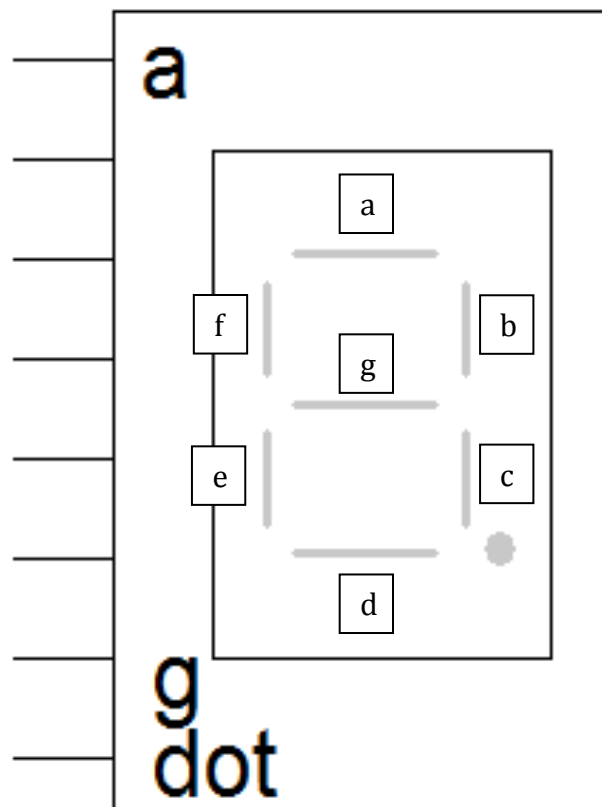
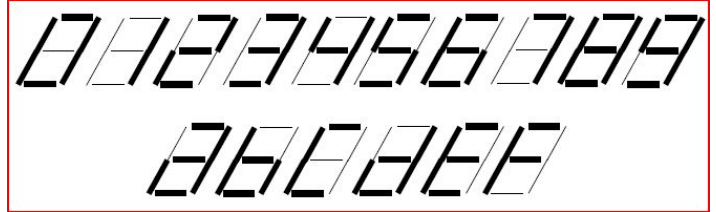


CS 2420 Lab 6

Topics: Combinational logic function design, optimization and implantation

Pre Lab: Fill in the truth table, K-maps, and find functions for each of the seven lights.

Build a circuit to display a decimal digit in a 7-segment component. In DSCH, use a hex keyboard to generate an input combination rather than have four buttons.



Labels for the LED segments:

LA = a
LB = b
LC = c
LD = d
LE = e
LF = f
LG = g

For example, for input 0; a, b, c, d, e, and f will glow while g remains off. This means for the truth table that LA, LB, LC, LD, LE, and LF will all have a '1' while LG will have a '0'.

T1. Make the truth table for the 7-segment component

DSCH provides a 7-segment display component. Find the labels for all segments. Fill in the following truth to display the correct number or letter based on the figure at the top of page 1.

Input					Output							
	A	B	C	D	LA	LB	LC	LD	LE	LF	LG	
0	0	0	0	0								0
1	0	0	0	1								1
2	0	0	1	0								2
3	0	0	1	1								3
4	0	1	0	0								4
5	0	1	0	1								5
6	0	1	1	0								6
7	0	1	1	1								7
8	1	0	0	0								8
9	1	0	0	1								9
A	1	0	1	0								A
B	1	0	1	1								B
C	1	1	0	0								C
D	1	1	0	1								D
E	1	1	1	0								E
F	1	1	1	1								F

T2. Make K-Maps

Based on the truth table, draw the K-map for each segment

LA		C,D			
		00	01	11	10
A,B	00				
	01				
	11				
	10				

LB		C,D			
		00	01	11	10
A,B	00				
	01				
	11				
	10				

LC		C,D			
		00	01	11	10
A,B	00				
	01				
	11				
	10				

LD		C,D			
		00	01	11	10
A,B	00				
	01				
	11				
	10				

LE		C,D			
		00	01	11	10
A,B	00				
	01				
	11				
	10				

LF		C,D			
		00	01	11	10
A,B	00				
	01				
	11				
	10				

LG		C,D			
		00	01	11	10
A,B	00				
	01				
	11				
	10				

T3. Find simplified logic functions

Now, optimize logic functions for the segments based on their K-maps. Write down the optimized functions

LA =

LB =

LC =

LD =

LE =

LF =

LG =

T4. Build the circuit in DSCH

Take screen shots of your circuit to include in your report; perhaps several small ones as opposed to one big one.