**Pixel Art Editor**

Course Code & Section: CSE 115.2

Project Group 6

Author Information

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**Abstract -** This paper presents a simple pixel art editor implemented in C using the SDL2 library. The editor allows users to draw and edit images at a pixel level within a 32x32 grid. Basic functionalities include drawing, erasing and selecting colors via keyboard shortcuts. The project serves as a foundation for further improvements, such as undo/redo capabilities, saving/loading functionality, and a more user-friendly graphical interface.

***Keywords: Pixel Art Editor, SDL2, Graphics Programming, C Language, Input Handling, Rendering, Grid System.***

**I. Introduction**

Pixel art is a form of digital art where images are edited at the pixel level, widely used in retro gaming and low-resolution design. This project implements a simple pixel art editor using SDL2, a powerful multimedia library that facilitates graphics rendering and input handling in C.

The objective of this project is to provide a lightweight and efficient tool for creating pixel-based drawings, offering essential features while maintaining an intuitive interface.

**II. System Design and Implementation**

**1. Graphics and Rendering**

The application utilizes SDL2 to render a 32x32 grid of pixels, each represented by a 32x32 square. The rendering loop continuously updates the screen to reflect user interactions.

**2. Input Handling**

User interaction is facilitated through both mouse and keyboard inputs:

**Mouse Input:**

Left-click: Draw using the selected color.

Right-click: Erase (turn pixel white).

**Keyboard Input for Color Selection:**

R → Red

G → Green

B → Blue

W → White

K → Black

**3. Grid System**

Each pixel in the canvas is mapped to a 32x32 square, allowing precise pixel-based drawing and erasing. The program efficiently manages grid rendering and updates to ensure smooth operation.

**4. Rendering Loop**

The SDL2 loop continuously listens for user inputs and updates the grid accordingly. This ensures real-time feedback for a seamless drawing experience.

**5. Cleanup and Resource Management**

To prevent memory leaks, SDL2 resources are properly released upon program termination.

**III. Results and Discussion**

The pixel art editor successfully allows users to create simple pixel-based drawings with minimal latency. The implementation of a keyboard-driven color selection system enhances usability. However, certain limitations exist, such as the lack of undo/redo functionality and an advanced color selection palette.

**IV. Future Improvements**

Several improvements can be incorporated to enhance the usability and functionality of the editor:

**Undo/Redo Functionality**: To allow users to revert mistakes and improve editing efficiency.

**Saving and Loading Drawings**: Enabling users to store and retrieve pixel art creations.

**Expanded Color Palette**: Providing more color options for creative flexibility.

**Graphical User Interface (GUI) Enhancements**: Improving the visual appeal and accessibility of the editor.

**V. Conclusion**

This project provides a functional base for a pixel art editor using SDL2. By implementing core features such as drawing, erasing, and keyboard-based color selection, it offers a solid starting point for future expansions. With further improvements, this editor can become a more robust and versatile tool for digital artists and game developers.

**VI. References**

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**VII. Acknowledgment**

This project was developed as a learning exercise in C and SDL2 graphics programming.