Bilkent University

Department of Computer Engineering

Object Oriented Software Engineering Project

Project short-name: Mr.&Mrs. Pac-Man Ext.

Analysis Report

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Progress Report

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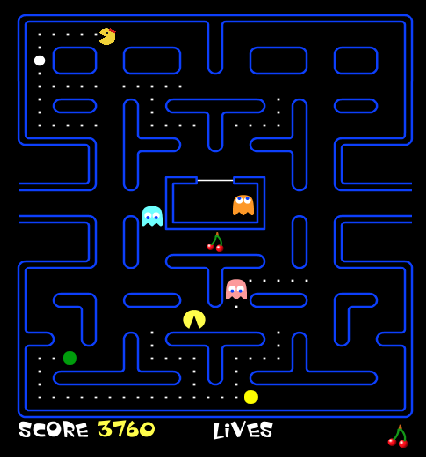
1. Introduction

Mr. & Mrs. Pac-Man Extended is a platform game which is similar to conventional Pac-Man arcade game. However, extended version provides playing with two players. They can control their own Pac-Man by using arrows and W, A, S, D combination. In the map, there will be enemies(ghosts), basic food and some special food. Player’s aim will be eating all the food in the map without hitting ghosts. In this way, they can pass levels and get the highest score. Additionally, extended version gives opportunity to design your own map.

2. Overview

By double clicking desktop icon of the game, player will see main menu which contains single player, two players, create map, load game, load map, highscore and help options.After selecting single player or two players, game will start from level 1. The game consists of three levels. At the end of each level, a pop up panel that shows various shields will appear.These shields make the Pac-Man faster and it gains resistance against ghostsaccording to shield’s features. Player can buy a shield by spending his/her scores. If player hits a ghost, the player loses the shield. Player’s scores will increase by eating food and ghosts. If player spends all lives, game will be over and program will ask for a name if s/he reached a high score.

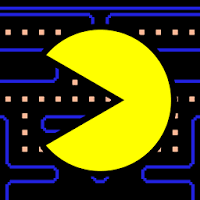
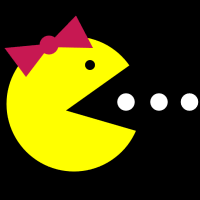
In the create-map mode, player can design his/her own map and can state location and number of ghosts. The player will create his/her own challenge and if the use wants to keep the level that he created, he can save the map for another use. The gap between the bricks will let the user to escape across the map and the user is also able to determine the place and amount of food.



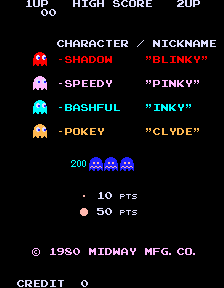
A view from the game

**2.1 Pac-Mans**

Both Mr. & Mrs. Pac-Man will have the same features in terms of their abilities. Differences are their appearance and controllers -the players that play them- . Mr. Pac-Man can be managed by using up, down, right and left arrows and Mrs. Pac-Man can be managed by using W, A, S, D.



**2.2 Ghosts**

****The ghost types of the classical Pac-Man game will be used in our version.

**2.2.1 Blinky**

It is the red ghost, known as the leader ghost of the group. It is following the Pac-Man from behind.

**2.2.2 Pinky**

It is the pink ghost and it positions in front of Pac-Man all the time.

**2.2.3 Inky**

It is the blue ghost which has a fickle mood. It is unpredictable.

**2.2.4 Clyde**

It is the orange ghost which is considered to be stupid. It chases Pac-Man with the lead of Blinky but it wanders off to its home corner when he gets too close.

**2.3 Food**

**2.3.1 Basic Food**

This kind of food does not give any new ability to pacmans. Player has to eat all basic food to pass the next level. When a basic food is eaten, player will get ten points.

**2.3.2 Big Basic Food**

This kind of food gives pacman opportunity to eat ghosts for five seconds and this food gives forty points.

**2.3.3 Green Food**

Green food is new type of food.This foodprovides passing through walls for five seconds and gives fifty points.

**2.3.4 Yellow Food**

Yellow food is also new type of food. This food provides passing through ghosts for five seconds and gives fifty points.

**2.4 Shields**

**2.4.1 Copper Shield **

Copper shield is the cheapest and weakest shield of the game. If player buys this copper shield, player’s pacman will obtain chance of hitting a ghost once without dying. Cost of copper shield is 3000 points.

**2.4.2 Silver Shield**

Silver shield provides hitting a ghost once without dying and increases speed by 5%. Cost of silver shield is 6000 points.

**2.4.3 Gold Shield **

Gold shield is the most powerful and expensive shield of the game. This shield provides hitting a ghost twice without dying and increases speed by 10%. After hitting ghosts twice, the player will automatically lose the shield. Cost is 9000 points.

3. Functional Requirements

* Player can close or open sound by clicking speaker icon on the main menu.
* Player can choose number of players.
* First player can move by using arrows. Second player can move by using W, A, S, D combination.
* Player can access the help menu by clicking question mark on the main menu.
* Player can see high score list.
* Player can design a map.
* Player can both load and save a game.
* Player can both load and save a map.
* Player can pause the game.

4.Non-Functional Requirements

* Throughout the project, object-oriented design concerns will be considered.
* User interface will have good and smooth looking.
* Our goal is to have high fps and to prevent input lags as much as possible.
* We will try to design our program with good class structure. In this way, program will be easy to add new features.

5. Pseudo-Functional Requirements

* This project will be implemented by using Java.
* Game images will be created by using photoshop programs. In need, web sources will be scanned.

6. System Models

**6.1 Use-Case Model**

**6.1.1 Use-Case Scenarios**

Use-Case-1

Play Game

Primary Actor: Player(s)

Main success scenario

1. Player starts the game by choosing game type.

2. Game starts from level 1.

3. After three seconds countdown, Pac-Man(s) are ready to move.

4. Players pass all levels.

5. The score is at top three scores.

6. The system asks for a name for the score gained.

7. Player enters the name.

8. Players quit the game.

Alternate Flow:

4.a Players lose all lives at any level.

4.a.1 Game over screen appears.

4.a.2 The system redirects player to step 5.

Alternate Flow:

5.a The score is not at top three scores.

5.a.1 The system redirects player to step 8.

Alternate Flow:

8.a Return to main menu

Use-Case-2

Create Map

Primary Actor: Player

Create Map Scenario

1. Player selects create map option.

2. Player designs a map.

3. Player starts the game with this map.

Alternate flow:

3.a Player returns to main menu without saving the map.

Alternate flow:

3.b Player returns to main menu after saving the map.

Use-Case-3

Pause Game

Primary Actor: Player

Main Success Scenario

1. Player presses ESC.

2. The system displays pause menu.

3. Player continues the game.

4. The game continues.

Alternate Flow

3.a Player change settings during pause.

3.a.1 The system redirects player to the settings menu.

Use-Case-4

Continue Next Level

Primary Actor: Player

Main Success Scenario

1. Player successfully passes one of levels except last level.

2. The system displays new equipment menu for next level.

3. Player buy one of the shields with scores.

4. Player continues with next level.

Alternate Flow

3.a Player does not buy shields and saves scores.

3.a.1 Player goes to step 4.

Use-Case-5

View Help

Primary Actor: Player

Main Success Scenario

1. Player chooses to view help.

2. The system displays information about gameplay and controls.

3. Player quits viewing help.

Use-Case-6

View High Scores

Primary Actor: Player

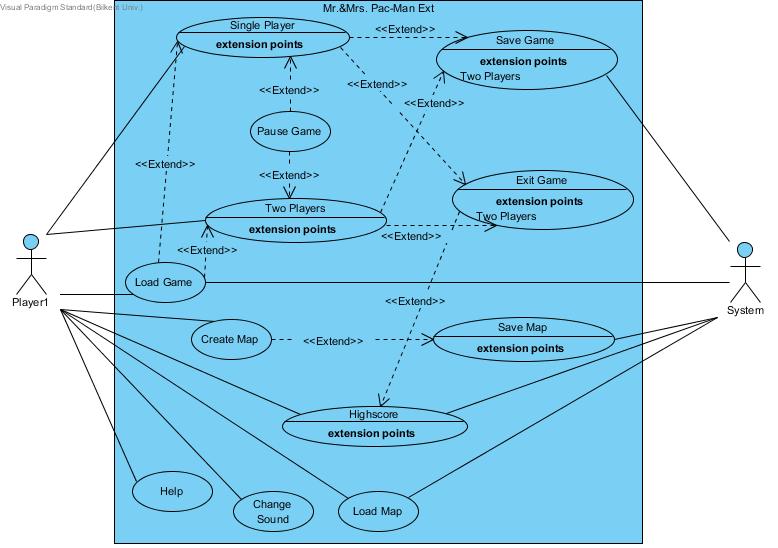
Main Success Scenario

1. Player chooses to view high scores.

2. The system displays top ten high scores.

3. Player quits viewing high scores.

**6.1.2 Use-Case Diagram**

****

**6.2 Dynamic Models**

In this section, some possible scenarios will be explained.

-Play Single Player: Choose single player mode and play the game by yourself.

-Use Shied: After completing first or second level, buy a shield.

-Eat Food: Eat special food and obtain new abilities.

-Play Two Player: Choose two player mode and enjoy with your friend.

-Create and Save Map: Design your own map and save it.

-Create Map and One Player Option: Design your own map and directly play it by yourself.

-Help&High Score&Sound Options: Go to help screen and learn about items and back to menu. Next, look at high score list and back to menu. Finally, disable sound by clicking speaker icon.

-Pause Game: View pause menu and resume game.

-Load Map: Play a game with saved map.

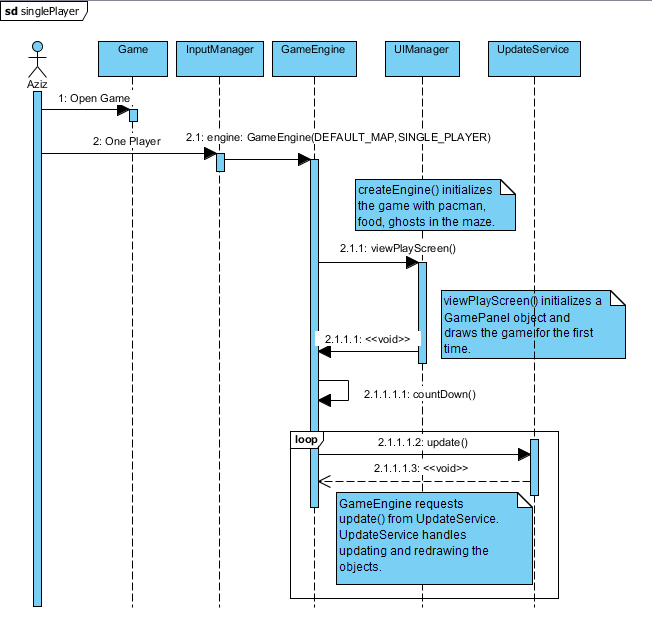
-Load Game: Play a game with saved game.

**6.2.1 Sequence Diagram**

Scenario #1: Play Single Player

Actor: Aziz

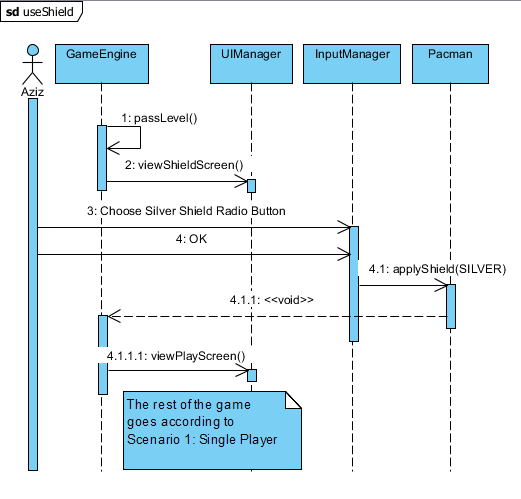
Aziz opens the game by double clicking desktop icon. Then, main menu appears on the screen and he selects single player mode. Next, first level starts and he sees ghosts, food and his character, Pac-man. After three seconds countdown, ghosts start to move. He eats food and tries to keep away from ghosts. He eats all the food and passes to the second level.



Scenario #2: Use Shield

Actor: Aziz

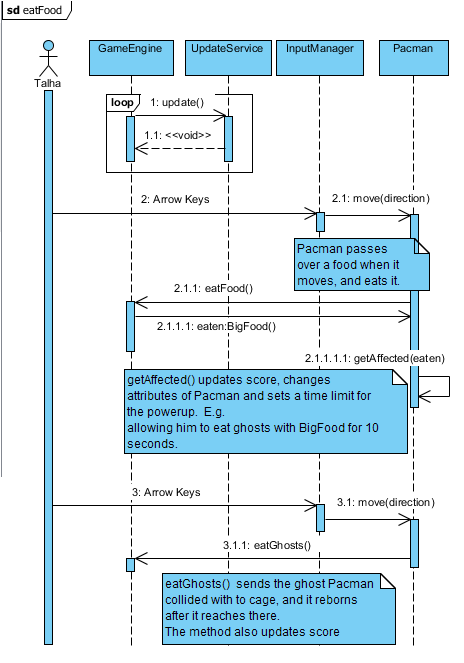
Aziz achieves eating all food and finishes level 1. Shield panel appears on the screen as pop-up and he buys silver shield with 6000 points. With the help of silver shield, Pac-man’s live and speed increase. Pac-man’s appearance also changes according to color of shield.



Scenario #3: Eat Food

Actor: Talha

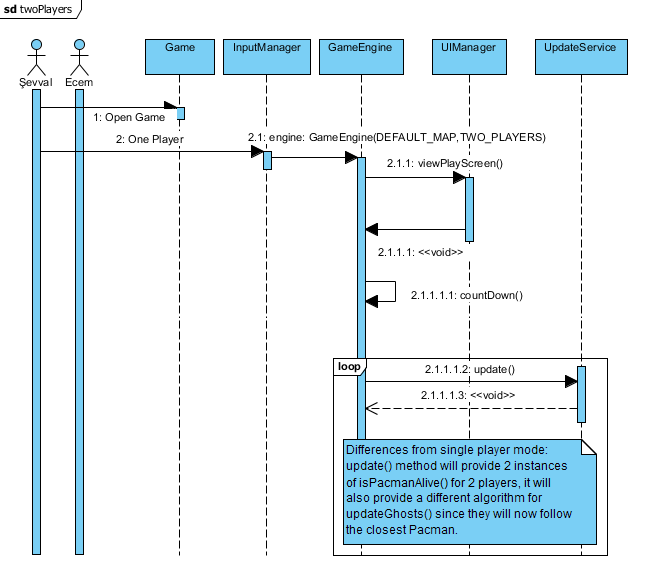
        Talha startstoplaythegameaftercountdown. Theghostsstarttochaseafterhimand he startstoeatthebasicfood. Thescorepointsstarttoincrease ten pointsbyeachbasicfood. Then he sees a bigbasicfoodandeats it. Talha now has theabilitytoeatghostsand he eatsone. Thepointsincrease 40 points. 10 secondslater, Pacmanlosestheabilitytoeatghostsandstartstoescapefromthemagain.



Scenario #4: Play TwoPlayers

Actor: Ecem, Şevval

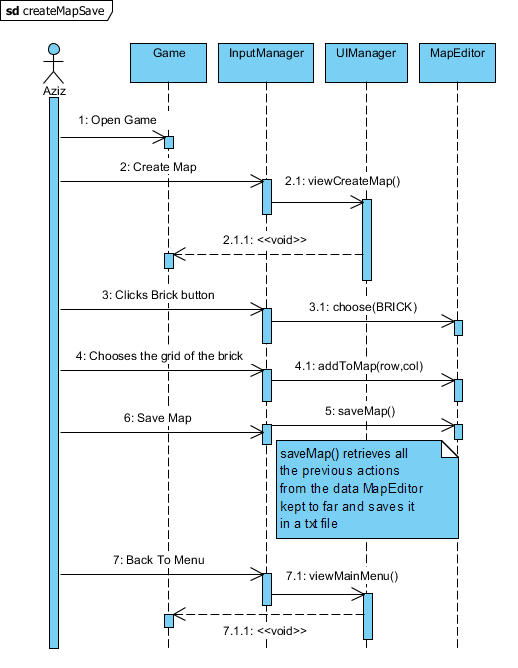
        Ecem opensthegamebydoubleclickingdesktopicon. Then, main menuappears on thescreenandsheselectstwoplayermode. Ecem entersthefirstlevelwith Şevval. Afterthecountdown, theghostsstartedtocomeafterbothPacmans. Theystarttoeatthefoodandescapefromghosts.



Scenario #5: CreateandSaveMap

Actor: Aziz

        Aziz opens main menuandselectscreatemapthis time todesign his ownmap. He markslocations of wallsandfood. He alsoselectsnumber of ghostsandmarkstheirlocations. Afterthat he decidestosavethemapandreturnsto main menu.



Scenario #6: CreateMapandOne Player Option

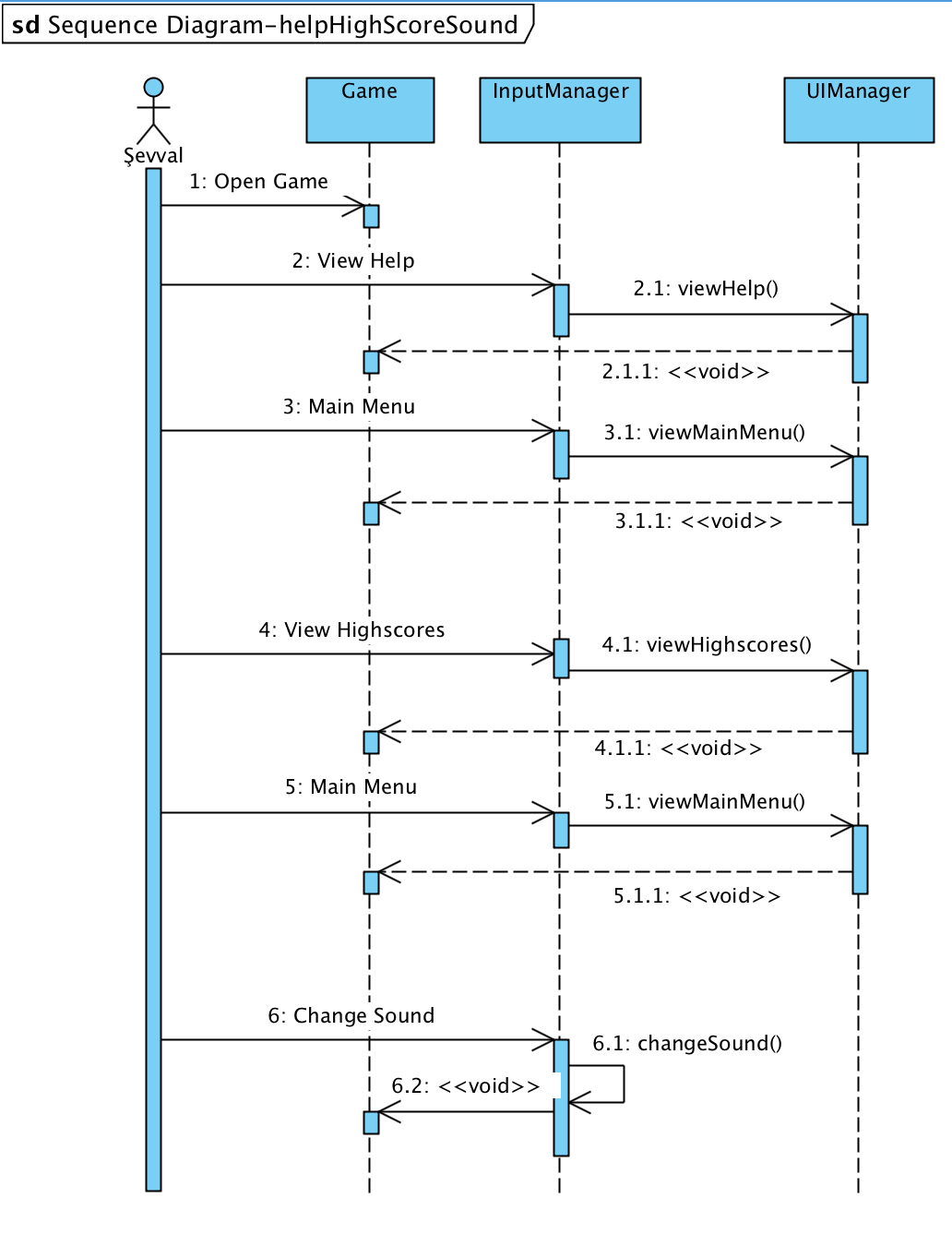
Actor: Şevval

        Şevval opensthegameand in the main menu, sheselectstheCreateMapoption. Shestartsdesigning her ownmap. Shedeterminesthelocationsforwallsandsheputsthefoodtotheplacesshewants. Shedecidesthenumber of ghostsandshelocatesthem. Shedoesn’tsavethemap. Shepressestheplaybuttonandimmediatelystartstoplay her map in singleplayeroption.

Scenario #7: Help&HighScore&SoundOptions

Actor: Şevval

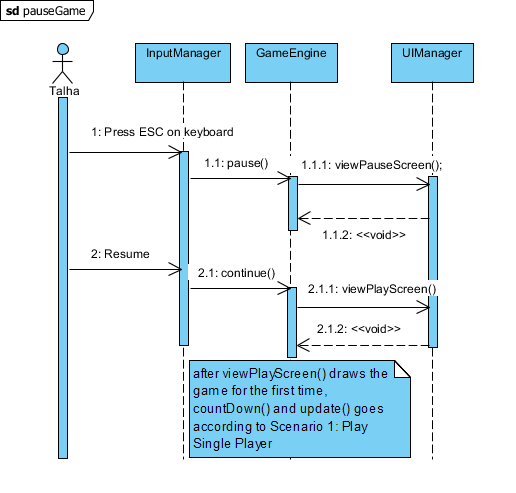
        Şevval opensthegameandthe main menucomestothescreen. Sheselectstheoption “help” togetsomeinformationaboutthegamefeatures. Shereadsthattherearefourtypes of foodandeach of them has differenteffectstothegame. Shealsolearnsabouttheshieldsandthelevel of protectiontheygivetoPacman.  Shequitsfromthehelpscreenandreturnstothe main menuagain. Shewantstocheckoutthehighscoressoshechoosestheoption “highscore”. Thelist of thehighest 5 scorescomestothescreen. Thelistsincludetheinformation of theplayer’s name andthenumber of pointsshescored. Şevval returnstothe main menuwiththebuttonwhich is locatedunderthescoretable. Shecomesbacktothe main menuanddecidestoturnoffthesound of thegame. Shepressesthesoundiconandturns of thesound.



Scenario #8: Pause Game

Actor: Talha

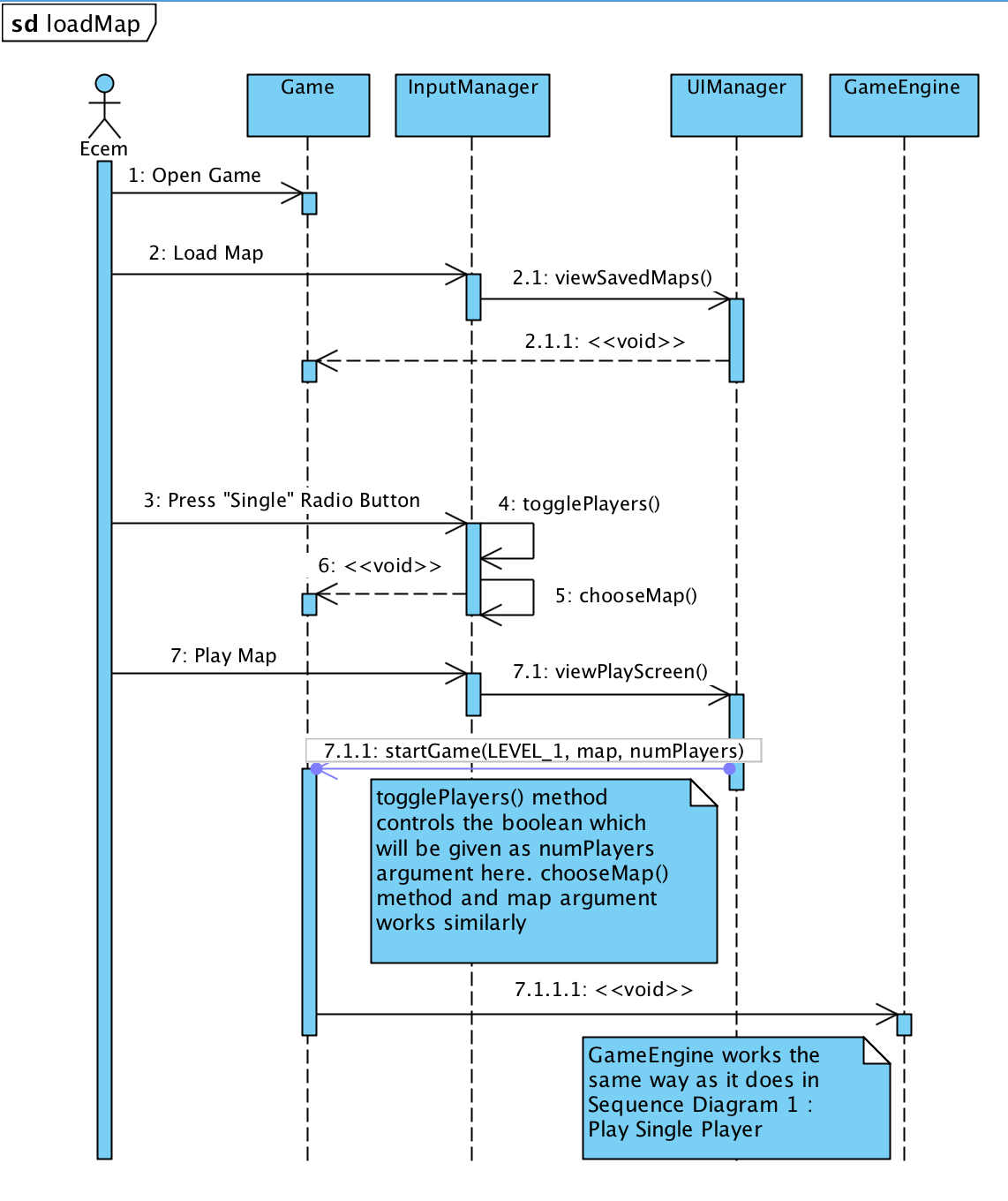
        Whileplayingthegame, Talha needstocheck his phoneso he pressesthe ESC button of thekeyboard. A pausegame pop upcomeswiththeoptionsfor “resume”, “savegame” and “exitgame”. Afterchecking his phone, Talha pressestheresumegamebuttonandcontinuethegame.



Scenario #9: LoadMap

Actor: Ecem

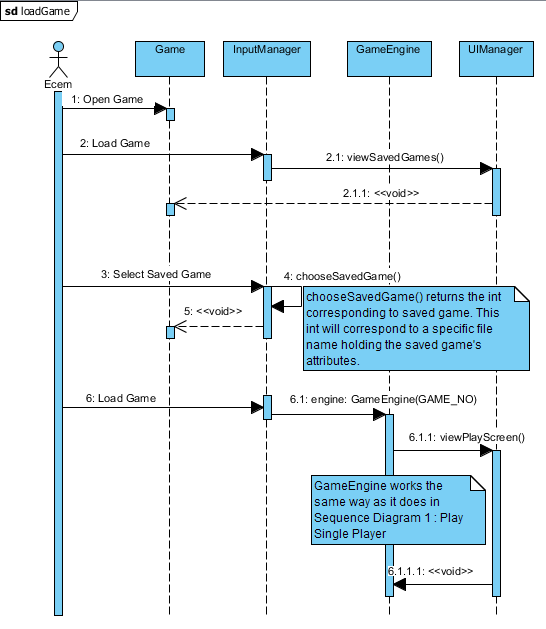
        Ecem opensthegameand main menucomestothescreen. ShepressestheLoadMapbuttontoplay on a previouslybuiltmap. SavedMapsscreencomesand it includes a tablewhich has themap name andsingleordoubleplayeroption. Shedecidesthemapthatshewantstoplayandselectsthesingleplayerradiobutton. Thenshepressesplaygamebuttonandstartstoplay.



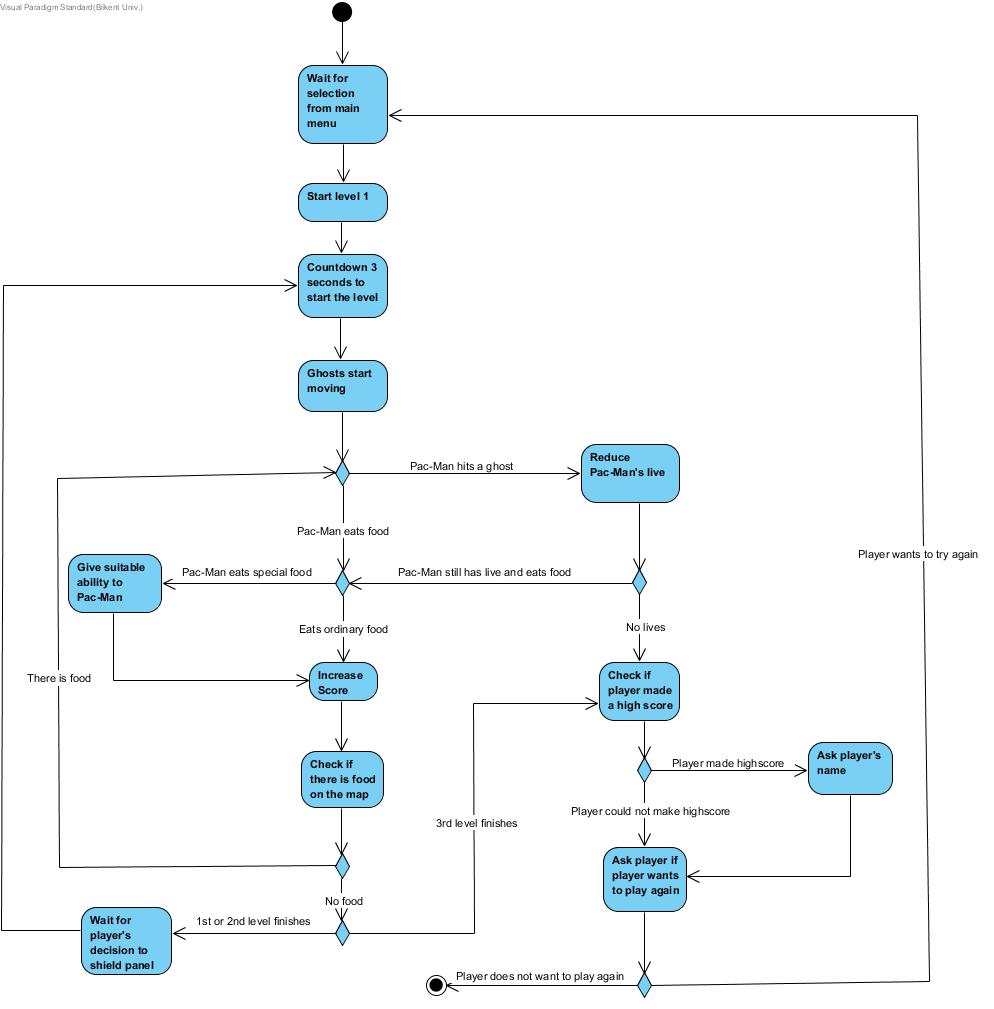
 Scenario #10: Load Game

Actor: Şevval

Şevval opensthegameandsheentersthe main menu. ShepressestheLoad Game buttontoseethesavedgames. A list of allsavedgamescomestothescreen. Shechooseswhichgameshewantstocontinueandthenshepressestheloadgamebuttonandgetsintothesavedgame.



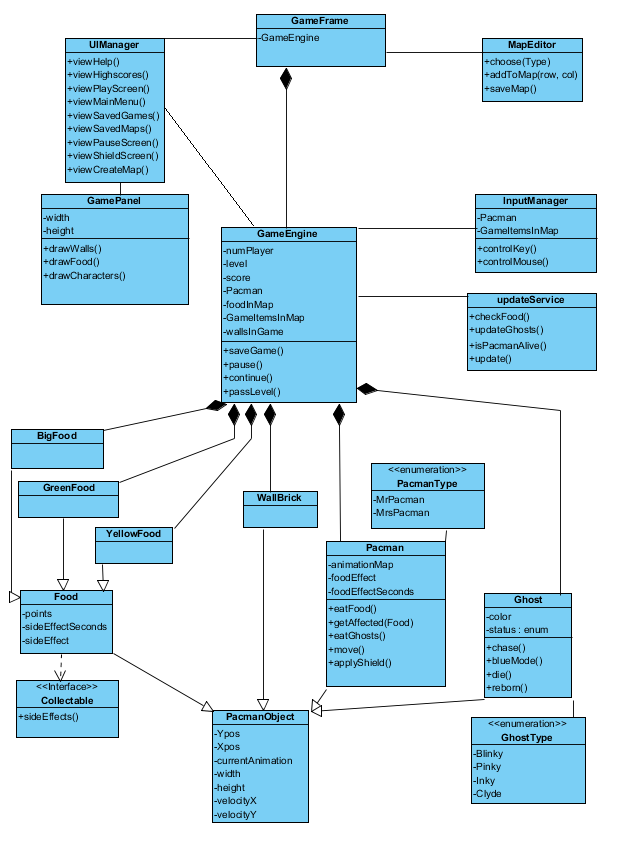
**6.2.2 Activity Diagram**

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Description

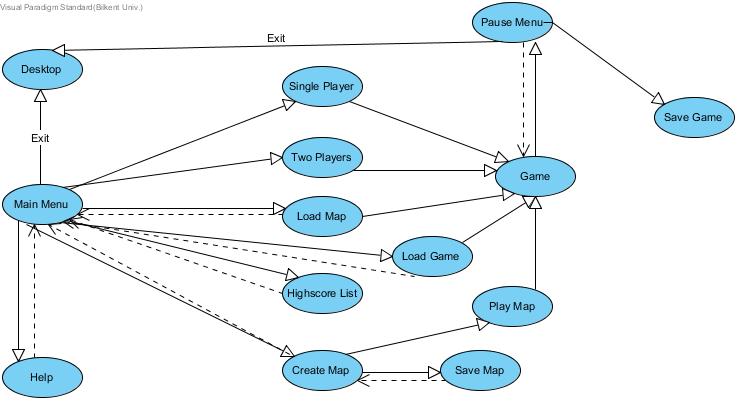
Main menu waits for player’s selection and the player selects single player mode. After that, system prepares level 1 which is given by the game. After three seconds countdown, ghosts start moving and player has ability to direct Pac-Man. Player starts eating food. If this food is special food, Pac-Man gains a new ability and player’s score increases. If eaten food is ordinary food, just player’s score increases without gaining any ability. After score is increased, system will check whether there is food on the map. If there is food, it means that level did not finish yet; therefore, loop continues until all food finishes or Pac-Man dies. If player hits a ghost, Pac-Man’s live is reduced and system checks if live remained or not. As long as Pac-Man has live, system goes back to level loop. Otherwise, Pac-Man dies and system controls if the score is high score. If it is, player will be asked for a name. However, if player completes first or second level, shield panel appears and system waits for a selection. After selection, game prepares next level. When player completes third level, system checks if score is high score. If it is not, without asking a name, player is asked for making decision about trying again.

**6.3 Object and Class Model**

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**6.4 User Interface**

**6.4.1 Navigational Path**

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Dashed lines represent back button or resume button.

**6.4.2 Screen Mock-Ups**

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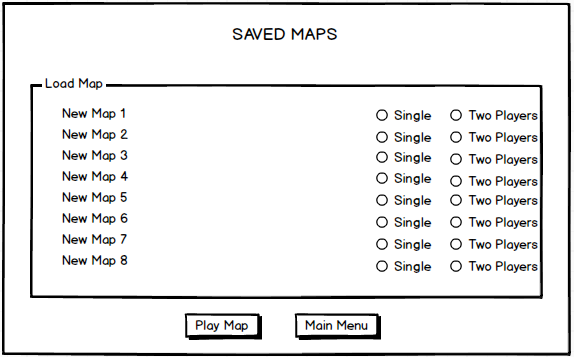
Main Menu

Figure above is main menu that player will see when s/he double clicks the game icon. From main menu, player will be able to access different pages of the game.



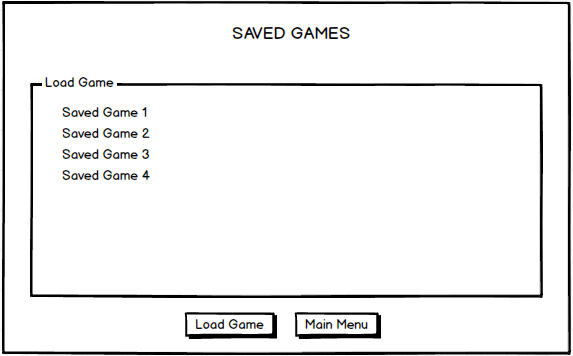
Initial Beginning

This is initial beginning of the game. In two players option Pac-mans will be located like above. Score and lives will be shown at the bottom of page.



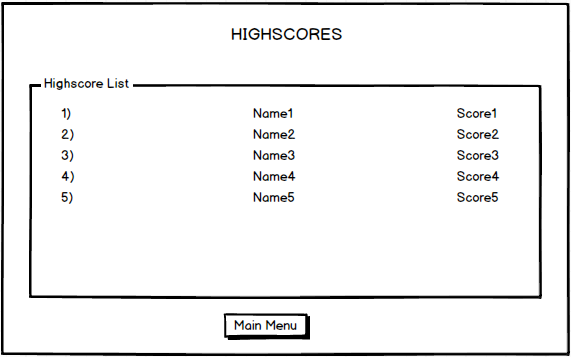
Load Map

When player selects load map option from main menu, this pop-up will appear on the screen. Player is directly can choose number of players from this pop-up.

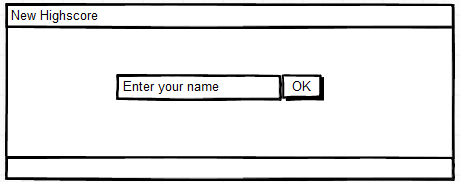


Load Game

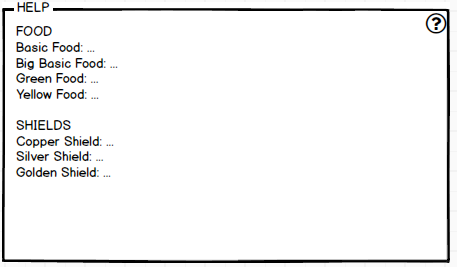
Load Game option also works like load map option.



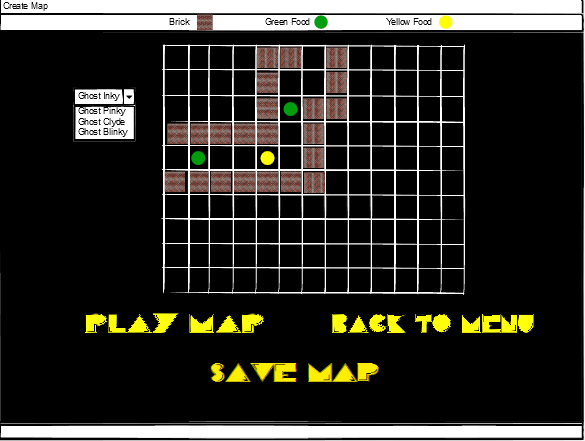
Player can see high score list from this screen by clicking highscores option.



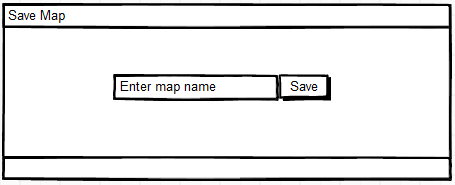
If player obtains a new high score, this panel will appear.



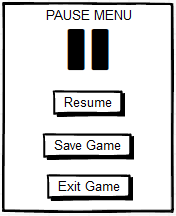
By clicking question mark on the main menu, player will see this help screen which tells features of items.



On create map screen player can design his own map by selecting items. Item bar is at top of the screen and ghosts can be selected from combo box at left side. Player can directly play the map or save it.



After creating the map, if user clicks save map button, this panel appears.



At any time of the game, player can stop game and save it.



If player achieves finishing first or second level, this shield panel will be seen on the screen and player will be able to choose what s/he wants to do by clicking one of radio buttons.



If player loses all lives, game over screen will appear and there will be play again option. If player obtained a high score, this screen will appear with high score saving panel.