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| EXPERIMENT: Group Photos |

References

1. *Digital Design Using Digilent FPGA Boards – VHDL / Active-HDL Edition*
   1. Chapter 12: *VGA Controller*
   2. Example 73: *Sprites in Block ROM*

Part 1

1. Use any photo editor program to make a 140 x 140 pixel photo of each group member.

2. Use img2coe8.m (see Moodle or the listing in the book) to convert each photo to a .*coe* file. Put img2coe8.m and your photo in the same folder, then open Matlab and change its directory to that same folder. In Matlab's command window, run the script by typing

img2 = img2coe8('loons100x100.jpg', 'loons.coe');

where 'loons100x100.jpg' should be replaced with your image filename, and 'loons.coe' should be replaced with your desired output filename.

Note: Nexys 4 boards use 4 bits per color for a total of 12 bits. You may use img2coe12.m available on Moodle if you wish to take advantage of the improved color.

3. Modify the top-level design shown below (that we discussed in class) to display both photos on the VGA screen. The photos should be arranged in two or three columns (depending on how many people are in your group) on the screen with the vertical position of each photo controlled by four of the switches on the Nexys board.

4. Demonstrate the operation of your program to your lab instructor.

**Deliverables:** *group\_photos\_top.vhd* and *vga\_bsprite4a.vhd*

Part 2

1. Add some background design of your choice. Arrange, or move, the group member photos in any way you want. The lab instructors will judge these designs for innovation and creativity. The first place winning group will receive an additional 10 points extra credit. Second place will receive an additional 5 points extra credit. In the case of a tie, the lab instructors may distribute extra credit points differently.

**Deliverables:** *group\_photos\_top2.vhd*, *vga\_bsprite4a2.vhd*, and any additional modified files. List of group members.