LAB Assignment #2 for ECE 443

Assigned: Tue., Sept. 13, 2012
Due: Thur., Sept. 20, 2012

Description: Implement a binary to BCD converter module

This laboratory is designed to give you experience with combinational circuit constructs such as the conditional signal assignment statement and process block.

You need to connect the right-most 5 switches on the board to your entity port. The switches will be interpreted as a 5-bit binary value. This assignment requires that you convert the 5-bit binary value into 2 BCD digits.

BCD refers to binary-coded decimal where 4-bits are used for each digit. The legal binary values for one BCD digit are given as 0000, 0001, 0010, 0011, 0100, 0101, 0110, 0111, 1000 and 1001 (the values 1010, 1011, 1100, 1101, 1110 and 1111 are NOT legal). The legal values represent the decimal digits 0 to 9, respectively.

The 5-bit input implemented by the switches represents binary numbers in the range of 0 to 31. You need to convert this 5-bit value into two BCD digits. For example, 11010 represents the value 26. You need to convert this to two BCD digits 2 and 6, which are represented in binary as 0010 and 0110.

Your design must be purely combinational (no sequential logic, e.g., state machines are allowed).

I will provide you with a state machine that takes the two 4-bit BCD signals and drives the low order 2 digits of the 7-segment display on the FPGA board.

Laboratory Report Requirements:

1) Turn in a commented copy of your VHDL code.
2) Turn in the schematic diagram that represents the synthesized schematic of the code.

Grading:
The grading from this lab will be based entirely on your in-class demo. Bonus points will be given to outstanding lab reports or for any implementation feature that goes above and beyond the requirements.