

<https://youtu.be/YxY3VPewYOs?si=TvHPy1rL0AoPeENX>

# Smart Parking Control System

## Abstract

The Smart Parking Control System is designed to efficiently manage parking spaces by providing real-time information about the availability of parking spots and controlling access to the parking area. The system utilizes infrared sensors, a 7-segment display, a 7-segment decoder (7448), a full adder (7483), OR gates (7432), AND gate (7408), NOT gate (7404), LEDs, jumper wires, and a breadboard to achieve its objectives.

## Components and Functionality

- **Inside Sensors (2):** These sensors are installed within the parking area to detect the presence of vehicles. Their outputs serve as inputs for two primary functions.
- **Outside Sensors (2):** Placed at the entrance of the parking area, these sensors determine if there are vehicles waiting to enter or exit.

### Full Adder (7483)

- **Function:** The inside sensors' outputs are fed into the full adder, which performs the addition operation on them, and output value represents the number of available parks in our parking.

### 7-Segment Decoder (7448) and Display

- **Function:** The sum obtained from the full adder is sent to the 7-segment decoder, which converts it into a format suitable for display on the 7-segment display.

### OR Gates (7432)

- **First OR Gate:** Takes the outputs of the inside sensors to determine if at least one parking space is empty.
- **Second OR Gate:** Takes the output of the AND gate (explained below) and checks if someone inside is waiting to exit.

### AND Gate (7408)

- **Function:** Takes the output of the first OR gate and determines if there is an empty space inside and someone is waiting outside (indicated by the outside sensors). This is used to control the opening of the parking gate.

## NOT Gate (7404)

- **Function:** Inverts the output of the outside sensors to complement the input to the AND gate, ensuring that the gate opens only when it is safe to do so.

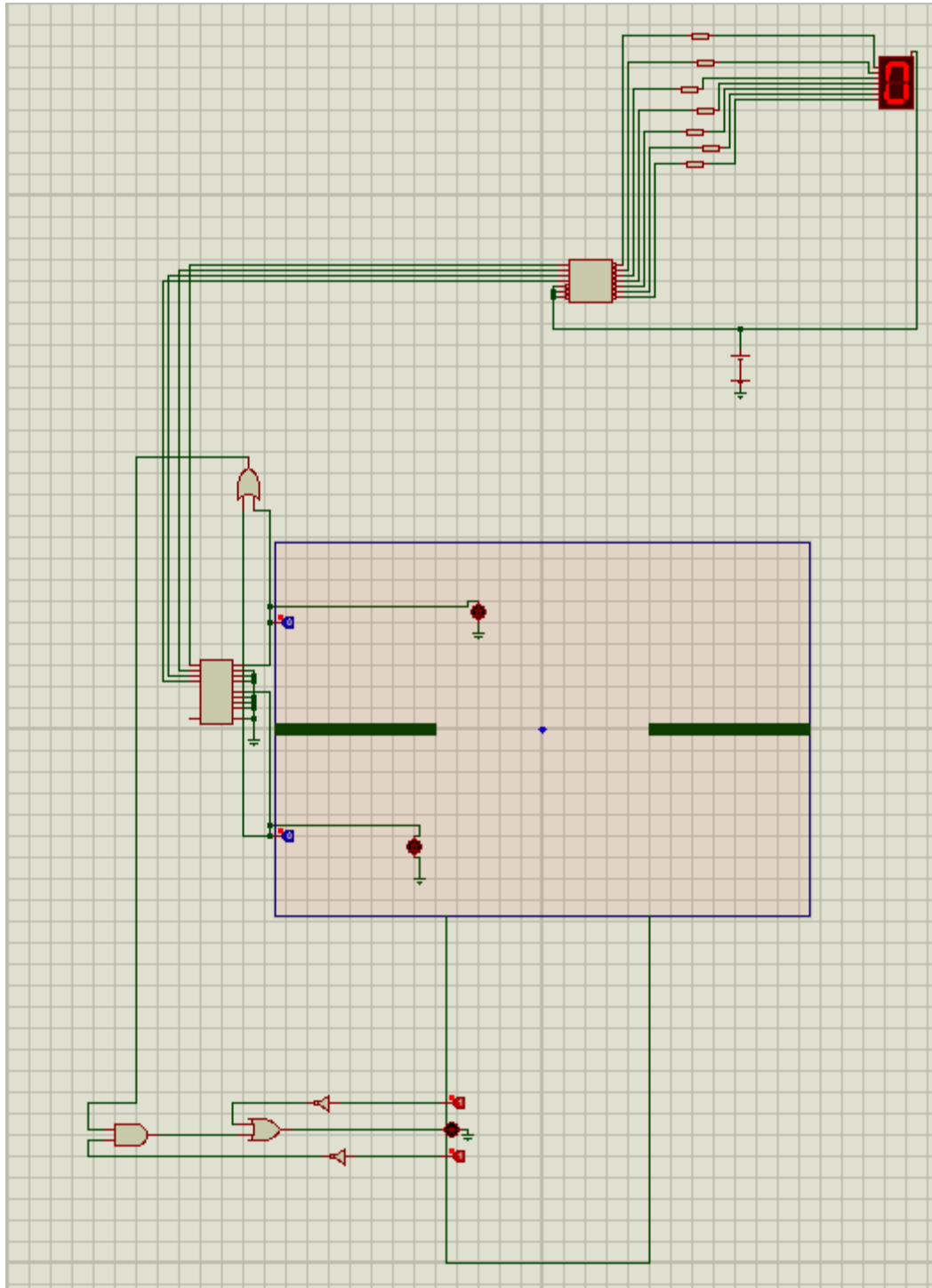
## LEDs

- **Indicator Lights:** LEDs are used to visually indicate the status of the parking area, such as whether it is full or if the gate is open.

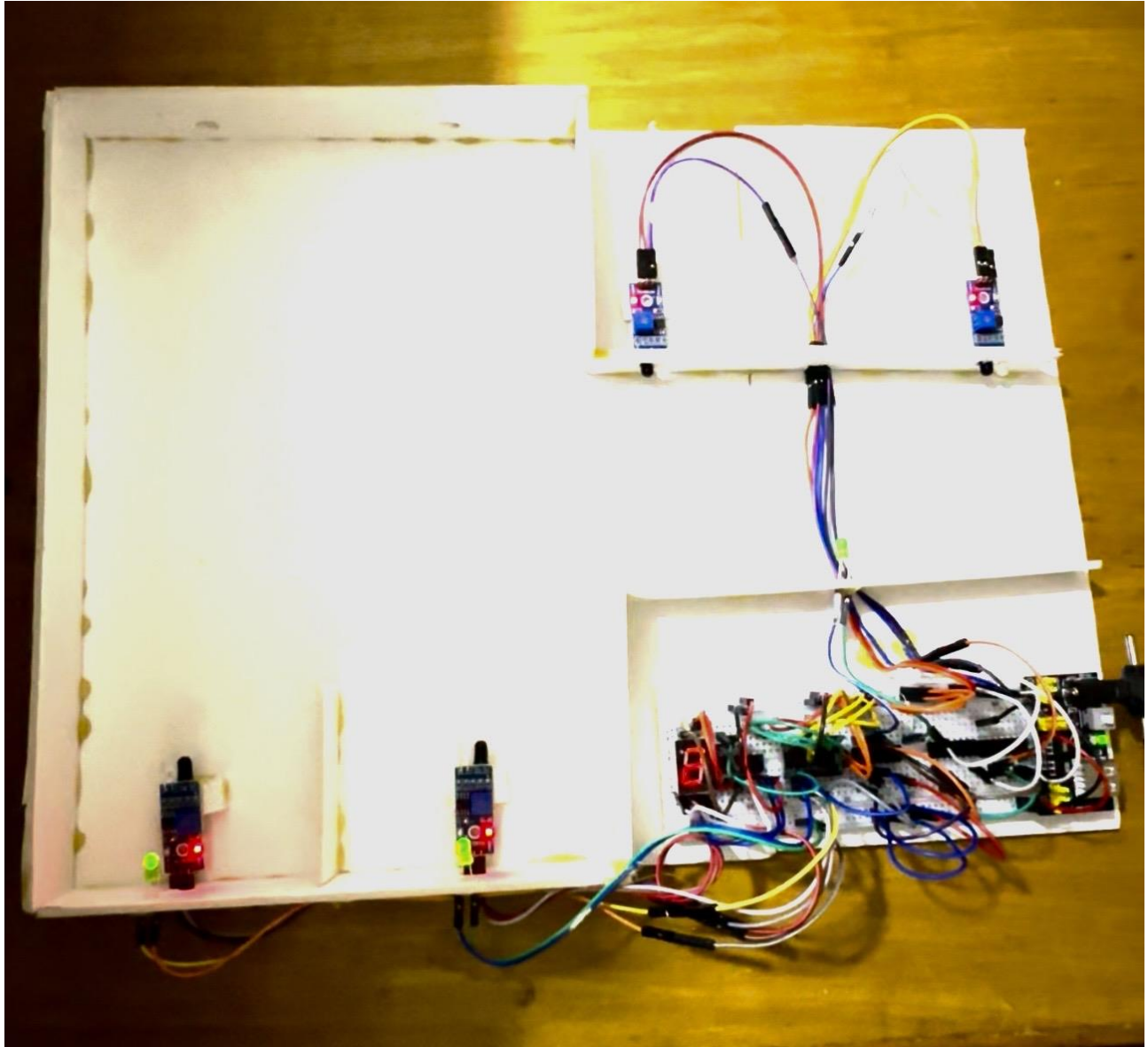
## System Operation

1. **Detection of Inside Vehicles:** The inside sensors detect the presence of vehicles within the parking area.
2. **Addition Operation:** The outputs from the inside sensors are added using the full adder.
3. **Display:** The sum is displayed on the 7-segment display through the 7-segment decoder.
4. **Space Availability Check:** The first OR gate determines if at least one parking space is available.
5. **Gate Opening Decision:** The AND gate checks if there is an empty space inside and if someone is waiting outside. If true, the gate is allowed to open.
6. **Exit Management:** The second OR gate checks if someone inside is waiting to exit, ensuring smooth traffic flow.
7. **Safety Measure:** The NOT gate ensures that the gate only opens when it is safe to do so, based on the outside sensors.

# Proteus design



## Project design



## Conclusion

The Smart Parking Control System successfully combines sensors, logic gates, and display components to efficiently manage parking spaces. It not only provides real-time information about space availability but also ensures safe and controlled access to the parking area. The system contributes to improved traffic flow and enhanced user experience.

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