SAINT LOUIS UNIVERSITY

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Memory Card Matching Game

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Final Project

Memory Card Matching Game

1. Executive summary

This document provides complete technical specifications for a java based Memory Card Matching game developed using Swing GUI framework. The game challenges the player to match the pairs of cards under the time given with different difficulty levels(i.e., easy, medium, hard), tracking the performance metrics and providing the visual feedback after completing the game.

2. Game Overview and Core features

The Memory Card Matching game serves as a single player puzzle challenge which requires testing of memory and concentration abilities of the players. Players attempt to complete the game by making the pairs from the cards hidden within a grid layout and trying to finish the level with minimal attempts. The game features three levels of difficulty which start from an easy setting of 4x4 grid and progress to medium with 6x6 grid and the end with most challenging Hard mode at 8x8 grid. The game utilizes a turn-tracking feature to count player attempts and incorporating the audio visual system feedback for user involvement.

Technical Stack :
Language : Java
GUI framework : Swing

3. Game Play Rules

1. Player selects the difficulty level then enters the name then the start button will disable then click on the start button.
2. Systems generates randomized card layout.
3. Game begins upon first card click (then the timer starts)
4. If the player clicks on two cards : if it matches then the card reveals the state, if it not matched then the card flips back after 1000ms.
5. Game ends when the player pair up all the cards orelse if time expires.

Some Handling cases :

1. Before clicking the level we cant able to click on the start button.
2. Double clicking on the same card. We can not click the same card at a time. If we do so then it will ignore the second click.

4. Functional Requirements

4.1 Core game requirements:

4.1.1 Game Initialization : System need to generate the NxN grid of cards where the N belongs to 4,6,8 based on the selected level.

4.1.2 Card Distribution : Cards shall be populated with $(N^2)/2$ unique emojis pairs randomly distributed.

4.1.3 Card Flipping : Clicking card shall it play flip sound effect, reveal the emoji with milliseconds, disable future click on the same card.

4.1.4 Matching Logic : System shall compare card values

4.1.5 Game Timer : It has 60 second countdown timer shall be implemented for hard difficulty.

4.2 Game State Management :

4.2.1 Session tracking : System shall maintain the current player name, Difficulty level.

4.2.2 Win Detection : Game shall detect completion when matched pairs should be equal to (rows x columns)/ 2

4.3 Audio Visual Systems:

Sound effects : system shall implement the audio effect when we click on the card flip, and some sound effects for match success and match fails.

5. UI Requirements

5.1 Screen Specifications :

Main Menu Screen :

1. Dimensions: 800x600
2. Setting the background
3. UI components: Title Text : “ Memory Master”, Difficulty selector, Player Name Field, Start button(Start button in disable when after clicking the level).

Game Screen:

1. Grid layout according to the level selected.

2. Status : It counts the attempts which have done, setting up the timer, pairs remaining progress bar.

5.2 Component states :

1. Setting the properties of the card with colour, brightness, emojis visible, when the emojis matched then the card features changes, Button disable(when we put the cursor it shows like not allowed).

6. Technical Design

UML Class Diagram