FINAL PROJECT

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PONG GAME - ONE PLAYER

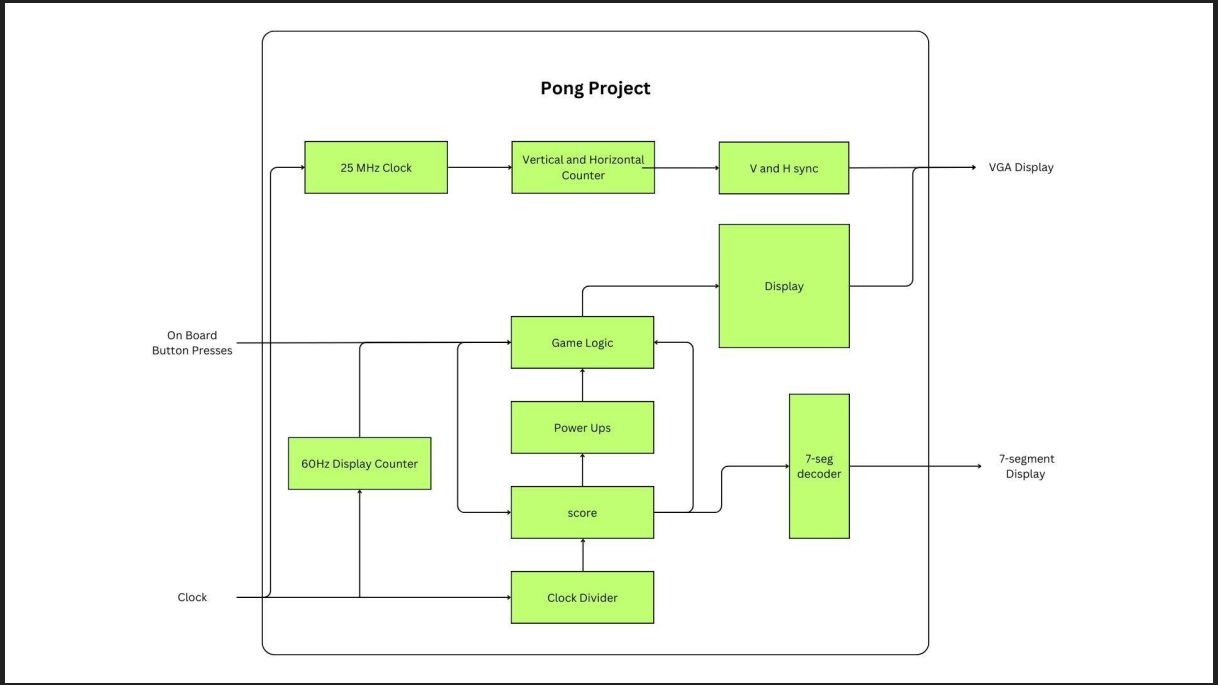
Intro

The goal of this project is to implement the game “pong” adapted on a Nexys 100T Board using VGA. Pong can be played in many different ways. The game of pong our group implemented is played with a solo player using one paddle and one ball. The goal is for the player to hit the ball with the paddle, each time doing so, gaining a point. To control the paddle, the player will use buttons on the Nexys Board that moves the paddle to the left or right. As the game progresses, the ball speeds up making it more difficult to gain a point. The goal of the game itself is to gain as many points as you can. To restart the game, the player will have to press the restart button on the controller (Nexys Board). To complete this project, our group used knowledge and experience acquired during our Computer Hardware Design Course taken this past semester.

Why the Pong Game?

Our group choose to do a game because we all grew up playing games and wanted to implement something fun to use. We choose pong because of the simplicity of the game as it does not require a lot of skill to play.

Diagram


Pong Project
25 MHz Clock
Vertical and Horizontal Counter
V and H sync
VGA Display
Display
On Board Button Presses
Game Logic
Power Ups
60Hz Display Counter
7-seg decoder
7-segment Display
score
Clock
Clock Divider

Method

Game Logic - Controls the Player Paddle and the ball. Once the ball reaches A certain boundary, it “bounces” and changes directions. If the ball collides with the player paddle, it adds to the score.

Power Ups - Once certain score threshold is crossed, the power up component increases the speed of the ball.

Score - Keeps track of the score of the game. When the ball collides with the player paddle, the Game Logic component tells the Score component to increase the score.

Method

Vertical and Horizontal Counter - Keeps track of the horizontal and vertical pixel count. This positional data is used to draw our elements on screen.

Vertical and Horizontal Sync - Vsync and Hsync are necessary signals for driving the VGA port. These two signals synchronize the exact location of where the cursor is ready to draw.

Display/VGA Driver - Handles the colors of the objects on the screen, as well as the shape of the frame, and the background color.

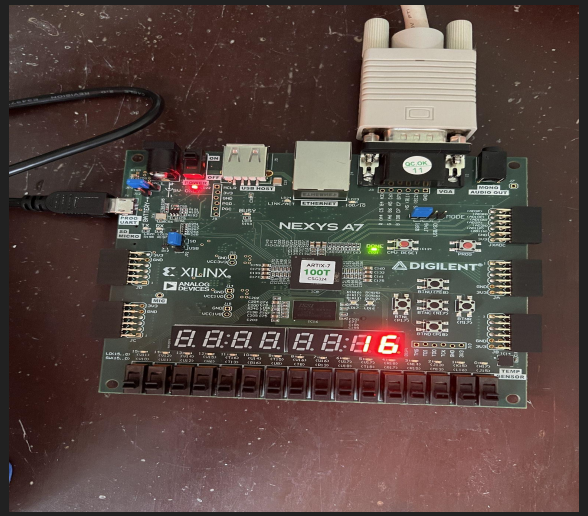
Setup and Challenges

Setup:

- Used a monitor to display the game
  - VGA port
- Used the buttons on Nexsy board to control paddle

Challenges:

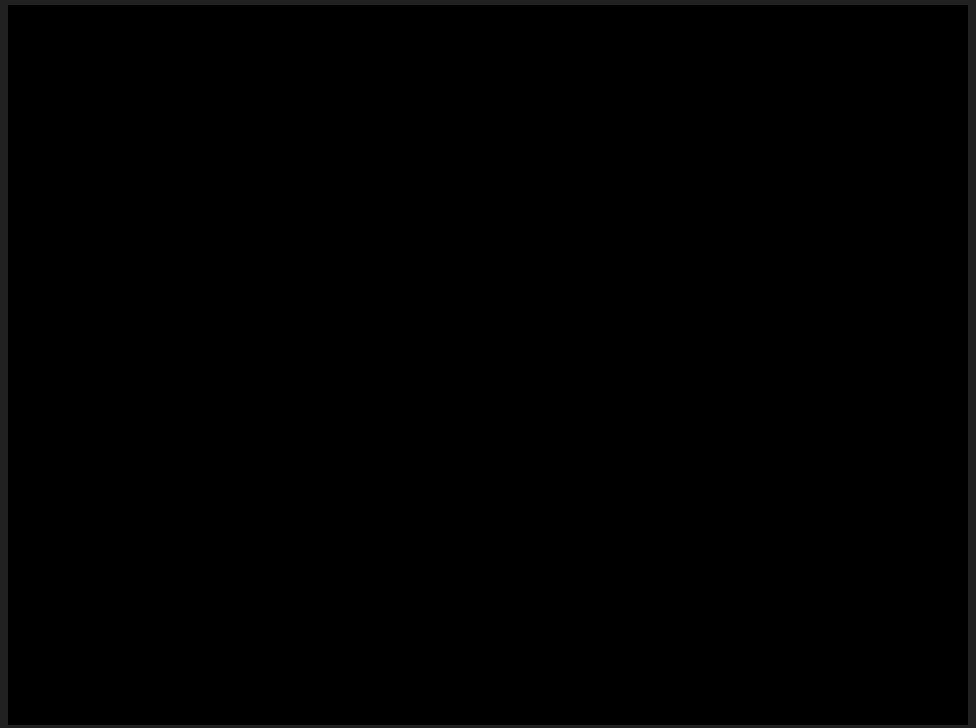
- Learning how to use the VGA
- Setting up the controls for the paddle



Future Additions

- Add a second paddle to make the game two players.
- Add a death counter and game over function
- Add more power ups
  - Multiple balls
  - Slow down ball
- Add a different way to control paddle
- Possibly continue with design change and turn into block breaking game

Presentation



References

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Thank You