

EDA385 Project Proposal - Squash-pong-thingy

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1 Description

The basic idea of the project is to implement a 3D-version of a squash-pong hybrid game.

The game area will resemble a squash room with the player looking inside it from the back.

It is then played using a mouse to move a racket in a two-dimensional plane positioned in front of the player.

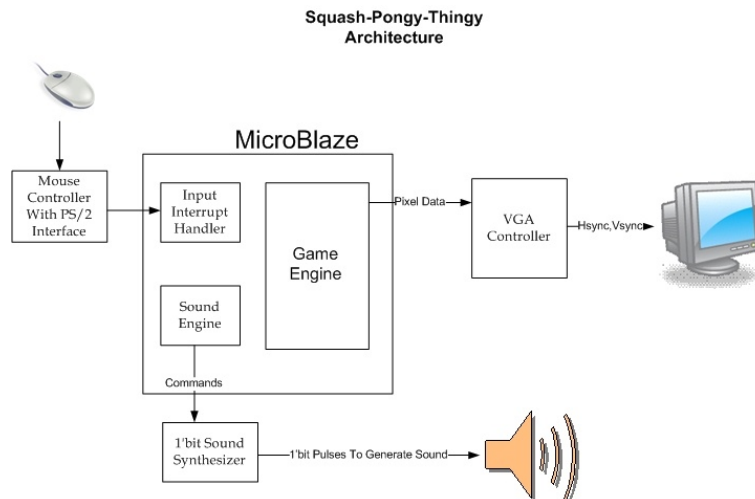
The aim of the game is to keep the ball in play within the room by catching it with the racket when it reaches the player.

The player loses a point for every missed ball.

The score will be displayed on the four 7-segment LED digits on the board.

2 Architecture

The game will consist of four parts:



2.1 VGA controller

The VGA controller will consist of two parts, one is responsible for communicating with the screen and the other is responsible for drawing the scene. For the first part we will most likely use an existing VGA controller and the second part will be implemented by us as it will be required for our game engine. We will not use a framebuffer, since our output is so simple we can do it on the fly.

2.2 PS/2 mouse controller

We'll implement our own hardware design for the mouse controller based on a subset of the PS/2 protocol specification. The PS/2 controller will generate

interrupts served by the Microblaze core. Supported features will be horizontal & vertical movement, scroll wheel and the buttons.

2.3 Microblaze based game engine

The Microblaze core will be responsible for running the game logic which will be divided into a main loop and an interrupt handler. It will be the glue that will hold everything together. It will use the BRAM as it's working memory.

2.4 7-segment LED controller

This controller will be responsible for updating the four 7-segment LED displays, displaying the scores.

2.5 Some kind of sound synthesizer

We're planning to do a simple 1-bit sound synthesizer which will essentially work by outputting a one or a zero depending on a counter. This will produce simple sounds at a constant volume, which should be enough for a start.

3 Time plan

Week 2

- Project proposal
- Architecture

Week 3

- Algorithms
- Displaying a static scene on the VGA
- PS/2

Week 4

- Implementation (programmable VGA engine, collision detection final phase)

Week 5

- Implementation (putting it all together)

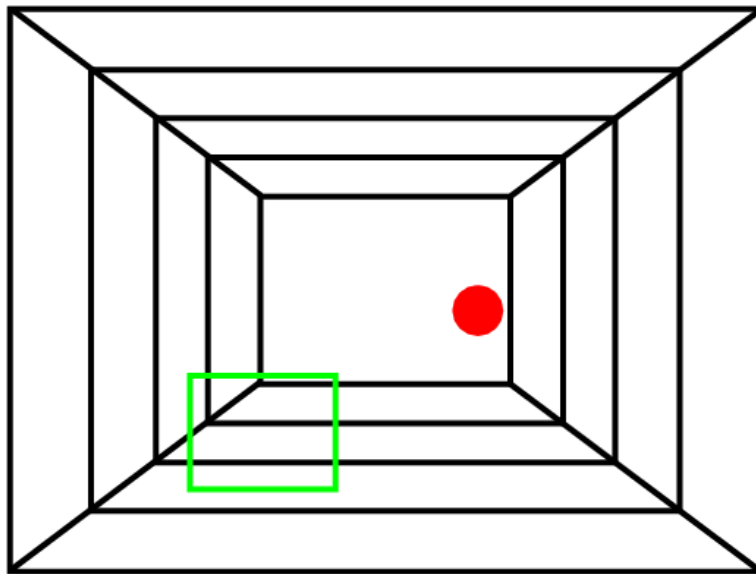
Week 6

- Optimizing and verification (if it doesn't work, we'll fix it!)

Week 7

- Everything should work by now!
- Final touches on the project report

4 Artistic impressions



5 Possible future additions

5.1 Highscore board

A possible addition would be scoreboard which would require the support for alpha-numeric character sprites in the VGA controller. Aswell as some input method, for example using the scroll wheel of the mouse, to associate a name with the score.

5.2 Multiplayer support

Multiplayer support would be implemented by two players controlling one racket each with different kinds of rules based on the game type. Since there's only one PS/2 port on the board, the multiplayer support would have to be implemented using two boards, connected in some way.