Task for learning FPGA programming

Deadline (Soft): 20.10.16

I suggest this to be attempted only by students of EC department (or CS/EE/IE, if they're REALLY interested. Other dept. students: **Please don't**)

Task:

Interface a VGA camera with a Xilinx Spartan 6 FPGA and write a verilog code to detect a red dot in the camera view.

To Do (For Learning):

- Learn the basics of Verilog and how Hardware description languages work.
- Install ISE 14.7 on your Laptop (most tutorials are available for the mentioned version).
- Familiarize yourself with ISE features, Timing simulations. Simulate simple logic gates with ISE.
- Read about configuration files and clocks.
- Interface 7 segment displays and all types of switches on the FPGA board.
- Implement few combinatorial logic circuits on FPGA board.
- Implement few sequential logic circuits on FPGA board.
- Learn about modules in ISE and develop one.

Deliverables:

- A setup that can detect a red dot in the image and shows number 666 on the onboard 7 segment display when it finds one.
- Github repo with all the codes in one place.

More Instructions:

Take FPGA board and camera from Siddharth. Download the programming software and find tutorials, datasheets, sample codes and configuration file on this page:

http://numato.com/mimas-v2-spartan-6-fpga-development-board-with-ddr-sdram/

Note that the task seems fairly simple at first, but is indeed quite challenging.

Once interfaced, we can take this one step forward and develop complex image processing applications on FPGAs.