Lab 11: VGA

Objective
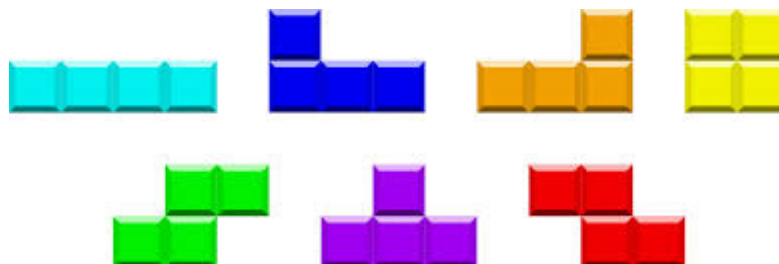
✓   Implement VGA display function.

Prerequisite

✓   Fundamentals of logic gates.
✓   Logic modeling in Verilog HDL.
✓   VGA displaying techniques

Experiments

1   VGA displaying functions.
    1.1   Inputs of the VGA controller are **clk, reset, en** and outputs of the VGA controller are hsync, vsync, vga_red[3:0], vga_green[3:0], vga_blue[3:0].
    1.2   At the beginning or when **reset** (button) is pressed, the VGA display shows the image (e.g. amumu.jpg). The VGA image stay still until **en** (button) is pressed.
    1.3   Pressing odd times **en** button to start/resume scrolling. Pressing even times **en** button to pause scrolling. Counter for **en** press is reset to zero when **reset** is pressed.

2   Calculator display.
    2.1   Combine the key board controller and VGA displaying controller to design a calculator with 2-digit addition/subtraction/multiplication. The display function should be the same as usual calculator or APP in the smartphone.

3   TETRIS element generator
    3.1   Generate basic elements of TETRIC (as follows) randomly in the VGA monitor, and plot each of them in the center of the first row of the display, which is a 10 x 20 (WxH) square 2D playing space.
    3.2   Each generated basic element moves down by the step of a square at the speed of 1Hz. Finally, they disappear below the playing space. When a basic element disappears, a new basic element is generated again and fall down again repeatedly.
    3.3   (Bonus) The same function of 3.1 and 3.2 are designed except that basic elements are stacked up until they are higher than the height of the playing space.

TA: _____