AUTO SELECTION OF AVAILABLE PHASE IN 3-PHASE SUPPLY SYSTEM

Objectives:

- Research and Develop Methods
- Conduct Efficient Trade-Study
- Design, Simulate, and Showcase

ABSTRACT

Our project aims at delivering a system that provides uninterrupted power supply to the load even in the absence of any phase in a three phase supply system. In this system auto selection is achieved by using a set of relays interconnected in such a way that if one of the relays is feeding to the load remains energized always.

Block Diagram

Proposed Design:
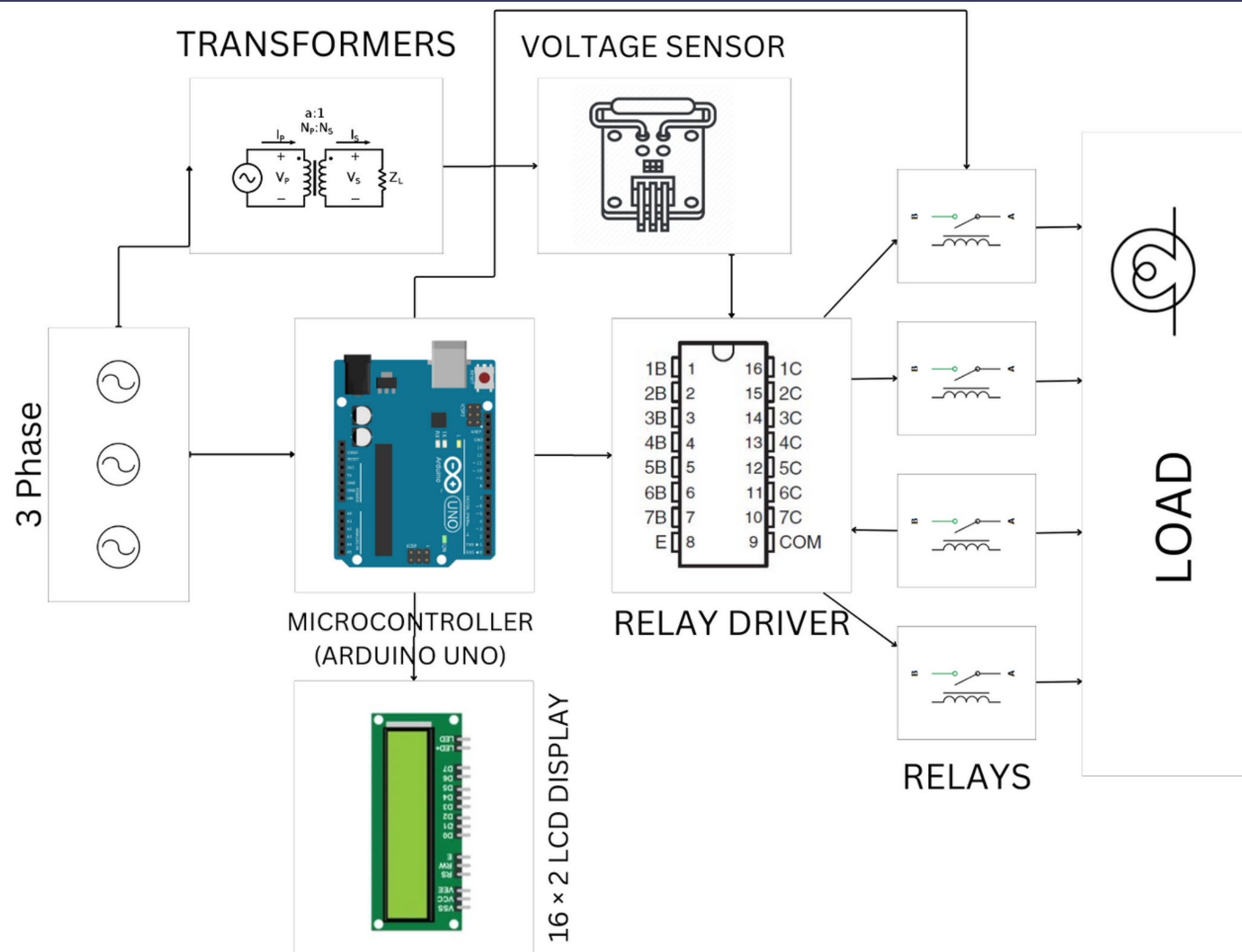
CRITICAL COMPONENTS

There are some critical components which paved the way for accomplishing the solution and they are,

- 3 phase load
- Step down transformer
- Voltage Sensor (Equivalent Circuit)
- Microcontroller
- Relay driver
- Relay Switches
- Light Bulb (Here, Load)
- 16×2 LCD Display

WORKING PRINCIPLE

- **AC Supply** - Direct AC power supply (230V) is given to the rectifier circuit and Arduino Microcontroller.
- **Sensing the voltage** - The given 3 phase AC supply is then sensed by the voltage sensor (equivalent circuit) which will continously monitor the voltage at each phase induvidually and send the data to the microcontroller. The microcontroller is programmed in such a way that it determines the path of the flow.
- **Relay control and activation** - Based on the microcontroller programmed logic, it controls the relay driver. This relay driver can interface low voltage microcontroller signals with the high-voltage relays. The relay driver drives separate relays. Each relay corresponds to a different phase. Depending on the microcontroller's decision, it will activate one of the relays.
- **Load control** - When relay is activated, it switches the AC supply to a connected load (bulb). The bulb will glow by using the power from any of the three phases

SIMULATION AND CODE

Method: 1
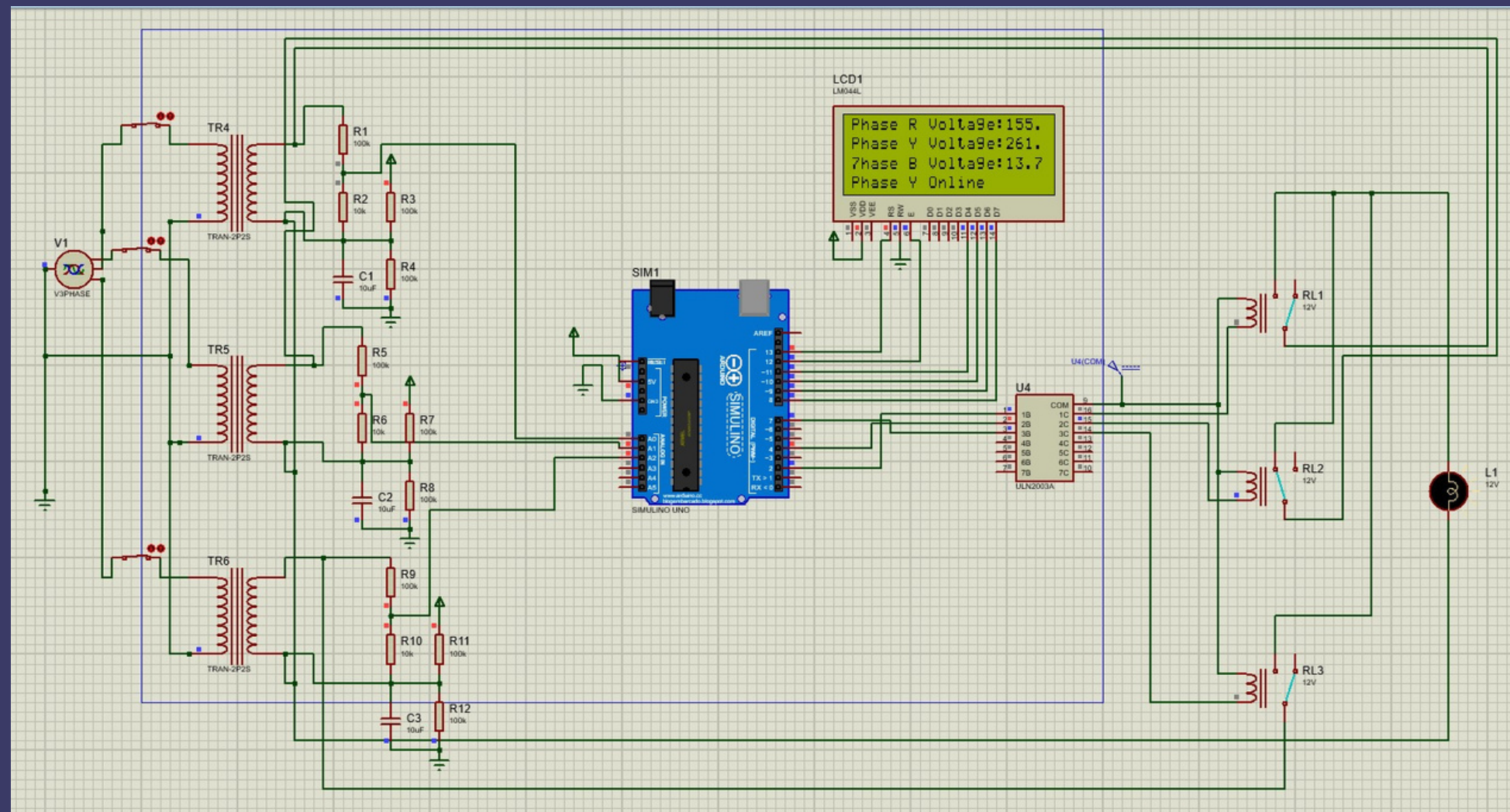
Method: 2
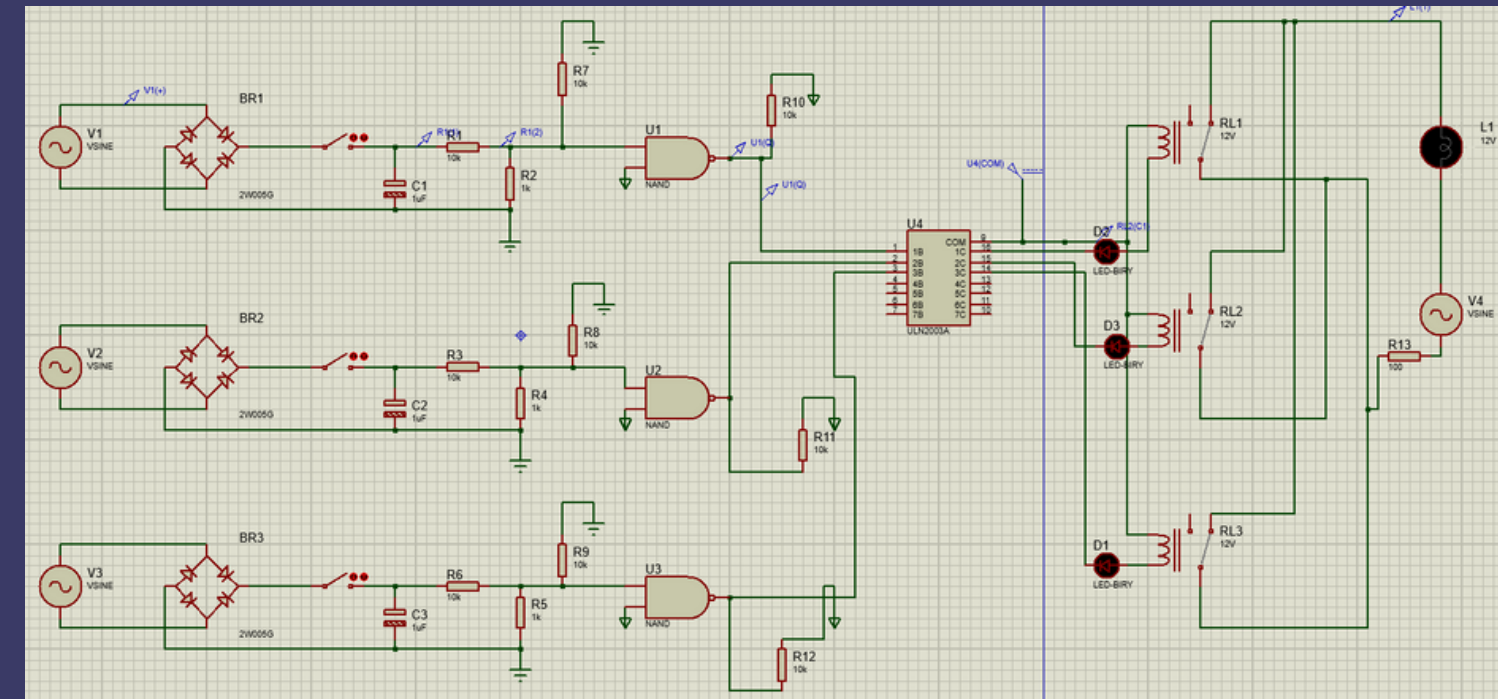
The code: CLICK HERE

TRADE OFF ANALYSIS

Methods
1. **Voltage Sensor with MicroController**
2. Logic based

Factors of analysis	Method 1	Method 2
Cost	2	1
Accuracy	1	2
Simplicity	2	1
Mass productibility	1	2
Flexibility	1	2
Effciency	1	2
Isloation	1	2
Speed	2	1

Factors of analysis	Weightage
Cost	1.5
Accuracy	1.5
Simplicity	0.5
Mass productibility	1
Flexibility	0.5
Effciency	1.5
Isloation	1
Speed	1

TRADE OFF Table

Factors of analysis	Method 1	Method 2
Cost	3	1.5
Accuracy	1.5	3
Simplicity	1	0.5
Mass productibility	1	2
Flexibility	0.5	1
Effciency	1.5	3
Isloation	1	2
Speed	2	1
Sum	11.5	14

Through trade-off analysis, it was concluded that the first method (Voltage Sensor with Microcontroller) outperforms the second method.

PROTOTYPE
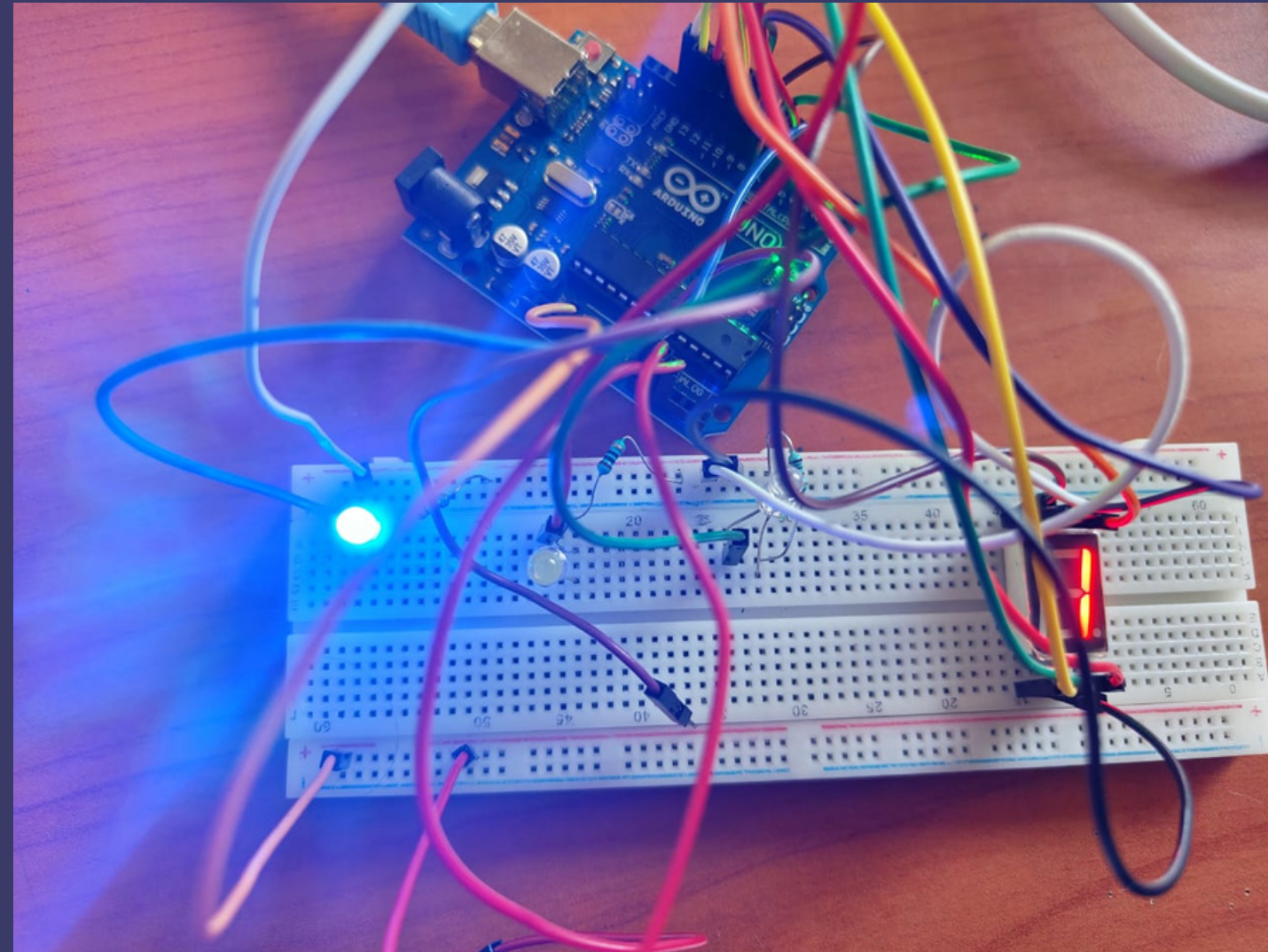
Sample simulation prototype of phase shifting and micro-controlleri