CSCE-312 QUIZ2 – TOTAL 15PTS

CSCE-312 | MONDAY FEB 8, 2016

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1. [5pts] Assuming AND gates have a delay of 2 ns, OR gates have a delay of 1 ns, and XOR gates have a delay of 3 ns, compute the longest time required to add two numbers using an 8-bit carry-ripple adder. (or 8 full adders) (either) 2'

   An 8-bit carry-ripple adder contains 7 full adders and 1 half adder. Both the FA and HA have a maximum gate delay of 3 ns. 1' Therefore, 8 adders x 3 ns/adder = 24 ns is required for an 8-bit carry ripple adder to ensure a correct sum is on the adder's output. (An Answer of 23 ns is also acceptable since the carry out of a half-adder will be correct after 2ns, not 3ns, and a half-adder may be used for adding the first pair of bits

2. [5pts] Design a system that computes the sum of two 6-bit numbers using 4-bit carry- if we assume ripple adders. Hint: Use cascading of the carry-ripple adders to build the sum of three no carry-in) 8-bit adders.   2.5'   2.5'
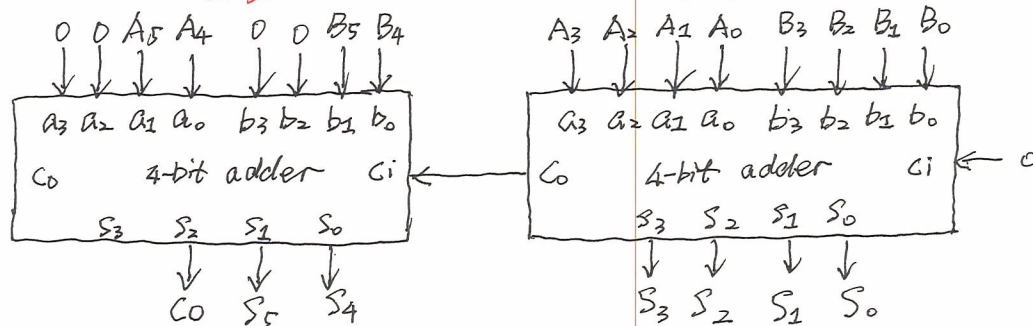
3. [5 pts, 1pt each] Convert the following decimal numbers to 8-bit two's complement binary form:
   a. 4   0 000   0100
   b. -2   1 111   1110
   c. -25   1 110   0111
   d. -128   1 000   0000
   e. 126   0 111   1110