ELC 363 - LABORATORY #2

ADDER DESIGN

1. INTRODUCTION

Use Verilog® to implement the following models. In the structural models, *use only simple primitive gates (AND, OR, INVERTER, NAND, NOR, XOR, XNOR) with as many inputs as necessary.* Only minimum cost designs should be considered. Assume a propagation delay of 1 time unit for all gates. A report with, at a minimum, all the items requested to be turned in throughout these instructions is to be submitted by each team by the due date discussed in class. All reports should be written in a word processor and similar productivity computer tools; no hand-written reports will be accepted.

2. MODEL A

Design a structural model for a 64-bit ripple carry adder.

Include in your report: Verilog® HDL and waveforms that show that your adder works. A couple of cases simulated are sufficient.

3. MODEL B

Design a structural model for a 64-bit carry look-ahead adder using 2-bit look-ahead.

Include in your report: Verilog® HDL and waveforms that show that your adder works. A couple of cases simulated are sufficient.

4. MODEL C

Design a behavioral model for a 64-bit adder.

Include in your report: Verilog® HDL and waveforms that show that your adder works. A couple of cases simulated are sufficient.

5. PROJECT DISCUSSION

In your project report, address the following issues:

1) Cost and speed comparison of models A and B.

2) Comparison of the modeling capabilities and productivity of the behavioral model versus the structural models.

3) Discuss a strategy for system development that uses both techniques. Consider both top-down and bottom-up modeling.

6. OTHER

Do not procrastinate. There is a large learning curve to climb. Do not underestimate this. Also, other classes will be using the workstations, so access may become a scarce resource.

Remember: Bring up any questions or problems early and often.

7. GRADING RUBRIC:

The total grade for this assignment will be 20 points normalized to 100% for your report. Each model will be worth 1 point, and their corresponding simulation results 2 points each. The items in (5) will be worth 5 points: 2 points for 5.1, 1 point for 5.2, and 2 points for 5.3. The rest of your report will be worth 6 points, for a total of 20 points.

8. REPORT FORMAT:

Free form, but it must be:

      a. One report per team.

      b. Have a cover sheet with identification: Title, Class, Your Name, etc.

      c. COMPLETELY word-processed

      d. Double spaced

e. 12 pt Times New Roman font

f. Fully justified (optional)

g. Outline of the body of the report: Introduction, Problem Description, Results, Discussion, and Conclusions.