# AGM - Arcade Game Maker Pedagogical Product Line

# Requirement

## Use cases

### Play Selected Game

|  |  |
| --- | --- |
| **Use Case Name:** | Play Selected Game |
| **Use Case ID:** | AGM001 |
| **Use Case Level:** | Abstract |
| **Actor:** | GamePlayer or GameInstaller |
| **Preconditions:** | AGM011: Install game has completed successfully. |
| **Postconditions:** | Actor has won/lost/tied and the game is ready to play again. |
| **Detailed Description** | |
| **Trigger:** | Actor selects game executable and initiates execution. |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects PLAY from the menu | Initializes the game and displays the gameboard | | Left-clicks to begin play | Starts game action | | Left-clicks or uses keyboard to enter commands | Responds to the command in the expected manner | | Responds to Won/Lost/Tied dialog box with left-click | Returns the gameboard to its initialized, ready-to-play state | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | At any time, may select EXIT from the menu | See AGM002: Exit game | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | See AGM006: Play Brickles |  | | See AGM007: Play Pong |  | | See AGM008: Play Bowling |  | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | AGM002: Exit game |
| **Decision Support** | |
| **Frequency:** | On Demand |
| **Criticality:** | High |
| **Risk:** | Low |

### Exit Game

|  |  |
| --- | --- |
| **Use Case Name:** | Exit Game |
| **Use Case ID:** | AGM002 |
| **Use Case Level:** | System end-to-end |
| **Actor:** | GamePlayer or GameInstaller |
| **Preconditions:** | Game system is running. |
| **Postconditions:** | Game system is terminated. |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects EXIT from system menu | Prompts actor to save or exit the game | | Saves game | Saves the game and exits the program | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Cancels the EXIT action | Returns to suspended action | | |
| **No. 2:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | May initiate EXIT by left-clicking the upper right-hand corner of the game window | Prompts actor to save or exit the game | | Saves game | Saves the game and exits the program | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | AGM001: Play selected game |
| **Decision Support** | |
| **Frequency:** | Low - only once per game start-up |
| **Criticality:** | Low |
| **Risk:** | Low |

### Save Game

|  |  |
| --- | --- |
| **Use Case Name:** | Save Game |
| **Use Case ID:** | AGM003 |
| **Use Case Level:** | System end-to-end |
| **Actor:** | GamePlayer or GameInstaller |
| **Preconditions:** | Game executable is running, and a game has been started. |
| **Postconditions:** | Current state of the game has been written to the specified file OR action has been cancelled. |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects the SAVE option in the system menu | Allows the actor to specify a filename | | Writes game data to the file | | Returns to the game's pre-SAVE status | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects the EXIT menu option | See AGM002: Exit game | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects the SAVE option in the system menu | Prompts the actor to specify a filename | | Raises exception because the disk is full | | Selects a different disk | Attempts to save again | | Identifies an existing file with the same name as specified in the Save dialog | | Raises ExistingFileException | | Chooses a different name OR  Agrees to overwrite the existing file | Writes the file | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | AGM002: Exit game |
| **Decision Support** | |
| **Frequency:** | On demand |
| **Criticality:** | Medium |
| **Risk:** | Medium - other files might be corrupted. |

### Save Score

|  |  |
| --- | --- |
| **Use Case Name:** | Save Score |
| **Use Case ID:** | AGM004 |
| **Use Case Level:** | System end-to-end |
| **Actor:** | GamePlayer |
| **Preconditions:** | Game system is running and a game is in progress |
| **Postconditions:** | File has been written, or action has been cancelled |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects SAVE SCORE from system menu | Prompts actor to specify a filename | | If the file does not exist, creates new file | | Writes score to the file | | Returns to the game's pre-SAVE status | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects SAVE SCORE from system menu | Prompts actor to specify a filename | | If the file exists, overwrites existing score  Else creates new file and writes score | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects the SAVE SCORE option in the system menu | Prompts actor to specify a filename | | Raises exception because the disk is full | | Selects a different disk, if available | Attempts to save again | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | AGM005: Check previous best score |
| **Decision Support** | |
| **Frequency:** | On demand |
| **Criticality:** | Medium |
| **Risk:** | Low |

### Check Previous Best Score

|  |  |
| --- | --- |
| **Use Case Name:** | Check Previous Best Score |
| **Use Case ID:** | AGM005 |
| **Use Case Level:** | System end-to-end |
| **Actor:** | GamePlayer |
| **Preconditions:** | Game system is running. |
| **Postconditions:** | Stored score has been shown to actor. |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects Check Previous Best Score | Prompts actor to specify a filename | | Reads the file and returns score in a dialog box | | Selects OK on dialog box to continue | Returns to state before select | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects Check Previous Best Score | Prompts actor to specify a filename | | Finds that file does not exist | | Selects OK on dialog box to continue | Returns to state before select | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | AGM004: Save score |
| **Decision Support** | |
| **Frequency:** | On demand |
| **Criticality:** | Medium |
| **Risk:** | Low |

### Play Brickles

|  |  |
| --- | --- |
| **Use Case Name:** | Play Brickles |
| **Use Case ID:** | AGM006 |
| **Use Case Level:** | System end-to-end |
| **Actor:** | GamePlayer or GameInstaller |
| **Preconditions:** | AGM011: Install game has completed successfully. |
| **Postconditions:** | Game has been played. |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects PLAY from the menu | Initializes the game and displays the gameboard | | Left-clicks to begin play | Starts game action | | Left-clicks or uses the keyboard to enter commands | Moves the paddle horizontally to follow the mouse track  After each movement of the puck, system checks for a collision with another object.  If puck collides with the ceiling, it is reflected back into the playing area.  If the puck collides with a wall, it is reflected back into the playing area.  If the puck collides with the floor, it ceases to exist. If the maximum number of pucks has not been reached, requests and provides a new puck. If the maximum has been reached, the Lost dialog is presented.  If the puck collides with a brick, defines action by the type of brick. When the puck collides with the last brick, the Won dialog is presented. | | Responds to Won/Lost dialog box with left-click | Returns the gameboard to its initialized, ready-to-play state | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | N/A |
| **Decision Support** | |
| **Frequency:** | On demand |
| **Criticality:** | High |
| **Risk:** | Low |

### Play Pong

|  |  |
| --- | --- |
| **Use Case Name:** | Play Pong |
| **Use Case ID:** | AGM007 |
| **Use Case Level:** | System end-to-end |
| **Actor:** | GamePlayer or GameInstaller |
| **Preconditions:** | AGM011: Install game has completed successfully. |
| **Postconditions:** | Game has been played. |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects PLAY from the menu | Initializes the game and displays the gameboard | | Left-clicks to begin play | Starts game action | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | N/A |
| **Decision Support** | |
| **Frequency:** | On demand |
| **Criticality:** | High |
| **Risk:** | Low |

### Play Bowling

|  |  |
| --- | --- |
| **Use Case Name:** | Play Bowling |
| **Use Case ID:** | AGM008 |
| **Use Case Level:** | System end-to-end |
| **Actor:** | GamePlayer or GameInstaller |
| **Preconditions:** | AGM011: Install game has completed successfully. |
| **Postconditions:** | Game has been played. |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects PLAY from the menu | Initializes the game and displays the gameboard | | Left-clicks to begin play | Starts game action | | Repeat the following for 10 frames plus a bonus throw | | | Positions the mouse and left-clicks to send ball down alley | Moves the ball down the alley using a randomly selected algorithm. If collisions result when the ball reaches the pins, moves pins as determined by the physics of the collision. | | Counts number of pins knocked down | | Positions the mouse and left-clicks to send ball down alley | Moves the ball down the alley using a randomly selected algorithm. If collisions result when the ball reaches the pins, moves pins as determined by the physics of the collision | | Computes score | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | N/A |
| **Decision Support** | |
| **Frequency:** | On demand |
| **Criticality:** | High |
| **Risk:** | Low |

### Initialization

|  |  |
| --- | --- |
| **Use Case Name:** | Initialization |
| **Use Case ID:** | AGM009 |
| **Use Case Level:** | Function sub-use case |
| **Actor:** | N/A |
| **Preconditions:** | AGM006: Play Brickles, AGM007: Play Pong, or AGM008: Play Bowling has begun operation. |
| **Postconditions:** | Game is ready to operate. |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | |  | Creates the standard instances of the required classes | | Enters the READY state | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects Load Game from the menu | Presents a file chooser box | | Opens the file that is indicated | | Reads and constructs the game objects | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | |  | Runs out of memory while creating objects | | Displays the Error dialog box | | Destroys objects already created | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | N/A |
| **Decision Support** | |
| **Frequency:** | Once per game start-up |
| **Criticality:** | High |
| **Risk:** | Medium |

### Animation Loop

|  |  |
| --- | --- |
| **Use Case Name:** | Animation Loop |
| **Use Case ID:** | AGM010 |
| **Use Case Level:** | Function sub-use case |
| **Actor:** | N/A |
| **Preconditions:** | AGM009: Initialization has operated successfully and the user has left-clicked. |
| **Postconditions:** | Game is completed. |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | |  | Generates periodic signals and sends them to the game | | Moves all objects one step according to their movement algorithm | | Checks for collisions and executes the collision algorithms of the objects | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Holds down the left mouse button | Pauses the movement of the game | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | N/A |
| **Decision Support** | |
| **Frequency:** | Once for every playing of the game |
| **Criticality:** | High |
| **Risk:** | Medium |

### Install Game

|  |  |
| --- | --- |
| **Use Case Name:** | Install Game |
| **Use Case ID:** | AGM011 |
| **Use Case Level:** | System end-to-end |
| **Actor:** | GameInstaller |
| **Preconditions:** | N/A |
| **Postconditions:** | Game is installed. |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects the installer executable to execute | Presents a file chooser to allow selection of a directory in which to place the game files | | Selects a directory | Places game files in the directory | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | |  | Finds insufficient space to which to write files | | Displays the Out of Space dialog box | | Left-clicks on OK button | Exits the program | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | AGM012: Uninstall Game |
| **Decision Support** | |
| **Frequency:** | Very seldom |
| **Criticality:** | High |
| **Risk:** | Low |

### Uninstall Game

|  |  |
| --- | --- |
| **Use Case Name:** | Uninstall Game |
| **Use Case ID:** | AGM012 |
| **Use Case Level:** | System end-to-end |
| **Actor:** | GameInstaller |
| **Preconditions:** | AGM011: Install game completed successfully. |
| **Postconditions:** | All disk space taken up by the game is reclaimed. |
| **Detailed Description** | |
| **Trigger:** |  |
| |  |  | | --- | --- | | **Actor** | **System Response** | | Selects UNINSTALL from the system menu | Presents a file chooser to the actor | | Selects directory where game is stored | Erases files in the directory | | Presents the Uninstall Completed dialog box | | Selects the OK button in the dialog box | Closes dialog box | | |
| **Alternative Courses of Action** | |
| **No. 1:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Extensions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Exceptions** | |
| **List:** | |
| |  |  | | --- | --- | | **Actor** | **System Response** | | N/A | N/A | | |
| **Concurrent Uses:** | N/A |
| **Related Use Cases:** | AGM011: Install game |
| **Decision Support** | |
| **Frequency:** | Very seldom |
| **Criticality:** | Low - can be done manually |
| **Risk:** | Medium - might erase the wrong files |

## 

# Analysis

# Design

# Implementation