

Logical Expression through assembly

Md. Naveed Ahmed

CONTENTS

1	Problem Statement	1
2	Components	1
3	Solution :	1
3.1	Theoretical Solution	1
3.2	Truth table for Boolean Logic	1
4	Connections	2
5	Procedure	2
5.1	LED Blinking	2

TABLE I

3 SOLUTION :

3.1 Theoretical Solution

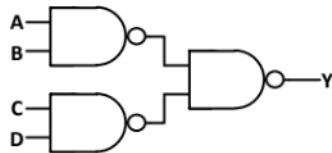
Based on Demorgans Law

$$\overline{AB} = \overline{A} + \overline{B} \quad (1)$$

$$\overline{\overline{A}} = A \quad (2)$$

1 PROBLEM STATEMENT

Question-14 : In the logic circuit shown in the figure, Y is given by



As per the boolean circuit A,B,C and D are inputs and Y is the output. The equivalent expression of the boolean logic is

$$Y = \overline{\overline{AB} \cdot \overline{CD}}$$

- (a) $Y = ABCD$
- (b) $Y = (A + B)(C + D)$
- (c) $Y = A + B + C + D$
- (d) $Y = AB + CD$

By using equation(1) then the output Y is

$$Y = \overline{\overline{AB} + \overline{CD}}$$

Again by using equation(2) then the output Y is

$$Y = AB + CD$$

3.2 Truth table for Boolean Logic

2 COMPONENTS

Component	Value	Quantity
Resistor	220 Ohm	1
Arduino	UNO	1
Seven Segment Display		1
Decoder	7447	1
Jumper Wires	M-M	20
Breadboard		1

A	B	C	D	Y
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

TABLE II

4 CONNECTIONS

Input	A	B	C	D	
Output					Y
Arduino	2	3	4	5	8

TABLE III

5 PROCEDURE

5.1 LED Blinking

- 1) Make connections as per TABLE-III
- 2) Connect Arduino ground to the led - resistor end
- 3) Connect Arduino 8 pin to the LED Positive
- 4) In arduino we are having pins A,B,C,D.here we are using port B pin 8 is taken as output pin.
- 5) port D pins 2,3,4,5 pins are taken as a inputs. portD pins 2,3,4,5 pins are connected vcc or gnd in breadboard as per truth table
- 6) Execute the following code
- 7) Observe the results as per below TABLE II by changing input values

Observe the circuit and verify the program by executing the link provided below.

<https://github.com/naveed790/FWC/>