Lab 1
EET 241 (Logic Circuits)
Total Points: 100

Objective: Software simulation of the basic logic gates: NOT, AND, and OR gate.

Materials Needed: Logisim (for software simulation)

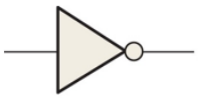
Theory: Many situations and processes that you encounter in your daily life can be expressed in the form of propositional or logic functions. Since such functions are true/false or yes/no statements, digital circuits with their two-state characteristics are applicable.

- For example, the prepositional statement "The light is on" will be true if "The bulb is burned out" is true and if "The switch is on" is true.
- Prepositional statement can be made as: *The light is on only if the bulb is not burned out and the switch is on.*

Three basic logic functions (NOT, AND, and, OR) are indicated by standard distinctive shape symbols as shown in Figure. The lines connected to each symbol are the inputs and outputs. The inputs are on the left of each symbol and output is on the right. A circuit that performs a specified logic function (AND, OR) is called a logic gate. AND and OR gates can have any number of inputs as indicated by dashes in the figure.

NOT Gate

The NOT function changes one logic level to the opposite logic level, as indicated on Figure. When the input is HIGH (1), the output is LOW (0). When the input is LOW (0), the output is HIGH (1). The NOT function is implemented by a logic circuit known as an inverter (NOT gate).



Input	Output
A	X
0	1
1	0

AND Gate

The AND function produces a HIGH output only when all the inputs are HIGH as indicated in Figure. When all the inputs are HIGH, then the output is HIGH. The AND function is implemented by a logic circuit known as an AND gate.

Inputs		Output
A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

OR Gate

The OR function produces a HIGH output only when one or more inputs are HIGH as indicated in Figure. The OR function is implemented by a logic circuit known as an OR gate.

Inputs		Output
A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

Procedure

1. Install Logisim on your computer. You need java runtime environment as well. In the EET 241 Mediasite, you can watch the video on how to install Logisim software on your computer and simulate lab 1 on Logisim.

2. Connect NOT gate with input and output. Test the output for different combination of inputs. Tabulate the results on 1-1.

3. Connect AND gate with inputs and output. Test the output for different combination of inputs. Tabulate the results on 1-2.

4. Connect OR gate with inputs and output. Test the output for different combination of inputs. Tabulate the results on 1-3.

Lab1 report (Software Simulation)

Name:

Data and Observations:

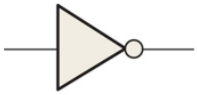


Table 1-1 NOT Gate

Input	Output
A	X
0	1
1	0

Table 1-2 AND Gate

Inputs		Output
A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

Table 1-3 OR Gate

Inputs		Output
A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

Submission Process

You should name Logisim file as lab1.circ. You just need to submit lab1 report and Logisim file (lab1.circ). You do not need to submit tutorial or procedure.

I would suggest you create a folder and name it as Lab1 and copy your lab1 report and lab1.circ. Then you will zip the Lab1 folder. Finally, upload the zipped Lab1 file on the Canvas.