University of Bohol
College of Engineering and Technology
Computer Engineering Department

First Semester

PCB DESIGNING

CPEP 316 - Computer Engineering Drafting and Design

In partial fulfillment of the requirements for the degree of

Bachelor of Science in Computer Engineering

Submitted to:

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Submitted By:

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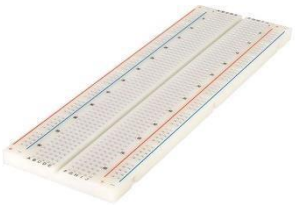
Introduction

In Computer Drafting and Design, the first task involves three main objectives. These are generating a schematic design, developing a PCB design, and then implementing it on a physical PCB. This aims to enhance your skills and abilities, equipping you for the practical aspects of a Computer Engineering-related profession. You will learn how to craft your designs and simplify complex tasks by making the most of available tools and resources in your surroundings. Ultimately, this activity readies you for involvement in more practical projects with real-world applications. In this activity we used the following tools, equipment, materials, and components:

Proteus – A software that is used to simulate the schematic diagram and to make the PCB layout diagram.

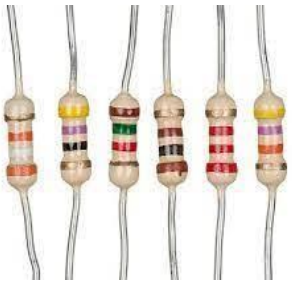
Fritzing – A software that is used to create circuit design in a breadboard.

Breadboard – A solderless board which is good in prototyping. We need this to test if the schematic diagram really works. This is to test first if the design works before transferring the design in a PCB.



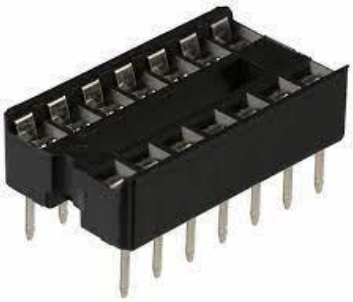
PCB: Printed Circuit Board - A board used to mechanically support and electrically connect electronic components through conductive pathways.

Resistor - Electronic components that limit the flow of electric current in a circuit.



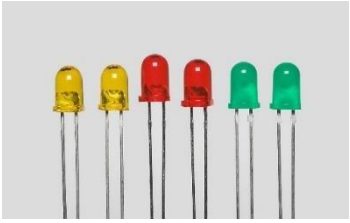
74LS08 - An integrated circuit that performs logical AND operations in digital circuits.

Header pins (IC Holder & Switch) Connectors used to interface with electronic components. We use this to save the PCB if a component suddenly fails which we just remove it and replace the damaged component.

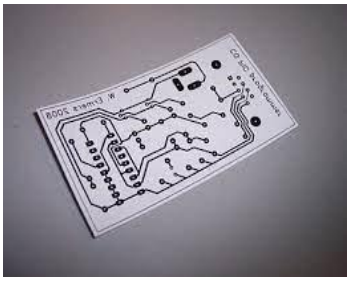


Dipswitch - A small switch with multiple positions, typically used for setting configuration options in electronics. Primarily used to dictate if a certain signal is high or low.

LED: Light-Emitting Diode - A semiconductor device that emits light when a current passes through it.



Laser Print PCB Design - A method of creating printed circuit board designs using a laser printer for transferring patterns onto the PCB.



Ferric Chloride - A chemical used for etching copper from PCBs to create circuit traces.

Acetone - A solvent often used for cleaning and removing residues in electronics.

Steel Wool - A bundle of fine steel fibers used for cleaning and polishing metal surfaces.

Toolbox - Where we store the materials and equipment.

Soldering Iron - A tool used to solder electronic components and wires onto a PCB.

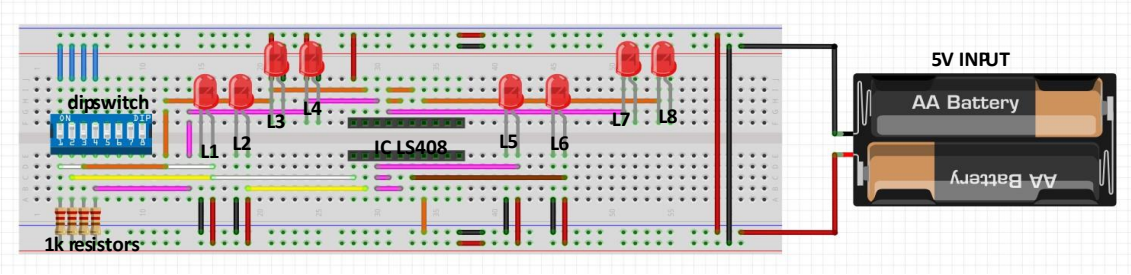
Soldering Lead - is a metal alloy usually made of tin and lead which is melted using a Soldering iron

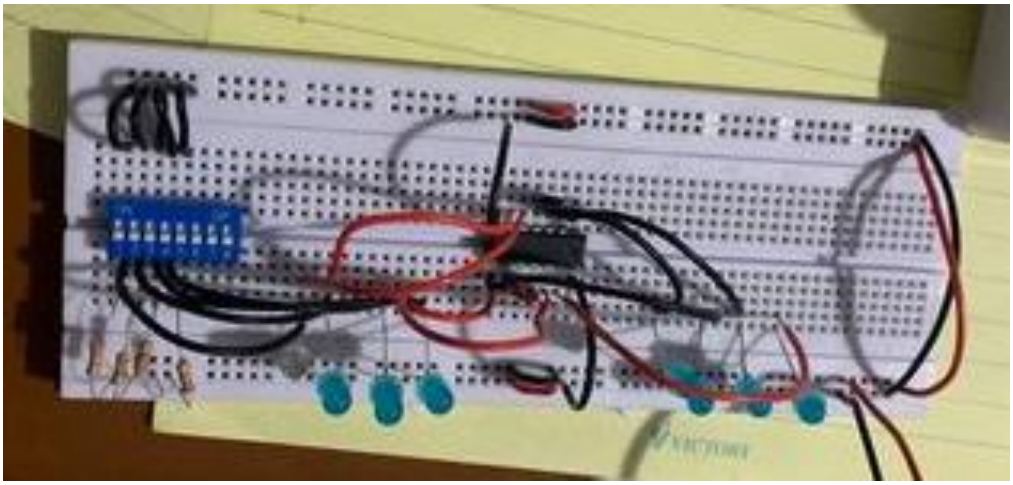
Cutter Wire/Wire Stripper - A tool used for cutting and stripping wires in electronics and electrical work.

Cotton - used to rub the acetone into the PCB to smoothen and remove unnecessary dirt and prints.

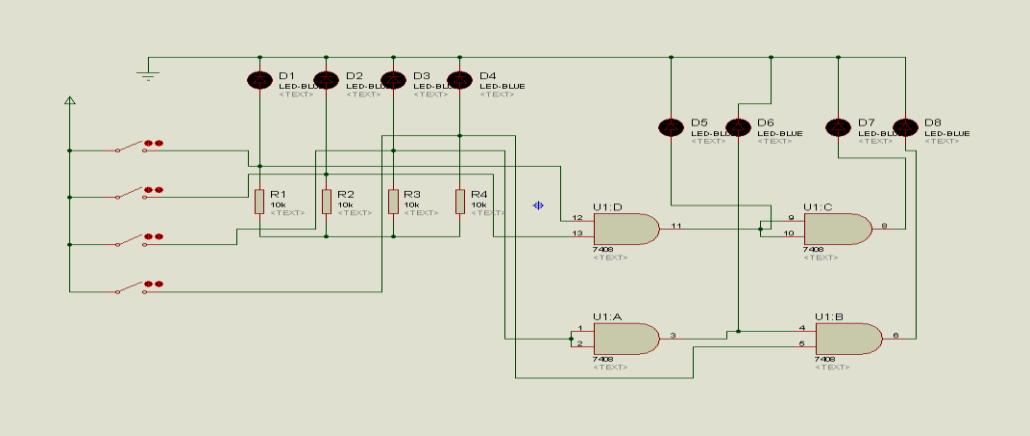
Heat press machine – Efficient way to transfer your printed design to your PCB.

Circuit Design



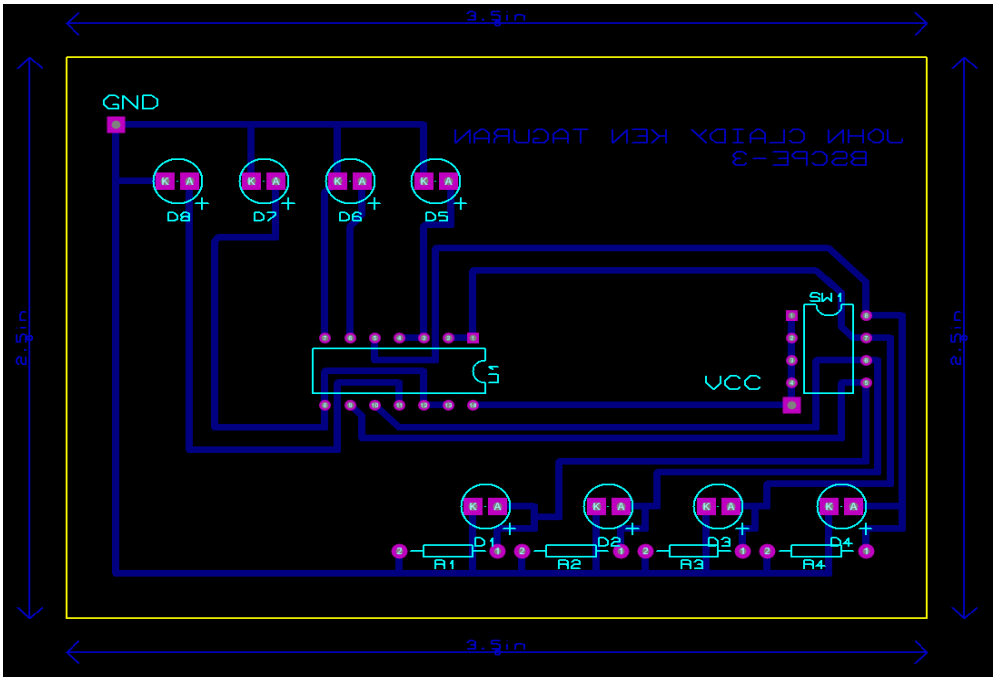


Schematic Diagram

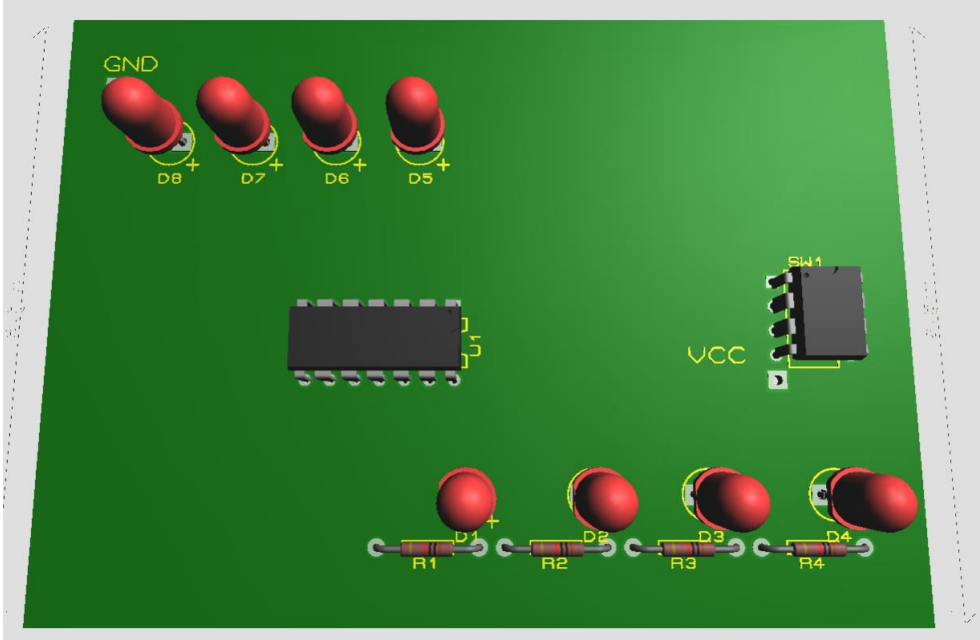


PCB Diagram

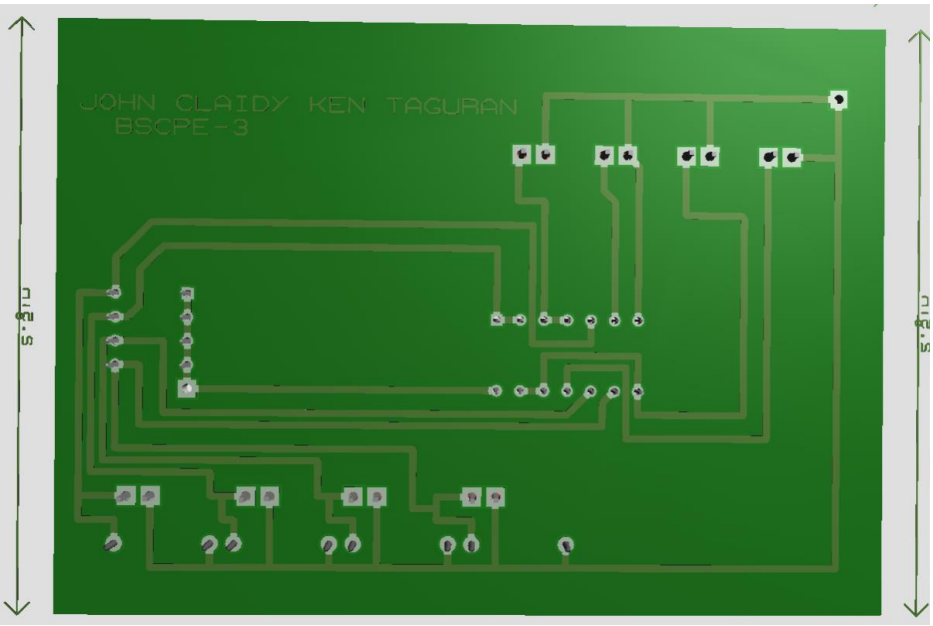
PCB Layout



Top View



Bottom View



Materials and Costing

Quantity	Material	Cost	Total
1	Printed Circuit Board 3x4in	P 5.00 per inch	P 35.00

4	Resistors	P 1.00 piece	P4.00
1	7LS408 IC	P 60.00 piece	P 60.00
1	IC Socket Holder	P 8.00 piece	P 8.00
1	Ferric Chloride	P 35.00	P 35.00
1	Acetone 50 ml	P 25.00	P 25.00
1	Steel wool	P 15.00	P 15.00
2	Soldering Lead	P 20.00 meter	P 40.00
1	Laser Printed PCB Design in photopaper	P 25.00 piece	P 25.00
1	Cotton	P 7.00	P 7.00
1	Soldering Iron	Borrowed	P 0.00
1	Heat Press	Borrowed	P 0.00
Grand Total:	**P 254.00**		

Truth Table

A	B	C	D	Hex Value	L1	L2	L3	L4	L5	L6	L7	L8
0	**0**	**0**	**0**	0	0	0	0	0	0	0	0	0
0	**0**	**0**	**1**	1	1	0	0	0	0	0	0	0
0	**0**	**1**	**0**	2	0	1	0	0	0	0	0	0
0	**0**	**1**	**1**	3	1	1	0	0	1	1	0	0
0	**1**	**0**	**0**	4	0	0	1	0	0	0	0	0
0	**1**	**0**	**1**	5	1	0	1	0	0	0	0	0
0	**1**	**1**	**0**	6	0	1	1	0	0	0	0	0
0	**1**	**1**	**1**	7	1	1	1	0	1	1	0	0

1	**0**	**0**	**0**	8	0	0	0	0	0	0	0	0
1	**0**	**0**	**1**	9	1	0	0	1	0	0	0	0
1	**0**	**1**	**0**	A	0	1	0	1	0	0	0	0
1	**0**	**1**	**1**	B	1	1	0	1	1	1	0	0
1	**1**	**0**	**0**	C	0	0	1	1	0	0	1	1
1	**1**	**0**	**1**	D	1	0	1	1	0	0	1	1
1	**1**	**1**	**0**	E	0	1	1	1	0	0	1	1
1	**1**	**1**	**1**	F	1	1	1	1	1	1	1	1

Simulation

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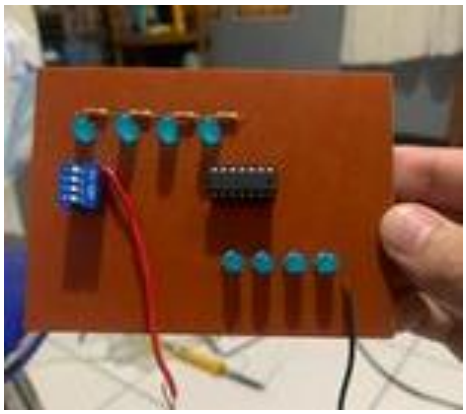

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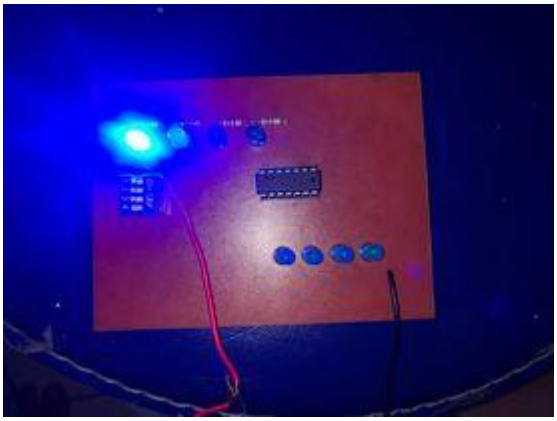

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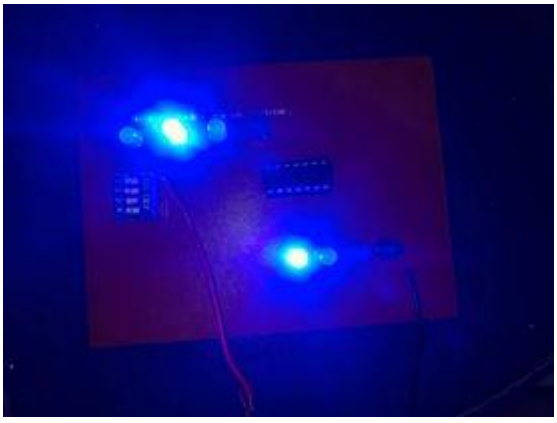

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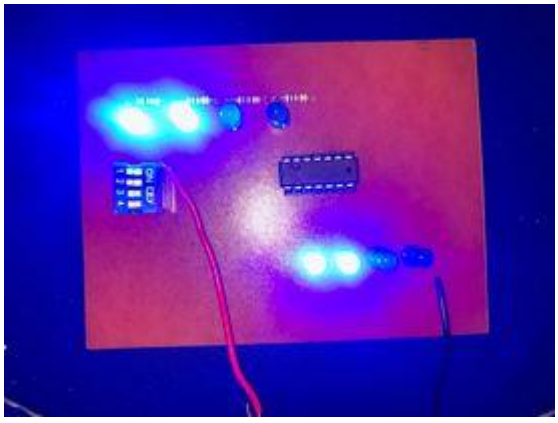

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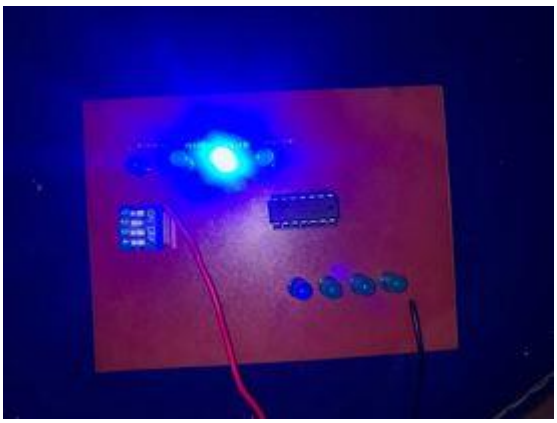

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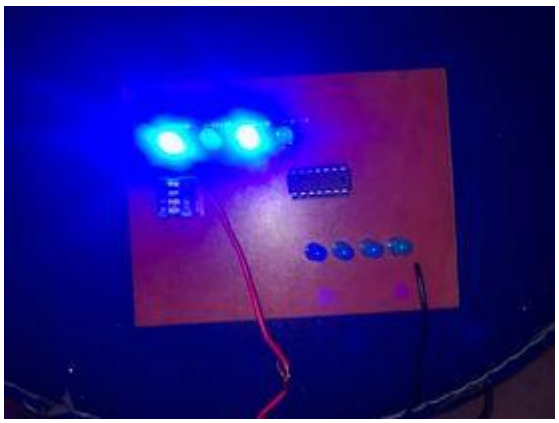

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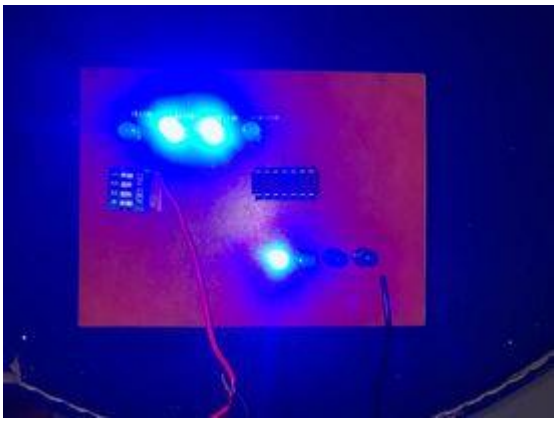

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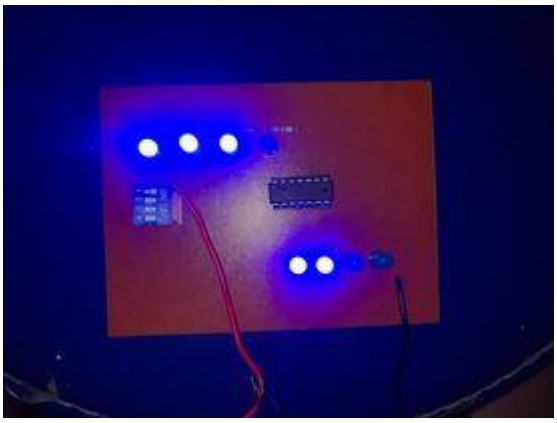

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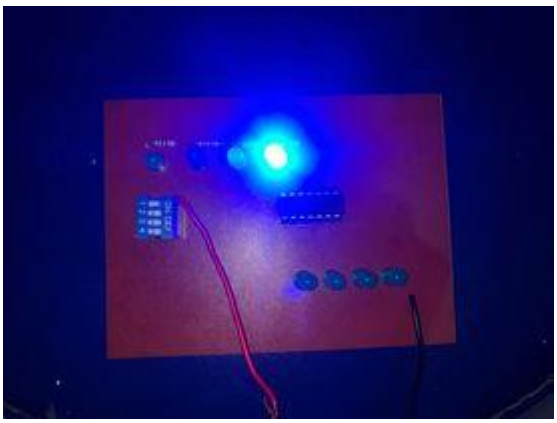

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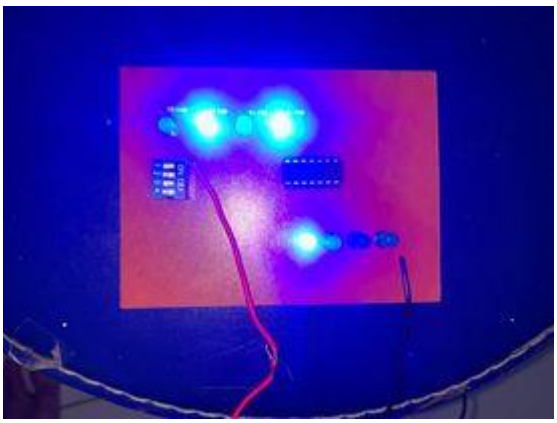

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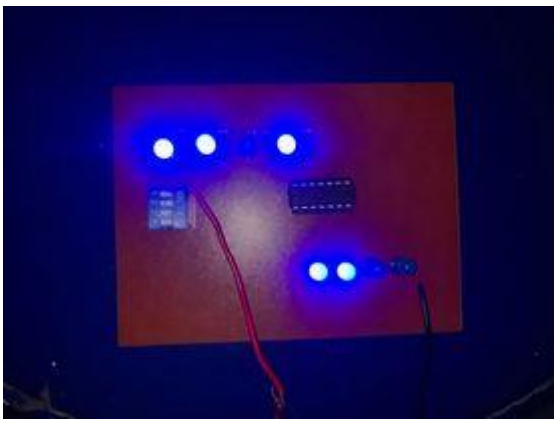

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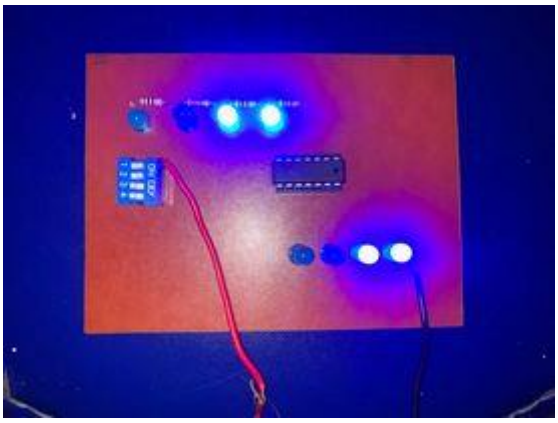

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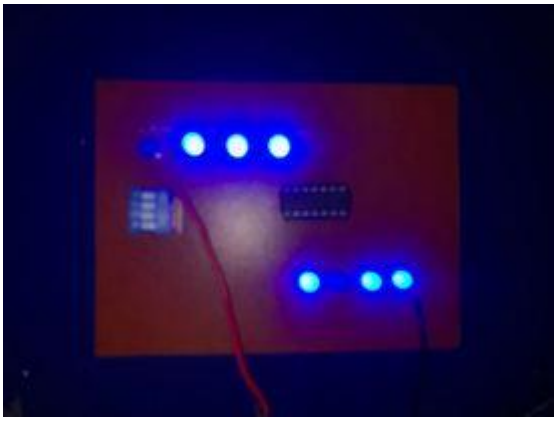

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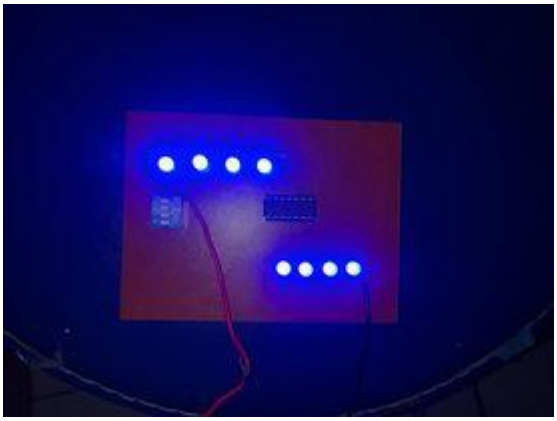
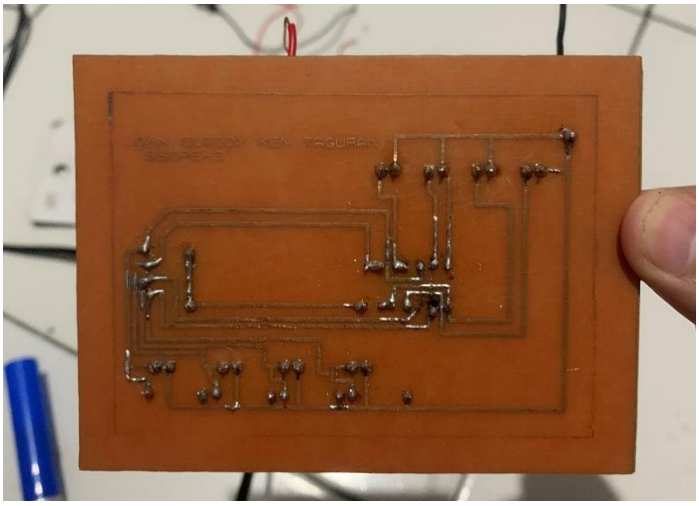


Hurdles

One of the earliest hurdles I encountered was the issue of cost, The Burnt Circuits, The Perils of Errors, Time, The Manual Approach, and The Essence of Hard Work. As a newbie to hardware and this type of project, I'm navigating unfamiliar territory. In this learning curve, I'm bound to encounter various challenges and make mistakes, which is all part of the process. I manage to complete the task(finally), but it often comes at the price of increased costs due to errors. This increased expenditure is an expected consequence of my initial learning phase, and I'm not taken aback by the fact that I occasionally create a bit of chaos. The silver lining is that I view these experiences as valuable lessons, and they serve as a foundation for improvement in subsequent activities, enabling me to build on the knowledge gained from the errors I've made.

Documentation



Venturing into the realm of PCB (Printed Circuit Board) design marked a new chapter in my journey through the world of hardware. My initial foray into creating an actual PCB design was a challenging, eye-opening experience, replete with struggles and steep learning curves. This essay serves as both a documentation of my experiences and a testament to the hard work and dedication it takes to navigate the intricacies of PCB design.

My journey in creating an actual PCB design was far from smooth, but it was an invaluable experience. It reinforced the importance of resilience, adaptability, and hard work. The struggles with costs, burnt circuits, errors, time constraints, manual operations, and the consistent effort invested in each step of the process formed a tapestry of experiences that, in the end, proved to be more than just a documentation of challenges; it was a testament to the dedication and growth that comes with embarking on a complex journey in PCB design.

I resolved to drop it from a height of 6.5 feet, with the anticipation that its outcome might parallel my academic performance, my grades will also fall HAHA — a risky endeavor indeed. Testing my project's resilience by dropping it from 6.5 feet turned out to be a memorable adventure. The unexpected success of the project's survival, despite my doubts, reminded me that life and academic challenges are often unpredictable. As I contemplated the whims of fate and the uncertainties of grading, I learned to embrace the notion that sometimes, just like my project, we may fare better than we initially expect. In the end, it was a playful experiment that left me with a newfound appreciation for resilience and the unexpected twists and turns that life can bring.

Curriculum Vitae

Name: John Claidy Ken O. Taguran

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Contact Number: 09497629625

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Mother's name: Marilyn O. Taguran

Father's name: John M. Taguran

Motto*: "EMBRACE THE NEW ITERATION OF YOURSELF; YOU DON'T ALWAYS HAVE TO BE A WARRIOR."*

Portfolio: https://claidytaguran.github.io/porttaguran.github.io/