Lab-8
EL 114 Digital Logic Design

Notes:

- In your lab-book, write your steps/methods, and the observations/results, including the desired vs. the observed truth-table values, etc
- Get TA's signature after completing each question.

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1. Using ICs, implement a one-bit Full-adder, as shown in Fig. 1. The full adder has three binary inputs (x, y, z), where z represents the carry-in, and has two binary outputs S and C, where C represents the carry-out.

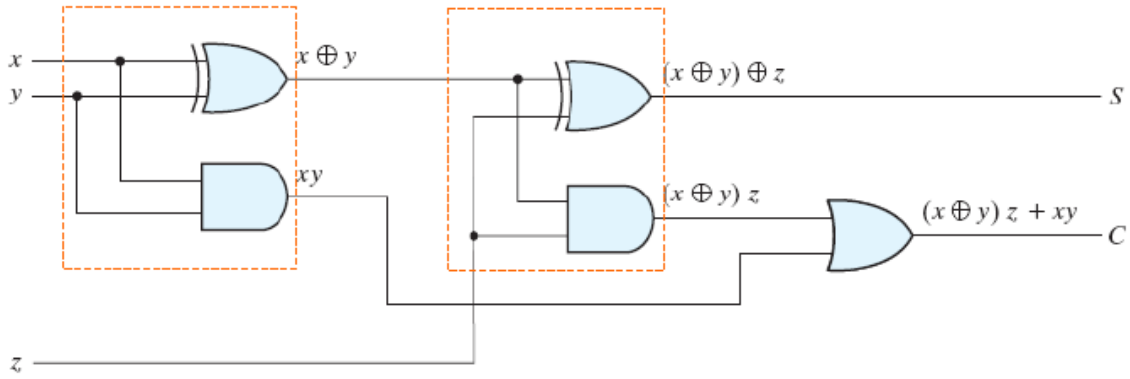

Fig. 1: Full-Adder (FA) using two half-adders

   - In your notebook, observe and record the outputs, for all possible combinations of the 3 inputs (i.e. create the truth-table)

2. Using ICs, implement a simple 2-to-4 decoder, using four 2-input AND gates, and some inverters.
   - Draw the circuit in your notebook. (Assume A_1, A_0, as the inputs, and D_0 to D_3 as the outputs)
   - Observe and record the output for all possible input combinations. Create an appropriate truth-table for the same in your notebook.
   - Continue to the next question; Do NOT disconnect / disassemble your decoder circuit…

3. Using the decoder circuit you already built, and using some additional OR gates, implement the following Boolean functions
   $F_1 = A_1'A_0 + A_1A_0'$
   $F_2 = A_1A_0 + A_1'A_0'$

- Observe and record the outputs for all possible input combinations for the two functions F_1, and F_2. Create/observe the appropriate truth-table for the same in your notebook.

4. Using ICs, implement a 1-to-2 decoder with Enable, using 2-input AND gates, and inverters.
   - Draw the circuit in your notebook.
   - Observe and record the output for all possible input combinations. Create an appropriate truth-table for the same in your notebook.