

CS 2614: Computer Organization

Lab 2

Spring 2023

K-Maps with Don't Cares

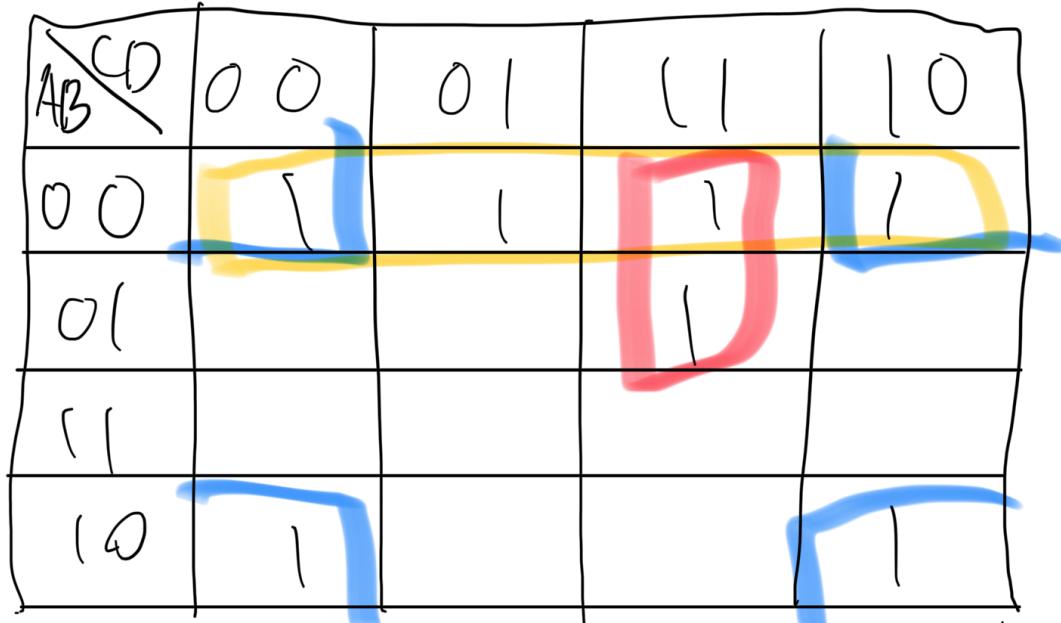
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The UNIVERSITY of OKLAHOMA
Galloway College of Engineering
School of Computer Science

Pre-Lab Exercise

1. Simplify the Boolean function $F(A, B, C, D) = \sum (0,1,2,3,7,8,10)$ using K-map.

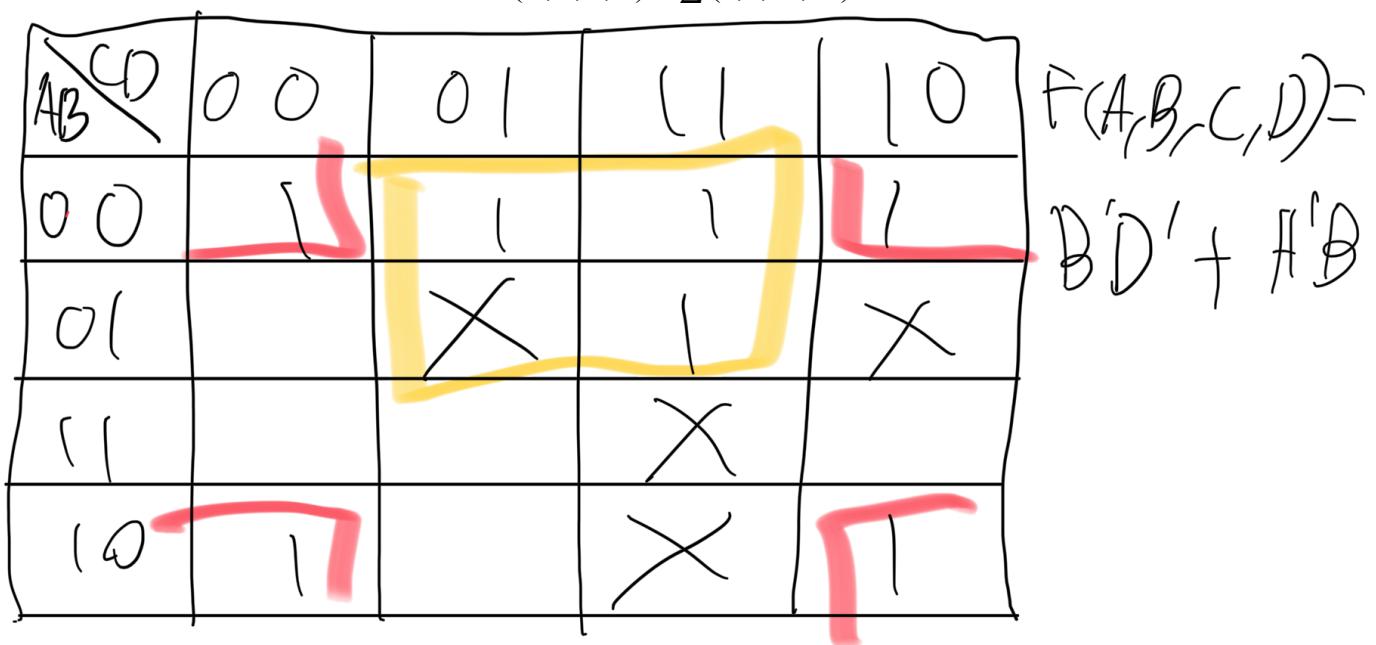


$$F(A, B, C, D) = A'B' + B'D' + CD'$$

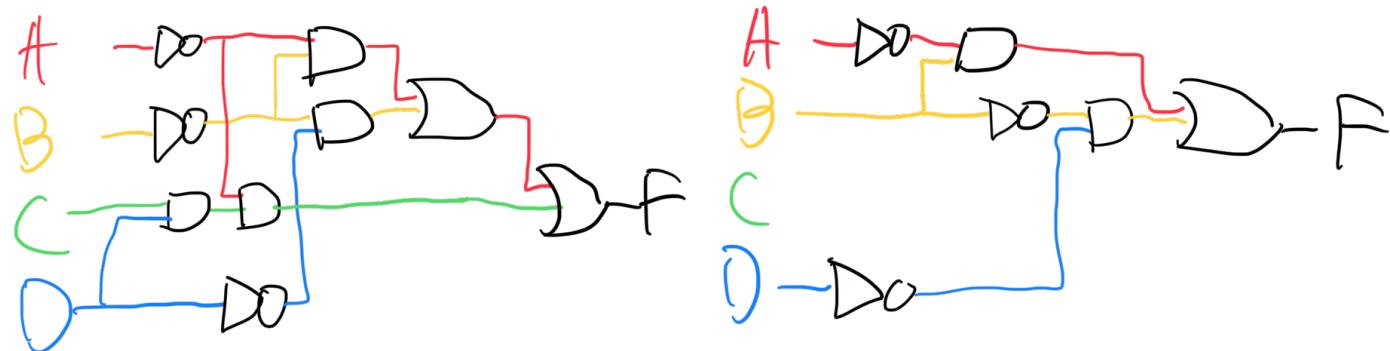
2. Simplify the Boolean function F together with the *don't-care* conditions d in *sum-of-products* form

$$F(A, B, C, D) = \sum (0,1,2,3,7,8,10)$$

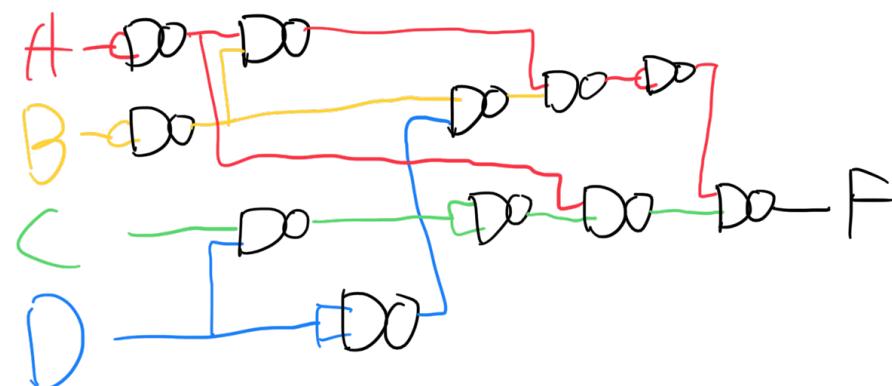
$$d(A, B, C, D) = \sum (5,6,11,15)$$



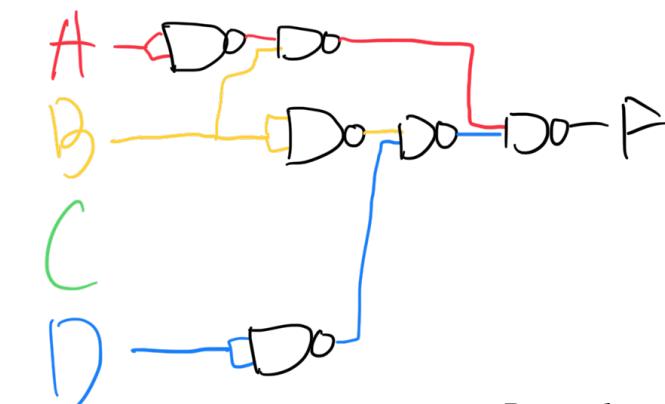
3. Draw the circuit diagram for **problems 1 and 2** using AND, NOT, and OR gates. All used gates should have only 2 input pins.



4. Draw the circuit diagram for **problem 1** using only NAND gates. All used NAND gates should have only 2 input pins.



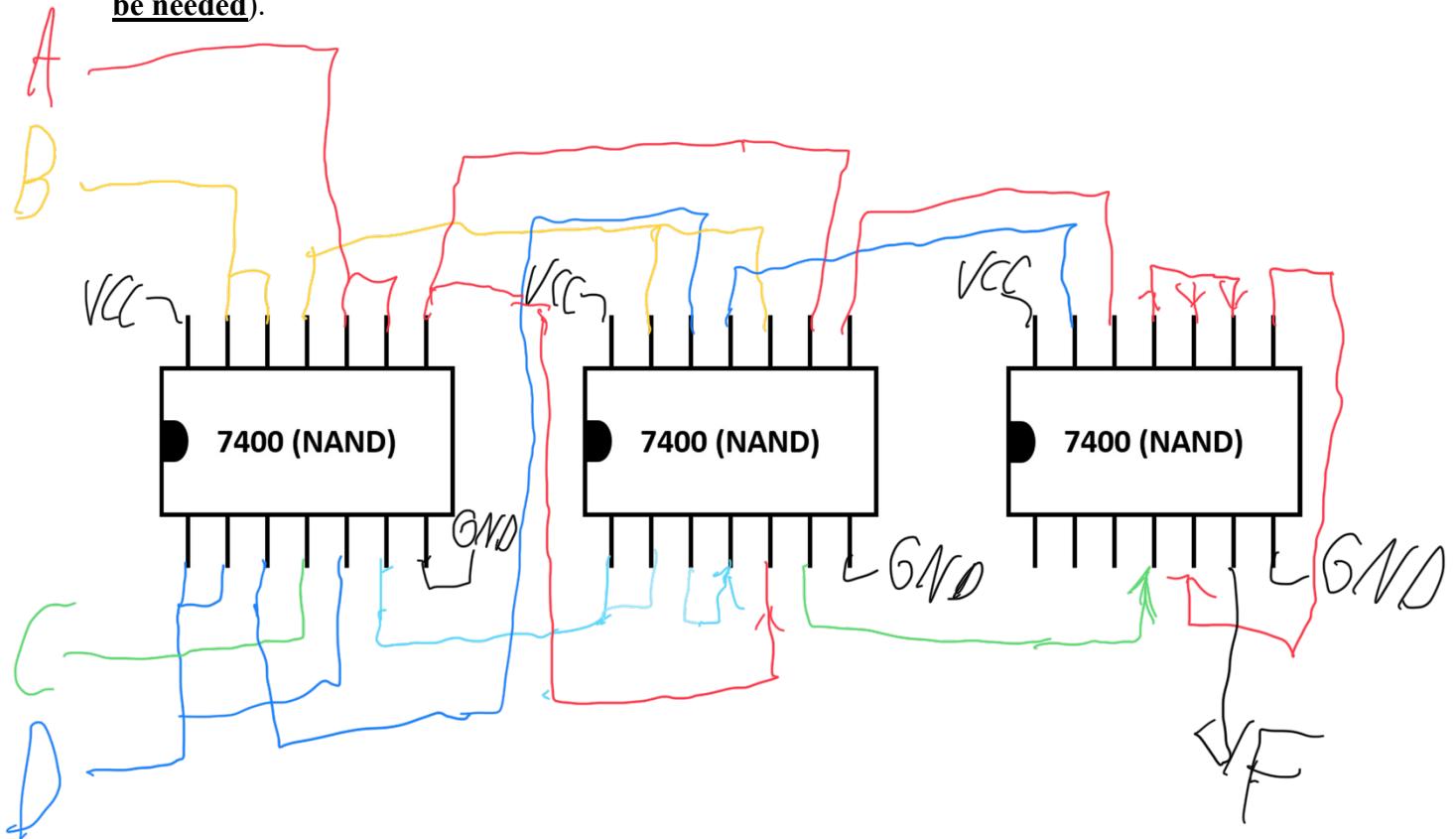
5. Draw the circuit diagram for **problem 2** using only NAND gates. All used NAND gates should have only 2 input pins.



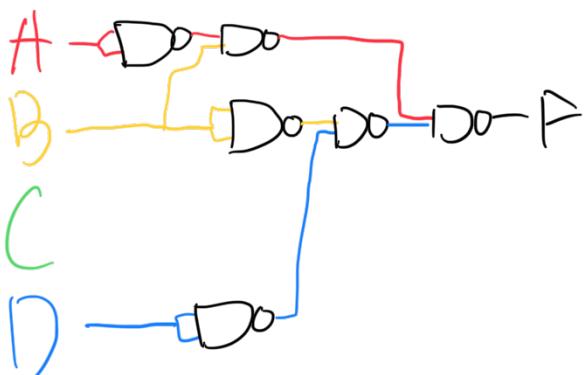
Remember to upload this section to the Canvas!

In-Lab Exercise

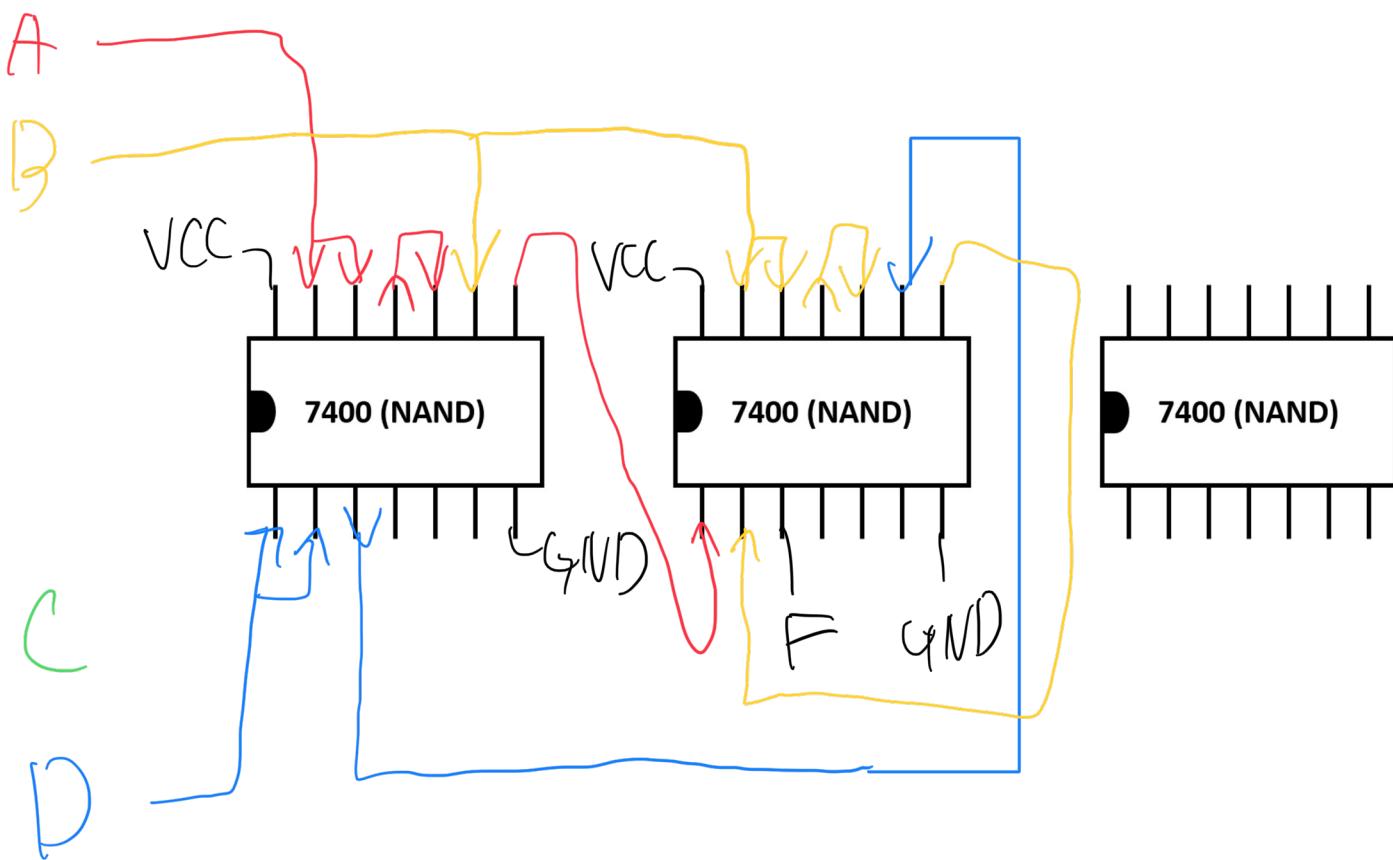
6. Draw the circuit from Problem 4 using **NAND gates** (label each input/output, some chips may not be needed).



7. Implement the circuit from Problem 6 on the breadboard.



8. Draw the circuit from Problem 5 using **NAND gates** only on the chips below (label each input/output, some chips may not be needed).



9. Implement the circuit from Problem 8 on the breadboard.