# CS 319 - Object-Oriented Software Engineering Analysis Report

## Hallway Rush

### Group D

Caner Bozkurt

Ezgi Ebren

Doğa Dikbayır

Mert Uygur

Course Instructor: Uğur Doğrusöz

Progress Date: 11.10.2014

# 1.Introduction

The player will be able to use a simple weapon to shoot the enemies. However, there will be different weapon types and bonuses appearing randomly through the game, which the player can choose to take or leave. The player can also choose to finish the game after killing the last enemy (the boss) or continue to beat their high score. Hallway Rush will be played by keyboard in the PlayHR mode and by mouse in other modes such as displaying the menu.

# 2.Overview

Game has three different mods.The enemy types will differ in speed, endurance, strength, movement and weapon choice in order to force the player to develop different survival strategies, in a sense. The player will also be able to pick up different bonuses (positive or negative effect), by shooting the chests appearing randomly in the game. There will be different types of weapons spawning according to the score and the player will be able to pick up these, or ignore them, just like the bonuses. The types of spawning enemies will change based on the player's score. Higher the score, it will be harder to survive the enemy waves. The game scenario will be beaten when the final enemy is killed, however the player will be able to continue playing in order to beat the high-score.

## 2.1 Gameplay

The player will need a keyboard and a mouse in order to play the game. He will be able to move on a horizontal line with the arrow keys, in order to shoot enemies. Various keys will be needed to use bonuses and weapons. The mouse will be needed to navigate through the menus.

## 2.2 Enemy Types

### 2.2.1 Mobs

Mobs are the enemies who are affected by all the bonuses and they spawn often, in large numbers, compared to other types of enemies.

**Zombie:** This mob is a simple zombie which has low health, medium speed, melee attack and vertical movement. If a zombie reaches the player, the player has to kill it in order to move again.

**Armed Zombie:** This mob has the same health and speed stats with the regular zombie, however it has ranged attack and horizontal movement. So it attacks the player from a range with a gun.

**Armoured Zombie:** Regular Zombie with higher health and slower speed.

**Special Task Zombie:** Armed Zombie with higher health and faster fire-rate.

**Runner:** Regular Zombie with faster speed and lower health. Once a Runner reaches player's horizontal line, it explodes. Therefore, if the player does not kill the Runner before it reaches the border, life points will be deducted from the player.

## 2.2.2 Non-mobs

Non-mobs are the enemies which are significantly harder to kill. They are completely or partially immune to player's bonuses. They have higher health than mobs and they have a high-score threshold in order to spawn.

**Juggernaut:** This enemy has very high health rate compared to regular mobs, it has a ranged attack. It can throw bombs which have a high area damage. If the player manages to kill it, it refills half of the health of the player.

**Baba O' Riley:** This unique enemy spawns only when the player is able to collect a large amount of score-points. It has the highest health rate in the game. It has ranged and high-damage attacks, it can throw bombs like the Juggernaut and it can spawn mobs to support itself. Once Baba O' Riley is killed, the player's health will be refilled and an extra life will be given.

# 2.3 Bonuses

## 2.3.1 Positive Bonuses

**Health(10,40,Full):** It drops in three states. It fills the player's health by 10/40/Max points, depending on it's state.

**Shield(3,6,10 seconds):** It drops in three states. It makes the player immune to all attacks for 3/6/10 seconds depending on it's state.

**Extra Life:** It gives the player an extra life.

**Hallway Rage:** It takes down all the mobs in the screen. It damages Juggernauts and Baba O' Riley.

**Push Back:** It pushes back the vertically advancing mobs, Zombies, Armoured Zombies and Runners.

**Insta-Kill:** The player is able to take down all the mobs in a single shot. Juggernaut and Baba O' Riley are not affected by this bonus.

**Double Damage:** It doubles the player's damage.

**Freezer:** It freezes the mobs for 6 seconds and non-mobs for 4 seconds.

**Slow Down:** It slows down all the enemies for 5 seconds.

**Explosive Shots:** Player is able to give area damage on every shot for 5 seconds.

### 2.3.2 Negative Bonuses

**Damage(-10,-30):** It drops in two states. It damages player's health by 10 or 30 health points.

**Sticky Floor:** The player is unable to move for 3 seconds.

**Acid Puddle:** The player's health is reduced by 20 points and he is not able to fire for 3 seconds.

**Spawn Mob:** Spawns a random mob.

## 2.4 Weapons

The player will have three slots of weapon and he will be able to navigate through the weapons according to the enemies he will face.

**Pistol:** This the default weapon of the player. It has medium damage and slow fire-rate.

**SMG:** Picked up by the player. Submachine gun has low damage and very fast fire-rate.

**Shotgun:** Picked up by the player. It has high damage and slow fire-rate.

**Assault Rifle:** Picked up by the player. The most long-term effective weapon in the game. It has fast fire-rate and medium damage.

**Grenade Launcher:** Picked up by the player. It has very slow fire-rate but very high area damage. It has limited ammo (5 capsules).

## 2.5 Game Mods

### 2.5.1 Standard Mod

In this game mod, the player will have the standard 100 points health bar and three lives. When the player has no health points all the bonuses and weapons drop and one life is

deducted. When all the lives are spent, the game is over and the user is asked to enter a nickname to enter his score to the system. If the score is among top ten scores, it is registered on the high scores table with the user's nickname.

If the game ends after Baba O' Riley is killed, the game scenario is also beaten and the player's score is recorded with a gold medal. Once Baba O' Riley is killed, the enemies will spawn in larger numbers in order to challenge the player exponentially.

### 2.5.2 God Mod

In this mod, the player has unlimited health. So it is a mod for exploring all the enemy types, weapons and bonuses. The game is over when the player quits it. No high score count.

### 2.5.3 Insane Mod

This mod will challenge the player more, compared to the standard mod. In this mod, the player will have a single life and only the health bonuses. The negative bonuses are still present in this mod. The ending conditions are same as in the standard mod.

# 3.Functional Requirements

## 3.1 Change Game Mod

From this menu, the user is able to choose between three game mods (see 2.5). By default, standard mod is selected by the system. Once a mod is selected, the upcoming games will start in that mod.

## 3.2 Play Hallway Rush

When the user starts Hallway Rush, the system starts a game based on game mod selection. The game ends when the player quits or an ending condition is satisfied. The user will be able to control the character with the keyboard and to navigate between the menus with the mouse.

## 3.3 Display Help

If the user has trouble with the controls or gameplay, he can access the help section. Help section consists of three sections:

- Scenario explanation
- User controls
- Game rules

So the player will be able to read the game scenario, learn the controls and learn about scoring and end conditions of the game.

## 3.4 Change Settings

The change settings menu will allow the user to:

- Select main character's gender
- Turn on/off the music
- Select between day and night ambiance

By default the background music is on.

The main character will have two texture files, one for male and one for female. So the user will be able to select it by this menu. By default the character is male.

Also the game's ambiance could differ between day and night based on user's selection. By default the ambiance is day time.

The user must apply the settings after selecting them in order to update the system.

The user will also be able to use the default settings by clicking 'Default Settings' and applying the changes.

## 3.5 Pause/Unpause Game

Once a game is started the player can pause the game. When a game is paused, the player can continue it anytime he wants (unless he closes the application).

## 3.6 View Credits

An information screen about the developers will appear when the user selects this menu.

## 3.7 Display High Score Table

The highest ten scores are displayed in a table with the nicknames of the users. A gold medal symbol will appear near the score if a user beats the game scenario too (see 2.5.1).

# 4.Non Functional Requirements
## 4.1 Graphics

The graphics of Hallway Rush will be minimalistic and aesthetic at the same time to provide the users a modern and fun gameplay. We will try to reduce flickering and other graphical problems to minimum to create a smooth gaming experience.

## 4.2 Music
The background music is going to be an old-school 8-bit track, to give the player a nostalgic arcade-game atmosphere.

## 4.3 Controls and Response Time
The response time of the game will be reduced to a minimum level in order to provide the players a smooth controlling. The control keys' positions also will be arranged to ease the gameplay.

## 4.4 Menus
The menus will include clear and short instructions to allow younger players to play the game with ease.

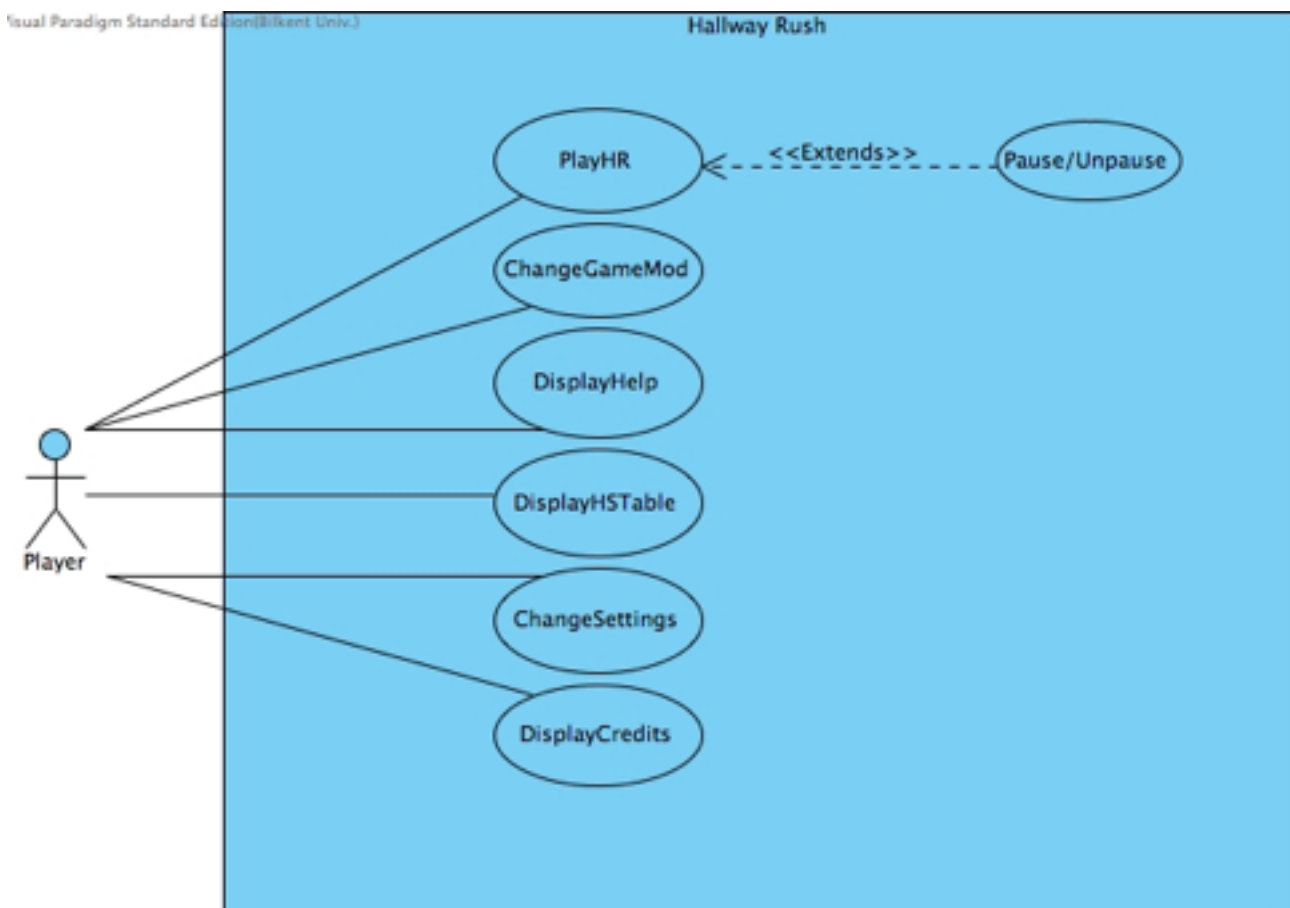# 5.System Models

## Use Case UML Model

**Figure 1-Hallway Rush Use Case Diagram**

# 5.1 Use Case List

<u>#1</u>

**Use Case Name:** PlayHR

**Participating Actors:** Player

**Pre-conditions:** The user is on the opening screen.

**Post-conditions:**

Either one of the two conditions below will end the game:

- The player has no lives remaining

- The player quits the game

If the player's score is high enough to enter the high scores list, system updates the high scores list with the player's score.

**Basic Flow Of Events:**

1.Player starts the game from main menu

2.System constructs a game based on the default standard mod

3.Player collects various bonuses

4.As the player's score increases, new types of enemies and weapons spawn

5.Player collects the score needed to confront the game boss

6.Player defeats the game boss and beats the game scenario

7.System updates the high score status with a gold badge

8.Player spends all of his lives

9.System records player's score with a gold badge and a nickname, if it is a high score

10.System returns to the main menu


**Alternative Flow Of Events:**

a.1.Player starts the game in god mod

a.2.Player quits the game

a.3.System returns to main menu


b.1.Player starts the game in standard mod

b.2.Player collects various bonuses

b.3.Player has no more lives before confronting the game boss

b.4.System records player's score with his nickname but without a gold badge, if it is a high score

b.5.System returns to the main menu

**Use Case Name:** ChangeGameMod

**Participating Actors:** Player

**Pre-conditions:** Player is on the opening screen

**Post-conditions:**

-Player changes the mod and system updates the game mod, OR

-Player returns to the main menu and the last selected mod remains as the mage mod.

**Basic Flow Of Events:**

1.Player selects 'Change Game Mod' from main menu

2.Player changes the default standard mod to insane mod

3.System updates the new game mod

4.Player clicks the 'Return to the main menu'

5.System returns to the main menu


**Alternative Flow Of Events:**

1.Player selects 'Change Game Mod' from main menu

2.Player changes the previously selected insane mod to standard mod

3.System updates the new game mod

4.Player changes the standard mod to god mod

5.System updates the new game mod

6.Player clicks 'Return to the main menu'

7.System returns to the main menu

**Use Case Name:** DisplayHelp

**Participating Actors:** Player

**Pre-conditions:** The player is on main menu

**Post-conditions:** System returns to the main menu when player clicks the return button

**Basic Flow Of Events:**

1.Player clicks on 'Help' from the main menu

2.Player reads the document and clicks the 'Return to the main menu'

3.System returns to the main menu

**Use Case Name:** DisplayHSTable

**Participating Actors:** Player

**Pre-conditions:** The player is on main menu

**Post-conditions:** System returns to the main menu when player clicks the return button

**Basic Flow Of Events:**

1.Player clicks on 'High Scores' from the main menu

2.Player looks at the scores and clicks 'Return to the main menu'

3.System returns to the main menu


#5:

**Use Case Name:** ChangeSettings

**Participating Actors:** Player

**Pre-conditions:** The player is on main menu

**Post-conditions:** System returns to the main menu with the updated settings when the player clicks the return button

**Basic Flow Of Events:**

1.Player clicks on 'Change Settings' from the main menu

2.Player turns the sound off

3.Player changes default ambiance(day time) to night time

4.Player changes the main characters default gender(male) to female

5.Player clicks 'Apply'

6.System updates the settings

7.Player clicks the return button

8.System returns to the main menu with the updated settings


**Alternative Flow Of Events:**

1.Player clicks on 'Change Settings' from the main menu

2.Player turns the sound off

3.Player changes the character's gender to female

4.Player clicks 'Apply'

5.System updates the settings

6.Player clicks 'Default Settings'

7.System selects the default settings on the interface for the player

8.Player clicks 'Apply'

9.System updates the settings as default settings

10.Player clicks the return button

11.System returns to the main menu with the default settings


#6:

**Use Case Name:** DisplayCredits

**Participating Actors:** Player

**Pre-conditions:** The player is on main menu

**Post-conditions:** System returns to the main menu when the player clicks the return button

**Basic Flow Of Events:**

1.Player clicks on 'Credits' from the main menu

2.Player sees the credits and clicks the return button

3.The system returns to the main menu


#7:

**Use Case Name:** Pause/Unpause

**Participating Actors:** Player

**Pre-conditions:** A game instance is running

**Post-conditions:** The game is on pause state or if it is already in pause, it returns to unpaused state

**Basic Flow Of Events:**

1.Player clicks the pause button during the game

2.System updates game's state to paused and it displays the pause screen

3.Player clicks the unease button after certain time

4.System updates game's state to unpaused and it resumes the game