Assignment: ATmega328P Indicator Module Simulation in Proteus 8

1. Introduction

This assignment focuses on designing and simulating an **Indicator Module** using an **ATmega328P** microcontroller. The system controls left and right indicator LEDs based on button inputs, simulates hazard lights, and manages a brake LED. The project is implemented using **Arduino IDE** and simulated in **Proteus 8**.

2. Circuit Design

2.1 Components Used:

- **Microcontroller**: ATmega328P
- **LEDs**: Left Indicator (PC0), Right Indicator (PC1), Brake LED (PB0)
- **Push Buttons**: Left Button (PC2), Right Button (PC4)
- **Power Supply**: 5V DC

2.2 Circuit Diagram (Proteus 8)

The simulation is designed using **Proteus 8**, where components are connected as follows:

Component	ATmega328P Pin
Left LED	PC0 (A0 on Arduino)
Right LED	PC1 (A1 on Arduino)
Brake LED	PB0 (D8 on Arduino)
Left Button	PC2 (A2 on Arduino)
Right Button	PC4 (A4 on Arduino)

3. Software Implementation

3.1 Avr Code

The system is programmed using **Arduino IDE and VS code** with direct register access. The logic includes:

- **LED control** based on button presses
- **Brake LED activation** when indicators are active
- **Debouncing mechanism** to prevent multiple triggers

4. Proteus 8 Simulation Setup

1. **Create a new project** in Proteus and add the ATmega328P microcontroller.
2. **Connect the LEDs and push buttons** according to the circuit diagram.
3. **Load the HEX file** (generated from Arduino IDE) into the ATmega328P in Proteus.
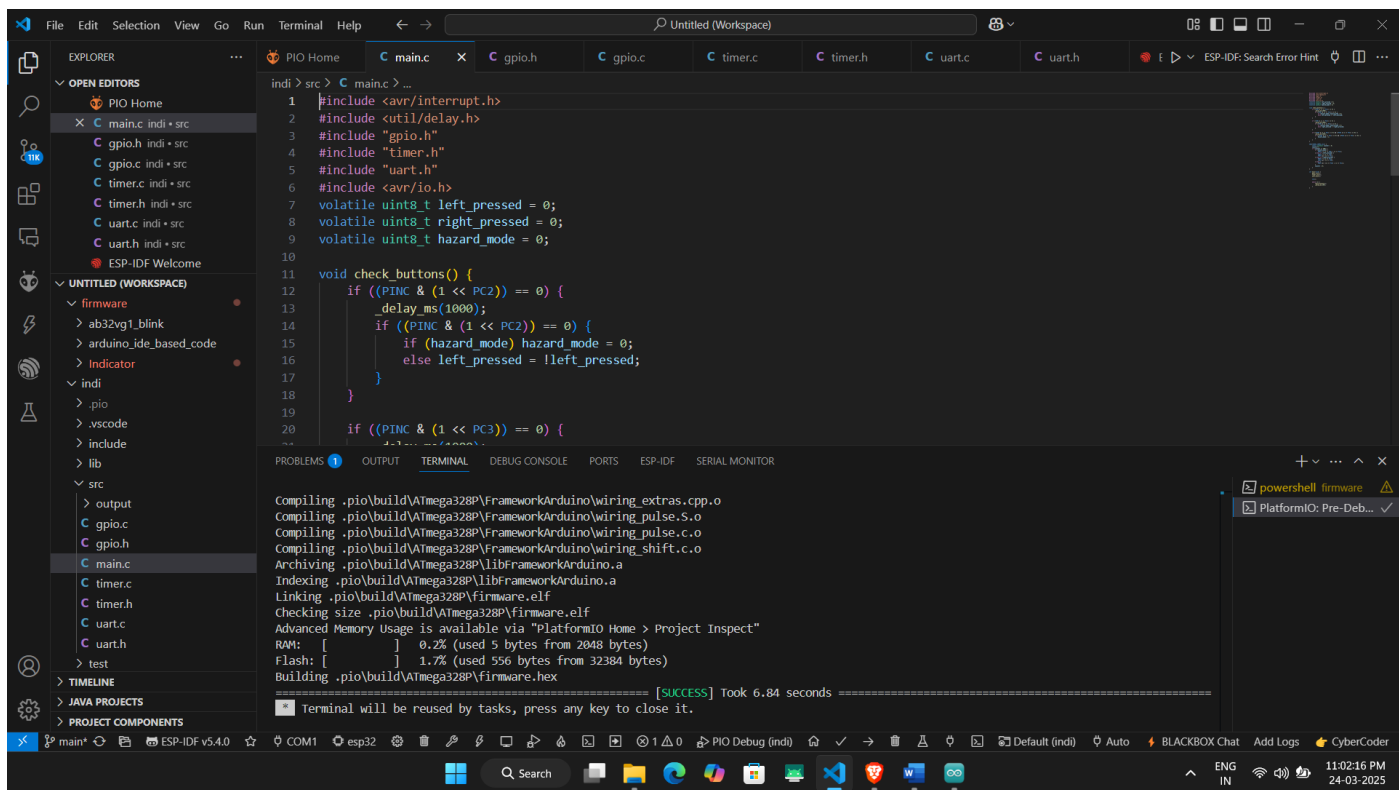4. **Run the simulation** and observe LED behavior based on button presses.

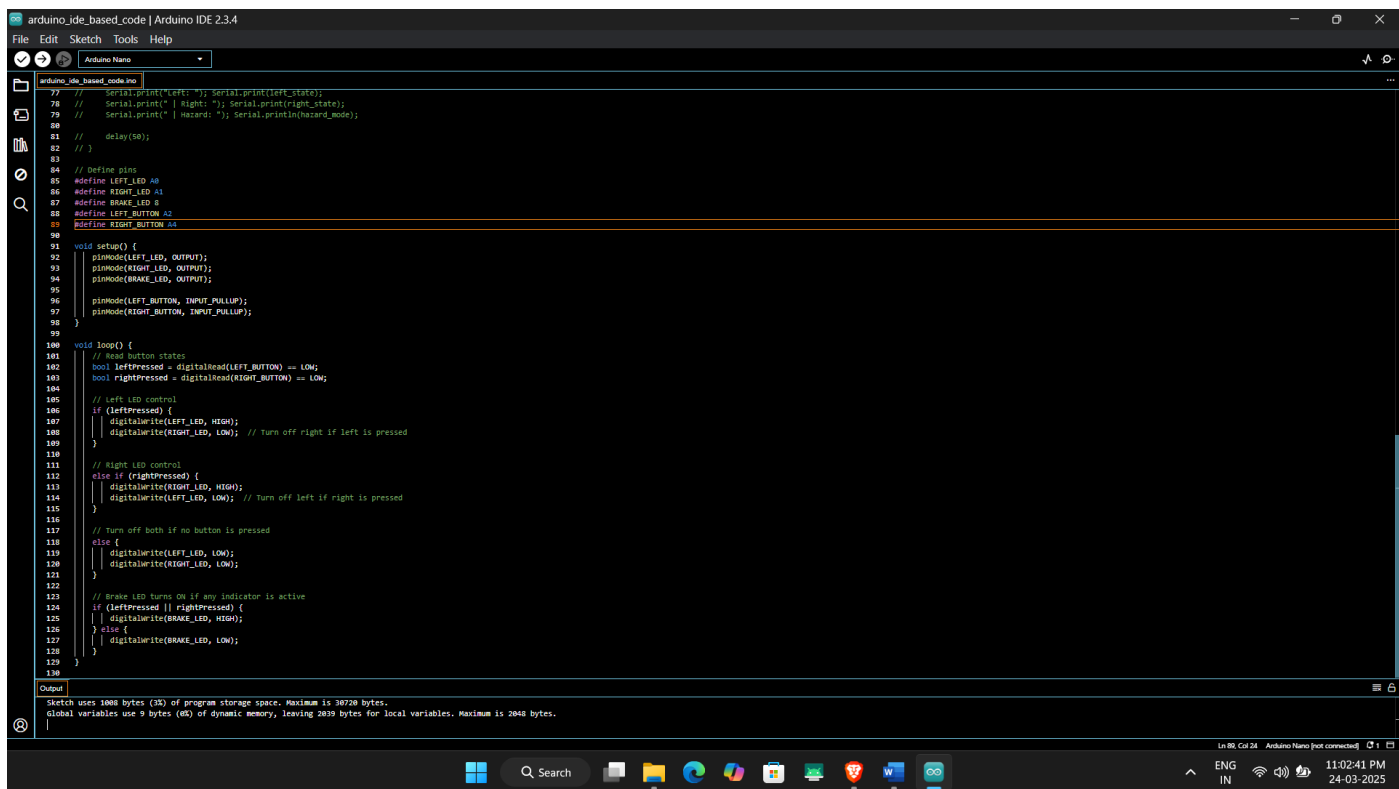**Figure 1: compiled code on vs code (Platformio)**

Figure 2: Compiled code on Arduino ide.

5. Expected Output

Button Press	Action
Left Button Pressed	Left LED ON, Right LED OFF

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Button Press	Action
Right Button Pressed	Right LED ON, Left LED OFF
No Button Pressed	Both LEDs OFF
Any Indicator ON	Brake LED ON
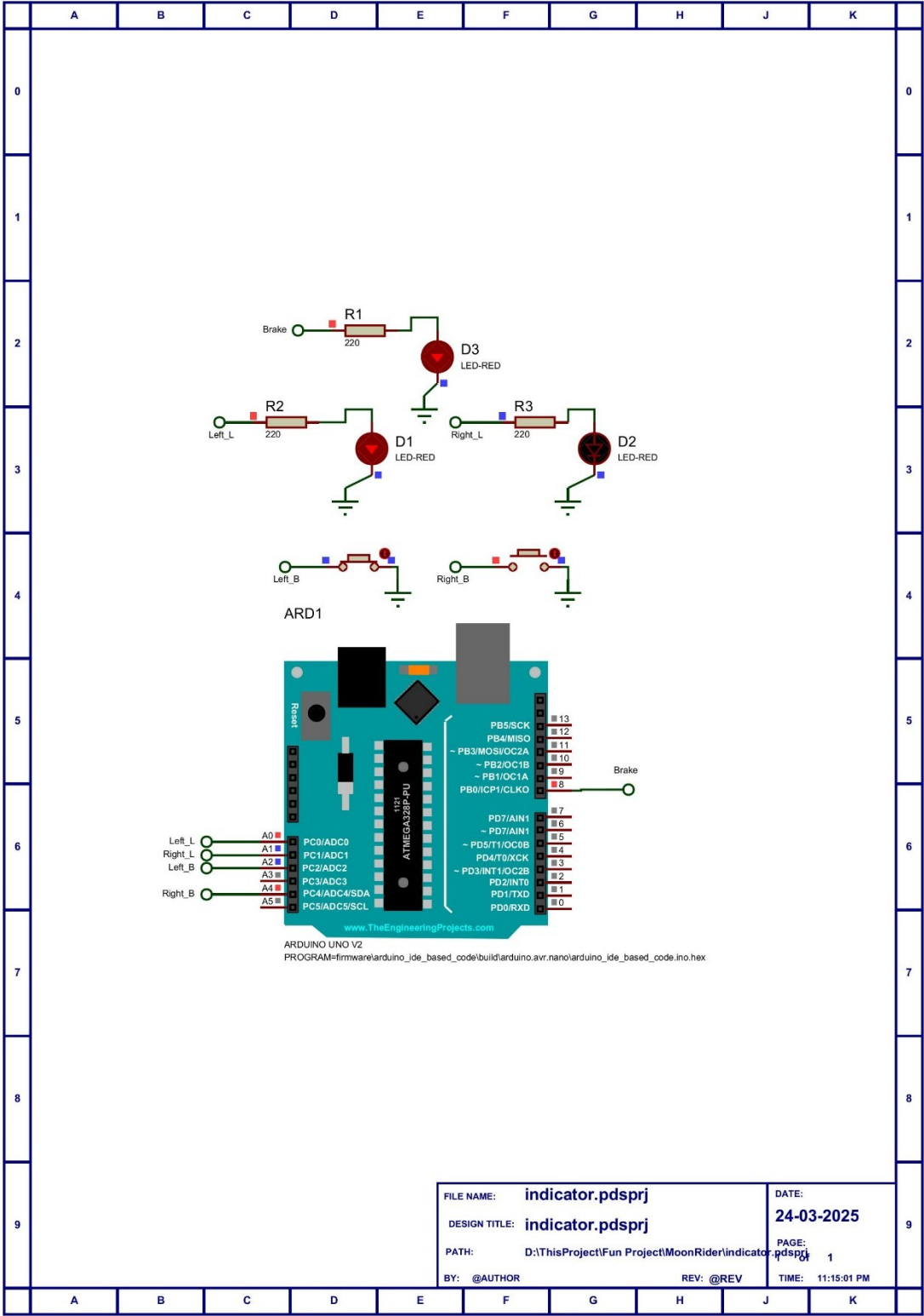
Figure 3: left indicator

Figure 4: Right indicator

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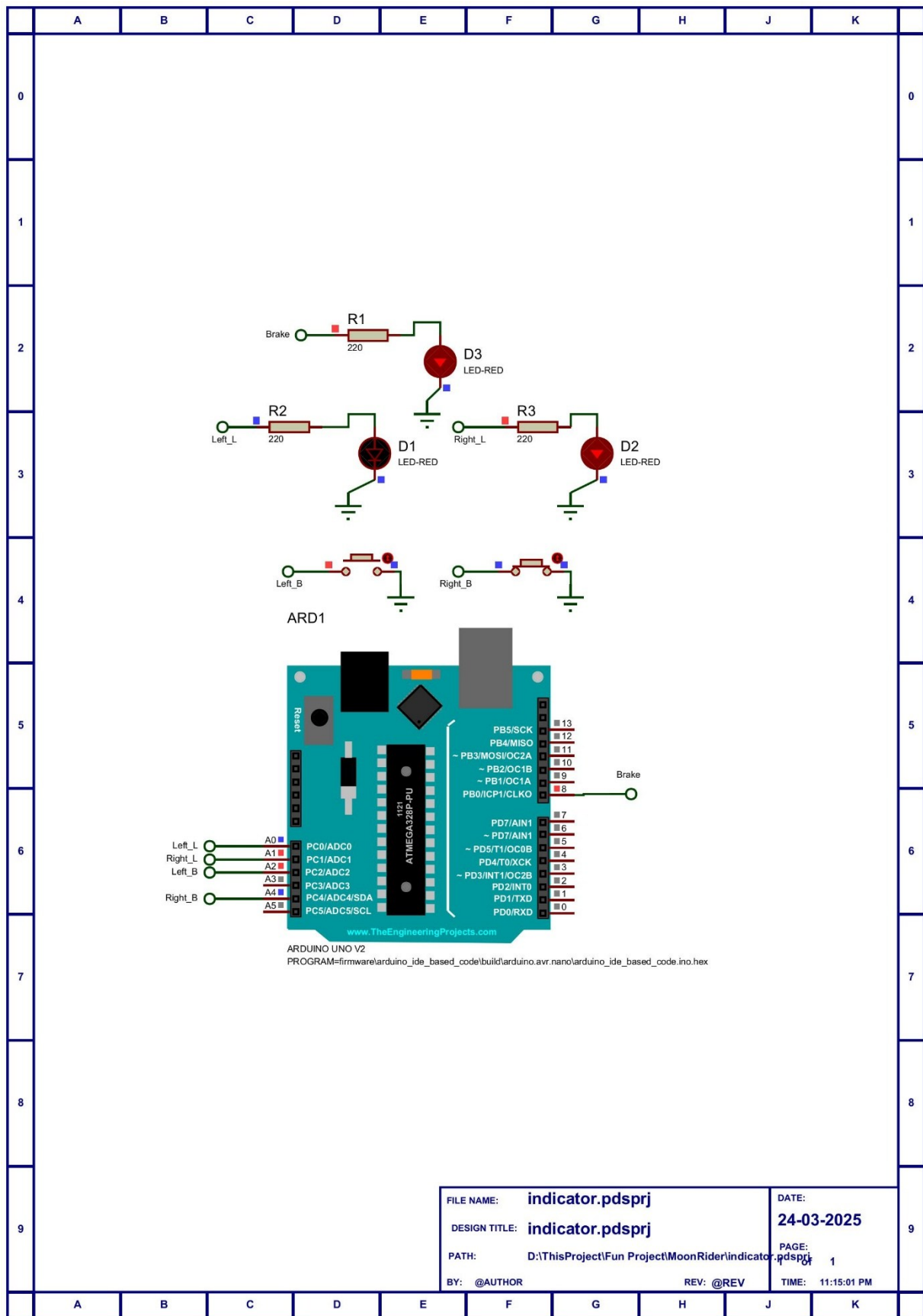**6. Conclusion**

This project successfully simulates an **automobile indicator system** using ATmega328P. The Proteus 8 simulation confirms that the system responds correctly to button inputs, controlling the LEDs as expected. Further enhancements could include **hazard light blinking** and **UART logging** for real-world applications for UART logging, I have made custom serial monitor please check out github repository,

https://github.com/AjayGautam1199/Custom-Serial-Monitor-for-Arduino-and-other-microcontroller