CSE 260

LAB - 7

Sihat Sahariar

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Section: 11

Experiment Name: Design a circuit that outputs 2's Complement of a 3 bit number using encoder and decoder.

Objective:

- Doing the experiment we will be able to understand the work of encoder and decoder.
- Being able to design the internal circuit for encoder & decoder.
- Would know to design the circuit for 2's complement

Equipments:

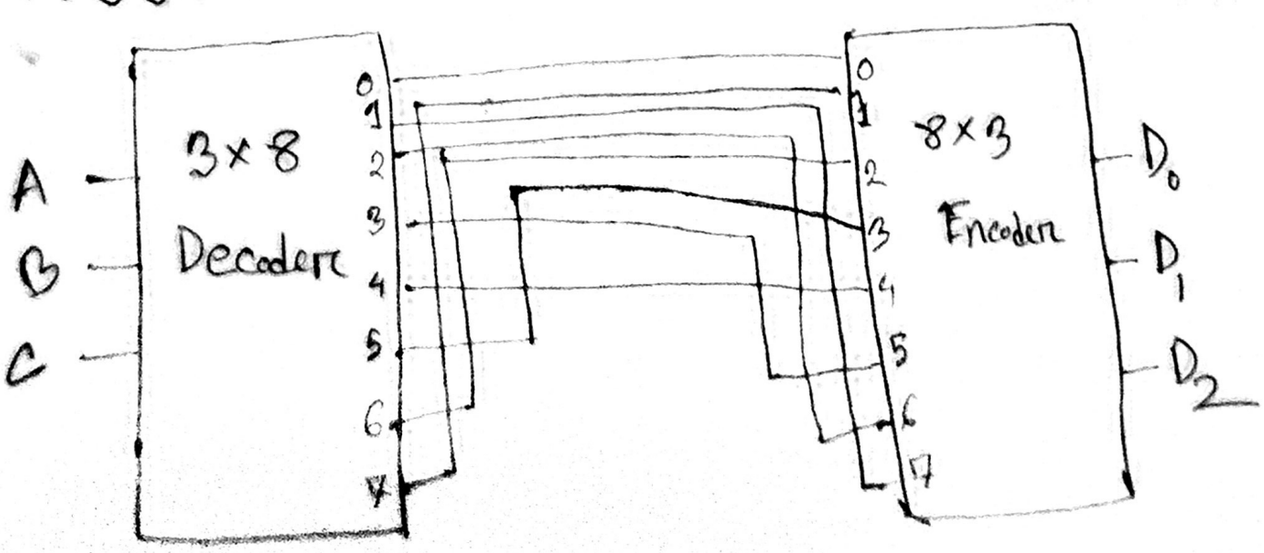
1. 74LS138
2. 74LS148
3. LOGICSTATE
4. LOGICPROBE

Experimental Circuit:

* Truth table for 2's complement output

Input				Output				Active low input			Output line connection	
Min term	C	B	A	Min term	D_2	D_1	D_0	D_2	D_1	D_0	Decoder	Encoder
0	0	0	0	0	0	0	0	1	1	1	0	0
1	0	0	1	7	1	1	1	0	0	0	1	7
2	0	1	0	6	1	1	0	0	0	1	2	6
3	0	1	1	5	1	0	1	0	1	0	3	5
4	1	0	0	4	1	0	0	0	1	1	4	4
5	1	0	1	3	0	1	1	1	0	0	5	3
6	1	1	0	2	0	1	0	0	0	1	6	2
7	1	1	1	1	0	0	1	1	1	0	7	1

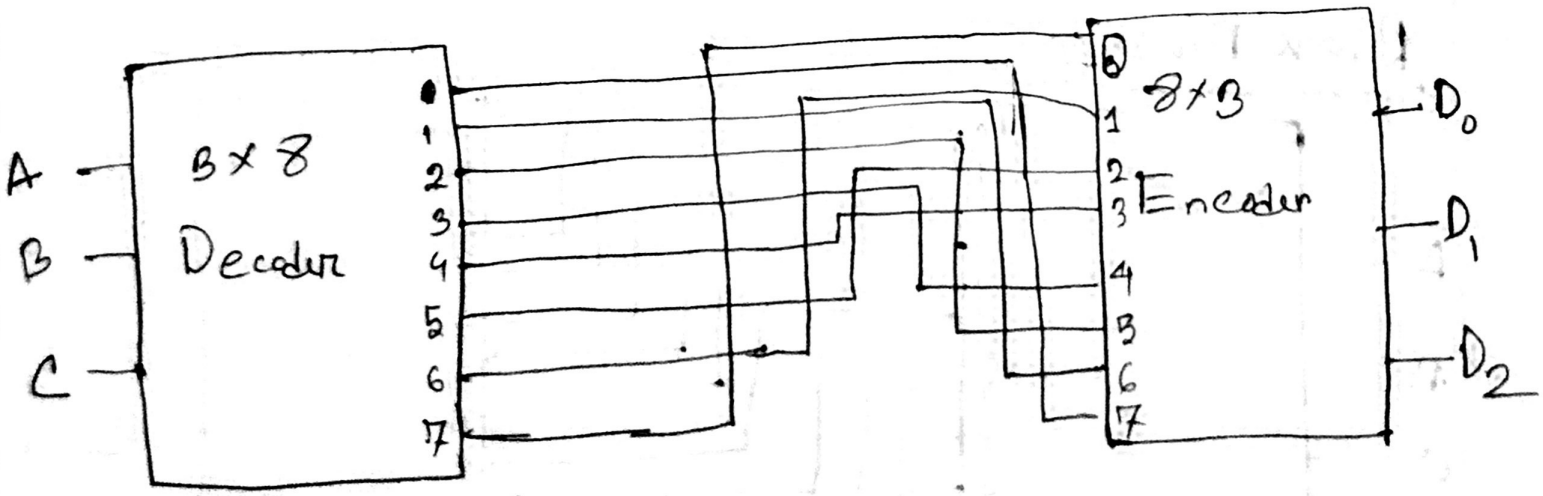
Block Diagram:



① Truth table for 1's complement:

Input				Output			
C	B	A	Minterm	Minterm	D_2	D_1	D_0
0	0	0	0	7	1	1	1
0	0	1	1	6	1	1	0
0	1	0	2	5	1	0	1
0	1	1	3	4	1	0	0
1	0	0	4	3	0	1	1
1	0	1	5	2	0	1	0
1	1	0	6	1	0	0	1
1	1	1	7	0	0	0	0

Block Diagram:



(b) We will design a BCD to Excess-3 Converter.

Input					Output				
D	C	B	A	Min term	Minterm term	D_3	D_2	D_1	D_0
0	0	0	0	0	3	0	0	1	1
0	0	0	1	1	4	0	1	0	0
0	0	1	0	2	5	0	1	0	1
0	0	1	1	3	6	0	1	1	0
0	1	0	0	4	7	0	1	1	1
0	1	0	1	5	8	1	0	0	0
0	1	1	0	6	9	1	0	0	1
0	1	1	1	7	10	1	0	1	0
1	0	0	0	8	11	1	0	1	1
1	0	0	1	9	12	1	1	0	0

Block Diagram