CSCE 587 Microprocessor Design and Synthesis

Homework 3 –VGA Video, Test Pattern, Bitmapped Digits & Moving Ball

Assignment (150):

Perform the following tasks and submit homework to doug@sidechannel.net. Zip all files into a single file named <lastname>-hw03.zip. Strive to keep final zip file as small as possible. (Don't send multi-MB pics – shrink/reduce size to something reasonable.)

1. (30) Read chapter 10 on generating a test pattern and re-implement the design for a VGA resolution of 640x480.
2. (60) Read chapter 11 on digits and re-implement the design to generate a string of "bitmapped" digits similar to original design. Because this is a larger, higher resolution display, modify "digits10_case" module to output 8-bits of data as opposed to 5, and scale each digit up by 4x. To maintain spacing use the upper 3 bits of the horizontal position (9:6) to determine position. Do not modify the case statement in terms of defining more bits for a given selected address – use the bits defined in conjunction with a concatenation of 3 extra bits to fully define a "row" of 8-bits. The "rom" or case statement-based module requires only minor modifications.

   Output should look as follows:

3. (60) Read chapter 12 on a moving ball and re-implement the design to generate a moving "ball" on a VGA display resolution of 640x480. Make sure the "edges" of the ball bounce off the corners of the screen – not the center.

Notes:

- Use the supplied source code that generates a red outlined box on a VGA display as a starting point for each of the designs above.
- Do not change in interface for any of the modules being re-implemented (except as noted in the problem itself).

- Submit one zip file that contains three independent projects (one for each design) – DO NOT mix code from different designs into a larger one.
- Include a screenshot of each working design. (Shrink picture to a reasonable size!)