CS 319 - Object-Oriented Software Engineering

Analysis Report

Left For F

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## 1. Introduction

Left 4 F is a turn based RPG game where you try to graduate from Bilkent CS department. Throughout your journey you encounter many homeworks,assignments, projects and professors. Your goal is to defeat them with your knowledge and graduate without getting F's.

You, as a student, obtain some skills which will represented by weapons. Also you will learn concepts which you can use as a enhancement to your weapons. There will be known enemies such as projects and random enemies like homeworks or quizes. There will also be enemy bosses as teachers. If player as a student could not beat the enemies which represent their school requirements as in real life he/she will get an F and fail.

The game will have a turn based combat system just like in Final Fantasy. The random enemies will pop while walking in the map like walking in tall grass in Pokemon. There won't be any safe zones in game since in Bilkent there are no safe times for a student for not to worry about lectures. The player will have health points which can be refilled by coffees. There will be abilities for each weapon and enchantment that will be used to attack enemies. The enemies will have resistances and weaknesses if player hits an enemy with certain resistance by the same type of ability the enemy will receive less damage than it would receive normally or if player hits enemy with certain weakness by the same type of ability the enemy will receive more damage that it would receive normally. There won't be any checkpoints like in hardcore RPG games since also in Bilkent if you get a F grade you have to do all the completed tasks again. Also you can not save and continue the game as in real life.

## 2. Overview

The main idea of the game is that the player will be a computer sciences student at Bilkent University and needs to pass quizzes, exams and projects which will be enemies. Game is designed as four years. At each year, the enemies will be more hard to pass than the last year. The players will have the coding languages as their attacks and the data structures as their enchantments. There will be a dynamic map for players to move on, here they can collect supplies like energy drinks, coffees, data structures etc. At some points on the map, the players will face enemies. If they fail to pass the enemy, they will get an "F" and must retake the year. At the end of each year, the players will earn a new attack. The goal is to finish all years and graduate.

2.1 Playing the game

Keyboard and a mouse is needed for the game. Player will move with W, A, S, D keys and select which attack to use with the mouse. Pressing key P will open the pause menu. In all the menus and screens except the gameplay screen, the mouse will be used.

2.2 Levels

Each level will be a year and the game will be containing four of them. The game background will be the same but at each year, the enemies will be more hard to pass than the last year. Player can't play the next levels without passing the previous ones.
The locations of the enemies and the collectibles will change at each level. If the player fails to pass the enemies, he/she will get an "F" and must retake the year.

2.3 Enemies

There will be 4 types of enemies. At each level, the player will have to pass each one. The enemies will be 4 quizzes, 2 exams, 1 project and 1 teacher. When facing an enemy, battle screen will show up. There will be three sections on the right bottom corner of the screen, attacks, items and skip. Selecting attacks will open a new popup which will have the coding languages as the attacks. The items popup will have energy drink and coffee to increase energy and data structures to enhance your attacks. Skipping an enemy will cause players their energy and the reduced energy will change from enemy to enemy. When the energy hits 0, the game will finish.

2.4 Character

Players can choose which character to play in the first year and has to play with it until the game is done, or they can choose to start over with a new character. There will be two characters, one is a male and the other will be a female character. They can move in the map, attack or use items in the battle screen. At each level, they can collect coffee, energy drinks and coding languages in the map.

3. Requirement Specifications

3.1 Functional Requirements
3.1.1 Play
The main idea of the game is to pass 4 years and graduating. The player will start the game with 1 energy drinks, 1 coffee, 100 points of energy and 1 attack. The energy may decrease by the attacks of the enemies or skipping enemies. When players encounter an enemy, the battle screen will come up and from there, they can choose to attack, enhance their attacks

or to increase their energy. The energy of the enemies will vary accordingly to their difficulty level.

Players can collect collectibles that scattered randomly in the map. They can use them in the battles or in the pause menu. The effects of each collectible will be shown in the tutorial screen.

### 3.1.2 Tutorial Screen

Tutorial will show the players how to move and use their items. It will also show that how the turn based fights work and the effects of the collectibles.

### 3.1.3 Options Menu

In the options menu, the game sound which will be playing on the background can be changed or muted.

### 3.1.4 Pause Menu

While playing, players can access to the pause menu by pressing P. In the pause menu, player can choose to resume, options menu or the main menu. Also, a button will open a new popup to show the items that the player has and they can use them here.

### 3.1.5 Credits Screen

Credits menu will contain the names and contact information of the developers.

### 3.1.6 Exit

On the main menu, there will be an exit button which will close the game.

### 3.2 Nonfunctional requirements

### 3.2.1 User-friendly Interface

A game needs to attract the user. Therefore, our game will be visually comfortable and appealing. Also our group will be careful with the details of the map and the enemies so that they will look good.
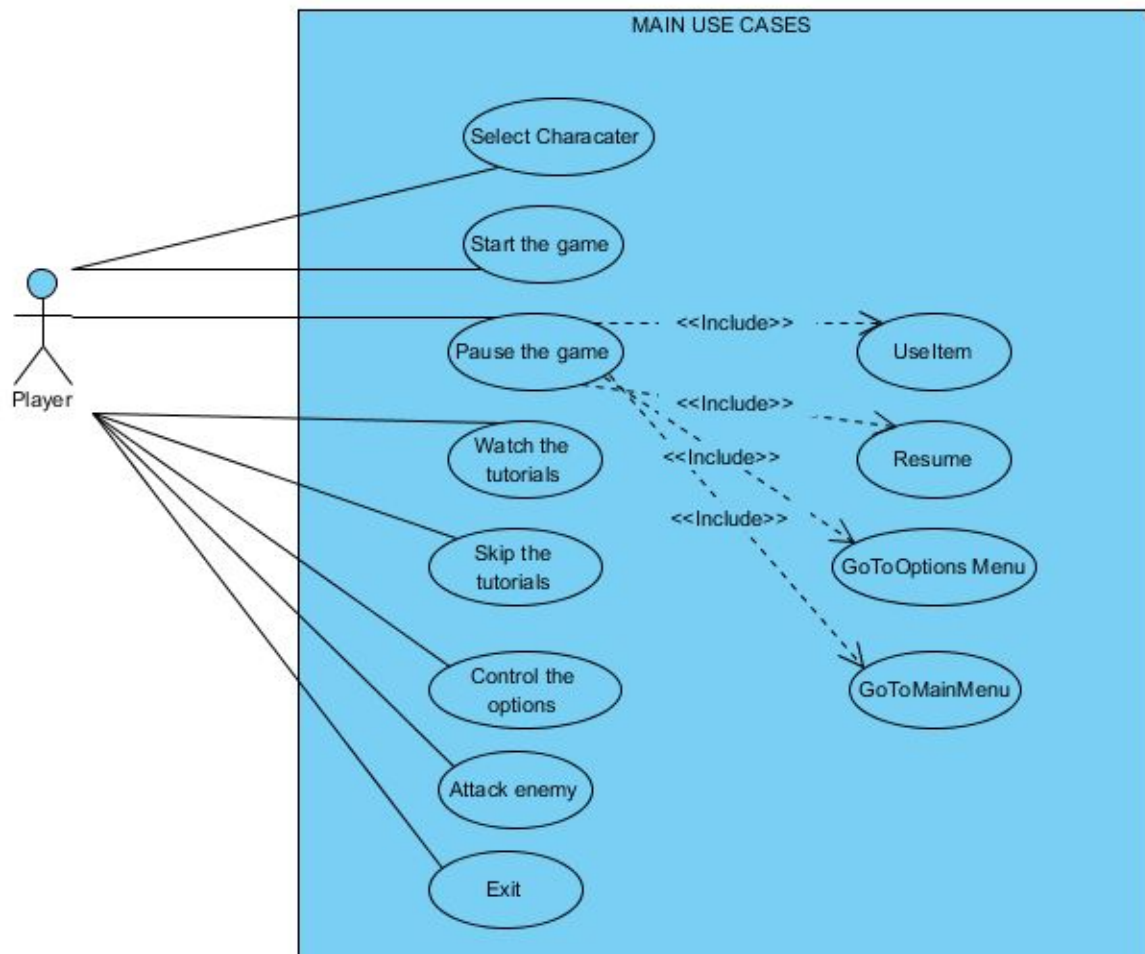
### 3.2.2 Reliability

A bug-free game is a reliable one. Thus, our main concern will be around this issue. Our aim is to consider all cases and solve the problem in the development stage, so that we will have a reliable program.

### 3.2.3 Entertainment

There will be a funny and appealing story in the game which users can relate to. Varying enemies and collectibles will make the user smile and want to play it again. Difficulty system in each level and the randomized positions of the enemies will avoid the repetition in the game.

## 4. System Models
4.1 Use Case Model



MAIN USE CASES

Select Characater
Start the game
Pause the game
Watch the tutorials
Skip the tutorials
Control the options
Attack enemy
Exit

<<Include>> UseItem
<<Include>> Resume
<<Include>> GoToOptions Menu
<<Include>> GoToMainMenu

Player

4.1.1 Select Character
Use Case Name: Select Character
Primary Actor: Player
Stakeholders and Interests:
-> Player select the sex of character
-> System provides the player this options:
        -Male
        -Female

Pre-condition: Setup the game
Post-condition: -

Entry Condition: Selection of the character
Exit Condition: Select any other choices of the menu

Success scenario event flow:
The character is selected by the player

4.1.2 Start the game
Use Case Name: Start the game
Primary Actor: Player
Stakeholders and Interests:
-> Player push the start button in order to play the game
-> System starts the game

Pre-condition: Select the character
Post-condition: -

Entry Condition: Push the start button to start the game
Exit Condition: Select the main menu button or exit button

Success scenario event flow:
The player starts to play the game

4.1.3 Pause the game
Use Case Name: Pause the game
Primary Actor: Player
Stakeholders and Interests:
-> Player pauses the game when he/she wants to stop the game
-> System provides pause menu to the player

Pre-condition: Start the game

Entry condition: Push the P in the keyboard
Exit condition: Select resume or any other options in the pause menu

Success scenario event flow:
1. Player pause the game
2. Player can select  Resume to continue the game
3. Player can go to options menu
4. Player can go to main menu
5. Player can use items

   4.1.3.1 Use Item
   Use Case Name:  UseItem
   Primary Actor: Player
   Stakeholders and Interests:
   -> Player can use items to pass exams, to make homeworks and other assignments
   -> System provides items the player

Entry Condition: Clicking UseItem

Exit Condition: After clicking use items, the player come back to the pause menu

4.1.3.2 Resume

Use Case Name: Resume

Primary Actor: Player

Stakeholders and Interests:

-> Player can continue to play the game

-> System provides the player can continue from where he left off

Pre-condition: Pause the game

Entry Condition: Clicking the resume

Exit Condition: -

Success scenario event flow:

1. When the player click the resume button, he/she come back to the game

4.1.3.3 GoToOptionsMenu

Use Case Name: GoToOptionsMenu

Primary Actor: Player

Stakeholders and Interests:

-> Player can go to options menu to change some options if he/she wants to change songs or mute off.

-> System provides the player options menu

Pre-condition: opening pause menu

Entry Condition: Clicking the GotoOptionsMenu

Exit Condition: Clicking any change and back to the pause menu

Success scenario event flow:

1. Player can change options or back to the pause menu
2. Then he/she can resume or exit

4.1.3.4 GoToMainMenu

Use Case Name: GoToMainMenu

Primary Actor: Player

Stakeholders and Interests:

-> Player can go to the main menu after pause the game

-> System provides the player go to the main menu

Pre-condition: opening pause menu

Entry condition: Clicking GoToMainMenu
Exit condition: -

4.1.4 Watch tutorials
Use Case Name: WatchTutorials
Primary Actor: Player
Stakeholders and Interests:
-> Player is able to watch the tutorials to learn how to play and he/she can have hints about to pass the levels.
-> System provides the player the explanatory videos and hints

Pre-condition: Selecting character and starting the game

Entry Condition: Clicking watch tutorials
Exit Condition: Skip the tutorials or back to the main menu

Success scenario event flow:
1. Player watches the videos and learns hints
2. Player is able to become better while playing

4.1.5 Skip Tutorial
Use Case Name: Skip Tutorial
Primary Actor: Player
Stakeholders and Interests:
-> Player is able to skip tutorial videos or hints  while beginning of the new level
-> System provides the player to stop the tutorials

Pre-condition: Clicking watch the tutorials or beginning the new year

Entry Condition: -
Exit Condition: Clicking skip tutorials

Success scenario event flow:
1. Player skip tutorials if he/she does not want to watch the tutorials

4.1.6 Control the options
Use Case Name: Control the Options
Primary Actor: Player

Stakeholders and Interests:
-> Player can control the options if he/she wants to change options

Pre-condition: Being in the main menu

Entry Condition: Clicking the control the options
Exit Condition: Clicking back to the main menu

Success scenario event flow:
1. Player can change songs or mute off

4.1.7 Attack Enemy
Use Case Name: Attack Enemy
Primary Actor: Player
Stakeholders and Interests:
-> Player attacks the enemies because he/she has to pass the years in the school.

Pre-condition: Playing the game

Entry Condition: Clicking attack enemy when he/she encounters the enemy
Exit Condition: Finishing war the game continue

Success scenario event flow:
1. If player can success after the attack, he/she jump to the next level
2. Otherwise, the player have to replay the same level

4.1.8 Exit
Use Case Name: Exit
Primary Actor: Player
Stakeholders and Interest:
-> If player wants to exit the game click the exit
-> System provides the player exiting

Pre-condition: Being the pause menu or main menu
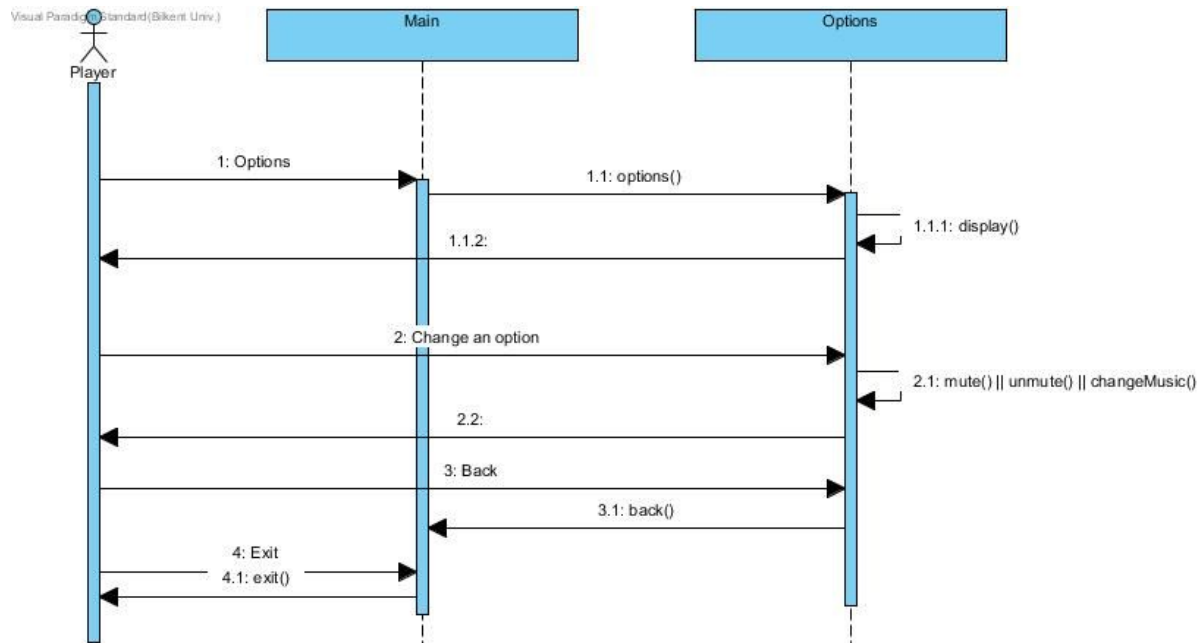
Entry Condition: Clicking exit
Exit Condition: -

Success scenario event flow:
1. If Player click exit, the game ends and player close the game

4.2 Dynamic models

4.2.1 Sequence Diagrams

4.2.1.1 Options from main menu



Scenario: In this scenario the user communicates with the main menu boundary object and select options. Then the options object displays. User changes an option and the according function starts to work. Then the user hits Back and Main Menu opens up. Lastly, the user hits Exit and the game exits.

4.2.1.2 Options from pause menu
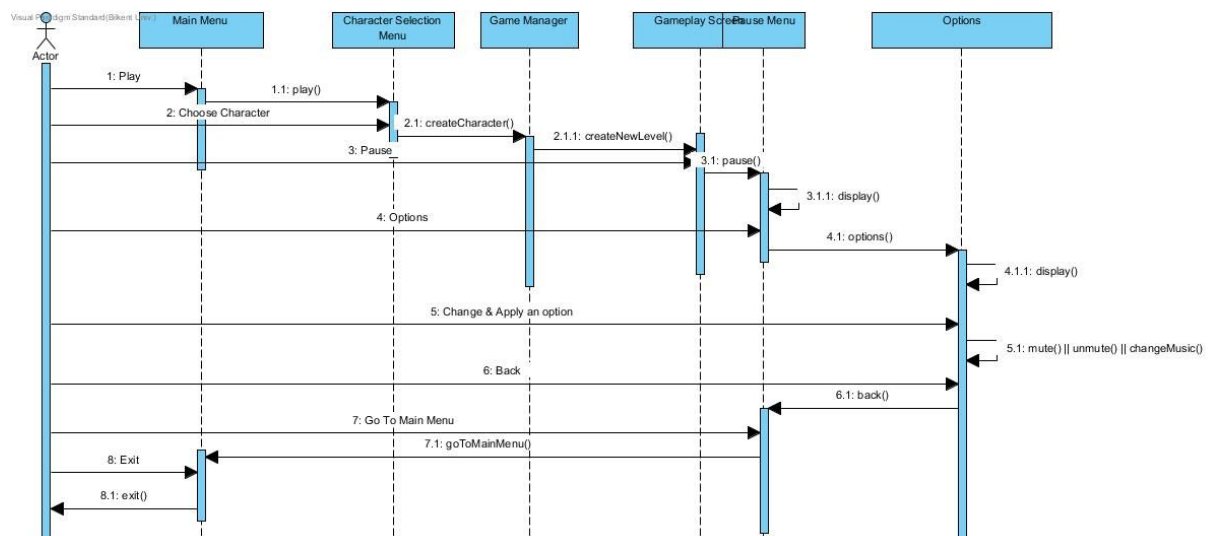


Scenario: The user hits start in the main menu. He is then redirected to the character selection menu, there user chooses a character to play with. Then game manager creates a new level and gameplay screen shows up. When the user wants to change an option, hits "P" key and the pause menu opens up. The user changes the options, then hits back and

redirected back to the gameplay screen. Then user hits the Go to Main Menu button and exits.

## 4.2.1.3 Tutorial / Credits:
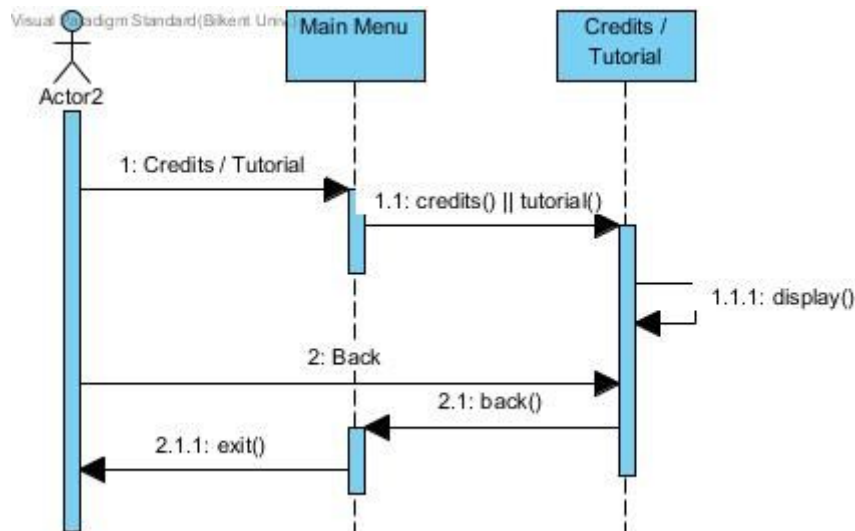


Scenario: The Credits and User Manual can be accessed the same way from the Main menu. The user communicates with the main menu boundary object and selects Credits/Manual. The chosen page is displayed. In the end, the user presses back and is redirected to Main again. From there, user chooses to exit.

## 4.2.1.4 Play:
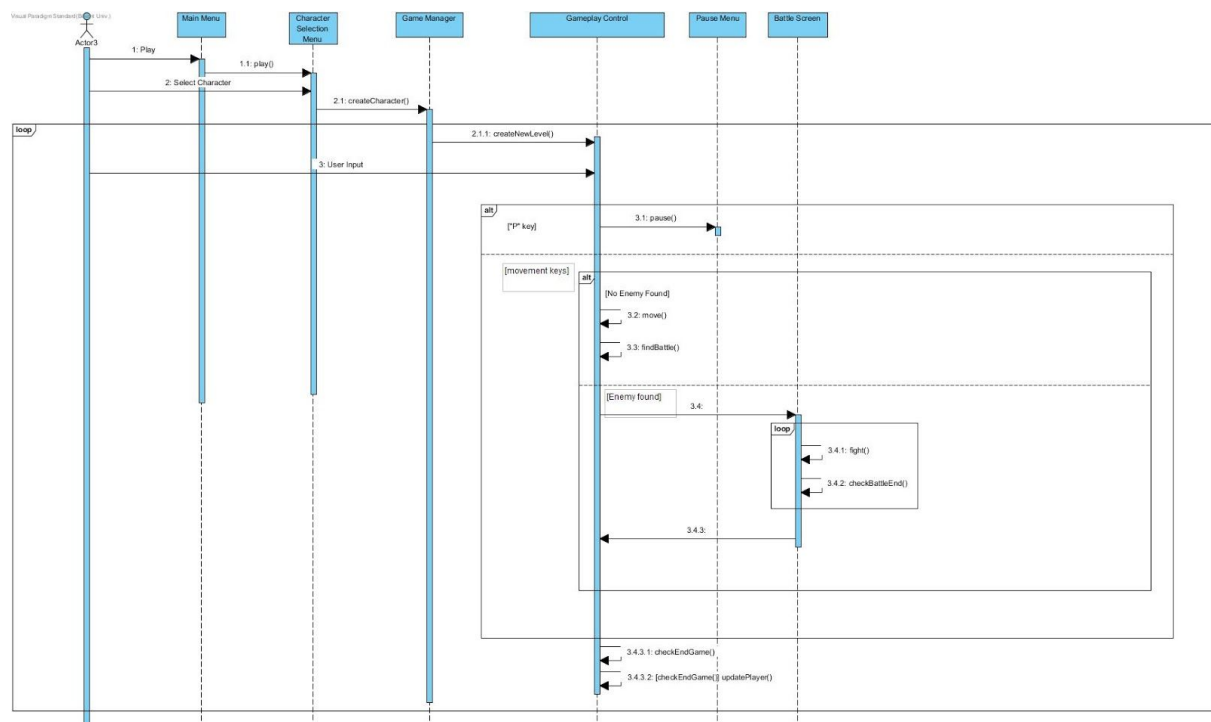


Scenario: The player interacts with the boundary object which is the main menu and clicks the Start button. The character selection menu opens up and asks the user to choose a

character. User chooses a character and game manager creates a new level. Player, enemies and a new map with randomly placed collectibles arranged.

After the game initialization, the continuity will be kept in a loop with several conditions, which are what keys the user pressing. Gameplay manager takes the user input and moves or pauses the game accordingly. If a collision with any collectible is encountered, manager will increase the number from the player properties. If not, play will go normally.

After moving, if an enemy is at the player's position, battle screen will open up immediately. There, turn will be considered and if it's enemy's turn, it will attack accordingly to its programming. If it's player's turn, it will wait for user to give an input and do it. At the end of each turn, a controller will check if the player's or enemy's health is reached 0. Then the battle screen will close and game will resume from where it stopped.

If user presses "P", the pause menu will be opened and the user can choose to resume, use item, go to main menu or go to options. If user resumes game will resume from where it stopped. Choosing go to main or options will take the user to asked point. In the options menu, clicking back will bring the user to pause menu. If the user wants to use items, another popup will come to screen which will show the items that the player has and clicking on them will call the appropriate action.

## 4.2.2 Activity Diagram
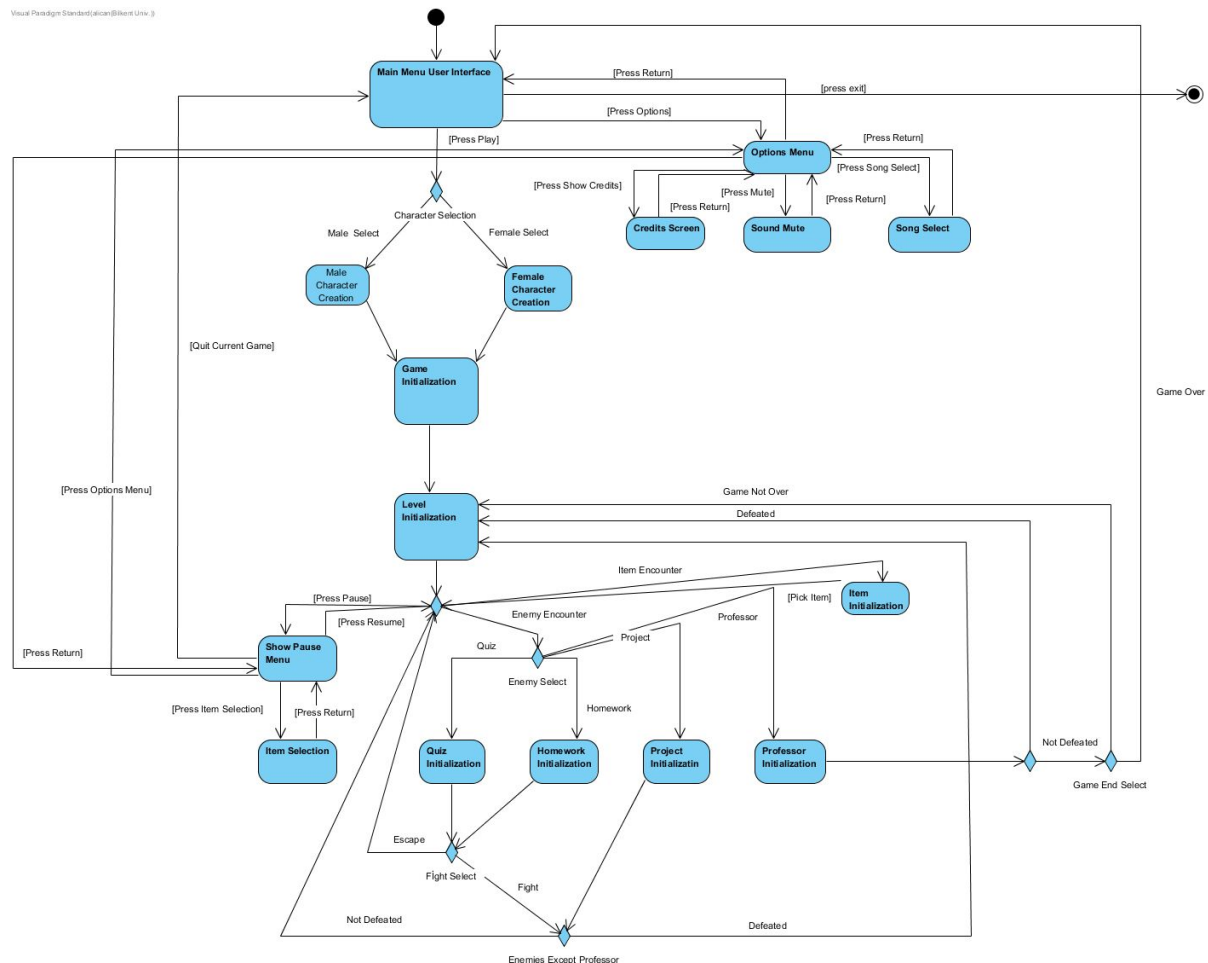
The user will first encounter the main menu where he/she can start a new game by pressing Play, close the game by pressing Exit, or go to options menu by pressing Options. After pressing play the system will show the character selection screen to user where he/she could select a male or a female character to play with. If the user presses Options the system will show the options menu where the user could select a song to play, mute the sound or show the Credits Screen.

As the user is inside the game, he/she will encounter different items and enemies. If the user encounters with an item he/she has to collect it. If the user encounters with an enemy, accordingly to the type of the enemy he/she can fight or escape. The general rules such as the escape penalty will be shown in the beginning of the each level as tutorials.

On the fight menu user has two options to run away or to fight. If the user run away from an enemy his/her life points will be decreases accordingly to the type of the enemy and the general rules of the level player is currently in. If the user chooses to fight there will be maximum of four skills he/she can use which will vary accordingly to the players previous experiences throughout the game.

The skills a player can use will be determined by the items and enhancements he/she collected throughout the game. Players should choose their arms wisely to be successful at this game since the skills they obtain by those items have specific types which will be effective or not effective to a certain enemy. The items could also be life point refillment like coffee.

The user can pause the game to select items, to return to main menu or to go to options menu.

There will be different types of enemies as quizzes, homeworks, projects and professors. When a players hit points hit zero he/she will get a F and has to repeat the level. After defeating final professor the game will be and the user will be led to main menu.

## 4.3 Object Model
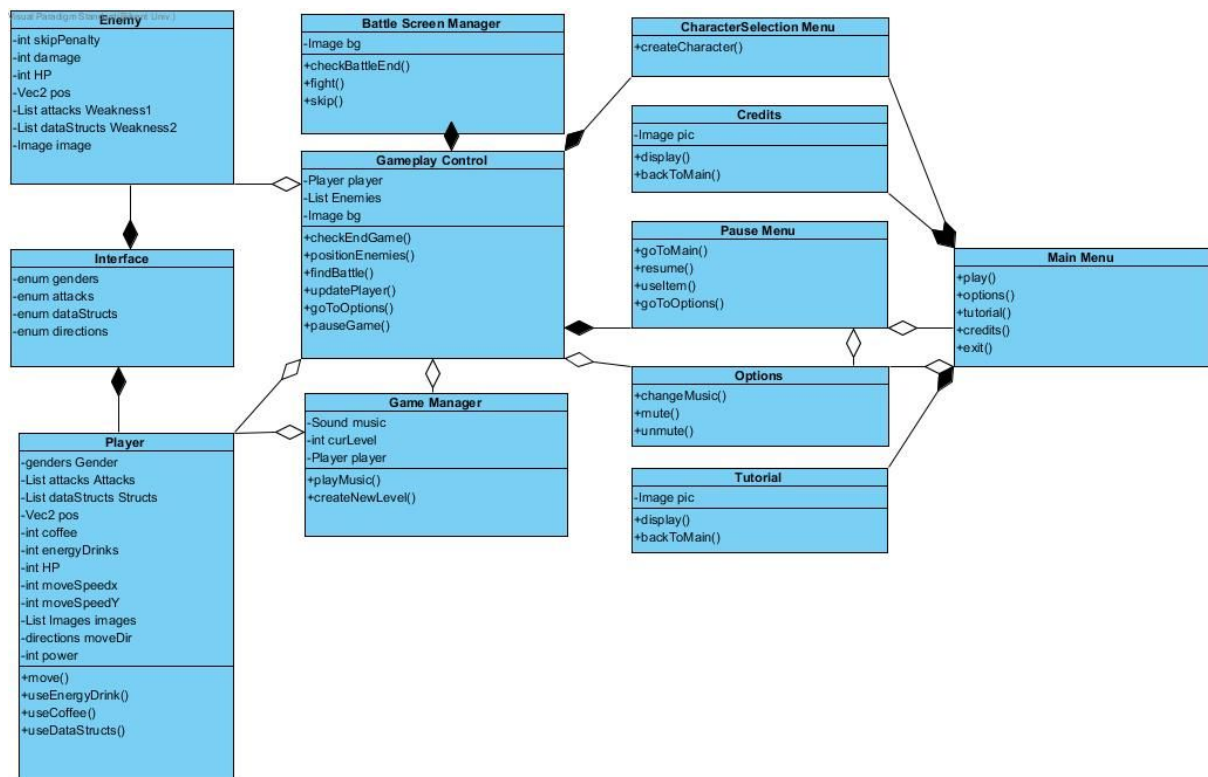


Main Menu: The functions of this class are play which goes to character selection menu, options, tutorial, credits that goes to their menus and exit to exit.

Credits, Tutorial, Options: They are simple menus accessed from the main menu.

Character Selection Menu: The class takes the input that comes from the player and creates and sends the player object to the game manager.

Game Manager: This class holds the information of the music, the current level and player. If the music is not muted, this class will start playing music and create new level according to the current level information and sends the player object that comes from character selection menu to gameplay control.

Gameplay Control: This class contains all the activity functions, player, enemies and the paused information. It also has an Image that is shown on the background.

Battle screen Manager: This class will constantly run fight function. This function will make enemy attack on its turn. On the players turn, it will let them use items, attack or skip. Also, it will check whether the fight is over or not.

Pause Menu: The functions of this class lets the players to go to main menu or options menu, resume or use items.

Interface: This class will contain the enumerators that player and enemy class use.

Player: This class will hold the properties and the functions of the player. The properties are the gender, attack list that gained by passing levels, structures list that gained by collecting them in the map, the player's position, moving speed, coffee and energy drink count, it's image, it's moving direction and power which indicates how strong they are. The functions are move, using coffee, energy drinks and data structures.

Enemy: Enemy class is much like player class. It only has properties of the enemies which are skipping penalty, its damage, health points, position, image and its weakness lists.

## 5. User interface
### 5.1 Navigational Path
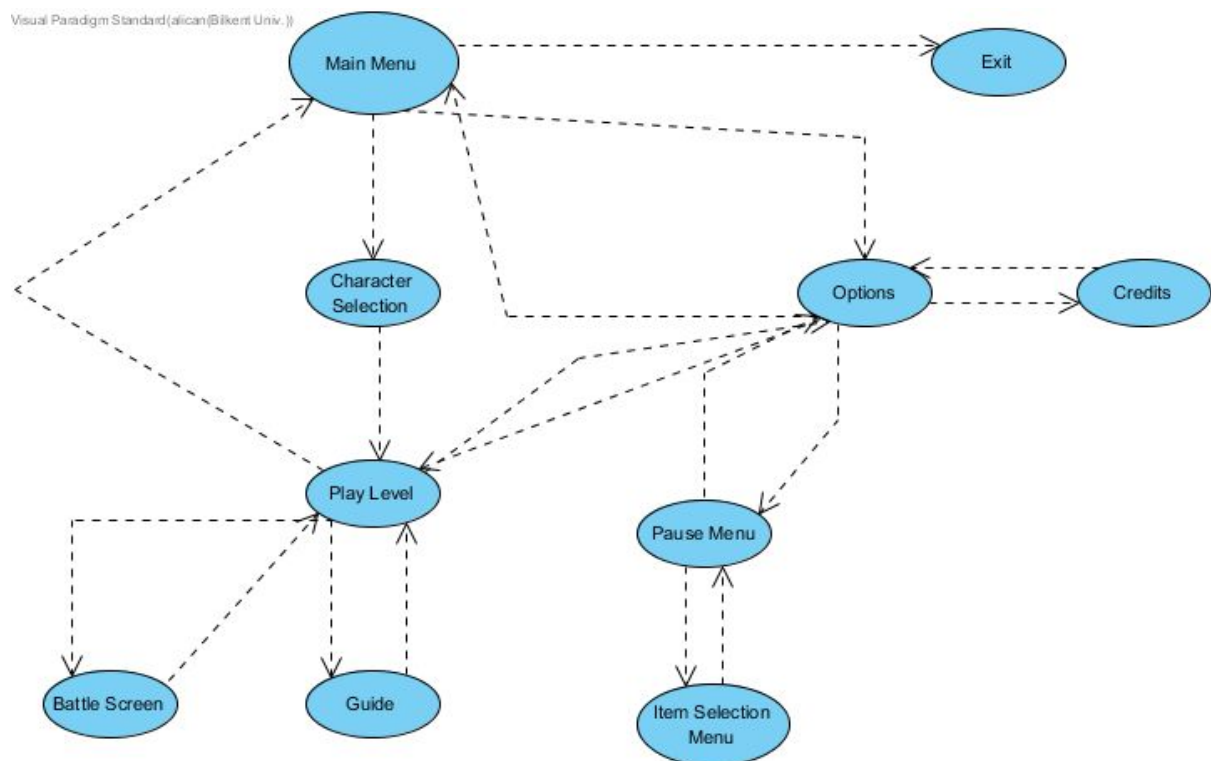
## 5.2 Screen Mockups
### 5.2.1 Main menu



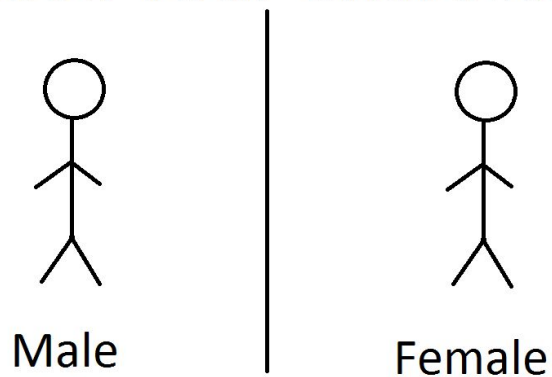This menu will be displayed when the user opens the game.

As explained above sections, clicking the Play will starts the game and display the character selection screen.

Options take the user to options menu.

Quit closes the game window.

### 5.2.2 Character Selection Menu



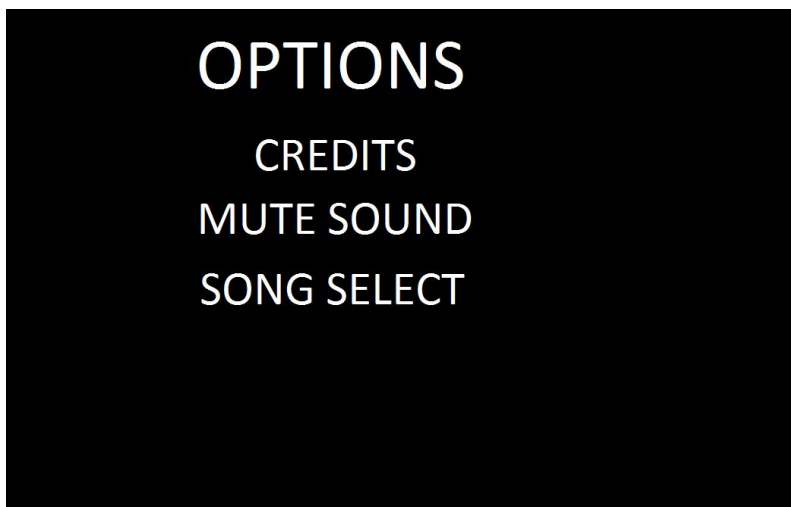This screen will be displayed after user clicks play in the main menu.

There are two options as female and male, by the users choice the in game character will be determined in this screen.

### 5.2.3 Gameplay Scene



In the gameplay scene the main element is the map and the user's character. In this scene user can pause the game to access the pause menu

### 5.2.4 Options



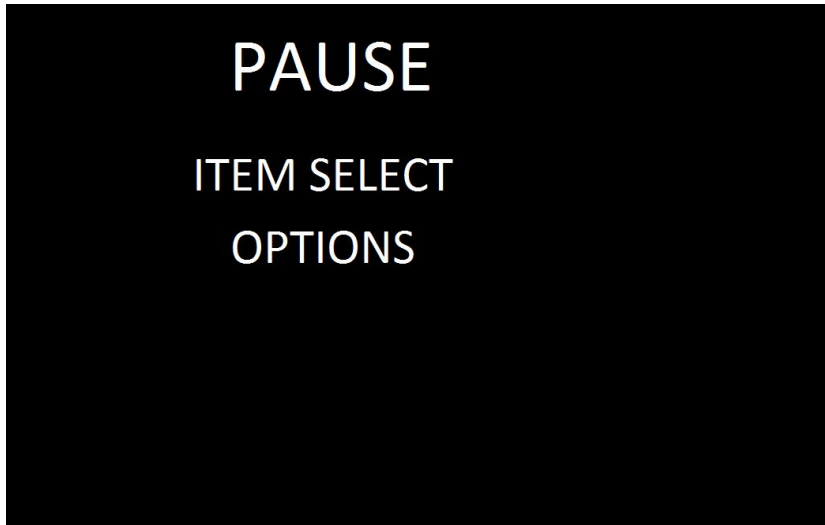This menu will be displayed when user clicks options in the main menu or in the pause menu.

The user has three choices as Credits, Mute Sound, Song Select.

Credits will be display the credits screen.

Mute Sound will be mute sounds of the game.

Song Select will be allow user to choice a song to play while he/she plays the game.
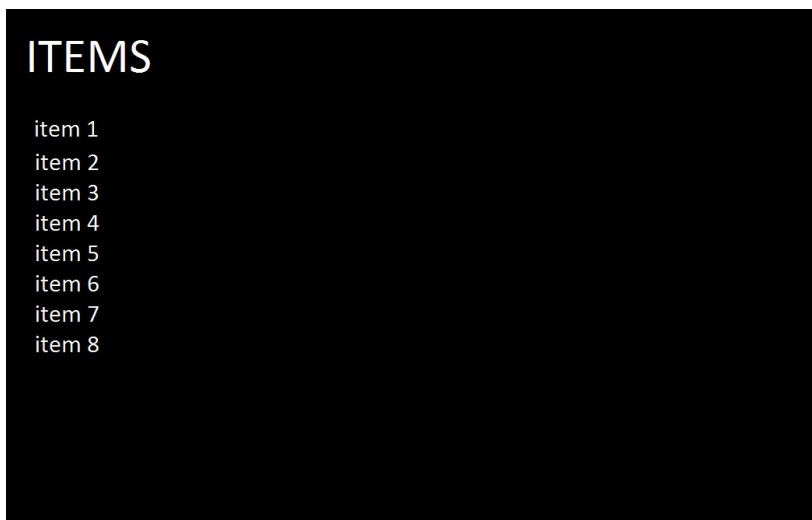
5.2.5 Pause Menu



This menu will be displayed when user pauses the game.

The user can go to options menu by clicking Options or go to item selection by clicking Item Select.

5.2.6 Item Menu



This menu will appear when the user click item select in the pause menu in this menu user can use consumables or weapons.
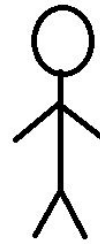
## 5.2.7 Battle Scene

HP: 78/100                                          HP: 5/12



User X                                              AVL Tree Quiz

| atack move 1        atack move 2 | fight                    run |
|----------------------------------|--------------------------------|
| atack move 3        atack move 4 |                                |

In the battle scene the users and enemies health points will appear in the top of the characters with their names in the bottom of the characters. In the entrance to the scene the user will have to options as fight and run. When pressed run the player will receive an escape penalty and return to the gameplay scene. When pressed fight the user can choose between his/her skills to defeat the enemy. The characters will attack in order starting from the enemy. The screen will disappear and user will return to gameplay menu when one of the characters hitpoint hit zero. If the enemy is the final professor after player defeat the enemy the credits screen will be displayed and user return to the main menu.

### 5.2.8 Tutorial



In this screen the user will be introduced to general key bindings and for each level the escape penalty and the general weakness of the enemies across the map will be shown.

### 5.2.9 Credits



In this screen the developers names will be displayed.

## 6. GLOSSARY AND REFERENCES
- Visual Paradigm v14.1