ECE 385 Fall 2021

Final Proposal

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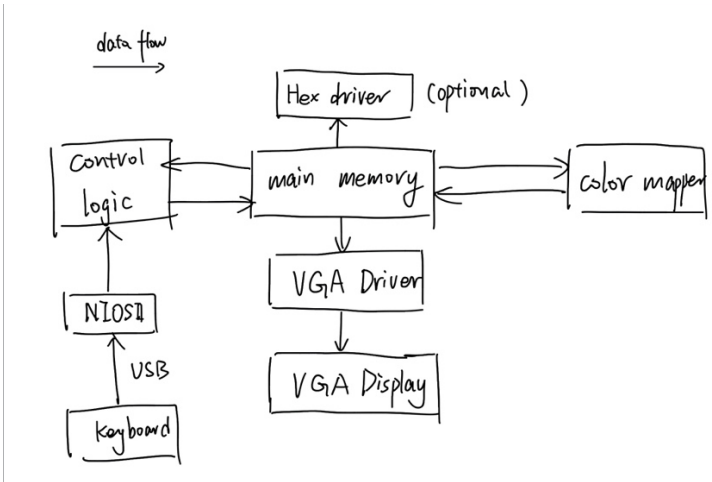
- **Ideas and Overview**

We want to design a Tetris system on FPGA. The game is to create a scene of blocks with different shapes, which can go down the top of the screen, and the player can rotate the block by pressing keys on the keyboard. As soon as these blocks form a full line, the complete line disappear, and the player can get points accumulated by Hexdriver or some score display on the FPGA board or screen. With blocks of various shapes keep falling, so blocks pile up until they reach the top of the screen, that means the player loss the game. Basic functions information from the web (https://baike.baidu.com/item/ tetris / 535753? Fr = Aladdin).
In addition, we will implement all steps using SystemVerilog basic components such as the system bus, SRAM, keyboard, and LED. Specifically, we store all the address assignment information and drop speed in the hardware section and expect to display the recorded points on the Hexdriver. Our design will include a NIOS II to connect with the USB keyboard same as Lab8 to control by the keyboard. Our goal was to demonstrate our IIe SoC using a USB keyboard and VGA monitor.

- **Block Diagram**



• List of Features

1. Baseline set of Features:
- Using NIOS II to keep connect to the USB so we can use a keyboard to control
- Eliminate a line when the line is full
- Hexdriver or just on the screen to display the score or using it to debug.(not sure how to display the score)

2. Additional Features:
The acceleration of the block when the score is high.
The audio display background music
Maybe a ranking system
Maybe a preview of the next block

• Expected Difficulty

- Tetris – accurate gameplay, score keeping, etc (5 – medium)

Actually, Tetris has a base difficulty of 5. For additional difficulty, we may display the score and accelerate the block when the score is high and we may display some background music and make a ranking system and a preview of the next block.

• Proposed Timeline

Project Week 1: 12/2
- Submit a detailed project proposal. Establish the platform designer and try to establish the display system with the code from lab8..

Project Week 2: 12/9
- Work on your final project, finish some basic operation with block, and make it rotate and falling. Be careful to the boundary check which could cause a lot of bug.

Project Week 3: 12/16
- Mid-checkpoint with your TA. We need to finish the basic function of the game.

Project Week 4: 12/23

Keep working on the difficulty part, like the audio and score display and the speed of block acceleration with the score number.

Demo Week 5: 12/28
- Demo project and submit written project report.