

ELC 2137 Lab 2: Transistor

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January 30, 2020

Summary

The purpose of this lab was to demonstrate how transistors can be used to construct logic gates on an IDL-800 board. Several gates were constructed and tested such as the OR, NOT, and NOR gates as well as an unknown gate that combined a NOR gate with two inverting gates, showing how transistors can be used to hook gates together. It was found that the unknown gate was the AND gate. Additionally, the flow of current in each gate was analyzed as documented in the written results.

Q&A

1. What logic operation does it implement?

The logic operation in the "unknown" gate combination was found to be the AND style operation. This means the LED would only lit up when both switches were turned on(set as 1 values), as further discussed in the Results section.

Results

Figure 1 and 2 both show how current flows in the constructed logic gates. It also shows whether or not each switch, transistor, and LED is on or off. Figure 3 is a logic table that demonstrates the results of the unknown gate constructed. Using the table, it can be identified as an AND gate.

Circuit Demonstration Page

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Instructor Initials

Pushbutton "Or Gate" BB

Transistor Not gate BB

Transistor Nor gate BB

Transistor unknown gate BB

Diagrams

On each of the circuits below, draw the current paths and note whether each switch, transistor, and LED is ON or OFF.

Inverter:

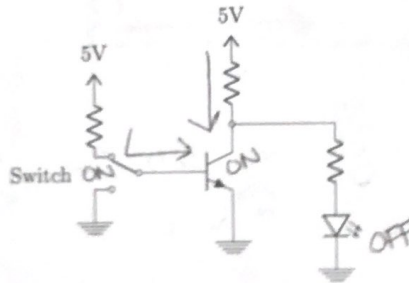
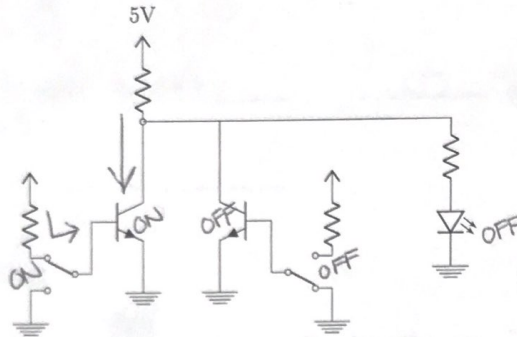


Figure 1: Page 1 of the Circuit Demonstration Document

NOR:



Final gate:

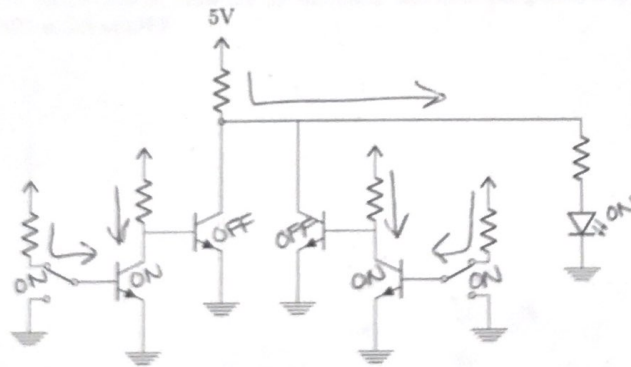


Figure 2: Page 2 of the Circuit Demonstration Document

A	B	AND
0	0	0
0	1	0
1	0	0
1	1	1

Figure 3: Logic table of the unknown circuit

Conclusion

While the purpose of this report was not exactly to find values, but rather to test the construction of logic gates using transistors, the skills gained will help students in the future as they try to find how to accomplish goals using logic gates. Additionally, this lab allowed students to become comfortable with lab equipment that is sure to be utilized in the future.