

CSE 3201 Digital Logic Laboratory

Lab4: Adders and Number Systems

Objective

The objective of this lab is to gain experience implementing arithmetic combinational circuits.

Reference Material

Altera DE2 manual and tutorial, available from the course web site. Chapter 3 of the text.

Pre-Lab

1. Design a circuit in Verilog that displays an 8-bit binary-coded decimal on a pair of seven segment displays. The pattern '- -' should be displayed if the number is not a valid BCD number.
2. Design an adder circuit that can add two 2-digit (i.e. each between 0 and 99) BCD numbers accounting for carry.
3. Simulate your designs!

Before entering the lab ensure that for each design you have at a minimum:

- Truth tables, maps, Boolean expressions and other design aids.
- Fully documented Verilog source
- Test patterns and/or a testing strategy

If you are not prepared for the lab you will not be allowed to start. The two-hour lab time slots are strictly enforced and you must be prepared in order to complete the lab in the allotted time.

In Lab Procedure

1. Test and debug your circuit for displaying a BCD number. Use SW0-7 for the low to high order bits respectively and display the result on the HEX0 and HEX1 seven-segment LED's. Demonstrate this circuit for the TA.
2. Test and demonstrate your BCD adder. Use SW0-15 for the two 2-digit BCD numbers to be added and display the result on the seven-segment LED's. Demonstrate this circuit for the TA.

The implemented circuits must be demonstrated to the TA who will note a completed lab and ask questions about your design. When implementing the circuit be sure to use the switches and lights to make it easy to demonstrate your circuits.

Evaluation

Lab demonstration, in-lab explanations and answers, debug and test approach.