

# Verification of First Distributive law of Boolean Algebra in Assembly Language

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**Abstract**—This document shows the verification of first distributive law of Boolean Algebra through Truth Table

## I. STATEMENT

This law states that  $X.(Y+Z) = X.Y + X.Z$

This law can be verified by the Truth table mentioned below:

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

TABLE I  
1.1 TRUTH TABLE

## II. COMPONENTS

Component	Value	Qunatity
Arduino	UNO	1
Jumper Wires	M-M	7
BreadBoard		1
LED		2

TABLE II  
1.1 COMPONENTS

## III. HARDWARE

**Problem 2.1.** Make connections between the Arduino UNO, and LED's as shown in Table 2.1

Arduino	2	8	GND
LED 1	+ ve		- ve
LED 2		+ ve	- ve

TABLE III  
2.1 CONNECTIONS

## IV. SOFTWARE

**Problem 3.1** Now execute the following program and verify the outputs as mentioned in Table 2.1 by modifying the inputs X, Y, Z.

```
svn co https://github.com/sureshoye/Assembly-Assignment
cd codes
avra hello.asm
avrdude -P atmega328p -c arduino -P /dev/ttyACM0
-b 115200 -U flash:w:hello.hex
```

TABLE IV

**Note:** You will observe that both LED bulbs glow together.

**Problem 3.2** Now execute the above program and verify the outputs by changing the last digits of r18,r19,r20,r21,r22,r23. Make sure that the inputs of r18 and r21 are same followed by r19 and r22, r20 and r22 with same values as they represent X,Y and Z