CSE260 Lab Report

Experiment Name: DESIGN A CIRCUIT THAT OUTPUTS 2'S COMPLEMENT OF A 3-BIT NUMBER USING ENCODER & DECODER

Submitted by

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Section: 05

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1> Name of the experiment : Design a circuit that outputs 2's complement of a 3 bit number using encoder and decoder.

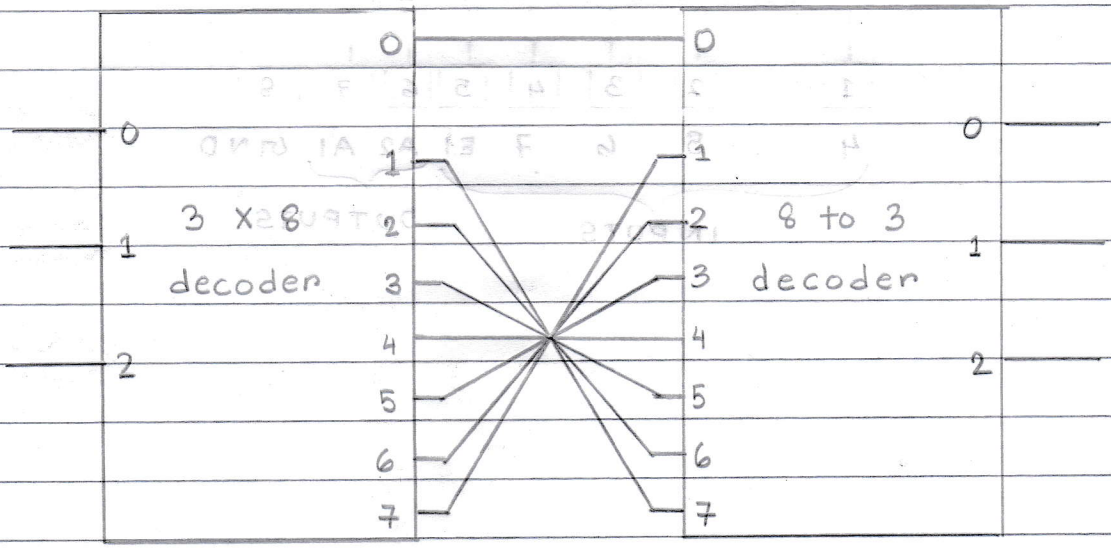
2> Objective :

- to design and implement a circuit that outputs the 2's complement of a 3-bit number using encoder and decoder

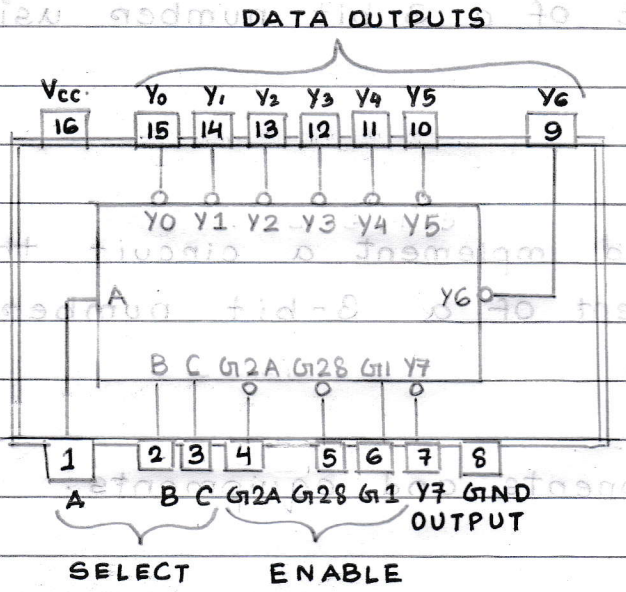
3> Required components and equipments :

- 74LS138
- 74LS148
- LED GREEN
- LOGIC STATE
- GROUND
- POWER
- WIRES

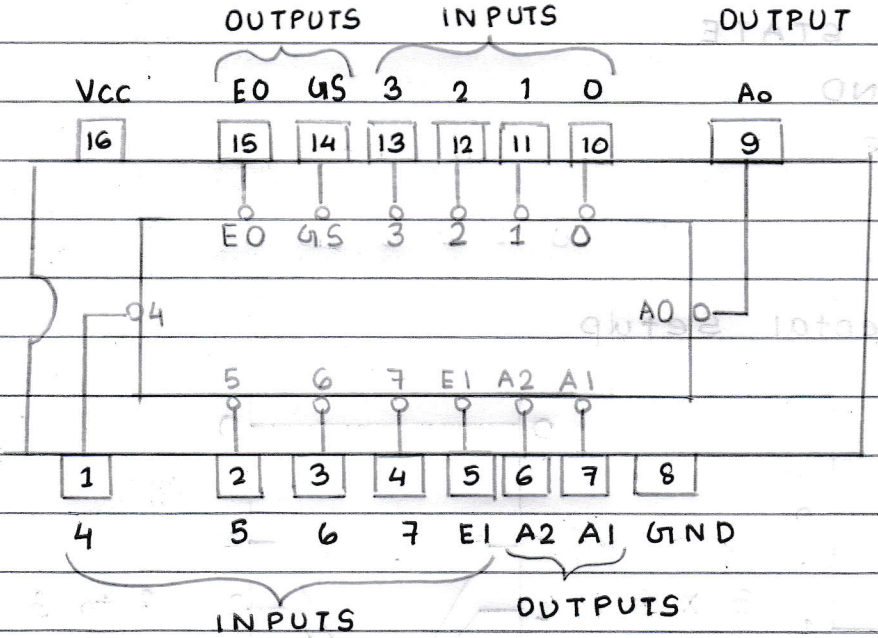
4> Experimental Setup



74138


DATA OUTPUTS
Vcc Y0 Y1 Y2 Y3 Y4 Y5 Y6
16 15 14 13 12 11 10 9
Y0 Y1 Y2 Y3 Y4 Y5
A
Y6
B C G2A G2B G1 Y7
1 2 3 4 5 6 7 8
A B C G2A G2B G1 Y7 GND
OUTPUT
SELECT
ENABLE

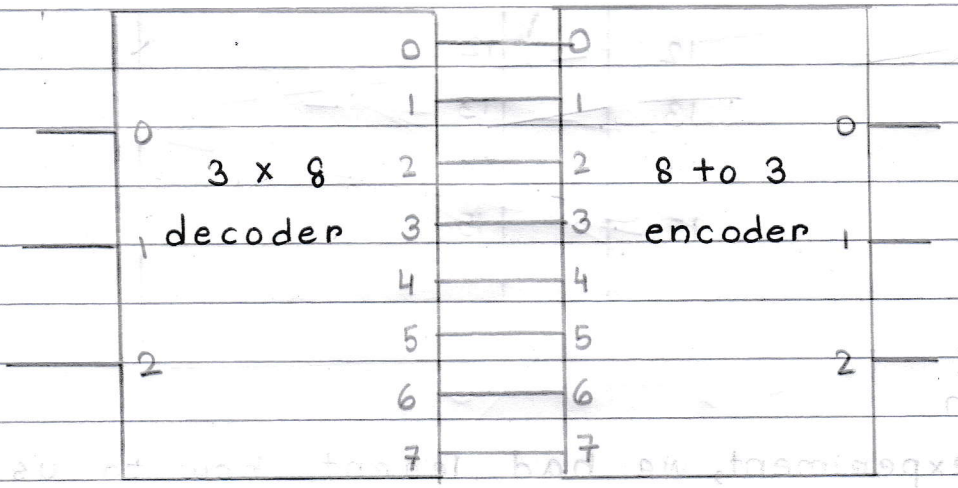
74148


OUTPUTS
INPUTS
OUTPUT
Vcc EO GS 3 2 1 0 A0
16 15 14 13 12 11 10 9
EO GS 3 2 1 0
A0
5 6 7 E1 A2 A1
1 2 3 4 5 6 7 8
4 5 6 7 E1 A2 A1 GND
INPUTS
OUTPUTS

5> Results

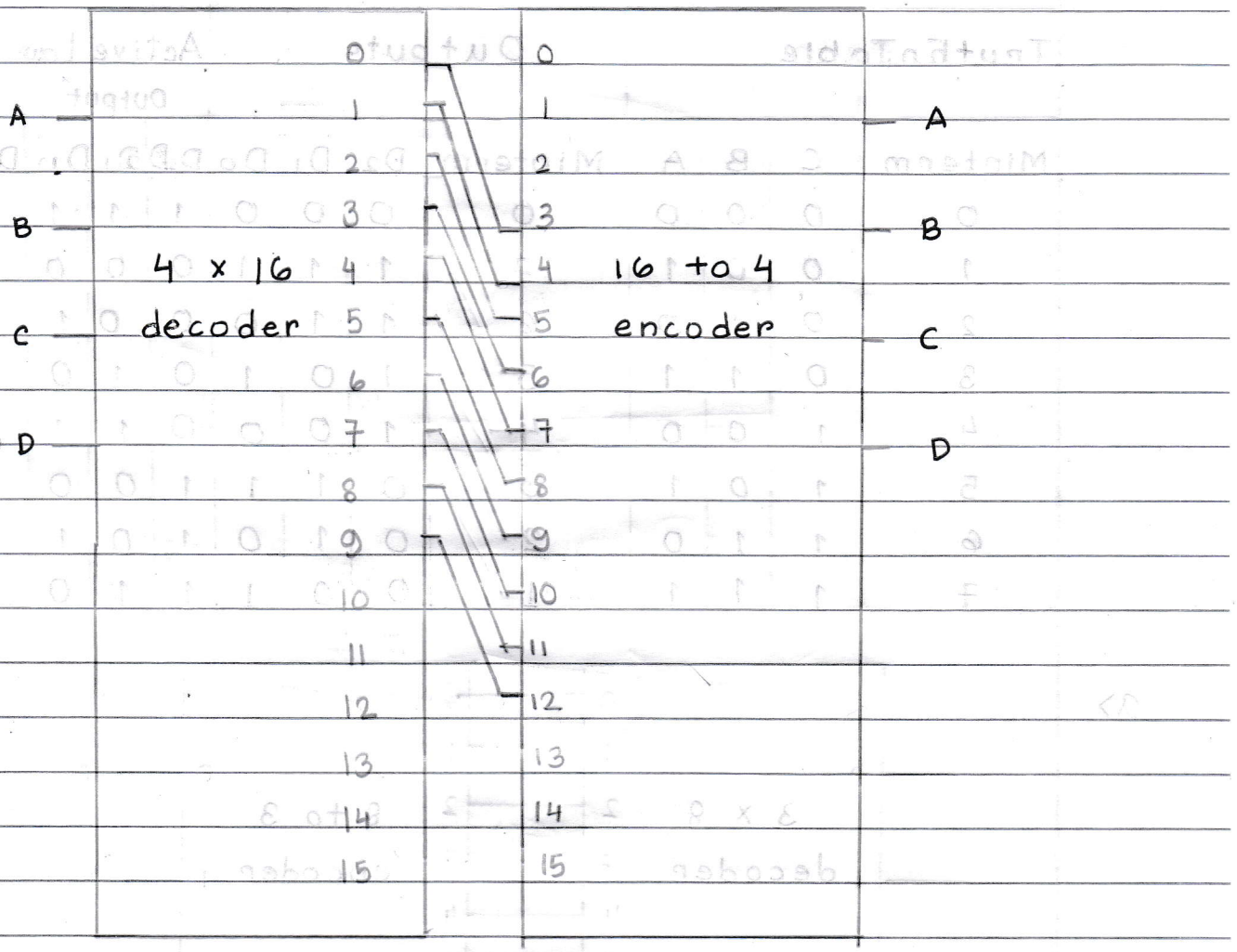
Inputs				Outputs				Active Low Output			Output Line Connection	
Minterm	C	B	A	Minterm	D_2	D_1	D_0	D_2	D_1	D_0	Decoder	Encoder
0	0	0	0	0	0	0	0	1	1	1	0	0
1	0	0	1	7	1	1	1	0	0	0	1	7
2	0	1	0	6	1	1	0	0	0	1	2	6
3	0	1	1	5	1	0	1	0	1	0	3	5
4	1	0	0	4	1	0	0	0	1	1	4	4
5	1	0	1	3	0	1	1	1	0	0	5	3
6	1	1	0	2	0	1	0	1	0	1	6	2
7	1	1	1	1	0	0	1	1	1	0	7	1

a>



b> Yes, we can implement a code convertor with encoder and decoder. In this experiment, we had converted a binary number into 2's complement. Additionally, we had also designed and implemented a code conventer in 5<a>, where we converted a binary number (3-bit) into 1's complement number system. Similarly, we can also convert from BCD to excess-3

with the following circuit:



Discussion

In this experiment, we had learnt how to use different connections between decoders and encoders to convert an n-bit code from one form to another. Particularly, we had seen how to convert a 3-bit binary number to 2's complement number. Even though, the concept was a little difficult for me to grasp, however constructing the circuit was simple and easy to implement.