

2048 Game Design Proposal

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Project Overview

The core of this project is a 2048 video game, leveraging its FPGA capabilities for hardware acceleration and VGA output for display. The game will display the game interface on a VGA monitor and respond to user inputs through button or keyboard.

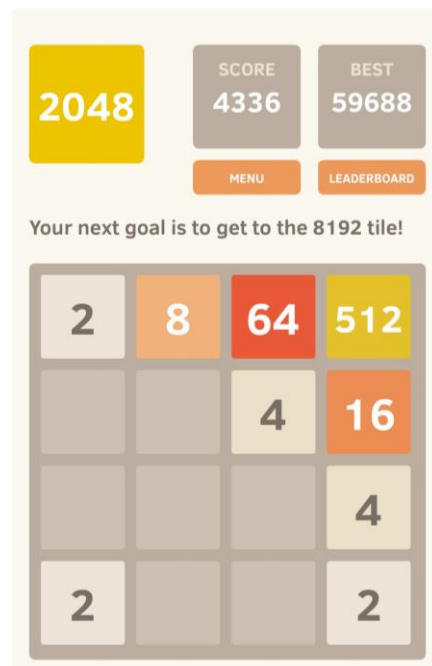


Figure1: the 2048 game

Hardware Design

- VGA display: This display will serve as the user's interface to monitor current game developments and to interact via input actions.
- Keyboard interface: The keyboard is used to select and move the number blocks and allow users to input any necessary information the game needs.
- Memory storage: This hardware will be where the game logic is stored.

Software Design

- Game logic: Implementation of the 2048 game algorithm, including number block generation, movement, merging, and score calculation.
- Display management: Utilization of a frame buffer for animation and transition of number blocks on the VGA display.
- User interface: A simple, intuitive interface displaying the game grid, score, and end-game notifications with options to restart the game.

Development Tools

- Quartus: For FPGA development, including System Verilog coding for the game logic and VGA display controller.
- VS code: For software coding, including game logic design, display management and user interface

Milestone

Stage1: Design the overall structure of 2048 game, then develop the game logic and display management.

Stage2: Finish the VGA display, keyboard interface and memory storage.

Stage3: Verify the functionality of the previous stages and then develop the user interface and test.