



Car Parking System

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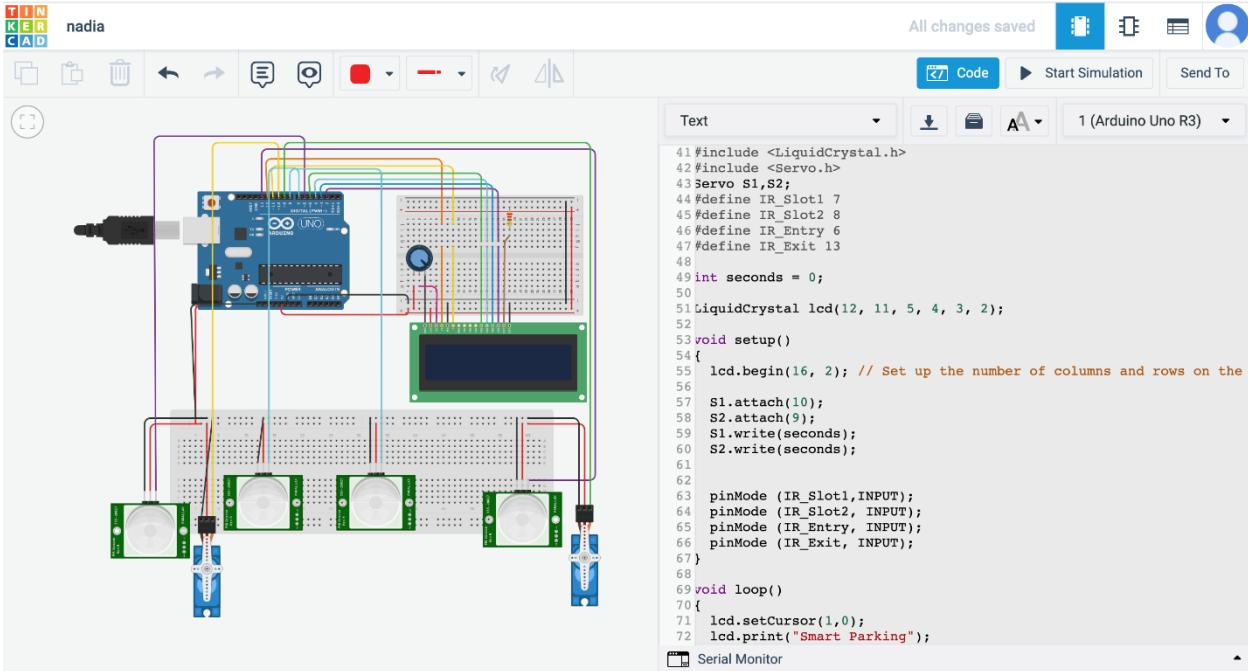
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Course: System Integration & Hardware Architecture

Project Details:

Car parking system is a mechanical system that multiplies parking capacity inside a parking lot. In this project, we have simulated and built an automatic car parking system that shows for each entering car which slot in parking is available and which one is not. Indeed, this project is built as software in TinkerCAD web app. There are 2 slots in the parking and by the time a car enters; the automatic LCD will show which slot is available and which one is not. Thus, this system has been coded in TinkerCAD which uses the C++ programming language.



Hardware Components:

Arduino= 1

Servo Motor= 2

LCD 16x2= 1

Sensor= 4

Potentiometer (225 kohm)=1

Breadboard=1

Small Breadboard=1

Resistor (220 ohm)= 1

Codes Description:

The tinker link of our project is below:

<https://www.tinkercad.com/things/e9eTrUggl3R-epic-allis-habbi/editel?sharecode=qPTWP4soXZxiD3prjO65t6EWZa-H6yNDOkjnsvkAiEY>

- 1) `#include <LiquidCrystal.h>` : This library allows an Arduino board to control LiquidCrystal displays (LCDs) based on a compatible chipset
- 2) `#include <Servo.h>` : This library allows Arduino boards to control a variety of servo motors.
- 3) `lcd.begin()`: Initializes the interface to the **LCD** screen, and specifies the dimensions (width and height) of the display.
- 4) `pinMode()`: Configures the specified pin to behave either as an input or an output.
- 5) `lcd.setCursor(col, row)` : Moves the LCD cursor's position to new position. A location at which subsequent text written to the LCD will be displayed.
- 6) `lcd.clear()`: It clears the LCD screen and positions the cursor in the upper-left corner.
- 7) `digitalRead()`: A function that is used to read the logic state at a pin. It is capable to tell whether the voltage at this pin is high (5V) or low (0V).

Details :

The first step is to define the necessary libraries and initialize the values. Secondly, in the void setup function, we have set things like pinMode. Furthermore, in the void loop function, we have declared lcd.setCursor function and all the if conditions. If slot 1 is set as HIGH, it means that it is filled and the LCD will show it. On the other hand, if slot 1 is not filled, then the LCD will show that slot 1 is available. The same process works for the second slot. In the end, we have the exit of the parking system, in this exit, the servo motor is attached to it so, it is working as a gate for the exit. If the car exit from the parking, then the motor will start.

Future work:

In future work, it is possible to enhance this diagram for a larger parking system. We can add more Pir sensors for more slots like slot 3 or slot 4. Besides, we can add one small LCD to the entrance door so that cars entering the parking; can see only the available slots, not the fill ones. Our project is only for the small parking. If we use this structure for bigger parking, then it is recommended to use more components. To conclude, all the details in this document are related to the diagram and hardware components.

