Implementation of Pong on a RISC-V Processor

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Objective and Requirements

The objective of this project is to implement a fully functional Pong game using the RISC-V processor. The main requirements include real-time paddle and ball movement, collision detection, score tracking, and display output on a connected screen. The game should be interactive, responsive, and playable with two players (Player vs Player) using separate input controls.

Optional game features, if time allows:

- Introduce random tokens that modify gameplay
    - Speed-up token: increases the ball's speed
    - Double points token: 2 points for the next point
    - Multi-ball token: introduces a second ball into play
- Game-mode:
    - Player vs Computer (1 vs AI)

Solution

We intend to make the game for the RISC-V board. We plan to create modules for paddle movement, ball movement, and collision detection. A screen will show the game using the VGA output on the board, and the players will control the paddles with buttons. Player input will be read from buttons connected via GPIO. We will use interrupts triggered by the built in timer to update the screen and control the speed of the game. The code will be written in C.

Verification

The solution will be verified by running the game on the RISC-V processor and observing correct paddle movement, ball reflection, and score updating. Additional tests will include verifying boundary conditions, such as ball collisions with screen edges and paddles, and ensuring that no crashes or unexpected behavior occurs during gameplay.

Contributions

The distribution of tasks will be presented in the final report.

Reflections

The final report will include a discussion and reflection on the project's progress and outcomes.