

# CSE260 Lab Report

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

**Submitted by**

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**Section:** 09

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Name of the experiment :

Design a circuit that outputs 2's complement of a 3-bit number using encoder and decoder.

Objective:

- i) To investigate the output of 2's complement using encoder and decoder.
- ii) To get familiar with encoder and decoder.
- iii) To gain experience working with practical circuits.



## Required components and equipments :

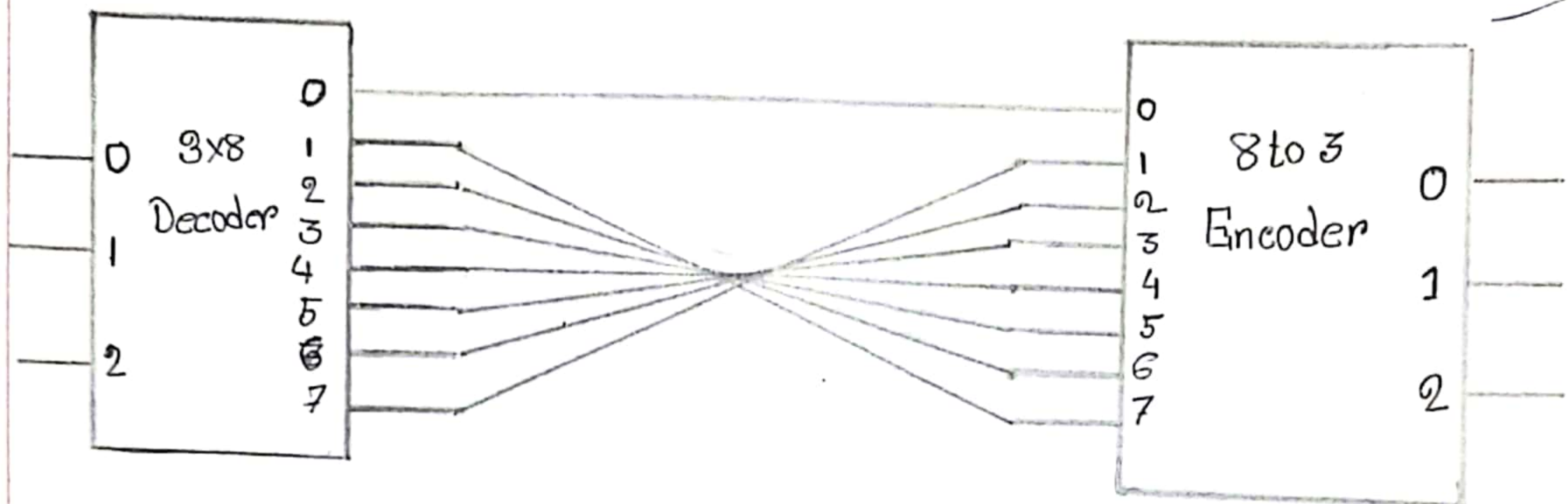
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- i) 74LS138 - decoder.
- ii) 74LS148 - encoder.
- iii) NOT GATE
- iv) LED - BLUE
- v) LOGIC - STATE
- vi) Ground.

P.T.O





## Result and Discussion :

The circuit accepts a three-bit value as an input and transforms it to its corresponding two-bit complement by reversing the form of the two-bit complement.



Truth Table 8

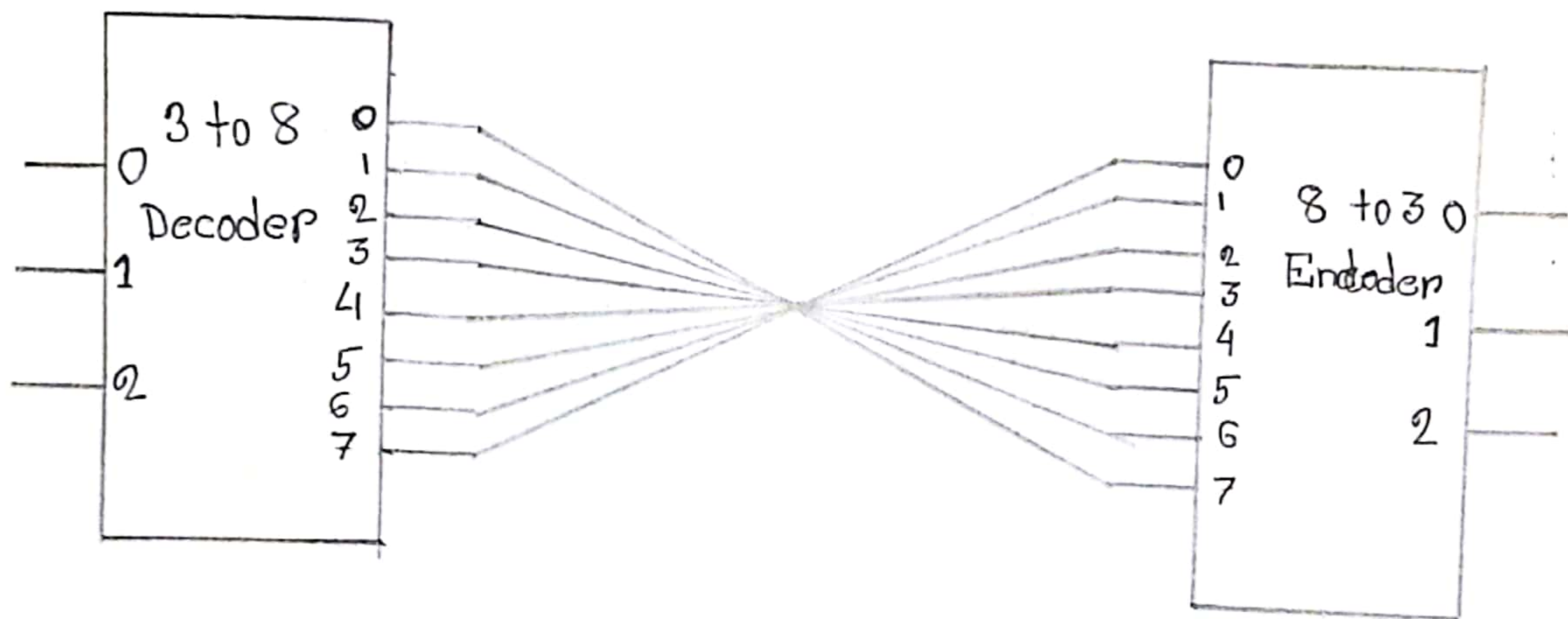
Inputs				Outputs			Active Low Outputs				Output Line Connection	
Minterms	C	B	A	Minterm	D <sub>2</sub>	D <sub>1</sub>	D <sub>0</sub>	D <sub>2</sub>	D <sub>1</sub>	D <sub>0</sub>	Decoder	Encoder
0	0	0	0	0	0	0	0	1	1	1	0	7
1	0	0	1	7	1	1	1	0	0	0	1	6
2	0	1	0	6	1	1	0	0	0	1	2	5
3	0	1	1	5	1	0	1	0	1	0	3	4
4	1	0	0	4	1	0	0	0	1	1	4	3
5	1	0	1	3	0	1	1	1	0	0	5	2
6	1	1	0	2	0	1	0	1	0	1	6	1
7	1	1	1	1	0	0	1	1	1	0	7	0

Here,  
 Decoder output will connect with encoder 0. And,  
 Decoder output will connect with encoder 7.



## Circuit Diagram :

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3-bit Number diagram

To get 1's complement, we have to connect:-

$0 \rightarrow 7, 1 \rightarrow 6, 2 \rightarrow 5, 3 \rightarrow 4, 4 \rightarrow 3, 5 \rightarrow 2, 6 \rightarrow 1, 7 \rightarrow 0$ .

We can build a code converter that includes an encoder and a decoder. We may create a BCD to Excess-3 code converter by combining  $3 \times 8$  decoders and  $8 \times 3$  encoders.