Space Defender

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Chapter 1

Todo List

Class Bomb

Add Bomb to the game

Member Bomb::fireWeapon (SpaceDefender &window) override

Add this function

Class Laser

Add Laser to the game

Member Laser::fireWeapon (SpaceDefender &window) override

Add this function

Member ScreenHighscore::draw (SpaceDefender &window) override

Add highscores to the screen that is read from a json file

Member ScreenSettings::draw (SpaceDefender &window) override

Add settings to the screen

Member SpaceDefender::SpaceDefender (TDT4102::Point position={100, 100}, int width=600, int height=800, const std::string &title="Space Defender")

Fix how enemies spawn

Need dynamic

Member SpaceShipEnemy::movements (SpaceDefender &window) override

Fix the movement of the enemy

Member SpaceShipEnemy::shooting (SpaceDefender &window) override

Fix shooting of the enemy

Member SpaceShipPlayer::shooting (SpaceDefender &window) override

Only bullets are fired, consider making it more general. For example having a set weapon type

Add weapon delay

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

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

TDT4102::AnimationWindow
- SpaceDefender . . . 18

Screen . . . 13
- ScreenGame . . . 14
- ScreenHighscore . . . 15
- ScreenMenu . . . 16
- ScreenSettings . . . 17

SpaceShip . . . 21
- SpaceShipEnemy . . . 23
- SpaceShipPlayer . . . 25

Weapon . . . 27
- Bomb . . . 9
- Bullet . . . 10
- Laser . . . 12

Chapter 3

Class Index

3.1 Class List

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

Bomb
: Class for Bomb. Inherits from Weapon . . . 9

Bullet
: Class for Bullet. Inherits from Weapon . . . 10

Laser
: Class for Laser. Inherits from Weapon . . . 12

Screen
: Abstract base class for different screens . . . 13

ScreenGame
: The game screen . . . 14

ScreenHighscore
: The highscore screen . . . 15

ScreenMenu
: The menu screen . . . 16

ScreenSettings
: The settings screen . . . 17

SpaceDefender
: The main game class which runs the game. Uses AnimationWindow as base class . . . 18

SpaceShip
: Abstract base class for different spaceships . . . 21

SpaceShipEnemy
: Class for enemy ship . . . 23

SpaceShipPlayer
: Class for player ship . . . 25

Weapon
: Abstract base class for different weapons . . . 27

Chapter 4

File Index

4.1 File List

Here is a list of all documented files with brief descriptions:

main.cpp
    Main file 31
Screen.cpp
    The cpp file for the Screen class 32
Screen.h
    The header file for the Screen class 32
SpaceDefender.cpp
    The cpp file for the SpaceDefender class 34
SpaceDefender.h
    The header file for the SpaceDefender class 34
SpaceShip.cpp
    The cpp file for the SpaceShip class 36
SpaceShip.h
    The header file for the SpaceShip class 36
Weapon.cpp
    The cpp file for the Weapon class 38
Weapon.h
    The header file for the Weapon class 38

Chapter 5

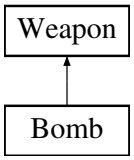
Class Documentation

5.1 Bomb Class Reference

Class for Bomb. Inherits from Weapon.

`#include <Weapon.h>`

Inheritance diagram for Bomb:



Public Member Functions

- **Bomb** (int speed, int damage)
- void fireWeapon (SpaceDefender &window) override

Public Member Functions inherited from Weapon

- Weapon (int speed, int damage)
- virtual ~Weapon ()=default
- int getSpeed ()
- int getDamage ()
- virtual void move ()
- virtual void draw (SpaceDefender &window)=0

Additional Inherited Members

Protected Attributes inherited from Weapon

- int **speed**
- int **damage**
- int **xProjectile**
- int **yProjectile**

5.1.1 Detailed Description

Class for Bomb. Inherits from Weapon.

Todo Add Bomb to the game

5.1.2 Member Function Documentation

5.1.2.1 fireWeapon()

```
void Bomb::fireWeapon (
            SpaceDefender & window)  [override], [virtual]
```

Todo Add this function

Parameters

window	

Implements Weapon.

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

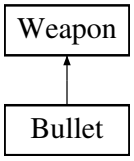
- Weapon.h
- Weapon.cpp

5.2 Bullet Class Reference

Class for Bullet. Inherits from Weapon.

```
#include <Weapon.h>
```

Inheritance diagram for Bullet:



Public Member Functions

- **Bullet** (int speed, int damage)
- void fireWeapon (SpaceDefender &window) override

  Fire the weapon.
- void draw (SpaceDefender &window) override

  Draw the bullet on the screen.

Public Member Functions inherited from Weapon

- Weapon (int speed, int damage)
- virtual ~Weapon ()=default
- int getSpeed ()
- int getDamage ()
- virtual void move ()

Additional Inherited Members

Protected Attributes inherited from Weapon

- int **speed**
- int **damage**
- int **xProjectile**
- int **yProjectile**

5.2.1 Detailed Description

Class for Bullet. Inherits from Weapon.

Parameters

radius	Radius of the bullet

5.2.2 Member Function Documentation

5.2.2.1 draw()

```
void Bullet::draw (
            SpaceDefender & window)  [override], [virtual]
```

Draw the bullet on the screen.

Parameters

window	SpaceDefender object
radius	Radius of the bullet
location	Location of the bullet. Updated in Bullet::fireWeapon(SpaceDefender& window)

Implements Weapon.

5.2.2.2 fireWeapon()

```
void Bullet::fireWeapon (
            SpaceDefender & window)  [override], [virtual]
```

Fire the weapon.

Sets the position of the projectile to the position of the player. The movement of the projectile is handled in Bullet::move().

Parameters

window	SpaceDefender object
xProjectile	Position of the projectile in the x-axis
yProjectile	Position of the projectile in the y-axis

Implements Weapon.

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

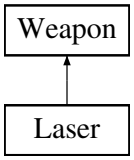
- Weapon.h
- Weapon.cpp

5.3 Laser Class Reference

Class for Laser. Inherits from Weapon.

`#include <Weapon.h>`

Inheritance diagram for Laser:



Public Member Functions

- **Laser** (int speed, int damage)
- void fireWeapon (SpaceDefender &window) override

Public Member Functions inherited from Weapon

- Weapon (int speed, int damage)
- virtual ~Weapon ()=default
- int getSpeed ()
- int getDamage ()
- virtual void move ()
- virtual void draw (SpaceDefender &window)=0

Additional Inherited Members

Protected Attributes inherited from Weapon

- int **speed**
- int **damage**
- int **xProjectile**
- int **yProjectile**

5.3.1 Detailed Description

Class for Laser. Inherits from Weapon.

Todo Add Laser to the game

5.3.2 Member Function Documentation

5.3.2.1 fireWeapon()

```
void Laser::fireWeapon (
            SpaceDefender & window)  [override], [virtual]
```

Todo Add this function

Parameters

window	

Implements Weapon.

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

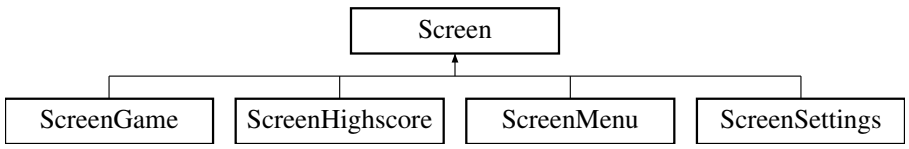
- Weapon.h
- Weapon.cpp

5.4 Screen Class Reference

Abstract base class for different screens.

`#include <Screen.h>`

Inheritance diagram for Screen:



Public Member Functions

- virtual ~Screen ()=default
- virtual void draw (SpaceDefender &window)=0

5.4.1 Detailed Description

Abstract base class for different screens.

Parameters

window	SpaceDefender object

5.4.2 Constructor & Destructor Documentation

5.4.2.1 ~Screen()

```
virtual Screen::~Screen ()  [virtual], [default]
```

Virtual destructor to ensure proper cleanup

5.4.3 Member Function Documentation

5.4.3.1 draw()

```
virtual void Screen::draw (
            SpaceDefender & window)  [pure virtual]
```

Pure virtual function. Is supposed to draw the screen

Implemented in ScreenGame, ScreenHighscore, ScreenMenu, and ScreenSettings.

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

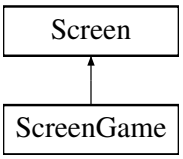
- Screen.h

5.5 ScreenGame Class Reference

The game screen.

```
#include <Screen.h>
```

Inheritance diagram for ScreenGame:



Public Member Functions

- void draw (SpaceDefender &window) override

  Draws the screencontent of the Game.

Public Member Functions inherited from Screen

- virtual ~Screen ()=default

5.5.1 Detailed Description

The game screen.

5.5.2 Member Function Documentation

5.5.2.1 draw()

```
void ScreenGame::draw (
            SpaceDefender & window)  [override], [virtual]
```

Draws the screencontent of the Game.

Draws and updates, enemie ships, the player ship and fired weapons.

Parameters

window	SpaceDefender object

Implements Screen.

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

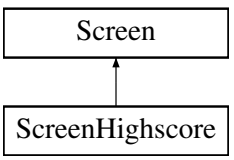
- Screen.h
- Screen.cpp

5.6 ScreenHighscore Class Reference

The highscore screen.

```
#include <Screen.h>
```

Inheritance diagram for ScreenHighscore:



Public Member Functions

- void draw (SpaceDefender &window) override

  Draws the screencontent of the Highscore.

Public Member Functions inherited from Screen

- virtual ~Screen ()=default

5.6.1 Detailed Description

The highscore screen.

5.6.2 Member Function Documentation

5.6.2.1 draw()

```
void ScreenHighscore::draw (
            SpaceDefender & window)  [override], [virtual]
```

Draws the screencontent of the Highscore.

Draws the highscore screen, and show the back button.

Todo Add highscores to the screen that is read from a json file

Parameters

window	SpaceDefender object

Implements Screen.

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

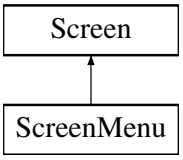
- Screen.h
- Screen.cpp

5.7 ScreenMenu Class Reference

The menu screen.

```
#include <Screen.h>
```

Inheritance diagram for ScreenMenu:



Public Member Functions

- void draw (SpaceDefender &window) override

  Draws the screencontent of the Menu.

Public Member Functions inherited from Screen

- virtual ~Screen ()=default

5.7.1 Detailed Description

The menu screen.

5.7.2 Member Function Documentation

5.7.2.1 draw()

```
void ScreenMenu::draw (
            SpaceDefender & window)  [override], [virtual]
```

Draws the screencontent of the Menu.

Draws the menu screen where it shows all the buttons exept the back button.

Parameters

window	SpaceDefender object

Implements Screen.

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

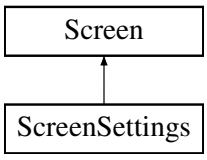
- Screen.h
- Screen.cpp

5.8 ScreenSettings Class Reference

The settings screen.

```
#include <Screen.h>
```

Inheritance diagram for ScreenSettings:



Public Member Functions

- void draw (SpaceDefender &window) override

  Draws the screencontent of the Settings.

Public Member Functions inherited from Screen

- virtual ~Screen ()=default

5.8.1 Detailed Description

The settings screen.

5.8.2 Member Function Documentation

5.8.2.1 draw()

```
void ScreenSettings::draw (
            SpaceDefender & window)  [override], [virtual]
```

Draws the screencontent of the Settings.

Draws the settings screen, where you can change the game settings

Todo Add settings to the screen

Parameters

window	SpaceDefender object

Implements Screen.

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

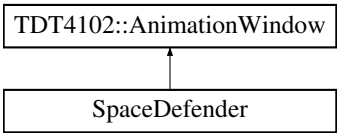
- Screen.h
- Screen.cpp

5.9 SpaceDefender Class Reference

The main game class which runs the game. Uses AnimationWindow as base class.

`#include <SpaceDefender.h>`

Inheritance diagram for SpaceDefender:



Public Member Functions

- SpaceDefender (TDT4102::Point position={100, 100}, int width=600, int height=800, const std::string &title="Space Defender")

  Construct a new SpaceDefender::SpaceDefender object.
- void setScreen (std::unique_ptr< Screen > newScreen)

  Set the current screen.
- void run ()

  Game loop that runs the game until the window is closed.

Public Attributes

- TDT4102::Button **StartGameBtn**
- TDT4102::Button **HighscoresBtn**
- TDT4102::Button **SettingsBtn**
- TDT4102::Button **EndGameBtn**
- TDT4102::Button **GoToMenuBtn**
- SpaceShipPlayer **playerShip**
- std::vector< SpaceShipEnemy > **enemyShips**
- std::vector< std::unique_ptr< Weapon > > **firedWeapons**

5.9.1 Detailed Description

The main game class which runs the game. Uses AnimationWindow as base class.

Parameters

currentScreen	Pointer to the current screen
btnWidth	Width of the buttons. Relative to window width
btnHeight	Height of the buttons. Relative to window height
playerShip	PlayerShip object
enemyShips	Vector of EnemyShip objects
firedWeapons	Vector of Weapon objects

5.9.2 Constructor & Destructor Documentation

5.9.2.1 SpaceDefender()

```
SpaceDefender::SpaceDefender (
            TDT4102::Point position = {100, 100},
            int width = 600,
            int height = 800,
            const std::string & title = "Space Defender")
```

Construct a new SpaceDefender::SpaceDefender object.

Parameters

position	Position of where the window starts in upper left corner

width	The width of the window
height	The height of the window
title	The title of the window
numEnemiesHeight	The number of enemies in the height of the window
numEnemiesWidth	The number of enemies in the width of the window

Todo Fix how enemies spawn

Todo Need dynamic

5.9.3 Member Function Documentation

5.9.3.1 run()

```
void SpaceDefender::run ()
```

Game loop that runs the game until the window is closed.

Updates the game state and draws the current screen

Parameters

currentScreen	Draws the current screen as long as its not a null pointer

5.9.3.2 setScreen()

```
void SpaceDefender::setScreen (
            std::unique_ptr< Screen > newScreen)
```

Set the current screen.

Replaces the current screen with std::move(newScreen) of the unique_ptr<Screen>

Parameters

newScreen	The new screen that we want to point to
currentScreen	The current screen that the pointer points to

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

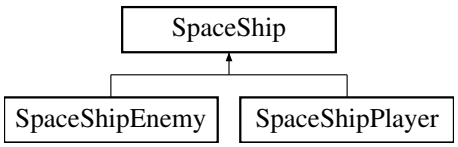
- SpaceDefender.h
- SpaceDefender.cpp

5.10 SpaceShip Class Reference

Abstract base class for different spaceships.

`#include <SpaceShip.h>`

Inheritance diagram for SpaceShip:



Public Member Functions

- SpaceShip (int startX, int startY, int startHealth)

  Constructor that initializes x, y and health.
- virtual ~SpaceShip ()=default
- virtual void movements (SpaceDefender &window)=0
- virtual void shooting (SpaceDefender &window)=0
- void healthReduction ()
- int getHealth () const
- int getPositionX () const
- int getPositionY () const
- int getShipHeight () const
- int getShipWidth () const
- void setShipSpeed (const int &newSpeed)

Protected Attributes

- int **x**
- int **y**
- int **health**
- const int **shipHeight** = 20
- const int **shipWidth** = 20
- int **shipSpeed**

5.10.1 Detailed Description

Abstract base class for different spaceships.

Parameters

window	SpaceDefender object
x	Position in the x-axis
y	Position in the y-axis
health	Health of the ship
shipHeight	Height of the ship
shipWidth	Width of the ship
shipSpeed	Speed of the ship

5.10.2 Constructor & Destructor Documentation

5.10.2.1 SpaceShip()

```
SpaceShip::SpaceShip (
            int startX,
            int startY,
            int startHealth)  [inline]
```

Constructor that initializes x, y and health.

Parameters

startX	
startY	
startHealth	

5.10.2.2 ~SpaceShip()

```
virtual SpaceShip::~SpaceShip ()  [virtual], [default]
```

Virtual destructor to ensure proper cleanup

5.10.3 Member Function Documentation

5.10.3.1 getHealth()

```
int SpaceShip::getHealth () const  [inline]
```

Getter for health

5.10.3.2 getPositionX()

```
int SpaceShip::getPositionX () const  [inline]
```

Getter for position in x-axis

5.10.3.3 getPositionY()

```
int SpaceShip::getPositionY () const  [inline]
```

Getter for position in y-axis

5.10.3.4 getShipHeight()

```
int SpaceShip::getShipHeight () const  [inline]
```

Getter for ship height

5.10.3.5 getShipWidth()

```
int SpaceShip::getShipWidth () const  [inline]
```

Getter for ship width

5.10.3.6 healthReduction()

```
void SpaceShip::healthReduction ()  [inline]
```

Reduces the health of the ship

5.10.3.7 movements()

```
virtual void SpaceShip::movements (
            SpaceDefender & window)  [pure virtual]
```

Pure virtual function. Is supposed to move the spaceship

Implemented in SpaceShipEnemy, and SpaceShipPlayer.

5.10.3.8 setShipSpeed()

```
void SpaceShip::setShipSpeed (
            const int & newSpeed)  [inline]
```

Setter for ship speed

5.10.3.9 shooting()

```
virtual void SpaceShip::shooting (
            SpaceDefender & window)  [pure virtual]
```

Pure virtual function. Is supposed do shooting

Implemented in SpaceShipEnemy, and SpaceShipPlayer.

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

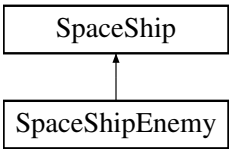
- SpaceShip.h

5.11 SpaceShipEnemy Class Reference

Class for enemy ship.

```
#include <SpaceShip.h>
```

Inheritance diagram for SpaceShipEnemy:



Public Member Functions

- **SpaceShipEnemy** (int startX, int startY)
- void movements (SpaceDefender &window) override

  Moves the spaceship of the enemy.
- void shooting (SpaceDefender &window) override

  Fires the weapon at some interval.

Public Member Functions inherited from SpaceShip

- SpaceShip (int startX, int startY, int startHealth)

  Constructor that initializes x, y and health.
- virtual ~SpaceShip ()=default
- void healthReduction ()
- int getHealth () const
- int getPositionX () const
- int getPositionY () const
- int getShipHeight () const
- int getShipWidth () const
- void setShipSpeed (const int &newSpeed)

Public Attributes

- TDT4102::Image **alienImage**

Additional Inherited Members

Protected Attributes inherited from SpaceShip

- int **x**
- int **y**
- int **health**
- const int **shipHeight** = 20
- const int **shipWidth** = 20
- int **shipSpeed**

5.11.1 Detailed Description

Class for enemy ship.

Parameters

alienImage	Image of the alienship

5.11.2 Member Function Documentation

5.11.2.1 movements()

```
void SpaceShipEnemy::movements (
            SpaceDefender & window)  [override], [virtual]
```

Moves the spaceship of the enemy.

Make a bullet, fire the and stores it in a vector

Parameters

window	SpaceDefender object

Todo Fix the movement of the enemy

Implements SpaceShip.

5.11.2.2 shooting()

```
void SpaceShipEnemy::shooting (
            SpaceDefender & window)  [override], [virtual]
```

Fires the weapon at some interval.

A random enenmy fires a bullet and stores it in a vector

Parameters

window	SpaceDefender object

Todo Fix shooting of the enemy

Implements SpaceShip.

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

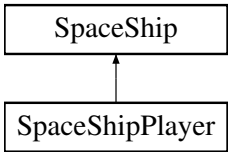
- SpaceShip.h
- SpaceShip.cpp

5.12 SpaceShipPlayer Class Reference

Class for player ship.

```
#include <SpaceShip.h>
```

Inheritance diagram for SpaceShipPlayer:



Public Member Functions

- **SpaceShipPlayer** (int startX, int startY)
- void movements (SpaceDefender &window) override

  Move the spaceship in x-axis using the arrow keys.
- void shooting (SpaceDefender &window) override

  Fires the weapon if the space key is pressed.

Public Member Functions inherited from SpaceShip

- SpaceShip (int startX, int startY, int startHealth)

  Constructor that initializes x, y and health.
- virtual ~SpaceShip ()=default
- void healthReduction ()
- int getHealth () const
- int getPositionX () const
- int getPositionY () const
- int getShipHeight () const
- int getShipWidth () const
- void setShipSpeed (const int &newSpeed)

Public Attributes

- TDT4102::Image **playerImage**

Additional Inherited Members

Protected Attributes inherited from SpaceShip

- int **x**
- int **y**
- int **health**
- const int **shipHeight** = 20
- const int **shipWidth** = 20
- int **shipSpeed**

5.12.1 Detailed Description

Class for player ship.

Parameters

playerImage	Image of the playership

5.12.2 Member Function Documentation

5.12.2.1 movements()

```
void SpaceShipPlayer::movements (
            SpaceDefender & window)  [override], [virtual]
```

Move the spaceship in x-axis using the arrow keys.

Parameters

window	SpaceDefender object
x	Position of the spaceship in the x-axis

Implements SpaceShip.

5.12.2.2 shooting()

```
void SpaceShipPlayer::shooting (
            SpaceDefender & window)  [override], [virtual]
```

Fires the weapon if the space key is pressed.

Fires a bullet, fire the and stores it in a vector

Parameters

window	SpaceDefender object
newBullet	Creates a new Bullet

Todo Only bullets are fired, consider making it more general. For example having a set weapon type
Add weapon delay

Implements SpaceShip.

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

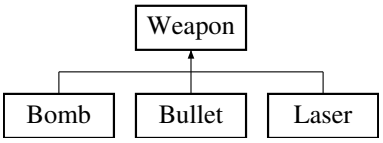
- SpaceShip.h
- SpaceShip.cpp

5.13 Weapon Class Reference

Abstract base class for different weapons.

```
#include <Weapon.h>
```

Inheritance diagram for Weapon:



Public Member Functions

- Weapon (int speed, int damage)
- virtual ~Weapon ()=default
- virtual void fireWeapon (SpaceDefender &window)=0
- int getSpeed ()
- int getDamage ()
- virtual void move ()
- virtual void draw (SpaceDefender &window)=0

Protected Attributes

- int **speed**
- int **damage**
- int **xProjectile**
- int **yProjectile**

5.13.1 Detailed Description

Abstract base class for different weapons.

Parameters

speed	Speed of the projectile
damage	Damage the projectile does
xProjectile	Position of the projectile in the x-axis
yProjectile	Position of the projectile in the y-axis
window	SpaceDefender object

5.13.2 Constructor & Destructor Documentation

5.13.2.1 Weapon()

```
Weapon::Weapon (
            int speed,
            int damage)  [inline]
```

Constructor that initializes speed and damage

5.13.2.2 ~Weapon()

```
virtual Weapon::~Weapon ()  [virtual], [default]
```

Virtual destructor to ensure proper cleanup

5.13.3 Member Function Documentation

5.13.3.1 draw()

```
virtual void Weapon::draw (
            SpaceDefender & window)  [pure virtual]
```

Pure virtual function. Is supposed to draw the projectile

Implemented in Bullet.

5.13.3.2 fireWeapon()

```
virtual void Weapon::fireWeapon (
            SpaceDefender & window)  [pure virtual]
```

Pure virtual function. Is supposed to fire the projectile, aka get the postion when fired.

Implemented in Bomb, Bullet, and Laser.

5.13.3.3 getDamage()

```
int Weapon::getDamage ()  [inline]
```

Getter for damage

5.13.3.4 getSpeed()

```
int Weapon::getSpeed ()  [inline]
```

Getter for speed

5.13.3.5 move()

```
virtual void Weapon::move ()  [inline], [virtual]
```

Move the projectile in y-axis

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

- Weapon.h

Chapter 6

File Documentation

6.1 main.cpp File Reference

Main file.

```
#include "std_lib_facilities.h"
#include "SpaceDefender.h"
```

Functions

- int main ()
  Starts the game.

6.1.1 Detailed Description

Main file.

Author

Tor Gunnar Ravatn Hammer (tor.ravatn@gmail.com)
Gabriel Anton Norheim ()

Version

1.0

Date

2025-04-01

Copyright

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6.1.2 Function Documentation

6.1.2.1 main()

```
int main ()
```

Starts the game.

Parameters

game	SpaceDefender object

Returns

Returns 0 on success

6.2 Screen.cpp File Reference

The cpp file for the Screen class.

```
#include "Screen.h"
#include "SpaceDefender.h"
```

6.2.1 Detailed Description

The cpp file for the Screen class.

Author

Tor Gunnar Ravatn Hammer (tor.ravatn@gmail.com)

Version

1.0

Date

2025-04-01

Copyright

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6.3 Screen.h File Reference

The header file for the Screen class.

Classes

- class Screen

  Abstract base class for different screens.
- class ScreenMenu

  The menu screen.
- class ScreenGame

  The game screen.
- class ScreenHighscore

  The highscore screen.
- class ScreenSettings

  The settings screen.

6.3.1 Detailed Description

The header file for the Screen class.

Author

Tor Gunnar Ravatn Hammer (tor.ravatn@gmail.com)

Version

1.0

Date

2025-04-01

Copyright

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6.4 Screen.h

Go to the documentation of this file.

```
00001
00011 #pragma once
00012
00013 class SpaceDefender;  // Forward declaration of SpaceDefender to avoid circular dependency
00014
00020 class Screen {
00021 public:
00022     virtual ~Screen() = default;
00023     virtual void draw(SpaceDefender& window) = 0;
00024 };
00025
00026
00031 class ScreenMenu : public Screen {
00032 public:
00033     void draw(SpaceDefender& window) override;
00034 };
00035
00036
00041 class ScreenGame : public Screen {
00042 public:
00043     void draw(SpaceDefender& window) override;
00044 };
00045
00046
00051 class ScreenHighscore : public Screen {
00052 public:
00053     void draw(SpaceDefender& window) override;
00054 };
00055
00056
00061 class ScreenSettings : public Screen {
00062 public:
00063     void draw(SpaceDefender& window) override;
00064 };
```

6.5 SpaceDefender.cpp File Reference

The cpp file for the SpaceDefender class.

```
#include "SpaceDefender.h"
#include <iostream>
```

6.5.1 Detailed Description

The cpp file for the SpaceDefender class.

Author

Tor Gunnar Ravatn Hammer (tor.ravatn@gmail.com)

Gabriel Anton Norheim ()

Version

1.0

Date

2025-04-01

Copyright

Copyright (c) 2025

6.6 SpaceDefender.h File Reference

The header file for the SpaceDefender class.

```
#include "AnimationWindow.h"
#include "widgets/Button.h"
#include "Screen.h"
#include "SpaceShip.h"
#include "Weapon.h"
```

Classes

- class SpaceDefender

  The main game class which runs the game. Uses AnimationWindow as base class.

6.6.1 Detailed Description

The header file for the SpaceDefender class.

Author

Tor Gunnar Ravatn Hammer (tor.ravatn@gmail.com)

Version

1.0

Date

2025-04-01

Copyright

Copyright (c) 2025

6.7 SpaceDefender.h

Go to the documentation of this file.

```
00001
00011 #pragma once
00012
00013 #include "AnimationWindow.h"
00014 #include "widgets/Button.h"
00015
00016 #include "Screen.h"
00017 #include "SpaceShip.h"
00018 #include "Weapon.h"
00019
00031 class SpaceDefender : public TDT4102::AnimationWindow {
00032 private:
00033     std::unique_ptr<Screen> currentScreen;
00034     unsigned int btnWidth;
00035     unsigned int btnHeight;
00036
00037     // Callback functions for buttons
00038     void cb_endGame()         {close();}
00039     void cb_startGame()       {setScreen(std::make_unique<ScreenGame>());}
00040     void cb_showHighscores() {setScreen(std::make_unique<ScreenHighscore>());}
00041     void cb_settings()        {setScreen(std::make_unique<ScreenSettings>());}
00042     void cb_menu()            {setScreen(std::make_unique<ScreenMenu>()); }
00043
00044 public:
00045     SpaceDefender(TDT4102::Point position = {100, 100}, int width = 600, int height = 800, const
      std::string& title = "Space Defender");
00046     void setScreen(std::unique_ptr<Screen> newScreen);
00047     void run();
00048
00049     // Buttons
00050     TDT4102::Button StartGameBtn;
00051     TDT4102::Button HighscoresBtn;
00052     TDT4102::Button SettingsBtn;
00053     TDT4102::Button EndGameBtn;
00054     TDT4102::Button GoToMenuBtn;
00055
00056     // Spaceships
00057     SpaceShipPlayer playerShip;
00058     std::vector<SpaceShipEnemy> enemyShips;
00059
00060     // Weapons
00061     std::vector<std::unique_ptr<Weapon» firedWeapons;
00062 };
```

6.8 SpaceShip.cpp File Reference

The cpp file for the SpaceShip class.

```
#include "SpaceShip.h"
#include "SpaceDefender.h"
#include <iostream>
```

6.8.1 Detailed Description

The cpp file for the SpaceShip class.

Author

Tor Gunnar Ravatn Hammer (tor.ravatn@gmail.com)

Version

1.0

Date

2025-04-01

Copyright

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6.9 SpaceShip.h File Reference

The header file for the SpaceShip class.

```
#include "subprojects/animationwindow/include/Image.h"
```

Classes

- class SpaceShip

  Abstract base class for different spaceships.
- class SpaceShipPlayer

  Class for player ship.
- class SpaceShipEnemy

  Class for enemy ship.

6.9.1 Detailed Description

The header file for the SpaceShip class.

Author

Tor Gunnar Ravatn Hammer (tor.ravatn@gmail.com)

Version

1.0

Date

2025-04-01

Copyright

Copyright (c) 2025

6.10 SpaceShip.h

Go to the documentation of this file.

```
00001
00011 #pragma once
00012
00013 #include "subprojects/animationwindow/include/Image.h" //for image type
00014
00015 class SpaceDefender;  // Forward declaration of SpaceDefender to avoid circular dependency
00016
00029 class SpaceShip {
00030 public:
00037     SpaceShip(int startX, int startY, int startHealth) : x(startX), y(startY), health(startHealth) {}
00038     virtual ~SpaceShip() = default;
00039     virtual void movements(SpaceDefender& window) = 0;
00040     virtual void shooting(SpaceDefender& window) = 0;
00041     void healthReduction() { --health; }
00042     int getHealth() const {return health;}
00043     int getPositionX() const {return x;}
00044     int getPositionY() const {return y;}
00045     int getShipHeight() const {return shipHeight;}
00046     int getShipWidth() const {return shipWidth;}
00047     void setShipSpeed(const int &newSpeed) {this->shipSpeed = newSpeed;}
00048
00049 protected:
00050     int x;
00051     int y;
00052     int health;
00053     const int shipHeight = 20;
00054     const int shipWidth = 20;
00055     int shipSpeed;
00056 };
00057
00063 class SpaceShipPlayer : public SpaceShip {
00064     public:
00065         SpaceShipPlayer(int startX, int startY) :
00066             SpaceShip(startX, startY, 3),
00067             playerImage("bilder/ShipSprite.png") {
00068             setShipSpeed(10);
00069         }
00070         void movements(SpaceDefender& window) override;
00071         void shooting(SpaceDefender& window) override;
00072         TDT4102::Image playerImage;
00073 };
00074
00075
00081 class SpaceShipEnemy : public SpaceShip {
00082     public:
00083         SpaceShipEnemy(int startX, int startY) :
00084             SpaceShip(startX, startY, 1),
00085             alienImage("bilder/ailienHead.png") {}
00086         void movements(SpaceDefender& window) override;
00087         void shooting(SpaceDefender& window) override;
00088         TDT4102::Image alienImage;
00089 };
```

6.11 Weapon.cpp File Reference

The cpp file for the Weapon class.

```
#include "Weapon.h"
#include "SpaceDefender.h"
```

6.11.1 Detailed Description

The cpp file for the Weapon class.

Author

Tor Gunnar Ravatn Hammer (tor.ravatn@gmail.com)

Version

1.0

Date

2025-04-01

Copyright

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6.12 Weapon.h File Reference

The header file for the Weapon class.

Classes

- class Weapon

  Abstract base class for different weapons.
- class Bullet

  Class for Bullet. Inherits from Weapon.
- class Bomb

  Class for Bomb. Inherits from Weapon.
- class Laser

  Class for Laser. Inherits from Weapon.

6.12.1 Detailed Description

The header file for the Weapon class.

Author

Tor Gunnar Ravatn Hammer (tor.ravatn@gmail.com)

Version

1.0

Date

2025-04-01

Copyright

Copyright (c) 2025

6.13 Weapon.h

Go to the documentation of this file.

```
00001
00011 #pragma once
00012
00013 class SpaceDefender;  // Forward declaration of SpaceDefender to avoid circular dependency
00014
00024 class Weapon {
00025 public:
00026     Weapon(int speed, int damage) : speed(speed), damage(damage) {}
00027     virtual ~Weapon() = default;
00028     virtual void fireWeapon(SpaceDefender& window) = 0;
00029     int getSpeed() {return speed;}
00030     int getDamage() {return damage;}
00031     virtual void move() {yProjectile -=speed;}
00032     virtual void draw(SpaceDefender& window) = 0;
00033
00034 protected:
00035     int speed;
00036     int damage;
00037     int xProjectile;
00038     int yProjectile;
00039 };
00040
00046 class Bullet : public Weapon {
00047 public:
00048     Bullet(int speed, int damage) : Weapon(speed, damage) {}
00049     void fireWeapon(SpaceDefender& window) override;
00050     void draw(SpaceDefender& window) override;
00051 private:
00052     int radius = 5;
00053 };
00054
00060 class Bomb : public Weapon {
00061 public:
00062     Bomb(int speed, int damage) : Weapon(speed, damage) {}
00063     void fireWeapon(SpaceDefender& window) override;
00064 };
00065
00071 class Laser : public Weapon {
00072 public:
00073     Laser(int speed, int damage) : Weapon(speed, damage) {}
00074     void fireWeapon(SpaceDefender& window) override;
00075 };
```