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# Vacant Parking Slot Detector

## Team Details

- ▼ Detail
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## Abstract

▼ Detail

### Introduction:

To accomplish faster, easier, and denser parking of automobiles during the majority of the time they remain inactive, smart parking combines technology and human ingenuity. This method aims to utilize as few resources as possible, such as fuel, time, and space.

To reduce urban congestion, mitigate environmental impact, and improve overall urban mobility, a better parking solution is necessary. This solution addresses the increasing issue of limited parking spaces, optimizing their usage and reducing the amount of time spent searching for a parking space. This not only reduces traffic congestion but also reduces carbon emissions, thus contributing to a more environmentally friendly environment.

Furthermore, improved parking solutions may also contribute to economic growth by increasing the accessibility of businesses, thus enhancing the quality of life within cities and promoting sustainable urban development.

## **Our Contribution:**

Our team aims to create a prototype that is designed to reduce human intervention in searching for parking spots. Thus, creating a more efficient, accurate, and potentially cost-effective solution. The project streamlines the parking process, making it more convenient for drivers.

The project features a counter, to keep track of the vacant spots in the parking space. This creates a quicker flow of traffic in such parking spaces.

Moreover, the position of the nearest available parking space is also displayed to the user at the entrance of the parking spot. This reduces the dependency on humans.

## **Working**

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### ▼ Detail

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Moreover, the position of the nearest available parking space is also displayed to the user at the entrance of the parking spot. This reduces the dependency on humans. User Input: The user approaches the Vacant Parking Slot Detecting Machine and inputs their vehicle type through a keypad, representing it as a password (e.g., "truck" for a truck, "bus" for a bus, "4wheeler" for a 4-wheeler, or "2wheeler" for a 2-wheeler).

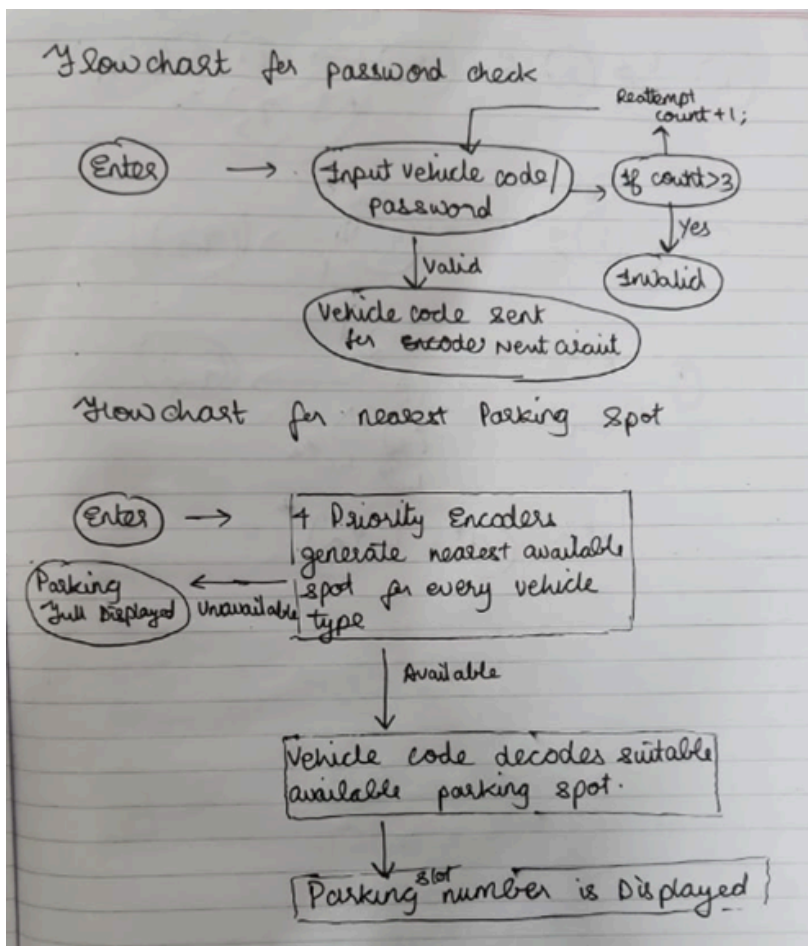
Password Verification: The system checks the entered password against the predefined vehicle types. If the password is valid, access is granted. If the password is incorrect, the system counts the number of incorrect attempts.

Access Granted: Upon successful verification, the system uses the decoder to determine the nearest available parking spot for the user's vehicle type based on the output of the priority encoders.

Parking Slot Indication: The system guides the user to the designated parking spot through LED indicators or display panels.

Access Denied: If a user exceeds three incorrect attempts, the system denies access and alerts the user.

### **Flow of Simulation:**



## Functionality

**Encoder:** Four priority encoders are utilized to detect the availability of parking slots for each vehicle type: truck, bus, 4-wheeler, and 2-wheeler. These priority encoders receive input signals from various parking spots and prioritize them based on vehicle type. The output of each priority encoder represents the availability status of parking spots for that specific vehicle type.

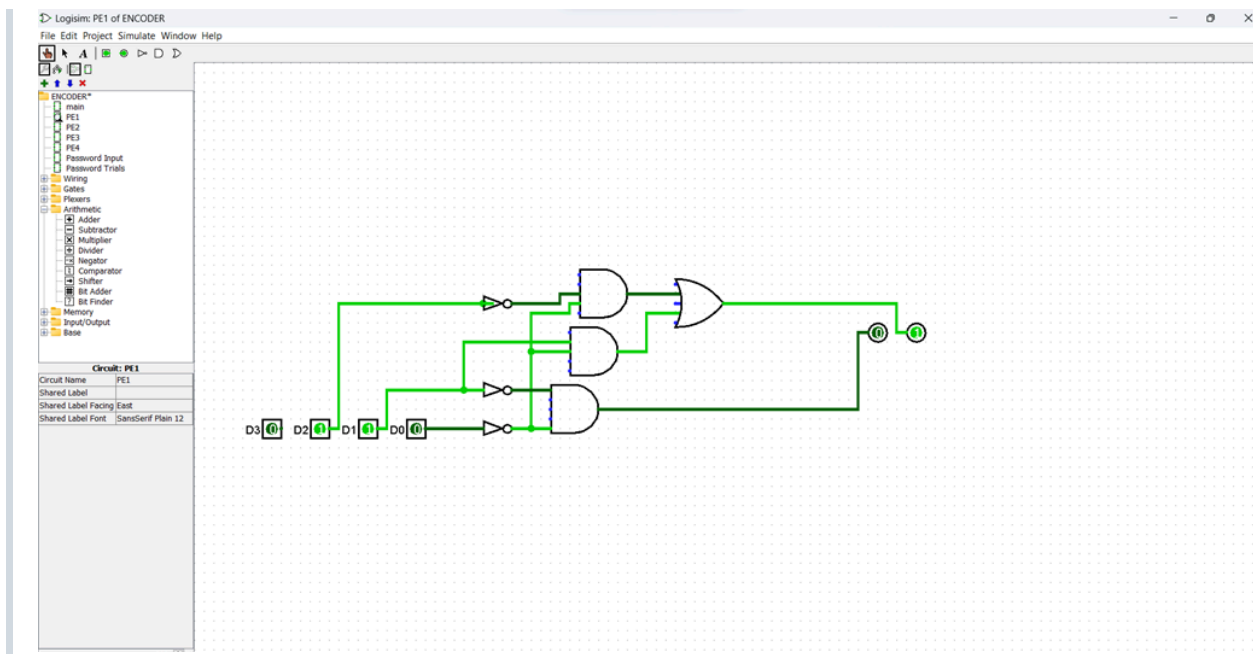
**Counter Counter:** created using T-flipflops is used to measure the number of times the password has been inputted. When the count crosses three and no correct inputs have been made previously, then the circuit breaks down due to excessive failed attempts. A red LED is displayed to show an error

**Decoder:** A decoder is used in the password application. When the vehicle enters its vehicle code, it is translated into one of four valid vehicles, if its password matches the given password. This translation of password to vehicle is done using a decoder General circuits created using min terms 1. In the odd case when all parking slots are full, the signal is required to be sent at the parking entry, using a red led, indicating that the parking is full; 2. To convert the result of all encoders into a suitable parking spot with respect to the vehicle code inputted

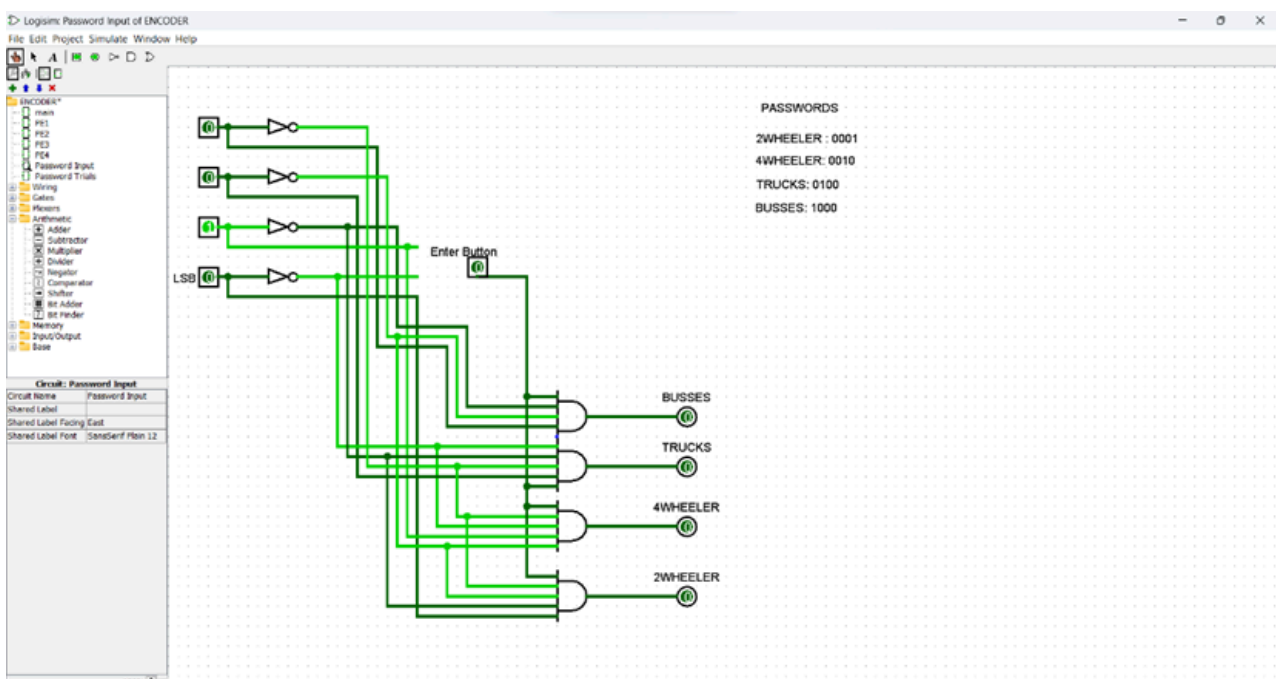
## Logisim Circuit Diagram

### ▼ Detail

Sample Encoder (1/4)



Password Input Segment:



Password Input Along with Counter Check to Limit Password Trials:

