LAB Assignment #3 for ECE 443

Assigned: Wed., Sept. 15, 2010
Due: Wed., Sept. 22, 2010

Description: Modify the UARTUnit.vhd code to implement an 'echo+1' function

You should download the UART files for lab 3 (lab3_files) before creating a project for lab 3. These files are slightly different than the versions you used for lab 2, where you simulated the UART, i.e., these files are setup with the appropriate constants to enable the UART to actually work in hardware, at a band rate of 9600, N81.

The UARTDriver.vhd is setup to echo the characters typed in hyperterminal (or equivalent) when the 'enter' pushbutton is pressed. I will discuss the functional behavior of the UARTDriver in class. For this lab, you need to change the 'echo' operation to a '+1' operation. The '+1' operation simply adds 1 to the numeric value of the byte that is received in the RX FIFO. When the 'enter' pushbutton is pressed, the character displayed in the hyperterminal will be the ASCII character that follows the value typed in the terminal, e.g., if you type the letter 'a', the letter 'b' will be displayed in the hyperterminal, etc.
You'll need to construct the proper UCF file, which includes the system clock, switches, LEDs and serial port (only rx and tx wires needed). Once you have programmed the FPGA, you should carry out a reset operation by moving the leftmost switch from the up position to the down position and back to the up position (it must remain in the up position during operation). An LED is connected to the reset signal, which will light up when the leftmost switch is in the down position.

Laboratory Report Requirements:

1) Turn in a commented copy of your VHDL code. If you want, just include a print out of your modified UARTUnit.vhd file.
BONUS points (10 pts):
2) Turn in schematic diagrams that represents the synthesized schematic of the UART modules.

Grading:
Your lab grade will consist of two parts. The first part is associated with the in-class demo, and is worth 50% of the total grade (50 pts). Successful demonstration of the lab's stated requirements is worth 50 pts. Partial implementations will be given only partial credit. The second portion of the lab grade is derived from your lab report, derived according to the posted guidelines for preparing laboratory reports.