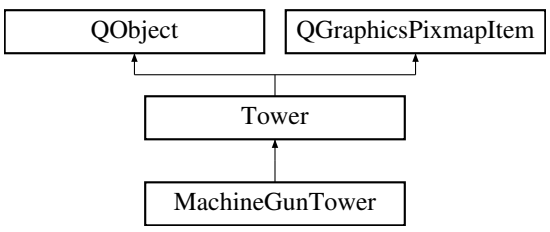
The documentation for this class was generated from the following files:

- src/include/item_placeble_tile.h
- src/item_placeble_tile.cpp

7.12 MachineGunTower Class Reference

```
#include <machine_gun_tower.h>
```

Inheritance diagram for MachineGunTower:



Public Slots

- void AcquireTarget ()

  MachineGunTower::AcquireTarget Overrides the Tower::AcquireTarget and uses its own Fire() method.

Public Member Functions

- MachineGunTower (QGraphicsItem ∗parent=0)

  Constructor MachineGunTower Sets graphics, creates area_of_effect and sets barrel lenght.
- void Fire ()

  MachineGunTower::Fire Override for Fire() method. Adds bullet spread with random angle.

Additional Inherited Members

7.12.1 Constructor & Destructor Documentation

7.12.1.1 MachineGunTower()

```
MachineGunTower::MachineGunTower (
            QGraphicsItem * parent = 0 )
```

Constructor MachineGunTower Sets graphics, creates area_of_effect and sets barrel lenght.

Parameters

parent	An optional parent return None

7.12.2 Member Function Documentation

7.12.2.1 AcquireTarget

```
void MachineGunTower::AcquireTarget ( )  [slot]
```

MachineGunTower::AcquireTarget Overrides the Tower::AcquireTarget and uses its own Fire() method.

7.12.2.2 Fire()

```
void MachineGunTower::Fire ( )  [virtual]
```

MachineGunTower::Fire Override for Fire() method. Adds bullet spread with random angle.

Reimplemented from Tower.

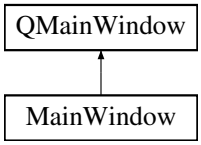
The documentation for this class was generated from the following files:

- src/include/machine_gun_tower.h
- src/machine_gun_tower.cpp

7.13 MainWindow Class Reference

```
#include <mainwindow.h>
```

Inheritance diagram for MainWindow:



Public Slots

- void start_on_click ()

Public Member Functions

- MainWindow (QWidget *parent=nullptr)
- ~MainWindow ()

7.13.1 Constructor & Destructor Documentation

7.13.1.1 MainWindow()

```
MainWindow::MainWindow (
            QWidget * parent = nullptr )
```

7.13.1.2 ~MainWindow()

```
MainWindow::~MainWindow ( )
```

7.13.2 Member Function Documentation

7.13.2.1 start_on_click

```
void MainWindow::start_on_click ( )  [slot]
```

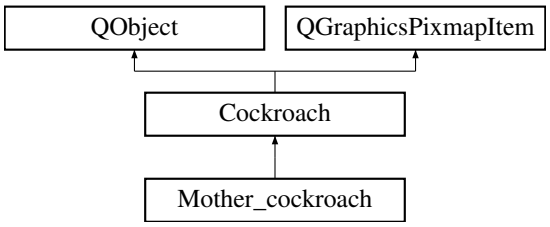
The documentation for this class was generated from the following files:

- src/include/mainwindow.h
- src/mainwindow.cpp

7.14 Mother_cockroach Class Reference

```
#include <mother_cockroach.h>
```

Inheritance diagram for Mother_cockroach:



Public Member Functions

- Mother_cockroach (int health, int speed, int value, int child_health, int child_speed, int child_value, QList< QPointF >pointsToFollow, QGraphicsItem *parent=0)

  Constructor Mother_cockroach defines the adult cockroach object,it defines the speed, value, enemy path, the initial location and position offset appear on the map.

Additional Inherited Members

7.14.1 Constructor & Destructor Documentation

7.14.1.1 Mother_cockroach()

```
Mother_cockroach::Mother_cockroach (
            int health,
            int speed,
            int value,
            int child_health,
            int child_speed,
            int child_value,
            QList< QPointF > pointsToFollow,
            QGraphicsItem * parent = 0 )
```

Constructor Mother_cockroach defines the adult cockroach object,it defines the speed, value, enemy path, the initial location and position offset appear on the map.

Parameters

health	Set health
speed	Set speed
value	Set value
pointsToFollow	Set pointsToFollow
child_health	Set child health
child_speed	Set child speed
child_value	Set child value
parent	An optional parent

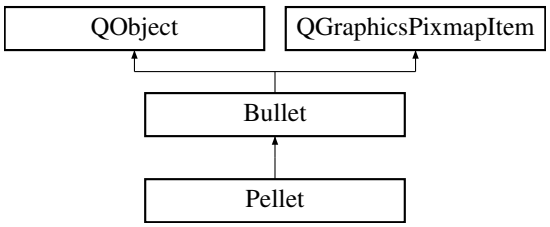
The documentation for this class was generated from the following files:

- src/include/mother_cockroach.h
- src/mother_cockroach.cpp

7.15 Pellet Class Reference

```
#include <pellet.h>
```

Inheritance diagram for Pellet:



Public Member Functions

- Pellet (QGraphicsItem *parent=0)

  Constructor Pellet.

Additional Inherited Members

7.15.1 Constructor & Destructor Documentation

7.15.1.1 Pellet()

```
Pellet::Pellet (
            QGraphicsItem * parent = 0 )
```

Constructor Pellet.

Parameters

parent	An optional parent return None

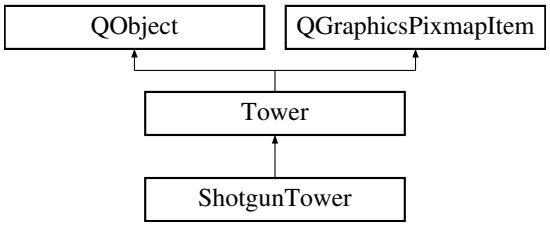
The documentation for this class was generated from the following files:

- src/include/pellet.h
- src/pellet.cpp

7.16 ShotgunTower Class Reference

```
#include <shotgun_tower.h>
```

Inheritance diagram for ShotgunTower:



Public Slots

- void AcquireTarget ()

  ShotgunTower::acquire_target overrides the Tower::AcquireTarget() and uses instead its own fire() method.

Public Member Functions

- ShotgunTower (QGraphicsItem *parent=0)

  Constructor ShotgunTower inherits from Tower Creates area_of_effect and connects timer to its overwritten Acquire↩ Target method Sets Barrel lenght.
- void Fire ()

  ShotgunTower::fire creates five bullets with different angles that goes towards the target.

Additional Inherited Members

7.16.1 Constructor & Destructor Documentation

7.16.1.1 ShotgunTower()

```
ShotgunTower::ShotgunTower (
            QGraphicsItem * parent = 0 )
```

Constructor ShotgunTower inherits from Tower Creates area_of_effect and connects timer to its overwritten AcquireTarget method Sets Barrel lenght.

Parameters

parent	An optional parent

7.16.2 Member Function Documentation

7.16.2.1 AcquireTarget

```
void ShotgunTower::AcquireTarget ( )  [slot]
```

ShotgunTower::acquire_target overrides the Tower::AcquireTarget() and uses instead its own fire() method.

7.16.2.2 Fire()

```
void ShotgunTower::Fire ( )  [virtual]
```

ShotgunTower::fire creates five bullets with different angles that goes towards the target.

Reimplemented from Tower.

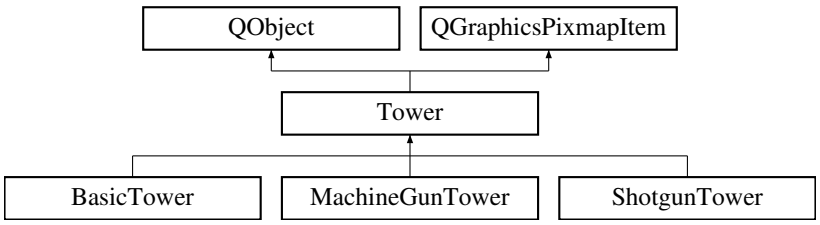
The documentation for this class was generated from the following files:

- src/include/shotgun_tower.h
- src/shotgun_tower.cpp

7.17 Tower Class Reference

`#include <tower.h>`

Inheritance diagram for Tower:



Public Slots

- virtual void AcquireTarget ()

  Tower::acquire_target Checks if enemies are in the area_of_effect, sets target and calls method fire() A Virtual method.

Public Member Functions

- Tower (QGraphicsItem ∗parent=0)

  Constructor Tower An abstract class that inherits from QGraphicsPixmapItem and QObject.
- double DistanceTo (QGraphicsItem ∗item)

  Tower::distanceTo Calculates distance from tower to an item.
- virtual void Fire ()

  Tower::fire Creates a bullet that will travel towards the target.
- void RotateTowardsEnemy (int angle)

  Tower::RotateTowardsEnemy Rotates the tower.
- void SetCenterPoint (QPointF center_point)

  Tower::setCenterPoint Set function for towers center point.
- QPointF GetCenterPoint ()

  Tower::getCenterPoint Get function for towers center point.
- void SetBarrelLenght (int lenght)

  Tower::setBarrelLenght Sets the value holding lenght of the barrel of the tower.
- int GetBarrelLenght ()

  Tower::getBarrelLenght Gets the value holding lenght of the barrel of the tower.
- void CreateAreaOfEffect (int scale_factor)

  Tower::createAreaOfEffect Creates the PolygonItem area_of_effect from points and scales them accordingly.

Protected Attributes

- QGraphicsPolygonItem ∗ area_of_effect
- QPointF target
- bool has_target
- QPointF center
- int barrel_lenght

7.17.1 Constructor & Destructor Documentation

7.17.1.1 Tower()

```
Tower::Tower (
            QGraphicsItem * parent = 0 )
```

Constructor Tower An abstract class that inherits from QGraphicsPixmapItem and QObject.

Parameters

parent	An optional parameter

7.17.2 Member Function Documentation

7.17.2.1 AcquireTarget

```
void Tower::AcquireTarget ( )  [virtual], [slot]
```

Tower::acquire_target Checks if enemies are in the area_of_effect, sets target and calls method fire() A Virtual method.

7.17.2.2 CreateAreaOfEffect()

```
void Tower::CreateAreaOfEffect (
            int scale_factor )
```

Tower::createAreaOfEffect Creates the PolygonItem area_of_effect from points and scales them accordingly.

Parameters

scale_factor	The scale_factor defines the size of the polygon

7.17.2.3 DistanceTo()

```
double Tower::DistanceTo (
            QGraphicsItem * item )
```

Tower::distanceTo Calculates distance from tower to an item.

Parameters

item	

Returns

7.17.2.4 Fire()

```
void Tower::Fire ( )  [virtual]
```

Tower::fire Creates a bullet that will travel towards the target.

Reimplemented in MachineGunTower, and ShotgunTower.

7.17.2.5 GetBarrelLenght()

```
int Tower::GetBarrelLenght ( )
```

Tower::getBarrelLenght Gets the value holding lenght of the barrel of the tower.

Returns

7.17.2.6 GetCenterPoint()

```
QPointF Tower::GetCenterPoint ( )
```

Tower::getCenterPoint Get function for towers center point.

Returns

7.17.2.7 RotateTowardsEnemy()

```
void Tower::RotateTowardsEnemy (
            int angle )
```

Tower::RotateTowardsEnemy Rotates the tower.

Parameters

angle	The angle of rotation

7.17.2.8 SetBarrelLenght()

```
void Tower::SetBarrelLenght (
            int lenght )
```

Tower::setBarrelLenght Sets the value holding lenght of the barrel of the tower.

Parameters

lenght	

7.17.2.9 SetCenterPoint()

```
void Tower::SetCenterPoint (
            QPointF center_point )
```

Tower::setCenterPoint Set function for towers center point.

Parameters

center_point	The center point of the tower

7.17.3 Member Data Documentation

7.17.3.1 area_of_effect

```
QGraphicsPolygonItem* Tower::area_of_effect  [protected]
```

7.17.3.2 barrel_lenght

```
int Tower::barrel_lenght  [protected]
```

7.17.3.3 center

```
QPointF Tower::center  [protected]
```

7.17.3.4 has_target

```
bool Tower::has_target  [protected]
```

7.17.3.5 target

```
QPointF Tower::target  [protected]
```

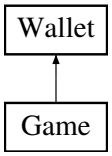
The documentation for this class was generated from the following files:

- src/include/tower.h
- src/tower.cpp

7.18 Wallet Class Reference

```
#include <wallet.hpp>
```

Inheritance diagram for Wallet:



Public Member Functions

- Wallet (int ammount)

  Construct a new Wallet:: Wallet object.
- void Deposit (int ammount)

  Deposit money to player wallet.
- bool Withdraw (int ammount)

  Withdraw money from player wallet.
- int GetBalance () const

  Get balance.
- void SetNewBalance (int ammount)

  Set New Balance for player.

7.18.1 Constructor & Destructor Documentation

7.18.1.1 Wallet()

```
Wallet::Wallet (
            int balance )
```

Construct a new Wallet:: Wallet object.

Parameters

balance	Player balance

7.18.2 Member Function Documentation

7.18.2.1 Deposit()

```
void Wallet::Deposit (
            int ammount )
```

Deposit money to player wallet.

Parameters

ammount	

7.18.2.2 GetBalance()

```
int Wallet::GetBalance ( ) const
```

Get balance.

Parameters

ammount	Player Wallet

Returns

None

7.18.2.3 SetNewBalance()

```
void Wallet::SetNewBalance (
            int ammount )
```

Set New Balance for player.

Parameters

ammount	Player Wallet

Returns

None

7.18.2.4 Withdraw()

```
bool Wallet::Withdraw (
            int ammount )
```

Withdraw money from player wallet.

Parameters

ammount	

Returns

None

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

- src/include/wallet.hpp
- src/wallet.cpp

Chapter 8

File Documentation

8.1 src/adult_cockroach.cpp File Reference

```
#include "adult_cockroach.h"
#include <QTimer>
#include <QPixmap>
#include <QtDebug>
#include <QLineF>
#include <QWidget>
#include <QPolygonF>
#include <QPen>
#include "game.hpp"
```

Variables

- Game * game

8.1.1 Variable Documentation

8.1.1.1 game

```
Game* game  [extern]
```

8.2 src/basic_tower.cpp File Reference

```
#include "basic_tower.h"
#include "bullet.h"
#include "game.hpp"
#include "QTimer"
```

Variables

- Game * game

8.2.1 Variable Documentation

8.2.1.1 game

```
Game* game  [extern]
```

8.3 src/build_basic_tower_icon.cpp File Reference

```
#include "build_basic_tower_icon.hpp"
#include "game.hpp"
#include "basic_tower.h"
```

Variables

- Game * game

8.3.1 Variable Documentation

8.3.1.1 game

```
Game* game  [extern]
```

8.4 src/build_machine_gun_tower_icon.cpp File Reference

```
#include "build_machine_gun_tower_icon.hpp"
#include "game.hpp"
#include "machine_gun_tower.h"
```

Variables

- Game * game

8.4.1 Variable Documentation

8.4.1.1 game

```
Game* game  [extern]
```

8.5 src/build_shotgun_tower_icon.cpp File Reference

```
#include "build_shotgun_tower_icon.hpp"
#include "game.hpp"
#include "shotgun_tower.h"
```

Variables

- Game * game

8.5.1 Variable Documentation

8.5.1.1 game

```
Game* game  [extern]
```

8.6 src/bullet.cpp File Reference

```
#include "bullet.h"
#include <QPixmap>
#include <QTimer>
#include <QtMath>
#include "cockroach.h"
#include "game.hpp"
#include <stdlib.h>
```

Variables

- Game * game

  Constructs bullet.

8.6.1 Variable Documentation

8.6.1.1 game

```
Game* game  [extern]
```

Constructs bullet.

Parameters

damage	Sets the damage value of the bullet
range	Sets the range of the bullet

Returns

None

8.7 src/child_cockroach.cpp File Reference

```
#include "child_cockroach.h"
#include <QTimer>
#include <QPixmap>
#include <QtDebug>
#include <QLineF>
#include <QWidget>
#include <QPolygonF>
#include <QPen>
#include "game.hpp"
```

Variables

- Game * game

  Constructs bullet.

8.7.1 Variable Documentation

8.7.1.1 game

```
Game* game  [extern]
```

Constructs bullet.

Parameters

damage	Sets the damage value of the bullet
range	Sets the range of the bullet

Returns

None

8.8 src/cockroach.cpp File Reference

```
#include "cockroach.h"
#include <QPixmap>
#include <QVector>
#include <QPointF>
#include <QPolygonF>
#include <QLineF>
#include <QTimer>
#include <QPen>
#include <typeinfo>
#include <QGraphicsPixmapItem>
#include <QDebug>
#include "bullet.h"
#include "game.hpp"
```

Variables

- Game * game

  Constructs bullet.
- Bullet * bullet

8.8.1 Variable Documentation

8.8.1.1 bullet

```
Bullet* bullet  [extern]
```

8.8.1.2 game

```
Game* game  [extern]
```

Constructs bullet.

Parameters

damage	Sets the damage value of the bullet
range	Sets the range of the bullet

Returns

None

8.9 src/game.cpp File Reference

```
#include <sstream>
#include "game.hpp"
#include "adult_cockroach.h"
#include "child_cockroach.h"
#include "mother_cockroach.h"
#include "tower.h"
#include "basic_tower.h"
#include "machine_gun_tower.h"
#include "shotgun_tower.h"
#include "build_machine_gun_tower_icon.hpp"
#include "build_shotgun_tower_icon.hpp"
#include "item_placeble_tile.h"
#include "item_not_placeble_tile.h"
```

8.10 src/include/adult_cockroach.h File Reference

```
#include "cockroach.h"
```

Classes

- class Adult_cockroach

8.11 adult_cockroach.h

Go to the documentation of this file.

```
1 #ifndef ADULT_COCKROACH_H
2 #define ADULT_COCKROACH_H
3
4 #include "cockroach.h"
5
6 class Adult_cockroach:public Cockroach{
7 public:
8     Adult_cockroach(int health, int speed, int value, QList<QPointF>pointsToFollow,
9                     QGraphicsItem *parent = 0);
10
11 private:
12     void GotHit(int damage);
13
14 };
15 #endif // ADULT_COCKROACH_H
```

8.12 src/include/basic_tower.h File Reference

```
#include <QMessageBox>
#include "tower.h"
```

Classes

- class BasicTower

8.13 basic_tower.h

Go to the documentation of this file.

```
1 #ifndef BASIC_TOWER_H
2 #define BASIC_TOWER_H
3 #include <QMessageBox>
4
5 #include "tower.h"
6
7 class BasicTower : public Tower{
8     Q_OBJECT
9 public:
10     BasicTower(QGraphicsItem * parent = 0);
11 public slots:
12     void AcquireTarget();
13 };
14
15 #endif // BASIC_TOWER_H
```

8.14 src/include/build_basic_tower_icon.hpp File Reference

```
#include <QGraphicsPixmapItem>
#include <QGraphicsSceneMouseEvent>
```

Classes

- class BuildBasicTowerIcon

8.15 build_basic_tower_icon.hpp

Go to the documentation of this file.

```
1 #ifndef BUILD_BASIC_TOWER_ICON_HPP
2 #define BUILD_BASIC_TOWER_ICON_HPP
3
4 #include <QGraphicsPixmapItem>
5 #include <QGraphicsSceneMouseEvent>
6
7 class BuildBasicTowerIcon: public QGraphicsPixmapItem{
8 public:
9
10     // pass the image path, pass it price
11     BuildBasicTowerIcon(QGraphicsItem *parent=0);
12     void mousePressEvent(QGraphicsSceneMouseEvent *event);
13
14
15 private:
16     int price;
17 };
18
19 #endif // BUILD_BASIC_TOWER_ICON_HPP
```

8.16 src/include/build_machine_gun_tower_icon.hpp File Reference

```
#include <QGraphicsPixmapItem>
#include <QGraphicsSceneMouseEvent>
```

Classes

- class BuildMachineGunTowerIcon

8.17 build_machine_gun_tower_icon.hpp

Go to the documentation of this file.

```
1 #ifndef BUILD_MACHINE_GUN_TOWER_ICON_HPP
2 #define BUILD_MACHINE_GUN_TOWER_ICON_HPP
3
4 #include <QGraphicsPixmapItem>
5 #include <QGraphicsSceneMouseEvent>
6
7 class BuildMachineGunTowerIcon: public QGraphicsPixmapItem{
8 public:
9     BuildMachineGunTowerIcon(QGraphicsItem *parent=0);
10     void mousePressEvent(QGraphicsSceneMouseEvent *event);
11 };
12
13 #endif // BUILD_MACHINE_GUN_TOWER_ICON_HPP
```

8.18 src/include/build_shotgun_tower_icon.hpp File Reference

```
#include <QGraphicsPixmapItem>
#include <QGraphicsSceneMouseEvent>
```

Classes

- class BuildShotgunTowerIcon

8.19 build_shotgun_tower_icon.hpp

Go to the documentation of this file.

```
1 #ifndef BUILD_SHOTGUN_TOWER_ICON_HPP
2 #define BUILD_SHOTGUN_TOWER_ICON_HPP
3
4 #include <QGraphicsPixmapItem>
5 #include <QGraphicsSceneMouseEvent>
6
7 class BuildShotgunTowerIcon: public QGraphicsPixmapItem{
8 public:
9     BuildShotgunTowerIcon(QGraphicsItem *parent=0);
10     void mousePressEvent(QGraphicsSceneMouseEvent *event);
11 };
12
13 #endif // BUILD_SHOTGUN_TOWER_ICON_HPP
```

8.20 src/include/bullet.h File Reference

```
#include <QGraphicsPixmapItem>
#include <QObject>
#include <QGraphicsItem>
#include <QGraphicsRectItem>
```

Classes

- class Bullet

8.21 bullet.h

Go to the documentation of this file.

```
1 #ifndef BULLET_H
2 #define BULLET_H
3
4 #include <QGraphicsPixmapItem>
5 #include <QObject>
6 #include <QGraphicsItem>
7 #include <QGraphicsRectItem>
8
9 class Bullet: public QObject, public QGraphicsPixmapItem{
10     Q_OBJECT
11 public:
12     Bullet(int damage, double range);
13     ~Bullet();
14     int GetDamage(){return damage_;}
15 public slots:
16     void move();
17     double get_max_range(); // rest could be in public
18     double get_distance_travelled();
19     void set_distance_travelled(double distance);
20
21 private:
22     double max_range;
23     double distance_travelled;
24     int damage_;
25 };
26
27 #endif // BULLET_H
```

8.22 src/include/child_cockroach.h File Reference

```
#include "cockroach.h"
```

Classes

- class Child_cockroach

8.23 child_cockroach.h

Go to the documentation of this file.

```
1 #ifndef CHILD_COCKROACH_H
2 #define CHILD_COCKROACH_H
3
4 #include "cockroach.h"
5
6 class Child_cockroach : public Cockroach
7 {
8 public:
9     Child_cockroach(int health, int speed, int value, QList<QPointF> pointsToFollow, int posit_index,
      QPointF q_offset, QGraphicsItem *parent = 0);
10
11 private:
12     void StartBehindDestination(QPointF);
13     void GotHit(int damage);
14 };
15
16 #endif // CHILD_COCKROACH_H
```

8.24 src/include/cockroach.h File Reference

```
#include <QGraphicsPixmapItem>
#include <QGraphicsPolygonItem>
#include <QGraphicsItem>
#include <QPointF>
#include <QObject>
#include <QList>
```

Classes

- class Cockroach

8.25 cockroach.h

Go to the documentation of this file.

```
1 #ifndef COCKROACH_H
2 #define COCKROACH_H
3
4 #include <QGraphicsPixmapItem>
5 #include <QGraphicsPolygonItem>
6 #include <QGraphicsItem>
7 #include <QPointF>
8 #include <QObject>
9 #include <QList>
10
11 class Cockroach : public QObject, public QGraphicsPixmapItem
12 {
13     Q_OBJECT
14 public:
15     // rule of three: default constructor, destructor, denied copy
16     Cockroach() = default;
17     Cockroach(int health, int speed,
18               int value, QList<QPointF> pointsToFollow,
19               QGraphicsItem *parent = 0);
20     Cockroach(const Cockroach &Coch) = delete;
21     Cockroach &operator=(Cockroach &coch) = delete;
22     ~Cockroach() = default;
23
24     int GetValue() const;
25     int GetHealth() const;
26     int GetSpeed() const;
27     int GetDestIndex() const;
28     QPointF GetDest() const { return dest_; }
29     QList<QPointF> GetPointList() const { return points_; }
30
31 public slots:
32     virtual void Move();
33     virtual void GotHit(int damage);
34
35 protected:
36     QList<QPointF> points_;
37     QPointF dest_;
38     int destList_index_;
39     int health_;
40     int speed_;
41     int value_;
42     double dx;
43     double dy;
44     int assB;
45     qreal variant_ = 0;
46     QTimer *timer_ = nullptr;
47     QList<QGraphicsItem *> colliding_items;
48
49     void PreventCollide();
50     void PreventCollidedToCocsh();
51     void PreventOutOfBoundry();
52     void BounceToWall();
53
54     void WalkTo(QPointF);
55     bool IsDead();
56     int RotateToPoint(QPointF p);
57 };
58
59 #endif // COCKROACH_H
```

8.26 src/include/game.hpp File Reference

```
#include <QGraphicsView>
#include <QGraphicsRectItem>
#include <QGraphicsPixmapItem>
#include <QColor>
#include <QObject>
#include <QTimer>
#include <QPushButton>
#include <QMouseEvent>
#include <QDebug>
#include <QMessageBox>
#include <QGraphicsTextItem>
#include "tower.h"
#include "wallet.hpp"
#include "build_basic_tower_icon.hpp"
#include "build_machine_gun_tower_icon.hpp"
#include "build_shotgun_tower_icon.hpp"
```

Classes

- class Game

Macros

- #define G 1 /** Ground tile*/
- #define R 2 /** Road tile */
- #define A 3 /** Shop tile*/
- #define B 4 /** Basic tower tile */
- #define M 5 /** Machine gun tower tile */
- #define S 6 /** Machine gun tower tile */
- #define E 7 /** Elon icon tile */
- #define W 8 /** Wallet icon tile */
- #define D 9 /** Done button tile */
- #define X 10 /** Exit tile */
- #define L 11 /** Currnent Level info tile */
- #define C 12 /** Current wave info tile */

8.26.1 Macro Definition Documentation

8.26.1.1 A

```
#define A 3 /** Shop tile*/
```

8.26.1.2 B

```
#define B 4 /** Basic tower tile */
```

8.26.1.3 C

```
#define C 12 /** Current wave info tile */
```

8.26.1.4 D

```
#define D 9 /** Done button tile */
```

8.26.1.5 E

```
#define E 7 /** Elon icon tile */
```

8.26.1.6 G

```
#define G 1 /** Ground tile*/
```

8.26.1.7 L

```
#define L 11 /** Currnent Level info tile */
```

8.26.1.8 M

```
#define M 5 /** Machine gun tower tile */
```

8.26.1.9 R

```
#define R 2 /** Road tile */
```

8.26.1.10 S

```
#define S 6 /** Machine gun tower tile */
```

8.26.1.11 W

```
#define W 8 /** Wallet icon tile */
```

8.26.1.12 X

```
#define X 10 /** Exit tile */
```

8.27 game.hpp

Go to the documentation of this file.

```
1 #ifndef GAME_H
2 #define GAME_H
3
4 #include <QGraphicsView>
5 #include <QGraphicsRectItem>
6 #include <QGraphicsView>
7 #include <QGraphicsPixmapItem>
8 #include <QColor>
9 #include <QObject>
10 #include <QTimer>
11 #include <QPushButton>
12 #include <QMouseEvent>
13 #include <QDebug>
14 #include <QMessageBox>
15 #include <QGraphicsTextItem>
16
17
18 #include "tower.h"
19 #include "wallet.hpp"
20 #include "build_basic_tower_icon.hpp"
21 #include "build_machine_gun_tower_icon.hpp"
22 #include "build_shotgun_tower_icon.hpp"
23
24 // #include <queue>
25
26 #define G 1
27 #define R 2
28 #define A 3
29 #define B 4
30 #define M 5
31 #define S 6
32 #define E 7
33 #define W 8
34 #define D 9
35 #define X 10
36 #define L 11
37 #define C 12
40 class Game : public QGraphicsView, public Wallet
41 {
42     Q_OBJECT
43 public:
44     Game(int tile_width, int tile_height, int player_balance);
45     ~Game();
46
47     QGraphicsScene *scene;
48     QGraphicsView *view;
49     QGraphicsPixmapItem *cursor;
50     Tower *building;
51     QTimer *SpawnChildTimer;
```

```
52      QTimer *SpawnAdultTimer;
53      QTimer *SpawnMotherTimer;
54      QTimer *WaveCheckTimer;
55      QTimer *BalanceUpdateTimer;
56      QList<QPointF> pointsToFollow;
57      QPushButton *done_button;
58      QMessageBox *WaveCompleteMsgBox;
59      QMessageBox *GameOverMsgBox;
60      QMessageBox *LevelCompleteMsgBox;
61      QGraphicsTextItem *CurrentBalanceText;
62
63      BuildBasicTowerIcon *basic_tower_icon;
64      BuildMachineGunTowerIcon *machine_gun_tower_icon;
65      BuildShotgunTowerIcon *shotgun_tower_icon;
66
67      int child_killed;
68      int adult_killed;
69      int mother_killed;
70
71      int child_spawmed;
72      int adult_spawmed;
73      int mother_spawmed;
74      int spawn_interval;
75      int total_spawned;
76
77      bool game_over_flag = false;
78      void createEnemies(int child_ammount, int adult_ammount, int mother_ammount, int interval);
79      void setCursor(QString filename);
80      void mouseMoveEvent(QMouseEvent *event);
81      void mousePressEvent(QMouseEvent *event);
82
83      void LevelTwo();
84
85  public slots:
86  //    void spawnEnemy();
87      void SpawnChild();
88      void SpawnAdult();
89      void SpawnMother();
90
91      void StartWave();
92      void IsWaveComplete();
93      void WaveComplete();
94      void WaitForPlayer();
95      void ResetLevel();
96      void CreateNewLevel();
97      void UpdateBalance();
98
99  signals:
100     void StartNextWave(void);
101     void GameOver(void);
102
103 private:
104     QList<QPointF> enemy_path_;
105     std::vector<std::vector<std::pair<int, QPointF>> map_info_;
106     std::vector<std::vector<std::vector<int>> game_level_map_layouts_;
107     std::vector<std::vector<std::vector<int>> levels_;
108     int current_wave_ = 0;
109     int current_level_ = 0;
110     int wave_left_ = 5;
111     int tile_width_;
112     int tile_height_;
113     int start_balance_;
114
115     void BuildMap(std::vector<std::vector<int> &map_layout);
116     void GenerateEnemyPath(int start_cell_x_pos, int start_cell_y_pos);
117     void DrawEnemyPath(QList<QPointF> &path);
118     void InitializeGameMaplayout();
119     void InitializeLevelInfo();
120 };
121
122 #endif //GAME_H
```

8.28 src/include/item_not_placeble_tile.h File Reference

```
#include <QGraphicsPixmapItem>
```

Classes

- class ItemNotPlacebleTile

8.29 item_not_placeble_tile.h

Go to the documentation of this file.

```
1 #ifndef ITEM_NOT_PLACEBLE_TILE_H
2 #define ITEM_NOT_PLACEBLE_TILE_H
3
4 #include <QGraphicsPixmapItem>
5
6 class ItemNotPlacebleTile : public QObject, public QGraphicsPixmapItem
7 {
8     Q_OBJECT
9 public:
10     ItemNotPlacebleTile(QString file_path, int width, int heigth, QPointF coord);
11     virtual ~ItemNotPlacebleTile() {}
12 };
13
14 #endif // ITEM_NOT_PLACEBLE_TILE_H
```

8.30 src/include/item_placeble_tile.h File Reference

```
#include <QGraphicsPixmapItem>
```

Classes

- class ItemPlacebleTile

8.31 item_placeble_tile.h

Go to the documentation of this file.

```
1 #ifndef ITEM_PLACEBLE_TILE_H
2 #define ITEM_PLACEBLE_TILE_H
3
4 #include <QGraphicsPixmapItem>
5
6 class ItemPlacebleTile : public QObject, public QGraphicsPixmapItem
7 {
8     Q_OBJECT
9 public:
10     ItemPlacebleTile(QString file_path, int width, int heigth, QPointF coord);
11     virtual ~ItemPlacebleTile() {}
12 };
13
14 #endif // ITEM_PLACEBLE_TILE_H
15
```

8.32 src/include/machine_gun_tower.h File Reference

```
#include "tower.h"
```

Classes

- class MachineGunTower

8.33 machine_gun_tower.h

Go to the documentation of this file.

```
1 #ifndef MACHINE_GUN_TOWER_H
2 #define MACHINE_GUN_TOWER_H
3
4 #include "tower.h"
5
6 class MachineGunTower : public Tower{
7     Q_OBJECT
8 public:
9     MachineGunTower(QGraphicsItem * parent = 0);
10     void Fire();
11 public slots:
12     void AcquireTarget();
13 };
14
15 #endif // MACHINE_GUN_TOWER_H
```

8.34 src/include/mainwindow.h File Reference

```
#include <QMainWindow>
#include <QStackedWidget>
```

Classes

- class MainWindow

Namespaces

- namespace Ui

8.35 mainwindow.h

Go to the documentation of this file.

```
1 #ifndef MAINWINDOW_H
2 #define MAINWINDOW_H
3
4 #include <QMainWindow>
5 #include <QStackedWidget>
6
7 QT_BEGIN_NAMESPACE
8 namespace Ui { class MainWindow; }
9 QT_END_NAMESPACE
10
11 class MainWindow : public QMainWindow
12 {
13     Q_OBJECT
14
15 public:
16     MainWindow(QWidget *parent = nullptr);
17     ~MainWindow();
18
19 public slots:
20     void start_on_click();
21
22 private:
23     Ui::MainWindow *ui;
24     QStackedWidget *wds;
25 };
26 #endif // MAINWINDOW_H
```

8.36 src/include/mother_cockroach.h File Reference

```
#include "cockroach.h"
```

Classes

- class Mother_cockroach

8.37 mother_cockroach.h

Go to the documentation of this file.

```
1 #ifndef MOTHER_COCKROACH_H
2 #define MOTHER_COCKROACH_H
3
4 #include "cockroach.h"
5
6 class Mother_cockroach:public Cockroach{
7 public:
8     Mother_cockroach(int health, int speed, int value, int child_health, int child_speed, int child_value,
       QList<QPointF>pointsToFollow,
9                      QGraphicsItem *parent = 0);
10 private:
11     void Split();
12     void GotHit(int);
13     int child_health_;
14     int child_speed_;
15     int child_value_;
16
17 };
18
19
20 #endif // MOTHER_COCKROACH_H
```

8.38 src/include/pellet.h File Reference

```
#include "bullet.h"
```

Classes

- class Pellet

8.39 pellet.h

Go to the documentation of this file.

```
1 #ifndef PELLET_H
2 #define PELLET_H
3
4 #include "bullet.h"
5
6 class Pellet : public Bullet{
7     Q_OBJECT
8 public:
9     Pellet(QGraphicsItem *parent = 0);
10
11 };
12
13 #endif // PELLET_H
```

8.40 src/include/shotgun_tower.h File Reference

```
#include "tower.h"
```

Classes

- class ShotgunTower

8.41 shotgun_tower.h

Go to the documentation of this file.

```
1 #ifndef SHOTGUN_TOWER_H
2 #define SHOTGUN_TOWER_H
3
4 #include "tower.h"
5
6 class ShotgunTower : public Tower{
7     Q_OBJECT
8 public:
9     ShotgunTower(QGraphicsItem * parent = 0);
10     void Fire();
11 public slots:
12     void AcquireTarget();
13 };
14
15 #endif // SHOTGUN_TOWER_H
```

8.42 src/include/tower.h File Reference

```
#include <QGraphicsPixmapItem>
#include <QGraphicsRectItem>
#include <QGraphicsPolygonItem>
#include <QGraphicsItem>
#include <QPointF>
#include <QObject>
```

Classes

- class Tower

8.43 tower.h

Go to the documentation of this file.

```
1 #ifndef TOWER_H
2 #define TOWER_H
3
4 #include <QGraphicsPixmapItem>
5 #include <QGraphicsRectItem>
6 #include <QGraphicsPolygonItem>
7 #include <QGraphicsItem>
8 #include <QPointF>
9 #include <QObject>
10
```

```
11
12
13 class Tower : public QObject, public QGraphicsPixmapItem{
14     Q_OBJECT
15 public:
16     Tower(QGraphicsItem * parent = 0);
17     double DistanceTo(QGraphicsItem * item);
18     virtual void Fire();
19     void RotateTowardsEnemy(int angle);
20
21     void SetCenterPoint(QPointF center_point);
22     QPointF GetCenterPoint();
23     void SetBarrelLenght(int lenght);
24     int GetBarrelLenght();
25     void CreateAreaOfEffect(int scale_factor);
26 public slots:
27     virtual void AcquireTarget();
28 protected:
29     QGraphicsPolygonItem * area_of_effect;
30     QPointF target;
31     bool has_target;
32     QPointF center;
33     int barrel_lenght;
34
35 private:
36     //implement copy contructor and copy assingment overload here
37 };
38 #endif // TOWER_H
```

8.44 src/include/wallet.hpp File Reference

```
#include <QGraphicsTextItem>
```

Classes

- class Wallet

8.45 wallet.hpp

Go to the documentation of this file.

```
1 #ifndef WALLET_HPP
2 #define WALLET_HPP
3
4 #include <QGraphicsTextItem>
5
6 class Wallet
7 {
8 public:
9     Wallet(int ammount);
10     void Deposit(int ammount);
11     bool Withdraw(int ammount);
12     int  GetBalance() const;
13     void SetNewBalance(int ammount);
14 private:
15     int balance_;
16 };
17
18 #endif // WALLET_HPP
```

8.46 src/item_not_placeble_tile.cpp File Reference

```
#include <item_not_placeble_tile.h>
```

8.47 src/item_placeble_tile.cpp File Reference

```
#include "item_placeble_tile.h"
```

8.48 src/machine_gun_tower.cpp File Reference

```
#include "machine_gun_tower.h"
#include "bullet.h"
#include "game.hpp"
#include "QTimer"
#include "cockroach.h"
```

Variables

- Game * game

  Constructs bullet.

8.48.1 Variable Documentation

8.48.1.1 game

```
Game* game  [extern]
```

Constructs bullet.

Parameters

damage	Sets the damage value of the bullet
range	Sets the range of the bullet

Returns

None

8.49 src/main.cpp File Reference

```
#include "mainwindow.h"
#include <QApplication>
#include <QDebug>
```

Functions

- int main (int argc, char ∗argv[ ])

8.49.1 Function Documentation

8.49.1.1 main()

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

8.50 src/mainwindow.cpp File Reference

```
#include "mainwindow.h"
#include "./ui_mainwindow.h"
#include "game.hpp"
#include <QDebug>
```

Variables

- Game ∗ game

  Constructs bullet.

8.50.1 Variable Documentation

8.50.1.1 game

```
Game* game
```

Constructs bullet.

Parameters

damage	Sets the damage value of the bullet
range	Sets the range of the bullet

Returns

None

8.51 src/mother_cockroach.cpp File Reference

```
#include "mother_cockroach.h"
#include <QTimer>
#include <QPixmap>
#include <QtDebug>
#include <QLineF>
#include <QWidget>
#include <QPolygonF>
#include <QPen>
#include <QDebug>
#include <stdlib.h>
#include "child_cockroach.h"
#include "game.hpp"
```

Variables

- Game * game

  Constructs bullet.

8.51.1 Variable Documentation

8.51.1.1 game

```
Game* game  [extern]
```

Constructs bullet.

Parameters

damage	Sets the damage value of the bullet
range	Sets the range of the bullet

Returns

None

8.52 src/pellet.cpp File Reference

```
#include "pellet.h"
```

8.53 src/readme.md File Reference

8.54 src/shotgun_tower.cpp File Reference

```
#include "shotgun_tower.h"
#include "bullet.h"
#include <QTimer>
#include "game.hpp"
#include <stdlib.h>
#include <QDebug>
#include "cockroach.h"
#include "pellet.h"
```

Variables

- Game * game

  Constructs bullet.

8.54.1 Variable Documentation

8.54.1.1 game

```
Game* game  [extern]
```

Constructs bullet.

Parameters

damage	Sets the damage value of the bullet
range	Sets the range of the bullet

Returns

None

8.55 src/tower.cpp File Reference

```
#include <QVector>
#include <QPointF>
#include <QPolygonF>
#include <QLineF>
#include "bullet.h"
#include "tower.h"
```

```
#include <QTimer>
#include <QGraphicsRectItem>
#include "game.hpp"
#include <QDebug>
#include <QPixmap>
#include <QGraphicsItem>
#include "cockroach.h"
```

Variables

- Game * game

  Constructs bullet.

8.55.1 Variable Documentation

8.55.1.1 game

```
Game* game  [extern]
```

Constructs bullet.

Parameters

damage	Sets the damage value of the bullet
range	Sets the range of the bullet

Returns

None

8.56 src/wallet.cpp File Reference

```
#include "wallet.hpp"
#include <QFont>
```

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