

# Requirements and Analysis Document

for Dodger Game

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Version 2

## 1 Introduction

The goal of the project is to create a Dodger game that takes place in space. The game's objective is to avoid falling asteroids and survive as long as possible and by doing that get as many points as possible to try and beat the high score.

A few properties for the game:

- The player controls the ship which can move on the x- and y-axis on the playing field.
- The asteroids fall in randomized and scripted paths over the playing field.
- On collision with asteroids the player takes damage (loses HP).
- The player can pick up power ups which helps or strengthen the player in some way.
- When the HP reaches zero the game is over.
- The points are based on time the player survives.
- If the player quits the game through the menu the player won't receive any points.
- The game saves a local list of top scores.

### 1.1 Definitions, acronyms, and abbreviations

Unit test: a unit test tests a specific functionality in the code and determines a specific behaviour or state.

HP: Health point - A value representing the player's remaining life.

High score: A list with the top scoring rounds a player has played.

Power up: A game object the player can pick up that gives a temporary advantage.

Character: The entity controlled by the player during the game.

Game Over: The player's hp reaches zero and the game round is therefore ended.

Wraparound: Spelet har inga väggar. När man åker utanför spelkartan flyttas man till motsatt sida och fortsätter i nuvarande färdriktning. (ex Snake) The game has no walls. If the player moves his or her character off screen the character appears on the opposite side and continues in the same direction (e.g. Snake).

Laser beam: A laser beam that fills the playing field from either top to bottom or from side to side, forcing the player to utilize the wrap around to avoid taking damage.

Debuff: A game object that gives the player a disadvantage.

## 2 Requirements

### 2.1 User Stories

[https://en.wikipedia.org/wiki/INVEST\\_\(mnemonic\)](https://en.wikipedia.org/wiki/INVEST_(mnemonic))

#### Story Identifier: 1

Story Name: Visible playable character

##### ## Description

As a player I want to see my character so that I can see where its position in the game is.

##### ## Confirmation

##### ### Functional

- Can I see the image of my character?
- Does the character and its image share the same position?

##### ### Non-functional

Availability:

- Can I always see my character?
- Do I always see the correct image for my character?

Security:

- Can the image for my character be changed while playing?

#### Story Identifier: 2

Story Name: Visible playing field

##### ## Description

As a player I want to see the playing field where my character is located.

##### ## Confirmation

##### ### Functional

- Is the image for the playing field visible?
- Does the image cover the whole playing field?

##### ### Non-functional

- availability...

#### Story Identifier: 3

Story Name: Movable character

##### ## Description

As a player I want to be able to move my character so that I can avoid hazards or obstacles.

##### ## Confirmation

##### ### Functional

- Can I move my character vertically?
- Can I move my character horizontally?
- Can I move my character diagonally?

##### ### Non-functional

Availability:

- Can I always move my character?

Security:

- Can something else move my character?

#### **Story Identifier: 4**

Story Name: Wraparound

##### **## Description**

As a player I want my character to appear on the opposite side of the playing field when going over its edge so that I don't get trapped in a corner.

##### **## Confirmation**

##### **### Functional**

- Does the character change its position to the opposite side of the playing field?
- Does the image of the character change its position to the opposite side of the playing field?
- Does the character appear on each side when it's only partly over the edge?

##### **### Non-functional**

- availability...
- security...

#### **Story Identifier: 5**

Story Name: Moving asteroids

##### **## Description**

As a player I want the asteroids to move over the playing field so that the game becomes challenging.

##### **## Confirmation**

##### **### Functional**

- Do the asteroids change coordinates?
- Do the asteroids move in a continuous path?
- If I click ...

##### **### Non-functional**

- availability...
- security...

#### **Story Identifier: 6**

Story Name: Collision with asteroid

##### **## Description**

As a player I want the asteroid to disappear on collision with my character, so that it is obvious that a collision has happened and also making the game look better visually.

##### **## Confirmation**

##### **### Functional**

- Is the projectile gone after a collision with the player's character?
- If I click ...

##### **### Non-functional**

- availability...

- security...

### **Story Identifier: 7**

Story Name: Visible health

#### **## Description**

As a player I want to be able to see how much health I have so that I am able to determine how well I'm doing and how much health I lose when I collide with asteroids.

#### **## Confirmation**

##### **### Functional**

- Can I see the health bar?
- Does the health bar show the correct amount of health?

##### **### Non-functional**

- availability...
- security...

### **Story Identifier: 8**

Story Name: Game Over screen

#### **## Description**

As a player I want to receive a Game Over screen when my health reaches zero so that it's clear that the simulation adheres to the rules of the game.

#### **## Confirmation**

##### **### Functional**

- Do I get a game over screen when my health reaches zero?
- Does the simulation end when my health reaches zero?

##### **### Non-functional**

Availability:

Security:

Can something end the game before my health reaches zero?

Can something change the screen to the game over screen before my health reaches zero?

### **Story Identifier: 9**

Story Name: Visible time

#### **## Description**

As a player I want to be able to see how much time has passed when I'm playing a game round, making it easier to determine how well I'm doing.

#### **## Confirmation**

##### **### Functional**

- Can i see the timer?
- Does the timer count up from zero?
- Does the timer start at zero when the game round starts?

##### **### Non-functional**

Availability:

- Can i always see the timer as long as a game round is active?

Security:

**Story Identifier: 10**

Story Name: Menu

**## Description**

As a player I want to be able to choose between different options of a main menu to start the game, see high scores or quit, depending on what I want to do.

**## Confirmation**

List all acceptance criteria; you should be able to test/confirm these.

**#### Functional**

- Can I see the buttons "Play", "High Score" and "Quit" in the main menu?
- Can i click the button "Play" and start the game?
- Can i click the button "Highscores" and see the best rounds?
- Can i click the "Quit" button and exit the game?
- Can i click the "Back" button and go back to the previous menu?

**#### Non-functional**

- availability...
- security...

**Story Identifier: 11**

Story Name: Postgame meny

**## Description**

Som spelare, när jag får game over, vill jag kunna välja om jag vill försöka igen, se highscore eller avsluta spelet för att slippa gå tillbaka till huvudmenyn.

**## Confirmation**

List all acceptance criteria; you should be able to test/confirm these.

**#### Functional**

- Can I see the menu after a game round has ended?
- Can I see the buttons "Try again" and "Main menu" in the post game menu?
- Can I click the "Main menu" button and go back to the main menu?
- Does a new game round start when I press "Try again"?

**#### Non-functional**

- availability...
- security...

**Story Identifier: 12**

Story Name: Select character

**## Description**

As a player I want to be able to select a character from a few different options so that I can get some variety.

**## Confirmation**

List all acceptance criteria; you should be able to test/confirm these.

**#### Functional**

- Can I see a selection of characters in the menu before the simulation starts?
- Can I click on a button for each character?

**#### Non-functional**

- availability...

- security...

### **Story Identifier: 13**

Story Name: Varied asteroids

#### **## Description**

As a player I want to experience asteroids of different speed and sizes so that the game becomes more varied.

#### **## Confirmation**

List all acceptance criteria; you should be able to test/confirm these.

#### **### Functional**

- Do asteroids have different speed values?
- Do asteroids have different sizes?

#### **### Non-functional**

- availability...
- security...

### **Story Identifier: 14**

Story Name: Exit game

#### **## Description**

As a player I want to be able to exit the game at any time in case I don't want to play further before a game round has ended.

#### **## Confirmation**

List all acceptance criteria; you should be able to test/confirm these.

#### **### Functional**

- Can I at any point exit the game?
- 

#### **### Non-functional**

- availability...
- security...

### **Story Identifier: 15**

Story Name: Pause

#### **## Description**

As a player I want to be able to pause the game during an active round in case I need to do something else and continue my round later.

#### **## Confirmation**

List all acceptance criteria; you should be able to test/confirm these.

#### **### Functional**

- Can i pause the game during an active round?
- If I click ...

#### **### Non-functional**

- availability...
- security...

### **Story Identifier: 16**

Story Name: See picked up power ups

## **## Description**

As a player I want to be able to see my picked up power ups so that I don't have to keep track of them myself.

## **## Confirmation**

List all acceptance criteria; you should be able to test/confirm these.

### **### Functional**

- Can I see which and what amount of power ups I have for the whole duration that I have them?
- Do I see the correct type and amount of power ups?
- Do I stop seeing a power up when its duration has ended?

### **### Non-functional**

Availability:

Security:

## **Story Identifier: 17**

Story Name: Visual and auditory feedback

## **## Description**

As a player I want to clearly see and hear when I take damage from a collision, so that I know that a collision has occurred.

## **## Confirmation**

List all acceptance criteria; you should be able to test/confirm these.

### **### Functional**

- Is there any kind of graphical cue that indicates that I have collided with an asteroid?
- Can I hear a sound that indicates that I have collided with an asteroid?

### **### Non-functional**

- availability...
- security...

## **Story Identifier: 18**

Story Name: High score

## **## Description**

As a player I want to be able to see my five top scores, so that I know when I beat my record score.

## **## Confirmation**

List all acceptance criteria; you should be able to test/confirm these.

### **### Functional**

- Can I see my five top scores in the high score menu?

### **### Non-functional**

- availability...
- security...

## **Story Identifier: 19**

Story Name: Increasing game difficulty

## **## Description**

As a player I want the asteroids to increase their speed with time so that the game becomes more challenging.

## ## Confirmation

List all acceptance criteria; you should be able to test/confirm these.

## ### Functional

- Do the asteroids become faster with time?

## ### Non-functional

- availability...
- security...

## Story Identifier: 20

Story Name: Temporary shield

## ## Description

As a player I want a powerup that shields me from taking any damage from the next collision with an asteroid, so that there is a bonus to aim for.

## ## Confirmation

## ### Functional

- Do I avoid damage from the next collision with an asteroid?
- Can I see a shield around the spaceship?

## ### Non-functional

- availability...
- security...

## Story Identifier: 21

Story Name: Background music

## ## Description

As a player I want to hear background music while I'm playing, so that the entertainment value increases.

## ## Confirmation

## ### Functional

- Can I hear a music track constantly being played in the background?

## ### Non-functional

- availability...
- security...

## Story Identifier: 22

Story Name: Visible score

## ## Description

As a player, I want to see my score when the game is over, so I know how I did.

## ## Confirmation

## ### Functional

- Can I see my score when the game is over?

## ### Non-functional

- availability...
- security...



## Story Identifier: 23

Story Name: Slow debuff

### ## Description

As a player I want to be debuffed so that my spaceship's speed is slowed down, so that the game gets more difficult.

### ## Confirmation

List all acceptance criteria; you should be able to test/confirm these.

### ### Functional

- Is the spaceship's speed slower after colliding with the debuff?

### ### Non-functional

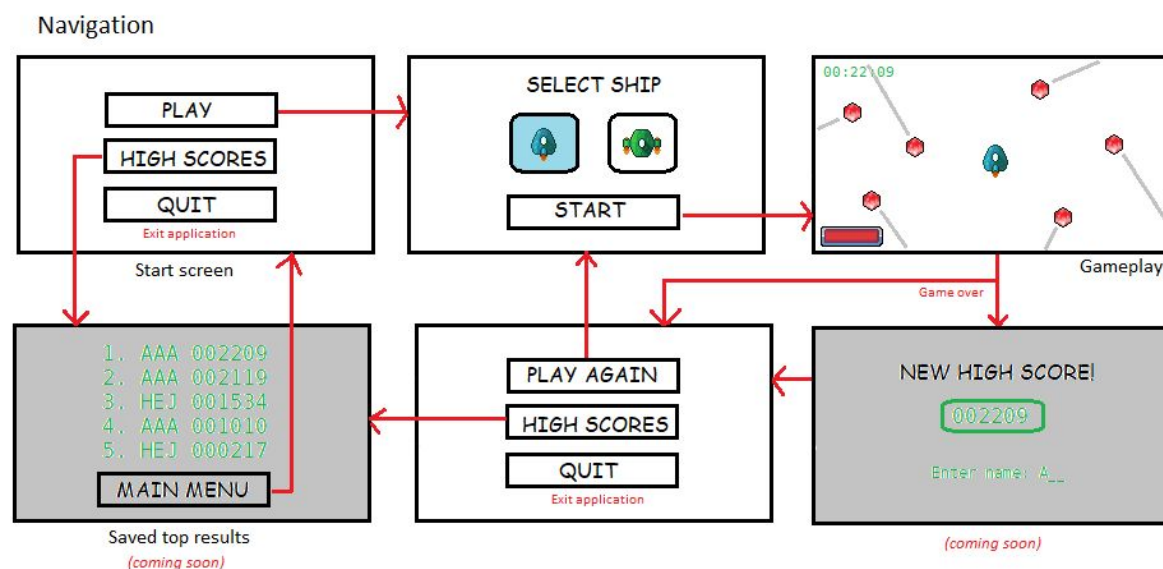
- availability...
- security...

## 2.2 Definition of Done

A user story is considered done when:

- The code compiles and is runnable.
- All tests that affect the current user story must go through.
- All other group members have reviewed the code and approved it.
- The code should be uploaded on github and ready to be merged into master.

## 2.3 User interface



# Space Dodger

PLAY

HIGHSCORE

QUIT

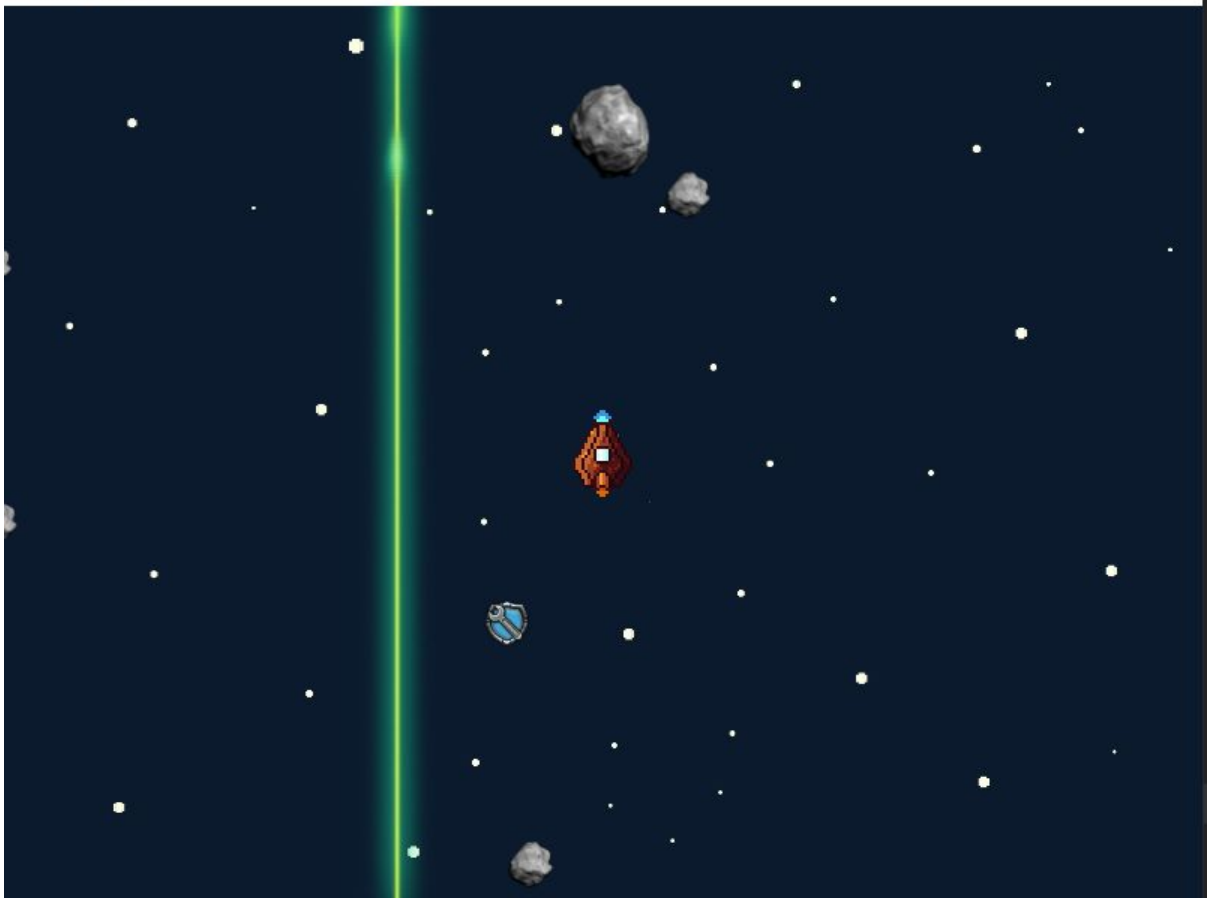
# Characters



START

BACK

Space Dodger





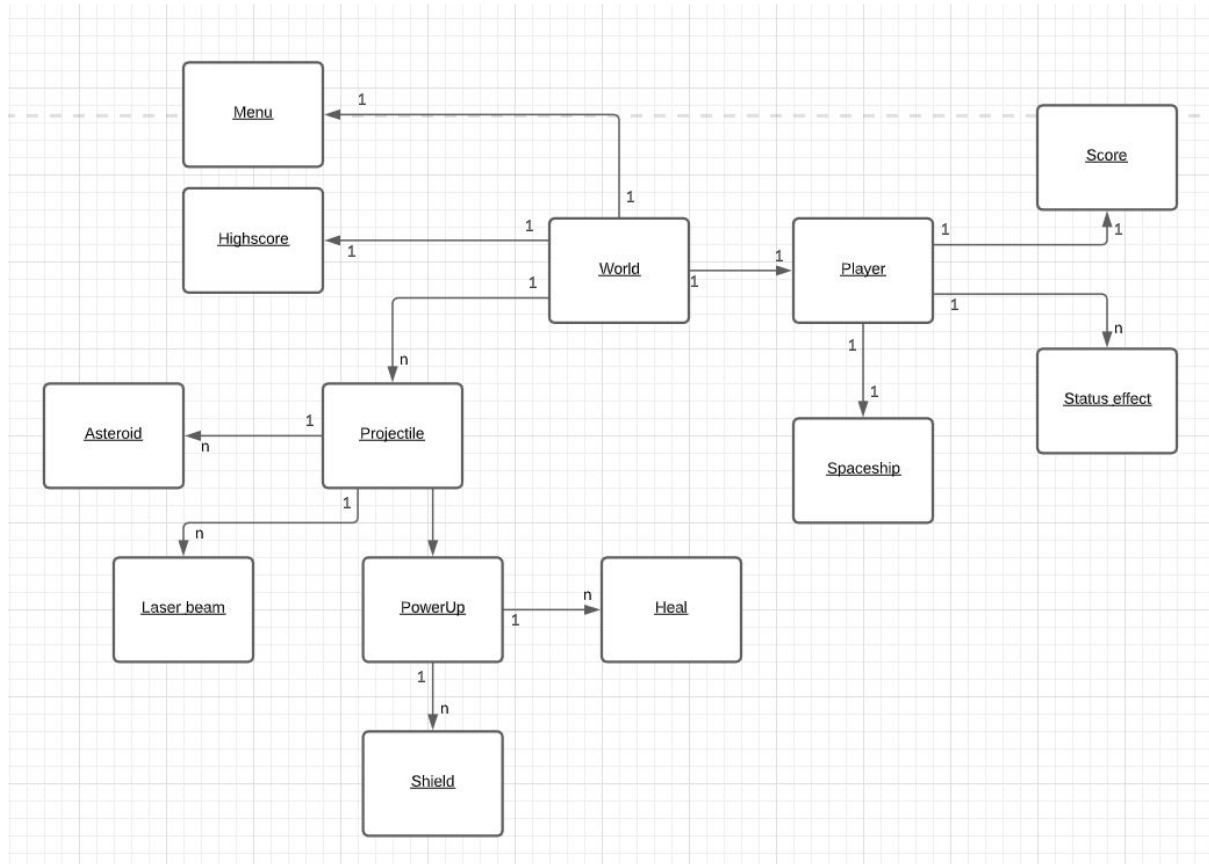
# GAME OVER

Score: 100

TRY AGAIN

MAIN MENU

### 3 Domain model



#### 3.1 Class responsibilities

**Menu:** is responsible for starting the simulation, closing the game, see highscores and choosing spaceship.

**World:** Creates all player objects, namely the player and the different kinds of projectiles and the laser beam.

**Highscore:** is responsible for showing the top scores in the history of the game.

**Projectile:** is responsible for determining basic behaviors to the different kinds of projectiles.

**Asteroid:** is responsible for assigning values to the different kinds of asteroids.

**Laser beam:** is responsible for assigning values to the laser beam.

**PowerUp:** Assigns values and behaviors to different power ups.

**Shield:** is responsible for collision and movement behaviors for the projectile that gives a shield status in case of collision with the spaceship.

**Heal:** is responsible for collision and movement behaviors for the projectile that gives health points in case of collision with the spaceship.

**Spaceship:** is responsible for showing the character, its direction, health points and the total score.

**Status effect:** describes how the player is affected in case of collision.

**Score:** indicates the number of points the player received during the last round of play.

## 4 References

JavaFX: <https://openjfx.io/>