

Name:

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**COE 202, Term 102**  
**Fundamentals of Computer Engineering**

**Quiz# 4 (Take Home)**

Due date: Monday, April 18, 2011

**Q.1.** Using logic works, you are required to do the following:

- a. Model a full adder circuit, verify its correct functionality by simulation. Add delay attributes to the gates by making the delay of a 2-input AND gate 2, the delay of a 2-input OR gate 2 and the delay of an XOR gate 4. Then create a device symbol for it.
- b. Using the full adder created in (a) construct a 4-bit Ripple Carry Adder (RCA). Verify its correctness by simulation and determine the longest delay. Then, create a device symbol for it.
- c. Model a 4-bit Carry Look-Ahead Adder (CLA) using the same gate delay attributes specified in (a). Verify its correctness by simulation and determine the longest delay. Compare its delay to the 4-bit RCA in (b). Then, create a device symbol for it.
- d. Model a BCD adder using the 4-bit RCA in (b) and verify its correctness by simulation.
- e. Model a 4-bit by 4-bit multiplier using the 4-bit CLA adder in (c). Verify its correctness by simulation.

***Save each part in a separate circuit file. Include snapshots of simulation output to illustrate the correctness of each of your circuits and the maximum propagation delay. Submit your solution as a word document along with the circuits in one zipped file.***