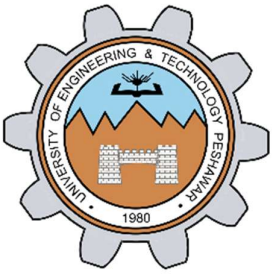
De-Morgan's Theorem

LAB # 03



Fall 2023

CSE-202L: Digital Logic Design Lab

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Class Section: **A**

Submitted to:

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Lab # 3:

De-Morgan's Theorem

OBJECTIVES:

- Experimentally verify the De-Morgan's theorems using two input variables.

DE-MORGAN'S THEOREM:

- (X + Y)' = X' . Y'
- (X . Y)' = X' + Y'

COMPONENTS REQUIRED

- 7432 quad 2-input OR gate
- 7404 hex inverter
- LED
- 7430 quad 2-input AND gate
- DIP switch
- Three 1 kΩ resistors

LOGIC CIRCUIT DIAGRAMS:

- **(X + Y)' = X' . Y'**

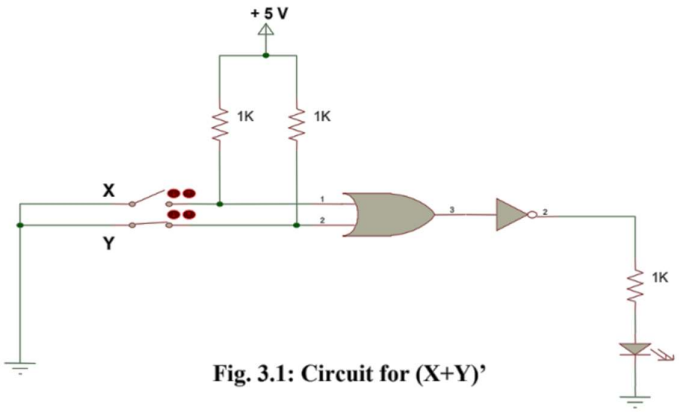


Fig. 3.1: Circuit for (X+Y)'

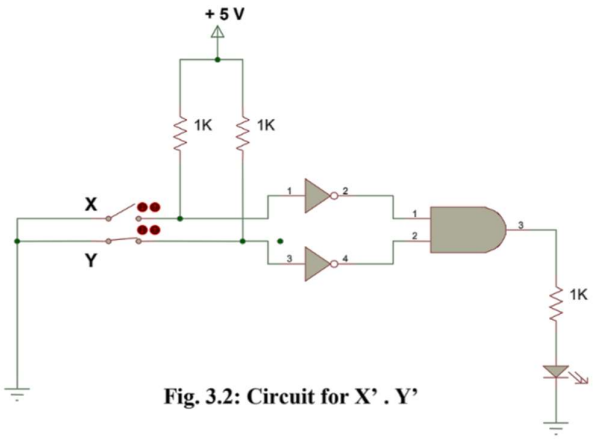
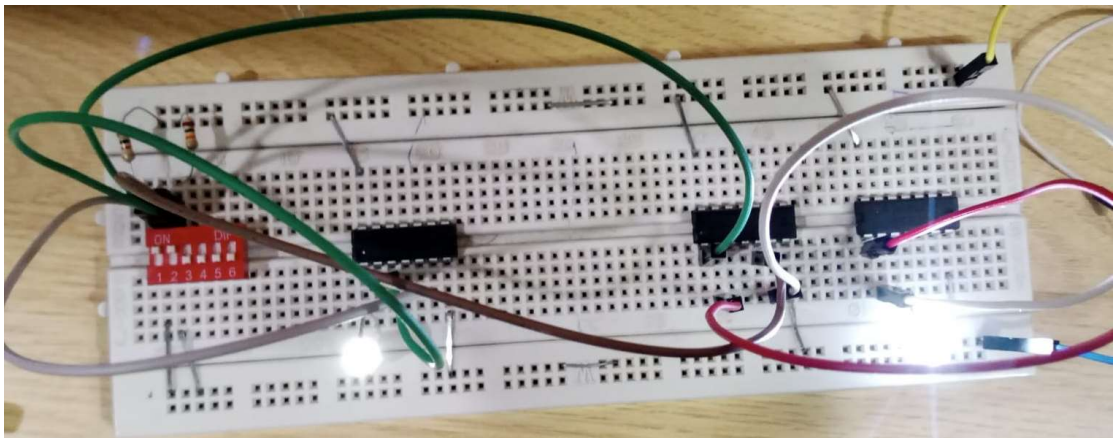


Fig. 3.2: Circuit for X' . Y'

EXPERIMENT:



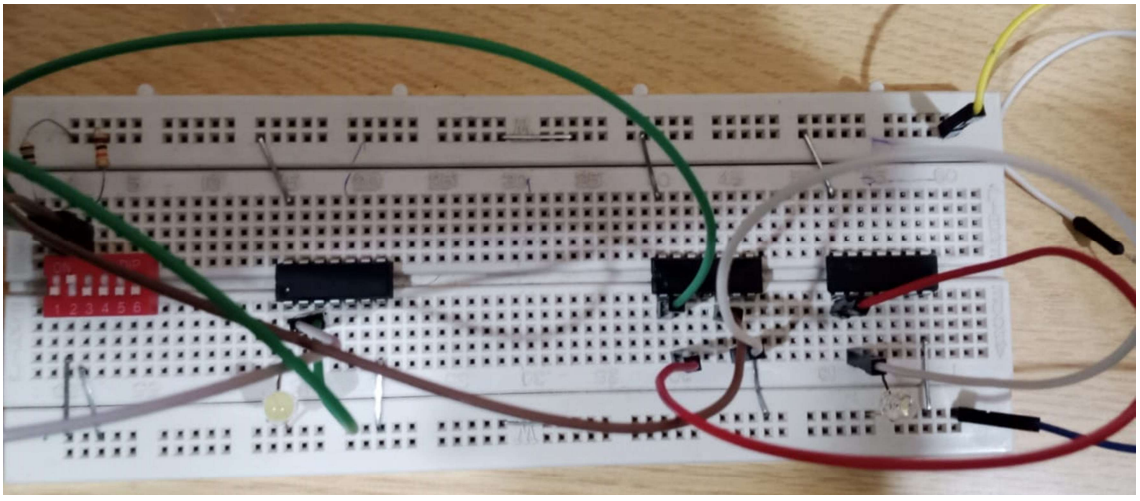


Table 1: (X+Y)'=(X'.Y')

X	Y	(X + Y)’	(X’ . Y’)
0	0	1	1
0	1	0	0
1	0	0	0
1	1	0	0

- (X . Y)’ = X’ + Y’

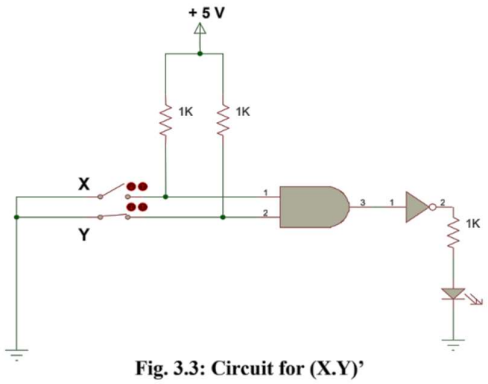


Fig. 3.3: Circuit for (X.Y)’

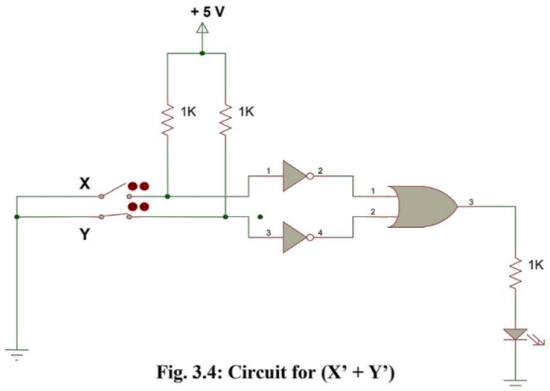
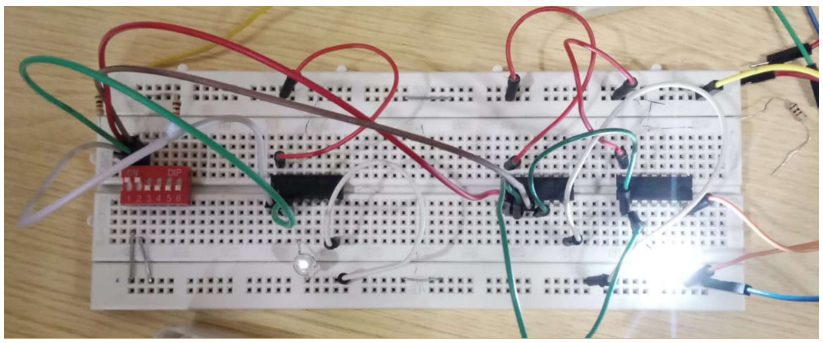


Fig. 3.4: Circuit for (X’ + Y’)

EXPERIMENT:



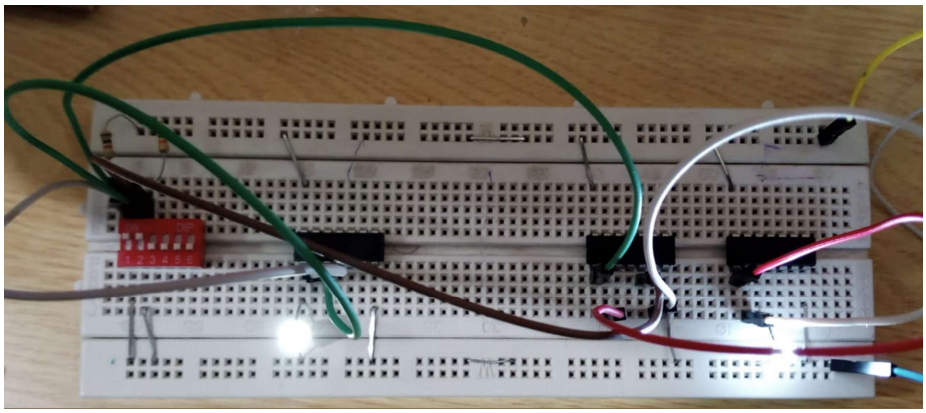


Table 2: (X.Y)'=(X'+Y')

X	Y	(X .Y)’	(X’ +Y’)
0	0	1	1
0	1	1	1
1	0	1	1
1	1	0	0