North South University

Department of Electrical & Computer Engineering

LAB REPORT

Course Code : EEE211. L

Course Title: Digital Electronics

Section: 01

Experiment Number: 01

Experiment Name: Implemantation of Boolean Function

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Course Instructor: FHE

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Experiment Name:

Introduction to basic logic gates. (Digital logic gates & Boolean functions).

Objectives:

i) Study the basic logic gates.

ii) Acquaint with the representation of Boolean functions using truth tables, logic diagrams & Boolean algebra.

iii) Prove the extention of inputs of AND and OR gates using the associate law.

iv) Familiarize with combinational logic circuit.

Apparatus:

- IC 7408 Quadruple 2-input AND gates.
- IC 7432 Quadruple 2-input OR gates.
- Trainer Board.

Theory:

Logic gates are the ~~them~~ major equipment in digital circuits. They perform various logical operation & produces a output value evaluating those operation.

Combinational logic gates are made up from basic logic gates that are combined or connected together to produce more complicated switching circuits.

A truth table shows all the output logic levels of a logical circuit for the inputs of different combination.

Boolean algebra is a branch of algebra in mathematics & mathematical logic, where the values of the varibles are the truth values true & false, denoted 1 & 0 respectively.

Circuit diagram:

$F = AB + BC + A'C'$

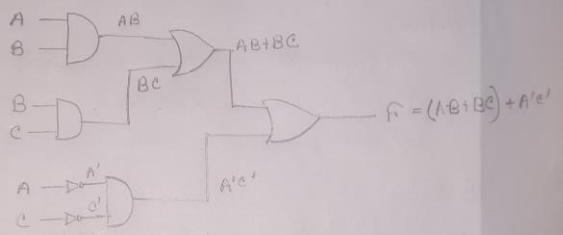

figure: Circuit diagram for Boolean function F.

Truth Table:

A	B	C	$I_1 = AB$	$I_2 = BC$	$I_3 = A'C'$	$F = I_1 + I_2 + I_3$
0	0	0	0	0	1	1
0	0	1	0	0	0	0
0	1	0	0	0	1	1
0	1	1	0	1	0	1
1	0	0	0	0	0	0
1	0	1	0	0	0	0
1	1	0	1	0	0	1
1	1	1	1	1	0	1

figure: Truth Table of Logic Gates.

Question & Answers:

Yes. It is possible to make 3-input NAND or NOR gate with 2-input NAND or NOR gates.

In this experiment we have used 2-input ~~or~~ OR gates to complete the experiment of 3-input. Similarly we can do the same for NAND or NOR gates; it won't effect the output.

Discussion:

Due to pandemic, we instead of practical lab we are attending online lab. We ~~completing the~~ are working in Logisim & complete the experiment. This experiment helped us to get familiar with the different logic gates & through this experiment we can relate our theoretical knowledge of combinational logic, boolean algebra etc. in practical session.

Though due to load-shedding, I could not attend the online lab class; But I watched the whole ~~class~~ recorded lecture later & completed this report.

Simulation:

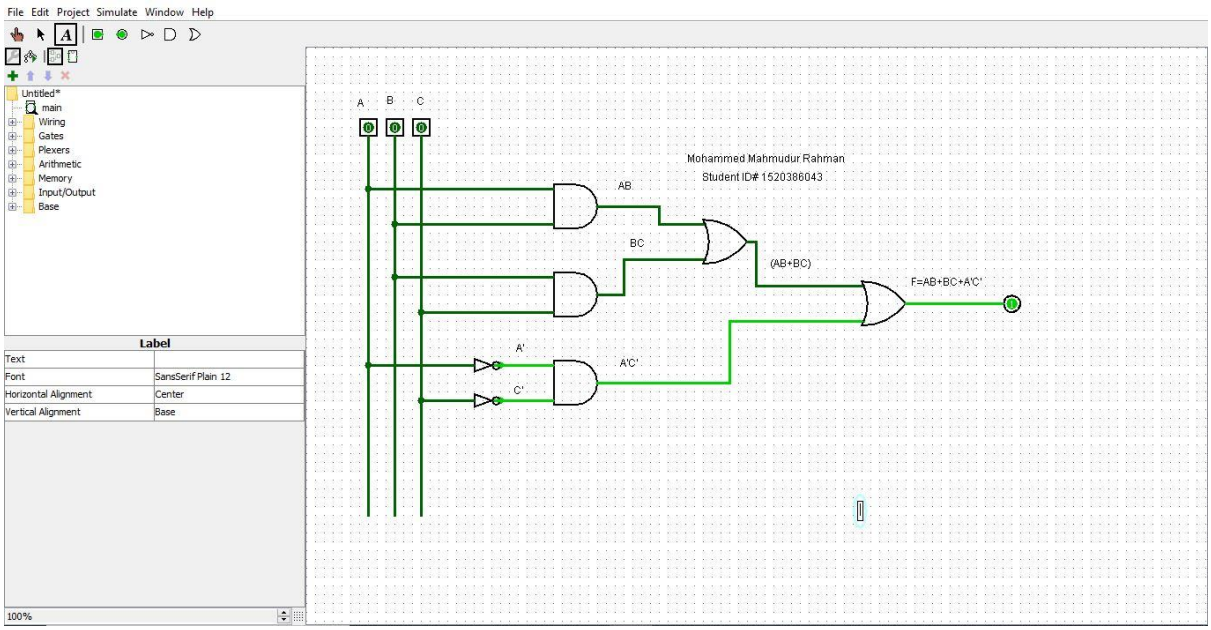

Figure 1: Simulation for Input 000

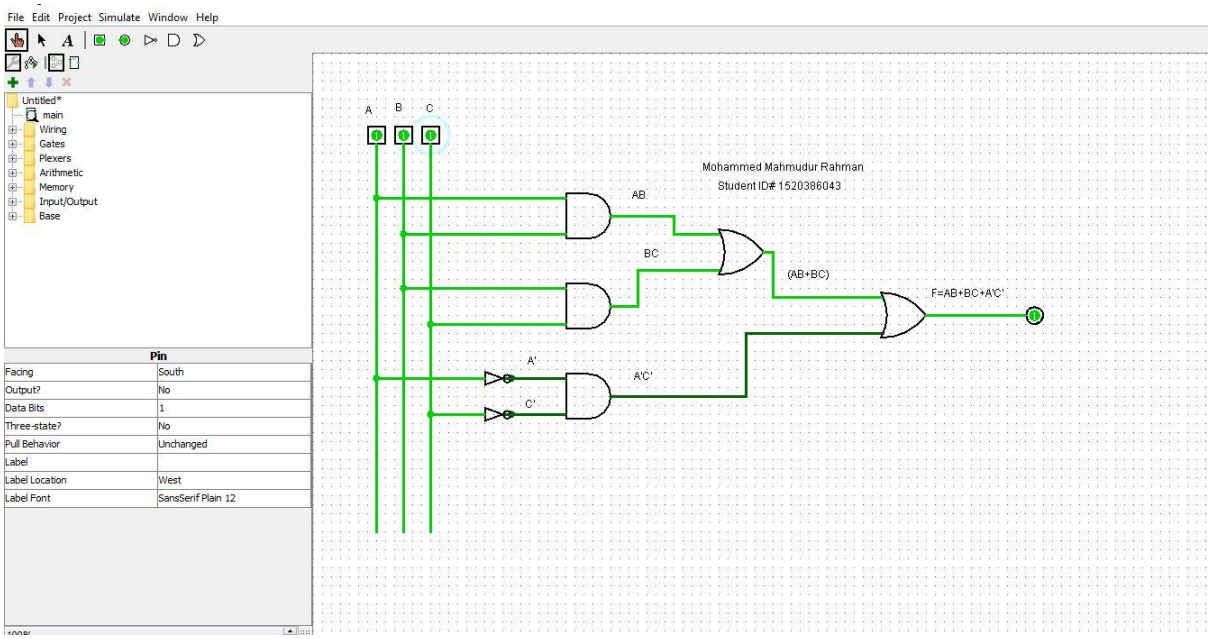

Figure 2: Simulation for input 111