**2805 ICT**Systems and Software Design  
**Assessment | Milestone 1  
Student Name:** Mitchell Roles **Student ID:** s5132278  
**Student Email:** [mitchell.roles@griffithuni.edu.au](mailto:mitchell.roles@griffithuni.edu.au)

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# Project Requirements

## Functional Requirements

Functional Requirements are, as the name implies, the needed functionality of a system or what that system needs to achieve with legal/expected input from a user. These functional requirements will detail what precisely is the desired behaviour of the product. For this specific project the goal is to create a version of the game Pac-Man so the functional requirements will reflect the needs to meet this end.

|  |  |  |
| --- | --- | --- |
| **ID:** FR-1 | **Name:** Broad GUI Requirements | |
| Functional Requirement | | Rationale |
| The system will need to offer a user an interface to which they can interact with the game in an intuitive and simple way, allowing them to select their desired settings and attempt to beat the game. | | Having a functional and intuitive GUI will allow for an enjoyable user experience, one which they can access what they want quickly and efficiently. |
| **ID:** FR-2 | **Name:** Functional Tutorial | |
| Functional Requirement | | Rationale |
| The system will require a dedicated section of itself to educate the user on how the core gameplay aspect functions as well as the win and lose conditions. | | The tutorial will allow a user to smoothly be introduced to the gameplay aspect of the system, avoiding any possible frustrations without some amount of guidance |
| **ID:** FR-3 | **Name:** Game Score | |
| Functional Requirement | | Rationale |
| The system should display some information, ascertaining to how well a user is doing in the game. “Eating” pellets, power-pellets or fruit all should increase the score. | | Having some form of score will allow a user to, at a glance, determine how well they are currently doing within a play state. |
| **ID:** FR-4 | **Name:** Win Condition | |
| Functional Requirement | | Rationale |
| The system needs to recognise when a user has completed a level. This will be done when the final pellet has been “eaten” | | Having a win condition will give a user a visible goal to move towards. This will also allow the game to finish and not continue forever. |
| **ID:** FR-5 | **Name:** Lose Condition | |
| Functional Requirement | | Rationale |
| The system will need to recognise when a user has lost the level. This will be when a ghost has touched “Pac-Man” and they are not under the effect of a power-pellet. | | This will give the user something to avoid and add some challenge to the experience, to prevent it from becoming boring. |
| **ID:** FR-6 | **Name:** Power Pellet | |
| Functional Requirement | | Rationale |
| The game aspect of the system will need to recognise when the user has “eaten” a power-pellet and have them enter a power up state, where the ghost will scatter and can be eaten themselves. | | This will give the player more choice as to how they wish to complete the level, going for the power up early or waiting until there are little pellets left. |

This might need to change.

## Use Cases

### Actor Description

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| --- | --- | --- |
| **Actor Name:** User | **Other Names:** Player | |
| Actor Description | | Actor Assumptions |
| The actor for this system will be a user, or player. This user will be the main driver of the program, as most the systems functions will remain unused unless they specifically use it. The user will be able to interact with the system through a combination of the mouse and keyboard. With the mouse primarily being used for the menu and the keyboard being used to navigate the maze. | | The user will have the expectation that the system will work faultlessly with no visible errors during gameplay. |

### Documented Templates

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| --- | --- |
| **Use Case:** Playing the Game | |
| **Functional Requirement Satisfied:** FR-1 | **Actor:** User |
| Description | |
| The user will interact with the game through the keyboard, using either the directional arrow keys or w, a, s, d to move “Pac-Man”. The user will navigate through a maze with the aim of picking up all the dots scattered throughout the level, whilst avoid the enemy ghost that pursue the player. The player will need to observe and learn the patterns of each “ghost” in order to complete the level in the smallest amount of time. | |
| Risk | |
| This requirement is the core of the game and without a user has no reason to use the system. Not implementing this requirement will leave a non-functional piece of software with little reason for existing. A user not being able to figure out the end goal is a possibility but implementing a tutorial of some description should suffice to negate this. | |
| Pre-Conditions | Post Conditions |
| The system started correctly or reset without fault and the user has selected their desired settings. | The game level successfully concludes with the player either completes the challenges or is caught be the enemies. |
| Basic Flow | |
| * The maze is generated, fully enclosed   + All dots are on the map   + The “ghost house” is located in the centre of the map   + The “ghosts” are placed in the ghost house   + The player character is placed somewhere in the maze * After an input from the player the game begins   + Player character begins to move   + Ghosts level the ghost house and pursue the player   + Player begins to pick up dots   + Timer begins   + Score increases with dot collection * Game ends if:   + Player collects all dots   + Or Player is touched by the ghosts whilst not under the effect of a power pellets | |
| Corresponding Diagram | Alternate Flow |
|  | The user terminates the program before the game could finish |

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| **Use Case:** Tutorial Pop Up | |
| **Functional Requirement Satisfied:** FR-2 | **Actor:** User |
| Description | |
| A small dismissible pop up screen which will contain concise information regarding how the game is played. Includes: movement controls, win condition, lose condition, power-pellet function and score mechanics. Will be presented with corresponding graphics that allow the user to more quickly grasp the core concepts that are communicated. | |
| Risk | |
| The player does not interact with this portion of the software and is unaware how the system functions. | |
| Pre-Conditions | Post Conditions |
| The game system started correctly, and the user has clicked on the tutorial tab in a menu. | The user has read and understood the information conveyed and exits the screen. |
| Basic Flow | |
| * User selected the “Tutorial” tab * A screen pops up * User can cycle through information   + Controls   + How to win   + Enemy introduction   + Power ups   + How the scoring works * User exits the screen when satisfied | |
| Corresponding Diagram | Alternate Flow |
|  | User never interacts with the menu |
| **Use Case:** Score Scaling | |
| **Functional Requirement Satisfied:** FR-3 | **Actor:** User |
| Description | |
| A scoring system that will rate how well a user is doing, or has done, inside a level. The system will increase the score a user has accumulated through eating pellets, eating power-pellets and eating ghosts under the effect of a power-pellet. The system will scale the amount of score a player gets regarding how long the game has been running for. With the longer the level has been running the smaller the amount of score a player will receive. | |
| Risk | |
| The player dose not understand how the scoring system works and potentially ends up with a score that is significantly lower than the amount they were expecting. | |
| Pre-Conditions | Post Conditions |
| The system and the game started and run correctly. | The level is terminated, through either completion or when the player is caught by a ghost. |
| Basic Flow | |
| * Player eats pellet/power-pellet/frightened ghost   + Score increases * As the timer increases   + Score amount decrease   + If the level has continued after a certain length of time no score is obtained | |
| Corresponding Diagram | Alternate Flow |
|  | The game is not started, and no score is accumulated. |

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| **Use Case:** Winning the Game | |
| **Functional Requirement Satisfied:** FR-4 | **Actor:** User |
| Description | |
| After the player has collected all the pellets in a level the game will finish and the final score the player has achieved will be displayed. The game will then reset the level and allow the user to play again. | |
| Risk | |
| The player never completes the level due to the difficulty of the game. | |
| Pre-Conditions | Post Conditions |
| The system and level have started correctly. The game functions properly. | The game is reset |
| Basic Flow | |
| * Player collects all of the pellets * A separate screen appears   + - Displays congratulatory text     - Displays score * Player exits screen * Game is reset | |
| Corresponding Diagram | Alternate Flow |
|  | Player never reaches the congratulations screen. |
| **Use Case:** Losing the Game | |
| **Functional Requirement Satisfied:** FR-5 | **Actor:** User |
| Description | |
| If the player has been caught by the ghosts and is not under the effect of a power-pellet the game level will terminated and the score the player achieved will be displayed. Afterwards the games will restart, and the player can play the game again. | |
| Risk | |
| The player never begins the game and never sees the screen. Or the player never loses. | |
| Pre-Conditions | Post Conditions |
| The game has started properly and the correctly detects when the player has lost | The game is reset |
| Basic Flow | |
| * Game begins and the player is caught * Some notification plays to alert the player that they have lost   + - Character animation     - Death sound   + Lose screen is displayed     - Some consoling text     - Score achieved   + Player exits screen   + Game resets | |
| Corresponding Diagram | Alternate Flow |
|  | Player completes the level and never sees the lose screen |

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| **Use Case:** Power-Up Mode | |
| **Functional Requirement Satisfied:** FR-6 | **Actor:** User |
| Description | |
| Player collects a power-pellet and all of the ghosts enter a freighted state and scatter. During a brief amount of time the ghost can be eaten by the player for extra score. After the ghosts have been eaten, they will return to the ghost house and begin their pursuit again. When the power up wears off, the ghost will return to their normal state and renew their pursuit. | |
| Risk | |
| This feature is critical to the gameplay experience, as it gives the player a small window of relief which allows them to either get themselves into a more advantageous position or to gain some extra score. | |
| Pre-Conditions | Post Conditions |
| The level has started correctly, and the game is functioning properly. | The power-up wears off and the game continues like normal. |
| Basic Flow | |
| * Player eats a power-pellet   + Ghosts enter frightened state   + Some musical que is played   + Count down begins * Ghosts are eaten and points are awarded to the player. * Power-up wears off | |
| Corresponding Diagram | Alternate Flow |
|  | Player does not start the game |

### Activity Diagram

## Use Case Diagram

## Non-Functional Requirements

## Constraints

# Project Risk

# Project Feasibility

# Prototype Demonstration

# Conceptual Design

## Automatic Document generation

**Conceptual Design**