A logo with blue and red text

Description automatically generated

**Documentation**

**Submitted by**

Name: Sujit Kumar Thakur

Student ID: 23085143

Submitted to: Aashish Acharya

Kathmandu, Nepal

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**Documentation:**

**Match-3 Game**

**Introduction:**

This project is a Match-3 puzzle game built using C++ and the SFML (Simple and Fast Multimedia Library). It features colorful gems, a scoring system, level progression, and game state saving/loading. The game is designed with simple object-oriented programming concepts to help learners understand 2D game development fundamentals.

From a development perspective, this project applies object-oriented programming (OOP) principles to organize code efficiently using classes like Piece and GameObject. It also serves as a beginner-friendly example of 2D game logic, user input handling, grid-based collision detection, inheritance and graphics rendering, making it an excellent learning tool for students and aspiring game developers.

**Tools & Technologies Used:**

* Programming Language: C++
* Graphics Library: SFML (Simple and Fast Multimedia Library)
* IDE/Compiler: Clion 2025.1
* Assets: background.png, gems.png, font.ttf
* File Handling: Used for saving and loading game state.

**Game Logic Overview**

**1. Grid and Tiles:**

* The game grid is 8x8, holding colored gem pieces.
* Each piece is an object with properties like position, type (kind), match flag, and transparency (alpha).

**2. Game Mechanics:**

* Players can click two adjacent gems to swap them.
* If the swap forms a horizontal or vertical line of 3 or more matching gems, those gems disappear.
* New gems fall from above to replace removed ones.

**3. Scoring and Levels:**

* Matching 3 gems: +10 points
* Matching 4 gems: +20 points
* Matching 5+ gems: +30 points
* When the score reaches 100 points, the game levels up to Level 2.

**4. Save/Load Feature:**

* Press K to save the game to save.txt.
* Press L to load the game from the file.

**5. Controls:**

* Mouse: Select and swap gems.
* W/A/S/D keys: Move the red highlight cursor.
* K key: Save the game.
* L key: Load the saved game.

**Graphics and Rendering:**

* The background and gem sprites are loaded from image files.
* The red highlight box shows the currently selected tile.
* Gems fade out when matched and animate as they fall into place.

**File Handling:**

* A simple text file save.txt stores the current score, move count, level, and grid state.
* File I/O is handled using ofstream and ifstream for saving and loading respectively.

**Key Features Summary:**

* 2D Match-3 gameplay using SFML.
* Object-oriented design (with Piece and GameObject classes).
* Colorful tile animations and fade effects.
* Keyboard and mouse controls.
* Level-up and score system.
* Save and load feature with file handling.

**Uses:**

* File I/O Operations
* 2D array manipulation
* User input handling
* Game state management
* Basic collision detection

**Conclusion:**

This Match-3 game project showcases how C++ and SFML can be used to build an engaging 2D puzzle game with intuitive gameplay and smooth visuals. Using object-oriented programming, sprite handling, and simple game mechanics, it provides a solid foundation for understanding core game development concepts. The inclusion of scoring, level progression, keyboard and mouse input, and file handling for saving/loading enhances the experience and encourages players to improve their strategy and performance. This project serves as a great starting point for beginners and can be expanded further with new features like combos, special tiles, sound effects, and more complex levels to create a richer and more dynamic gaming experience.