CCPS213 Lab BiG 4 (10%) Due: Dec 7th @23:00

Part A) Q1(70 Marks):

Decoders can be regarded as a kind of Converters.

From The truth table convert the BCD to 7 segment to specified output functions: H,T,L,K,M,L,N

a. Simplify the output function using Kmap (SOP or POS which ever is more direct). Make sure to use the "DON'T CARE" conditions as part of map.
b. Draw a circuit for each of your simplified functions in the simulator. Attach switches for inputs, and light bulbs for outputs (or 7 segment led).
c. Attach led to each output of the function

	BCD(8421)	OUTPUTS
DEC	***A B C D***	***H I J K L M N***
0	**0 0 0 0**	**1 1 1 1 1 1 0**
1	**0 0 0 1**	**0 1 1 0 0 0 0**
2	**0 0 1 0**	**1 1 0 1 1 0 1**
3	**0 0 1 1**	**1 1 1 1 0 0 1**
4	**0 1 0 0**	**0 1 1 0 0 1 1**
5	**0 1 0 1**	**1 0 1 1 0 1 1**
6	**0 1 1 0**	**1 0 1 1 1 1 1**
7	**0 1 1 1**	**1 1 1 0 0 0 0**
8	**1 0 0 0**	**1 1 1 1 1 1 1**
9	**1 0 0 1**	**1 1 1 1 0 1 1**
10	**1 0 1 0**	**x x x x x x x**
11	**1 0 1 1**	**x x x x x x x**
12	**1 1 0 0**	**x x x x x x x**
13	**1 1 0 1**	**x x x x x x x**
14	**1 1 1 0**	**x x x x x x x**
15	**1 1 1 1**	**x x x x x x x**

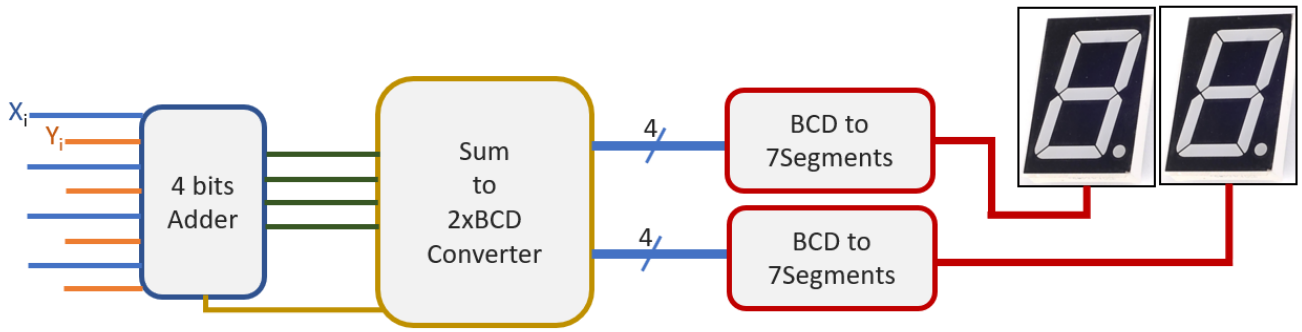
Part B) (130 marks)

Design a circuit which take in 2 sets of 4bits and add them together, display resulting sum value as decimal digit(s) on 2 seven segments led. To display the binary sum (c+4bits) on 2 seven segments led you may have to custom design a new converter, or create one using 2 adders along with gates.

Draw circuit using Logisim. Make sure to add input switch for the 4 Xi and Yi.

To get full marks your circuit must be able to display from the min to max range of adding 2 set of 4 bits.

You may use prebuilt adder from Logisim or from your prior works. You may use your BCD to 7 segment circuit from part A or the one provided to you on Dec 3rd.



Make to show all your works for part A & B.

Submit: one document showing you derivations and one circuit file with all your circuits

Hint for part B converter: look at decay counter detection gate for the one with using adders,

And for custom design think '5-8' converter: self investigate >4 literals kmap

Binary sum (c +4 bits)	BCD (2x4)
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