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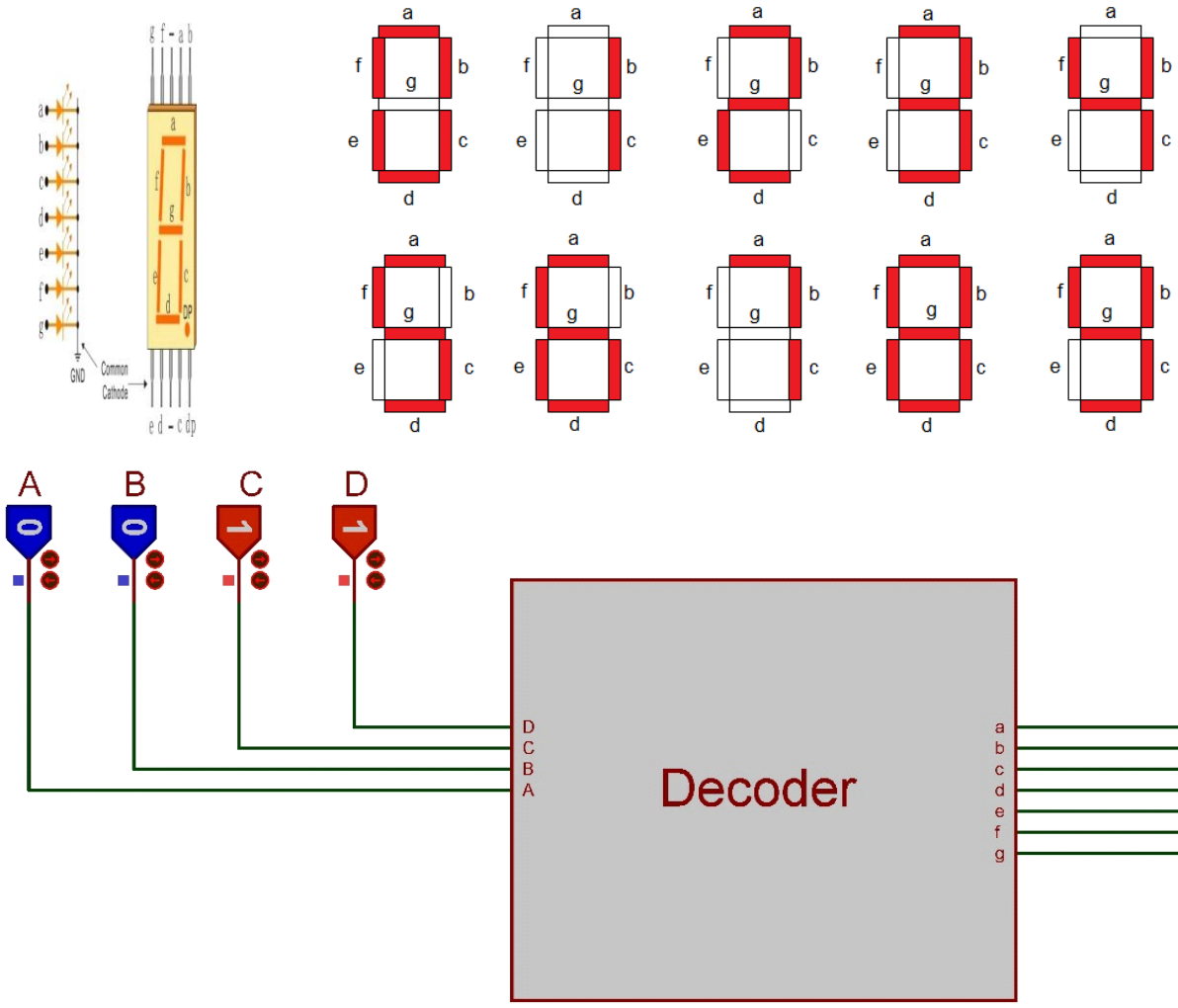
LAB03 Assignment



Your task is to design a decoder circuit that runs a 7-segment display. The circuit must show the numbers from 0 to 9 that is controlled with 4-bit input (ABCD). The steps you should do as follows.

1. Fill the truth table in page 2 based on the led statuses given in the picture above.

2. **Fill the Karnough Maps** on the page 3 to obtain the simplest Boolean function for each LED (from **a** to **g**) of the 7-segment display. We did first 3 LED (a,b,c) in the Lab class. Fill the karnough maps in page 3 and write the functions you obtained to the last raw of each K-Map table. For each rectangle use different colors on the rectangles to make the table easy to understand (Example tables is given in the first K-Map which is for Fa, Fb, Fc). (To add rectangle you can copy and paste existing ones)

PS: Upload the completed version of this file as a single .pdf file.

3. Finally, design the Boolean functions on Proteus Design Suite. (Use JUMPERS as we did in the lab!). Upload the project file. 7 Segment display must show all the digits (0-9) correctly corresponding to BCD input. A base design file is given in the assignment.

PS: Don't forget to fill your name and student number.

Truth Table

Digit	Inputs				Outputs (Seven Segment Led Pins)						
	A	B	C	D	a	b	c	d	e	f	g
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

a

CD / AB	00	01	11	10
00	**1**	**0**	**1**	**1**
01	**0**	**1**	**1**	**1**
11	**X**	**X**	**X**	**X**
10	**1**	**1**	**X**	**X**

B'D' + BD + C + A

b

CD / AB	00	01	11	10
00	**1**	**1**	**1**	**1**
01	**1**	**0**	**1**	**0**
11	**X**	**X**	**X**	**X**
10	**1**	**1**	**X**	**X**

C'D' + CD + B'

c

CD / AB	00	01	11	10
00	**1**	**1**	**1**	**0**
01	**1**	**1**	**1**	**1**
11	**X**	**X**	**X**	**X**
10	**1**	**1**	**X**	**X**

C' + D + B

d

CD / AB	00	01	11	10
00	1	0	1	1
01	0	1	0	1
11	X	X	X	X
10	1	1	X	X

A+BC'D+B'C'D'+CD'

e

CD / AB	00	01	11	10
00	1	0	0	1
01	0	0	0	1
11	X	X	X	X

f

CD / AB	00	01	11	10
00	1	0	0	0
01	1	1	0	1
11	X	X	X	X

10	1	0	X	X
A'CD'+AC+ABC'+B'C'D'				

10	1	1	X	X
C'D'+BC'+BD'+A				

g

CD **AB**	**00**	**01**	**11**	**10**
00	0	0	1	1
01	1	1	0	1
11	X	X	X	X
10	1	1	X	X
B'C+BC'+A +CD'				