

CS 2614: Computer Organization

Lab 6

Spring 2023

Seven Segment Display

Group #

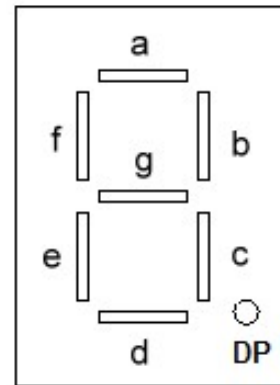
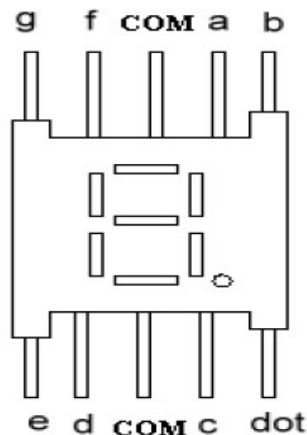
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Pre-Lab Exercise

- The seven segment display we are going to use in the lab consists of 8 LEDs (a, b, c, d, e, f, g and DP). In this exercise, we are going to design a combinational circuit such that the seven segment display shows decimal symbols depending on the input.

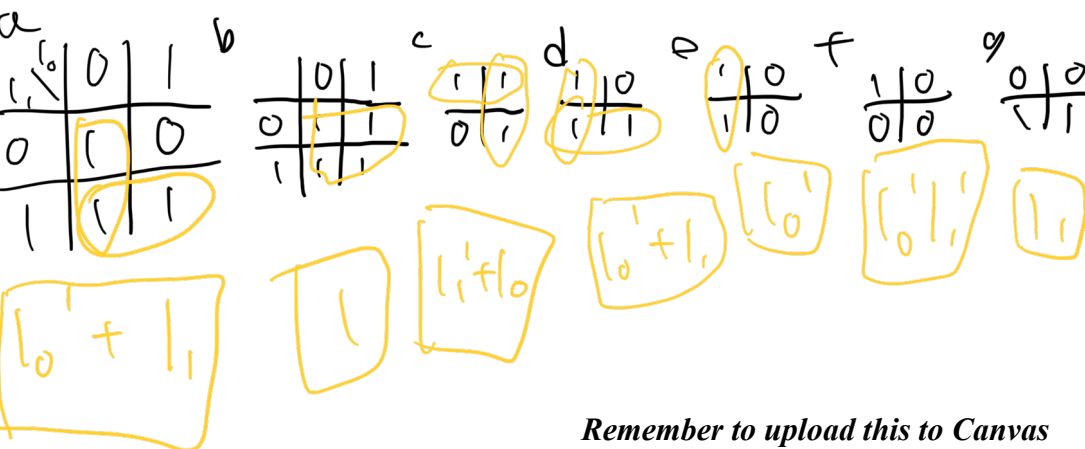


- Derive the truth table for displaying decimal digits 0,1,2 and 3 on the seven segment display.

Inputs		Outputs						
I ₁	I ₀	a	b	c	d	e	f	g
0	0	1	1	1	1	1	1	0
0	1	0	1	1	0	0	0	0
1	0	1	1	0	1	1	0	1
1	1	1	1	1	1	0	0	1

- Convert the above truth table to a combinational circuit.

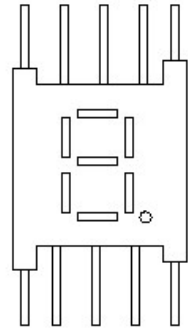
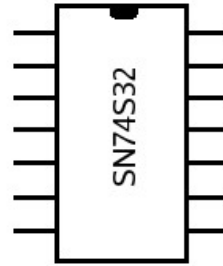
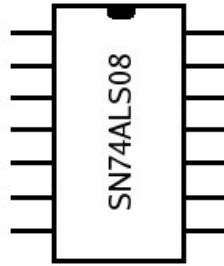
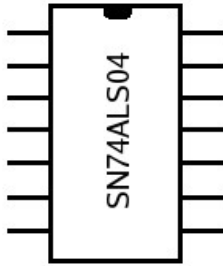
[Hint: Solve output bits (a through g) one by one by using K-map method, then combine and simplify them to get the circuit]



Remember to upload this to Canvas

In-Lab Exercise

2. Draw the circuit from Problem 1(b) using the chips below (label the chips and each input/output, **some chips may not be needed**).



3. Implement the circuit from Problem 2 on the breadboard.