LAB 6 - REPORT

For Q1)

Aim:

An automobile alarm circuit is used to detect certain undesirable conditions. The three switches are used to indicate the status of door(D), the ignition(IS), and the headlights (HS), respectively.

Design a logic circuit with these switches as inputs so that the alarm(A) will be activated only whenever either of the following conditions exists:

- The headlights are ON while the ignition is OFF
- The door is open while the ignition is ON

➢ **Implement The Above Circuit Using:**
(1) A 3:8 decoder(74HC237IC) and suitable 2-input logic gates.

Summary of the Experiment:

By writing the truth table, we form a logic equation with the output values for the given cases and then implement the circuit using a 3:8 decoder and OR gates.

Components used:

Decoder 74HC237, IC 74ALS32 and 1Kohm resistor array, DIP switches, LED displays, breadboard, power supply.

Design & Circuit diagram:

16/02/23

Lab-6

Decoder

1) 3 switches to indicate status of
   door (D)
   The ignition (IS)
   The Headlight (HS)

The Alarm(A) will be activated when

→ HS - on, Is - off

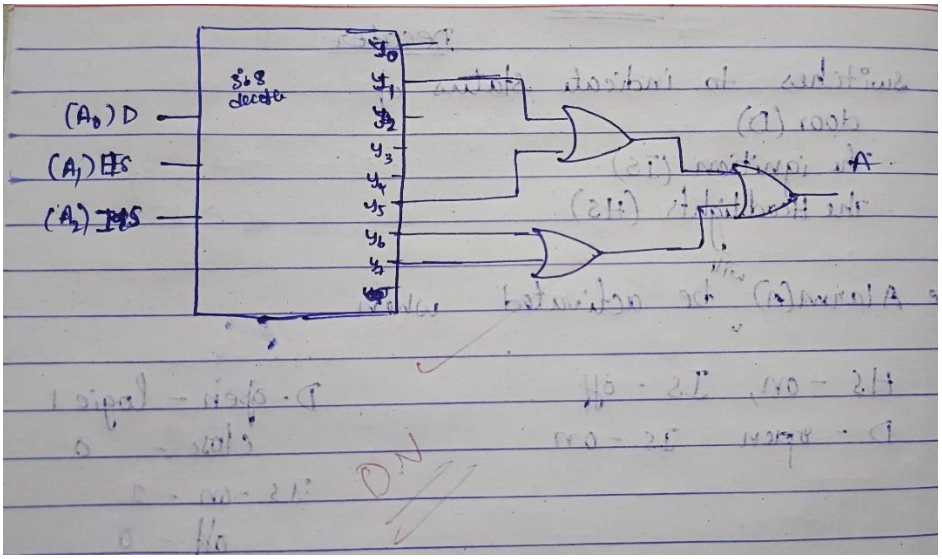
→ D - open Is - on

D - open - logic 1
close - 0
Is - on - 1
off - 0
HS - on - 1
off - 0

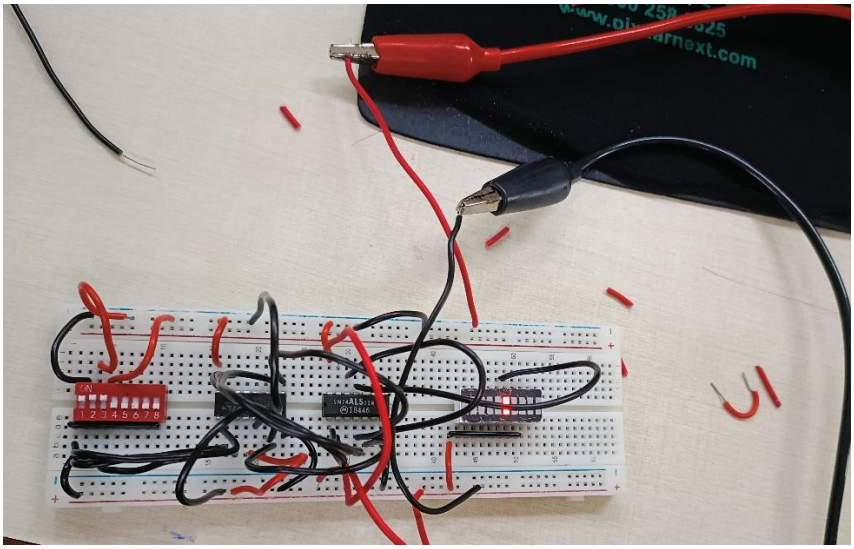
E	inputs			(A) outputs								
	A_2	A_1	A_0	F	y_0	y_1	y_2	y_3	y_4	y_5	y_6	y_7
0	D	Is	HS									
	0	0	0	0	1	0	0	0	0	0	0	0
	0	0	1	1	0	1	0	0	0	0	0	0
	0	1	0	0	0	0	1	0	0	0	0	0
	0	1	1	0	0	0	0	1	0	0	0	0
	1	0	0	0	0	0	0	0	1	0	0	0
	1	0	1	1	0	0	0	0	0	1	0	0
	1	1	0	1	0	0	0	0	0	0	1	0
	1	1	1	1	0	0	0	0	0	0	0	1

output A = $\Sigma 1, 5, 6, 7$

$\Sigma y_1\ y_5\ y_6\ y_7$



Snapshots :



Results and Conclusion:

I understood the properties of a decoder. I have learned how to form a logic equation using a truth table, and implement and build a circuit using DECODER. I have got the results perfectly with verified outputs.

**** ****

For Q2)

Aim :

1. Design and implement 4:1 MUX using basic logic gates.

2. Implement the following SOP with 4:1 MUX.

$Y = f(A, B, C, D) = \Sigma m(3,5,7,10,12,15) + d(9,11,13,14)$

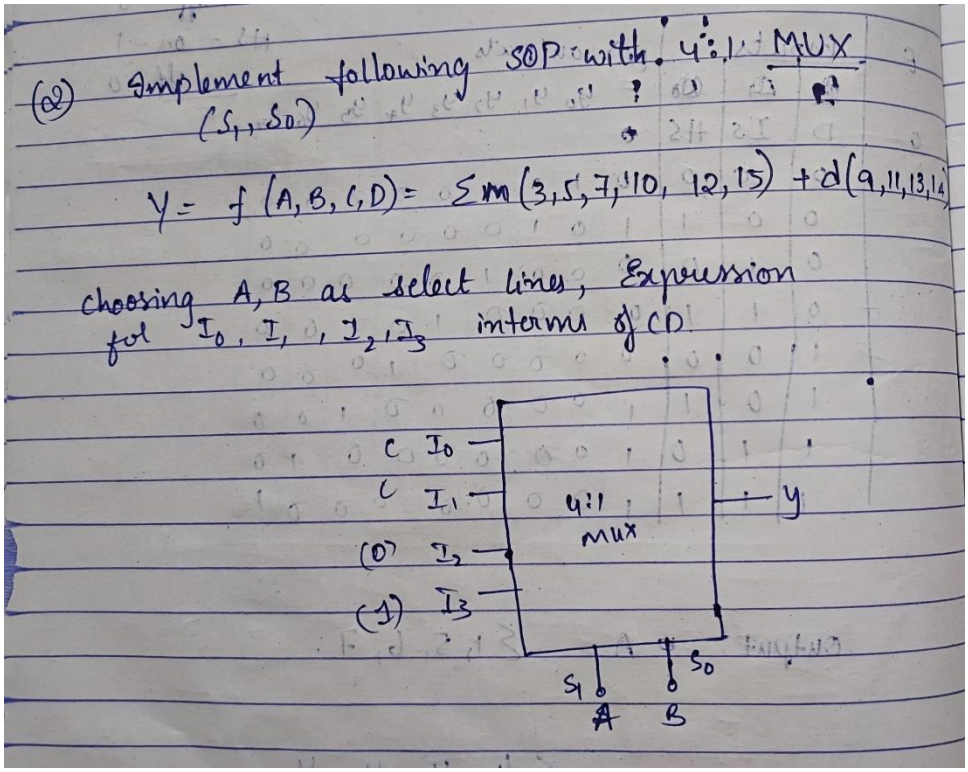
Summary of the experiment:

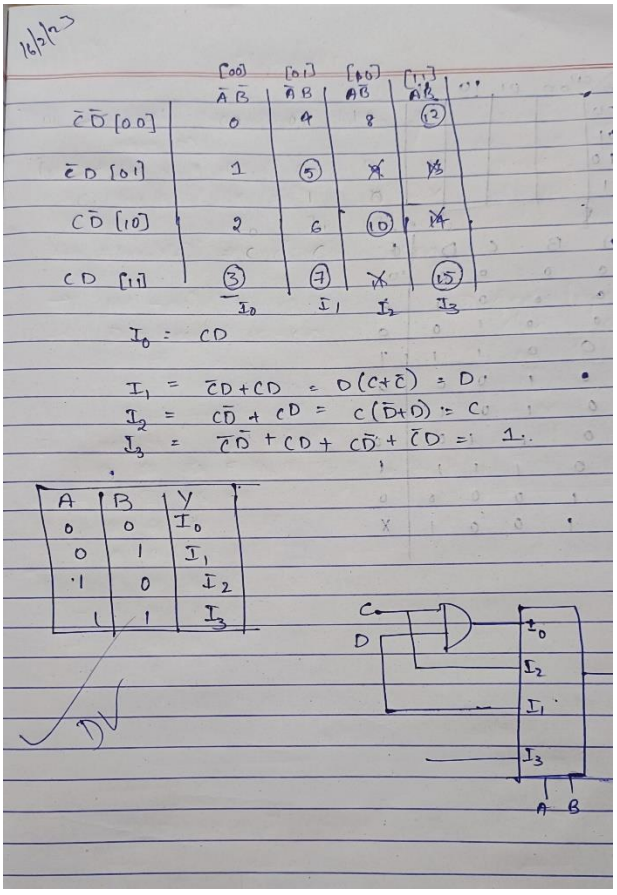
We implement a 4:1 multiplexer using basic logic gates and with the properties of DM74153 IC, we make the desired output.

Components used:

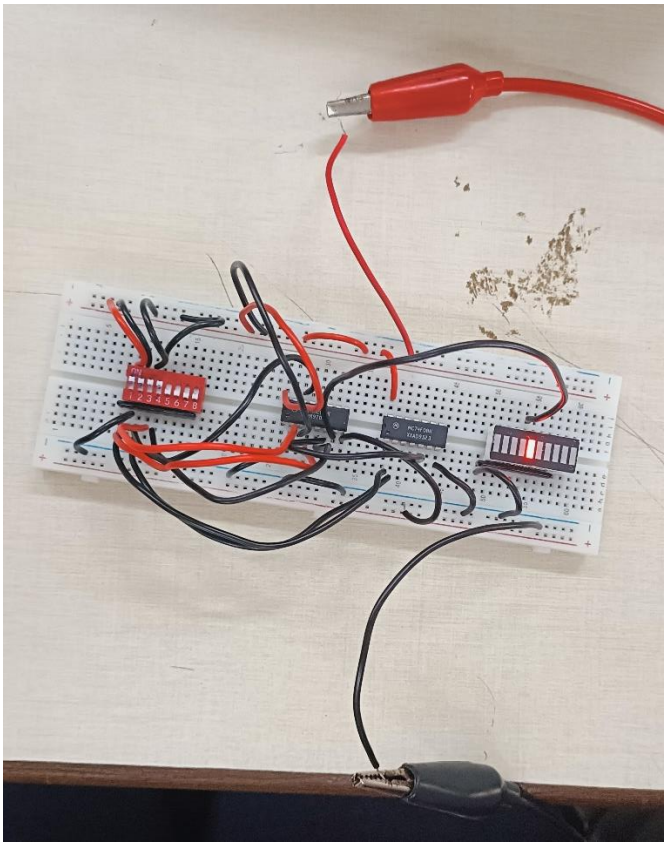
DM74153 IC, IC 7408 and 1Kohm resistor array, DIP switches, LED displays, breadboard, power supply.

Design & Circuit diagram:




16/2/22
$I_0 = C\bar{D}$
$I_1 = \bar{C}D + CD = D(C+\bar{C}) = D$
$I_2 = C\bar{D} + CD = C(\bar{D}+D) = C$
$I_3 = \bar{C}\bar{D} + CD + C\bar{D} + \bar{C}D = 1$
A B Y
0 0 I_0
0 1 I_1
1 0 I_2
1 1 I_3
C
D
I_0
I_2
I_1
I_3
A B

Snapshots :



Results & Conclusion :

- I understood the properties of DM74153 IC.
- Could implement and build a 4:1 MUX using basic logic gates by forming an equation using the truth table and got verified results for that.
- In the second part of the question, I was able build a the required output f(A, B, C, D) = Σm(3,5,7,10,12,15) + d(9,11,13,14) using 4:1 MUX using DM74153 IC.
- I have learned the implementation working about multiplexer

***** THE END*****