# PROJECT BRIEF

**PROJECT NAME:** SmartLift: Dual Elevator Control System

## INTRODUCTION

- Modern buildings increasingly rely on elevators for vertical transportation. Efficient elevator control systems are crucial for ensuring safety, optimizing wait times, and improving user convenience. This project presents the development of a dual-elevator control system using Arduino, designed to simulate real-world lift behavior with smart features like floor sensing and load monitoring.

## PROBLEM STATEMENT

- Traditional small-scale elevator models often lack real-time feedback mechanisms and safety features such as floor detection and load sensing. This project addresses these gaps by integrating limit switches for accurate floor detection and a load cell for real-time cabin weight monitoring.

## PROJECT GOALS

The primary objectives of this project are:

- To design a functional dual-lift control system.
- To implement real-time floor detection.
- To integrate a load cell for monitoring cabin weight and preventing overload.
- To simulate internal and external floor requests through button inputs.
- To implement priority-based lift selection based on distance.

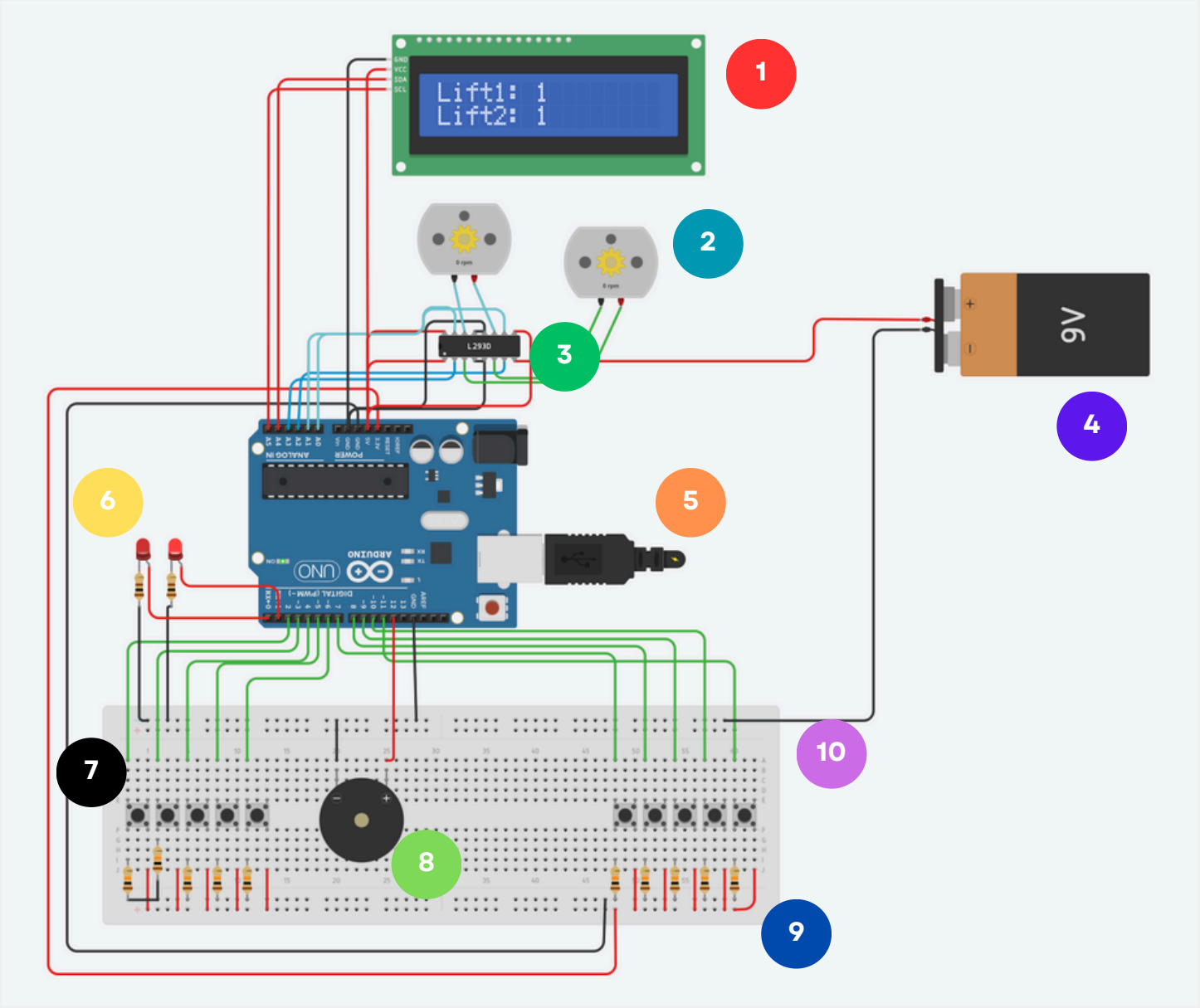
## KEY FEATURES

- Dual Elevator Support: Two independently controlled lifts sharing floor requests.
- Load Monitoring: A 1kg load cell ensures safety by measuring cabin weight.
- Priority-Based Lift Selection: The closest lift is dispatched to serve the request.
- LED Indicators: Show active lift during operation.

## COMPONENTS USED

- Arduino UNO Microcontroller
- DC Motors
- LM298 Motor Driver
- Load Cell
- Connecting Wires
- Power Supply
- Plywood

## CIRCUIT DIAGRAM




## COMPONENTS USED

| | | | |
|---|---|---|---|
| 1 | LCD DISPLAY | 6 | LED LIGHTS |
| 2 | DC MOTORS | 7 | PUSH BUTTONS |
| 3 | MOTOR DRIVER | 8 | BUZZER |
| 4 | POWER SUPPLY | 9 | RESISTORS |
| 5 | ARDUINO UNO | 10 | BREADBOARD |

## PROBLEMS FACED

During development we ran into a few hiccups:

The cars would sometimes “tie” when equally distant from a call and hesitate until we added a timestamp-based tie-breaker

Our call-panel buttons would chatter and register multiple presses before we introduced a 20 MS software debounce

The provided compartments weren’t sturdy enough, so we manufactured new ones from plywood and also made a lot of important additions to the structure like supports, motor holders, etc.

## CONCLUSION

In summary, our two-lift system for a five-story building successfully integrates efficient dispatch logic, overload detection, and precise motion control to deliver reliable, user-friendly performance. By assigning calls to the nearest car—including a simple timestamp tie-breaker—we minimized wait times and avoided conflicts. Load-cell monitoring with led indicators ensures safety by preventing overloading, while button-debounce routines produce smooth, accurate stops and clean input handling. Throughout development, we tackled mechanical, electrical, and firmware challenges to build a robust prototype. This project not only demonstrates practical elevator control strategies but also lays a solid foundation for future enhancements, such as energy-saving modes and remote monitoring.