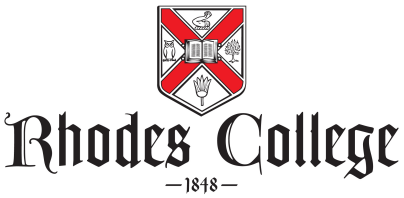
COMP 231
Introduction to Computer Organization
Lab 1



This lab will consist of a Quartus project folder, submitted as a single ZIP file, via Canvas (`http://canvas.rhodes.edu/`). **You must submit a .zip file.**

Important information for using the lab workstations:

1. Start by creating a new folder on your desktop named *231*.
2. Create a new folder inside of the 231 folder called *lab1*. This is where you will save your tutorial.
3. Follow the tutorial. When it prompts you where you want to save the folder – **You must change it to a different directory.** Instead of the `C:\intelFPGA_lite\18.1...` folder, switch it to the *lab1* folder you created under the Desktop.
4. Please do not save any work in the `intelFPGA_lite` folder or anywhere else on the `C:\` drive.
5. When you have completed the project, right click on your *lab1* folder and use the `7-Zip` menu to save as `lab1.zip`.
6. Save your entire Desktop/231 folder to a flash drive (in the file explorer)
7. Upload your .ZIP file to Canvas.

You are encouraged to use one of the six workstations in the hardware lab to complete this assignment. On your personal computer, you may also install the Digital software package to simulate your designs (`https://github.com/hneemann/Digital`) or the Altera tools (ask me for more details).

1 Quartus Tutorial

Once you have successfully logged into the hardware lab computer, read through and follow the exercise specified in the *Quartus II Introduction Using Schematic Designs* PDF (on the course website, listed under Lab 1). Create the `introtutorial` Quartus project in your *name*`_lab1` folder.

In this tutorial, you will implement a simple exclusive-OR (XOR) circuit and load it on the FPGA board. This circuit will use the switches (SW[0] and SW[1]) on the DE2-115 board to turn on and off the LED light on the board according to the XOR truth table.

Some notes:

- The pin assignment procedure in section 7 is suboptimal. The pins for the DE2-115 are incorrect and the entire process is overly complicated for the other FPGA assignments in the class. To remedy this, you should label your inputs in the XOR circuit with the names `SW[0]` and `SW[1]`. Also label your output `LEDG[0]` or `LEDR[0]` depending on whether you like red or green LEDs. Next, from the *Assignments* menu, select *Import Assignments...* and browse to the `DE2_115.qsf` file (on the course website, listed under Lab 1). This should leave you with valid pin assignments.
- You do not need to perform the simulation step in section 8 of the PDF.
- When starting the programmer, you may have to add the compiled Quartus (.sof) file, which can be found in the `output_files` folder in your `introtutorial` project.

Submission

When you have completed this entire exercise and have a functioning program, submit your lab 1 project folder as specified above to Canvas.