TicTacToe

By Yunfei Ouyang, Shanchun Yi

Introduction

We expect our project to be:

- Can demonstrate and reinforce the material and the understanding of the course
- An elegant abstraction or simple implementation of the later chapters
- A fun game of course!

Then we conclude TicTacToe is simple enough that also demonstrates our understanding and capable of being rendered graphically.

What did we do really?

Milestone one:

First we created the datapath which is used to store the status of 3 by 3 grid. A FSM is created to give the right signal to the datapath.

To determine the win condition, a module that reads in the 3 by 3 grid and outputs the signal which can indicate the outcome of the game.

Continue..

Milestone two:

We aimed to complete the graphics of the game in milestone two. First we drew the background of the game, converted to a readable .mif file. Then, we created a decoder that reads the 3 by 3 grid and outputs the starting x, y position and the colour. Since VGA requires the input pixel by pixel, we created a module that is essentially a counter which draws the squares correctly.

Results

We achieved the following:

- A win condition checker to check which player wins the game.
- An input for player1 and player 2 to input the position of the chess pieces.
- Two signals on the screen to determine which turn is it for players.
- A score system to store the score when player 1 wins the game, player 2 wins the game, or a tie.

Discussion

- It worked quite well except we haven't implemented the keyboard feature. Using the board as the input is more convenient than the keyboard.
- We learned how to use the control signal with the data path to output the result onto the vga monitor. As well as how to build up a finite state automata to help us determine the game condition. Finally, we learned that how to use a mif file converter to convert any bitmap and output it onto the screen.
- Drawing pixel by pixel is tedious and inefficient. Next time we would try to draw the grid using .mif or other methods.

Conclusion

Overall, we deem our project to be quite successful with full honesty. It's not that fancy or complicated like other groups. But it does the job and we reviewed a nice amount of material and concepts.

We realize how powerful the tools that are provided to us in other programming languages. Now we are more thankful to the forecomers that paved the way in the field of computer science.

Appendix

- vga_adapter
- ActualPositionDecoder.v
- ActualToDraw.v
- GridDecoder.v
- chessGrid.mif
- MainModule.v
- VGA.v
- WinCondition.v
- Note: the modules in vga_adapter and the VGA part in MainModule are not written by us.

Schematic