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CECS 360

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VGA Verification

Verification of VGA Sync:

1. Reset will always bring me to a known state where the xy count, video on, rgb, and so on are all set to 0 while the horizontal and vertical sync are set to 1.
2. Implemented a 2-bit counter that increments every 100MHz and generates a tick when count reaches 3.
3. Added an if statement that checks for a tick signal
4. Display, borders, and retrace minus 1 all adds up to 799
5. Added an if statement that checks the x count
6. Added an if statement that checks the x count
7. Added an if statement that checks for the completion of x count
8. Display, borders, and retrace minus 1 all adds up to 524
9. Added an if statement that checks the y count
10. Added an if statement that checks the y count
11. Added an if statement that checks for x and y video on signals
12. Added an if else statement that checks for video on signal

Efforts:

Many hardships were faced and overcome upon challenging this lab. First, I created a pseudo code for the lab. However, the code I have created included for loops which had to be modified using the modified moore approach. Next, I misunderstood the role of x\_count, y\_count, and video\_on for this lab. I originally thought that I needed to output the incrementing x\_count and y\_count every 25MHz for the pixels to show up. As for video\_on, I also thought that I needed to output the signal while the x\_count and y\_count were within the range of the screen for the display to work properly. To understand and grab the concept visually, I have referred Pong Chu’s code. However, as Mr. Tramel pointed out, Pong Chu’s code had bugs, so I have recoded the whole program from scratch while following the 12 requirements. Lastly, I figured out that I had latches in my code, so I spent a good 4-6 hours on debugging. On the contrary, I have found out that my problem was very simple to fix; a missing else statement after the else if statement.

Experiences:

Spending significant amount of time to understand, code, and debug the program made me realize the hardships that comes with debugging and simulation all over again. For me to complete this lab, I really needed to understand how the program was supposed to work without misassumptions. In that sense, I have also experienced and extracted much knowledge of how VGA works.