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# Revision History

# Project Description

## Introduction

## Context

## Business Goals

## Domain Model



As can be observed from the domain model, our user is a Player. Player can playa Game on a Map of his choice and earn a Score. In a Game, Player purchases and places Structures on the Map. Structures act as defenses: theyshoot Projectiles that damage Enemies which move along the Path. When an Enemy is killed, Player earns a given amount of Score Points that he can use to purchase Structures.

There are many types of Structures, Projectiles and Enemies. Each type has specific parameters that make it unique.

Player can also use Map Manager to manage Maps.Player can create, edit or delete Maps.

## Actors

Player is a User who plays the game.

# Functional Requirements

## Overview



## Use Cases

### Use Case: Enter Map Manager

**Successful Outcomes:**Primary Actor successfully enters Map Manager

|  |  |
| --- | --- |
| **Use Case Package** | Map Management |
| **ID** | UC-MM-01 |
| **Use Case Goal** | Primary actor enters Map Manager |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | User has launched the game |
| **Domain Entities** | User, Player, MapManager, Map |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention to enter Map Manager |  |
| 2 | System launches Map Manager |  |
| 3 | System prompts Player to select desired map management options |  |

**Alternative Flows:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

### Use Case: Create new map

<<includes>>Enter Map Manager

**Successful Outcomes:**Primary Actor successfully creates new map

|  |  |
| --- | --- |
| **Use Case Package** | Map Management |
| **ID** | UC\_MM\_02 |
| **Use Case Goal** | Primary actor creates new Map |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using Map Manager (UC-MM-01) |
| **Domain Entities** | Player, Map Manager, Map |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

**Alternative Flows:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

### Use Case: Edit map

<<includes>>Enter Map Manager

**Successful Outcomes:**Primary Actor successfully edits parameters of a map

|  |  |
| --- | --- |
| **Use Case Package** | Map Management |
| **ID** | UC\_MM\_03 |
| **Use Case Goal** | Primary Actor edits parameters of a map |
| **Actors** | Primary Actor: Player |
| **Level** | Summary Goal |
| **Precondition** | Primary Actor is using Map Manager (UC-MM-01). Map to be edited is initially valid (business rule). |
| **Domain Entities** | Player, Map Manager, Map |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

**Alternative Flows:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

### Use Case: Edit scenery

<<extends>> Edit map

**Successful Outcomes:**

|  |  |
| --- | --- |
| **Use Case Package** | Map Management |
| **ID** | UC-MM-04 |
| **Use Case Goal** | Primary Actor edits scenery of Map |
| **Actors** | Primary Actor: |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using Map Manager (UC-MM-01). Primary Actor is currently editing a map (UC-MM-03). |
| **Domain Entities** | Player, Map Manager, Map |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

**Alternative Flows:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

### Use Case: Edit path

<<extends>> Edit map

**Successful Outcomes:**Primary Actor edits parameters of path

|  |  |
| --- | --- |
| **Use Case Package** | Map Management |
| **ID** | UC-MM-05 |
| **Use Case Goal** | Primary Actor edits path |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using Map Manager (UC-MM-01). Primary Actor is currently editing a map (UC-MM-03). |
| **Domain Entities** | Player, Map Manager, Map, Path |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

**Alternative Flows:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

### Use Case: Save map

<<extends>> Edit map

**Successful Outcomes:**Primary Actorsaves currently open map

|  |  |
| --- | --- |
| **Use Case Package** | Map Management |
| **ID** | UC-MM-06 |
| **Use Case Goal** | Primary Actor saves currently open map |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using Map Manager (UC-MM-01). Primary Actor is currently editing a map (UC-MM-03). |
| **Domain Entities** | Player, Map Manager, Map |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

**Alternative Flows:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

### 

### Use Case: Delete map

<<includes>> Enter MapManager

**Successful Outcomes:**Primary Actor deletes an existing map

|  |  |
| --- | --- |
| **Use Case Package** | Map Management |
| **ID** | UC-MM-07 |
| **Use Case Goal** | Primary Actor successfully deletes an existing map |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using Map Manager (UC-MM-01). |
| **Domain Entities** | Player, Map Manager, Map |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

**Alternative Flows:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

### Use Case: Enter SinglePlayer

**Successful Outcomes:**Primary Actor enter SinglePlayer

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-01 |
| **Use Case Goal** | Primary Actor successfully enters SinglePlayer |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** |  |
| **Domain Entities** | Player, SinglePlayer |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

**Alternative Flows:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

### Use Case: Select map

<<includes>> Enter SinglePlayer

**Successful Outcomes:** Primary Actor selects map to play on

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-02 |
| **Use Case Goal** | Primary Actor successfully selects map |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). |
| **Domain Entities** | Player, SinglePlayer, Game |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

**Alternative Flows:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |

### Use Case: Play game

<<includes>> Enter SinglePlayer

**Successful Outcomes:** Primary Actor begins to play a game

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-03 |
| **Use Case Goal** | Primary Actor successfully beings to play a game |
| **Actors** | Primary Actor: Player |
| **Level** | Summary Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor has selected a map (UC-GT-02). |
| **Domain Entities** | Player, SinglePlayer, Map, Game |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention to start a game. |  |
| 2 | System prompts Primary Actor for confirmation about the selected map and starting a new game. |  |
| 3 | Primary Actor confirms. |  |
| 4 | System loads map and starts up a Game. |  |
| 5 | *Use case ends successfully.* |  |

### Use Case: Start enemy attack

<<extends>> Play game

**Successful Outcomes:**Primary Actor starts an enemy attack

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-04 |
| **Use Case Goal** | Primary Actor successfully starts an enemy attack |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor is playing a game (UC-GT-03). |
| **Domain Entities** | Player, SinglePlayer, Game, Enemy |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention to start enemy attack. |  |
| 2 | System responds by verifying if there are any structures. |  |
| 3 | System starts an enemy attack. |  |
| 4 | *Use case ends successfully.* |  |

**Alternative Flows:**

**2a. No Structure Placed**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 2a.1 | System informs Primary Actor that there are no structure placed. |  |
| 2a.2 | Primary Actor aborts attack. |  |
| 2a.3 | *Use case ends unsuccessfully.* |  |

### Use Case: Sell structure

**<<**extends>> Play game

**Successful Outcomes:**Primary Actor sells an existing structure

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-05 |
| **Use Case Goal** | Primary Actor successfully sells an existing Structure |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor is playing a game (UC-GT-03). Structure exists in Game (BR2). |
| **Domain Entities** | Player, SinglePlayer, Game, Structure |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention of selling a specific structure. |  |
| 2 | System prompts Primary Actor to confirm the sale. |  |
| 3 | Primary Actor confirms. |  |
| 4 | System removes the structure and updates user's resources with its resell value. |  |
| 5 | *Use case ends successfully.* |  |

### Use Case: Buy structure

<<extends>> Play game; <<includes>> Place Structure

**Successful Outcomes:**Primary Actor buys a structure

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-06 |
| **Use Case Goal** | Primary Actor successfully buys a Structure |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor is playing a game (UC-GT-03). Player has enough Score Points (BR3). |
| **Domain Entities** | Player, SinglePlayer, Game, Structure |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention of buying a structure. |  |
| 2 | System verifies the available resources of the Primary Actor. Then prompts the Primary Actor to confirm. |  |
| 3 | Primary Actor confirms. |  |
| 4 | *Use case ends successfully.* |  |

**Alternative Flows:**

**2a. Not Enough Available Resources**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 2a.1 | System informs Primary Actor that there is not enough available resources. |  |
| 2a.2 | Primary Actor aborts. |  |
| 2a.3 | *Use case ends unsuccessfully.* |  |

### Use Case: Place structure

**Successful Outcomes:** Primary Actor places a structure

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-07 |
| **Use Case Goal** | Primary Actor successfully places a Structure |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor is playing a game (UC-GT-03). Primary Actor has bought a structure (UC-GT-06). Valid selected area for Structure (BR4). |
| **Domain Entities** | Player, SinglePlayer, Game, Structure |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates where to put the Structure on the Map. |  |
| 2 | System verifies if the selected area if appropriate. |  |
| 3 | System places the Structure at the area specified by the Primary Actor. |  |
| 4 | *Use case ends successfully.* |  |

**Alternative Flows:**

**2a. Selected Area is Invalid**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 2a.1 | System informs Primary Actor that the selected area is invalid and prompts re-try. |  |
| 2a.2 | *Use case resumes at Main Success Scenario step 1.* |  |

**2a. Selected Area is Invalid**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 2a.1 | System informs Primary Actor that the selected area is invalid and prompts re-try. |  |
| 2a.2 | Primary Actor aborts. |  |
| 2b.3 | *Use case ends unsuccessfully.* |  |

### Use Case: Load game

<<extends>> Play Game

**Successful Outcomes:** Primary Actor loads a saved Game

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-08 |
| **Use Case Goal** | Primary Actor loads a Game |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor has a saved Game. |
| **Domain Entities** | Player, SinglePlayer, Game |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor selects a saved Game to load from the list of all saved Games. |  |
| 2 | System prompts the Primary Actor to confirm the selected saved Game. |  |
| 3 | *Use case ends successfully.* |  |

### Use Case: Exit game

<<extends>> Play Game

**Successful Outcomes:** Primary Actor exits Game

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-09 |
| **Use Case Goal** | Primary Actor successfully exits the Game |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor is playing a game (UC-GT-03). |
| **Domain Entities** | Player, SinglePlayer, Game |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention of exiting the Game. |  |
| 2 | System prompts the Primary Actor to confirm the decision. |  |
| 3 | Primary Actor confirms. |  |
| 4 | System sends Primary Actor to the main menu. |  |
| 5 | *Use case ends successfully.* |  |

### Use Case: Save game

**Successful Outcomes:** Primary Actor saves a Game

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-10 |
| **Use Case Goal** | Primary Actor successfully saves a Game |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor is playing a game (UC-GT-03). Valid Game Name (BR5). |
| **Domain Entities** | Player, SinglePlayer, Game |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention to save the current Game. |  |
| 2 | System prompts Primary Actor to enter a name and to confirm. |  |
| 3 | Primary Actor confirms. |  |
| 4 | *Use case ends successfully.* |  |

**Alternative Flows:**

**2a Invalid Name Entered**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 2a.1 | Name entered by the Primary Actor is not valid. |  |
| 2a.2 | System informs Primary Actor of the error and prompts re-try. |  |
| 2a.3 | *Use case resumes at Main Success Scenario step 1.* |  |

**2b Invalid Name Entered**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 2b.1 | Name entered by the Primary Actor is not valid. |  |
| 2b.2 | System informs Primary Actor of the error and prompts re-try. |  |
| 2b.3 | Primary Actor aborts. |  |
| 2b.4 | *Use case ends unsuccessfully.* |  |

### Use Case: View score

<<extends>> Play Game

**Successful Outcomes:** Primary Actor views Score

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-12 |
| **Use Case Goal** | Primary Actor successfully view score |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer(UC-GT-01). |
| **Domain Entities** | Player, SinglePlayer, Score, Score Point |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention to view Score. |  |
| 2 | System responds by presenting a list of Scores. |  |
| 3 | *Use case ends successfully.* |  |

### Use Case: Inspect Structure

**Successful Outcomes:** Primary Actor inspects a Structure

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-13 |
| **Use Case Goal** | Primary Actor successfully inspects a Structure |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor is playing a game (UC-GT-03). Primary Actor has placed a structure (UC-GT-07). |
| **Domain Entities** | Player, SinglePlayer, Game, Structure |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention to inspect a specific Structure. |  |
| 2 | System responds by presenting the properties of the selected Structure. |  |
| 3 | *Use case ends successfully.* |  |

**Alternative Flows:**

**3a Primary Actor Inspects Another Structure**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 3a.1 | Primary Actor wished to continue inspecting Structures. |  |
| 3a.2 | *Use case restarts at step 1.* |  |

### Use Case: Upgrade Structure

**Successful Outcomes:** Primary Actor inspects a Structure

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-14 |
| **Use Case Goal** | Primary Actor successfully upgrades a Structure |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor is playing a game (UC-GT-03). Primary Actor has placed a structure (UC-GT-07). Player has enough Score Points (BR3). |
| **Domain Entities** | Player, SinglePlayer, Game, Structure |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention to upgrade a specific Structure. |  |
| 2 | System verifies the available resources of the Primary Actor. Then prompts the Primary Actor to confirm. |  |
| 3 | Primary Actor confirms. |  |
| 4 | *Use case ends successfully.* |  |

**Alternative Flows:**

**2a. Not Enough Available Resources**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 2a.1 | System informs Primary Actor that there is not enough available resources. |  |
| 2a.2 | Primary Actor aborts. |  |
| 2a.3 | *Use case ends unsuccessfully.* |  |

### Use Case: Inspect Enemy

**Successful Outcomes:** Primary Actor inspects a Structure

|  |  |
| --- | --- |
| **Use Case Package** | Game Time |
| **ID** | UC-GT-15 |
| **Use Case Goal** | Primary Actor successfully inspects a Structure |
| **Actors** | Primary Actor: Player |
| **Level** | User Goal |
| **Precondition** | Primary Actor is using SinglePlayer (UC-GT-01). Primary Actor is playing a game (UC-GT-03). Primary Actor has started an enemy attack (UC-GT-04). |
| **Domain Entities** | Player, SinglePlayer, Game, Enemy |

**Main Success Scenario:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 1 | Primary Actor indicates intention to inspect a specific Enemy. |  |
| 2 | System responds by presenting the properties of the selected Enemy. |  |
| 3 | *Use case ends successfully.* |  |

**Alternative Flows:**

**3a Primary Actor Inspects Another Structure**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Notes |
| 3a.1 | Primary Actor wished to continue inspecting Enemies. |  |
| 3a.2 | *Use case restarts at step 1.* |  |

## User Story Conversion

## Business Rules

|  |  |  |  |
| --- | --- | --- | --- |
| **Number** | **Label** | **Business Rule** | **Notes** |
| BR1 | Map to be edited is initially valid |  |  |
| BR2 | Structure exists in Game | If the Player wants to sell a Structure, there should be an existing one in Game. |  |
| BR3 | Player has enough Score Points | In order to buy or upgrade a Structure, an amount of Score Points are required. Once the Structure has been successfully bought or upgraded, the required Score Points will be deducted. |  |
| BR4 | Valid selected area for Structure | Structures must be placed in an area on the Map that is not part of the Path. |  |
| BR5 | Valid Game Name | For the name of the saved Game to be valid, it must be between 1 and 30 characters, and only contain numbers ['0'...'9'], lowercase ['a'...'z'] and upper case letter ['A'...'Z'], dashes['-'], and underscores ['\_'] |  |

# Non-Functional Requirements

# Design Constraints

# Glossary

## Business Entities

|  |  |
| --- | --- |
| **Business Entity** | **Description** |
| Player | User of the application able to play games and create or edit maps. |
| Map Manager | System that allows Player to create new or edit existing maps. |
| Singleplayer | System that allows Player to play on existing maps. |
| Game | Description of the progress of Player playing Singleplayer. |
| Map | Visual and logical description of the game world on which Player can play on. |
| Path | Sequence of tiles on Map that Enemies are allowed to move along. |
| Score | Total score achieved by Player while playing Game. |
| Score Point | In-game currency that can be earned by eliminating Enemies and spent on purchasing Structures. |
| Structure | Purchasable defenses placed on Map by Player during Game. Structures shoot Projectiles at Enemies. |
| Projectile | In-game objects that damage and eliminate Enemies thus earning Score Points to add to Player’s Score. |
| Enemy | Physical objects that move along Path on Game’s Map and can damage Player’s base upon reaching it. |

# References

# 