

ECE 2300 Digital Logic and Computer Organization, Fall 2026

Lab 1A: Worksheet

NAME: _____

NetID: _____

2.1. Binary-to-Seven-Segment Converter Truth Table

Fill in the following truth table for the binary-to-seven-segment converter.

	in[3]	in[2]	in[1]	in[0]	seg[6]	seg[5]	seg[4]	seg[3]	seg[2]	seg[1]	seg[0]
0	0	0	0	0							
1	0	0	0	1							
2	0	0	1	0							
3	0	0	1	1							
4	0	1	0	0							
5	0	1	0	1							
6	0	1	1	0							
7	0	1	1	1							
8	1	0	0	0							
9	1	0	0	1							
10	1	0	1	0							
11	1	0	1	1							
12	1	1	0	0							
13	1	1	0	1							
14	1	1	1	0							
15	1	1	1	1							

2.2. Binary-to-BCD Converter Truth Table

Fill in the truth table on the next page for the binary-to-BCD converter.

	in[4]	in[3]	in[2]	in[1]	in[0]	tens[3]	tens[2]	tens[1]	tens[0]	ones[3]	ones[2]	ones[1]	ones[0]
0	0	0	0	0	0								
1	0	0	0	0	1								
2	0	0	0	1	0								
3	0	0	0	1	1								
4	0	0	1	0	0								
5	0	0	1	0	1								
6	0	0	1	1	0								
7	0	0	1	1	1								
8	0	1	0	0	0								
9	0	1	0	0	1								
10	0	1	0	1	0								
11	0	1	0	1	1								
12	0	1	1	0	0								
13	0	1	1	0	1								
14	0	1	1	1	0								
15	0	1	1	1	1								
16	1	0	0	0	0								
17	1	0	0	0	1								
18	1	0	0	1	0								
19	1	0	0	1	1								
20	1	0	1	0	0								
21	1	0	1	0	1								
22	1	0	1	1	0								
23	1	0	1	1	1								
24	1	1	0	0	0								
25	1	1	0	0	1								
26	1	1	0	1	0								
27	1	1	0	1	1								
28	1	1	1	0	0								
29	1	1	1	0	1								
30	1	1	1	1	0								
31	1	1	1	1	1								

2.4. Optimized Implementation

Draw a Karnaugh map for each output of the binary-to-seven-segment converter. Then use each Karnaugh map to derive the minimized sum-of-products form for the corresponding output. The only circles on your Karnaugh map should represent the final minimized Boolean equation.

out[6]

		in[3] in[2]			
		00	01	11	10
in[1] in[0]	00				
	01				
	11				
	10				

out[6] = _____

out[5]

		in[3] in[2]			
		00	01	11	10
in[1] in[0]	00				
	01				
	11				
	10				

out[5] = _____

out[4]

		in[3] in[2]			
		00	01	11	10
in[1] in[0]	00				
	01				
	11				
	10				

out[4] = _____

		in[3] in[2]			
		00	01	11	10
in[1] in[0]	00				
	01				
	11				
	10				

out[3] = _____

		in[3] in[2]			
		00	01	11	10
in[1] in[0]	00				
	01				
	11				
	10				

out[2] = _____

		in[3] in[2]			
		00	01	11	10
in[1] in[0]	00				
	01				
	11				
	10				

out[1] = _____

		in[3] in[2]			
		00	01	11	10
in[1] in[0]	00				
	01				
	11				
	10				

out[0] = _____