

SMART PARKING-INNOVATION

Design steps for smart parking using Tinkercad application

Creating a smart parking system based on an Arduino Uno using Tinkercad involves several steps. This system will use ultrasonic sensors to detect the availability of parking spaces and display this information on an LCD screen. Here's a step-by-step guide:

Step 1: Gather Components

Before you start designing in Tinkercad, gather the necessary components:

- Arduino Uno
- Infrared sensor
- LCD display (16x2)
- Breadboard and jumper wires

Step 2: Set Up Tinkercad

Go to Tinkercad (<https://www.tinkercad.com/>), create an account if you don't have one, and start a new project.

Step 3: Design the Circuit

Drag and drop the components onto the virtual workspace in Tinkercad. Connect them as follows:

- Connect the VCC and GND pins of the Ultrasonic sensors to 5V and GND on the Arduino Uno.
- Connect the Trig and Echo pins of the Ultrasonic sensors to digital pins on the Arduino (e.g., Trig to D2 and Echo to D3).
- Connect the SDA and SCL pins of the LCD display to A4 and A5 on the Arduino Uno.
- Connect the VCC and GND of the LCD display to 5V and GND on the Arduino.

Step 4: Write the Arduino Code

Write the Arduino code for the smart parking system. Here's a basic example:

```
#include <LiquidCrystal.h>
```

```
#include <Servo.h>
```

```
Servo S1,S2;
```

```
#define IR_Slot1 7
```

```
#define IR_Slot2 8
```

```
#define IR_entry 6
```

```
#define IR_exit 13
```

```
int pos=0;

LiquidCrystal lcd(12,11,5,4,3,2);
```

```
void setup() {
```

```
  S1.attach(10);
```

```
  S2.attach(9);
```

```
  S1.write(pos);
```

```
  S2.write(pos);
```

```
  pinMode(IR_Slot1, INPUT);
```

```
  pinMode(IR_Slot2, INPUT);
```

```
  pinMode(IR_entry, INPUT);
```

```
  pinMode(IR_exit, INPUT);
```

```
  lcd.begin(16,2);
```

```
  lcd.print("Smart Parking");
```

```
  lcd.setCursor(0,1);
```

```
  lcd.print("system");
```

```
  delay(2000);
```

```
  lcd.clear();
```

```
  lcd.setCursor(0,0);
```

```
  lcd.print("Slot 1 = A");
```

```
  lcd.setCursor(0,1);
```

```
  lcd.print("Slot 2 = A");
```

```
  delay(2000);
```

```
}
```

```
void loop()
```

```
{
```

```
  if(digitalRead(IR_Slot1)==HIGH)
```

```
{
```

```
lcd.setCursor(0,0);
```

```
lcd.print("Slot 1 = NA");
```

```
}
```

```
else
```

```
{
```

```
lcd.setCursor(0,0);
```

```
lcd.print("Slot 1 = A");
```

```
}
```

```
if(digitalRead(IR_Slot2)==HIGH)
```

```
{
```

```
lcd.setCursor(0,1);
```

```
lcd.print("Slot 2 = NA");
```

```
}
```

```
else
```

```
{
```

```
lcd.setCursor(0,1);
```

```
lcd.print("Slot 2 = A");
```

```
}
```

```
if(digitalRead(IR_entry)==HIGH)
```

```
{
```

```
  S1.write(pos+90);
```

```
}
```

```
Else'
```

```
{
```

```
  S2.write(pos);
```

```
}
```

```
if(digitalRead(IR_exit)==HIGH)
```

```
{
```

```
  S1.write(pos+90);
```

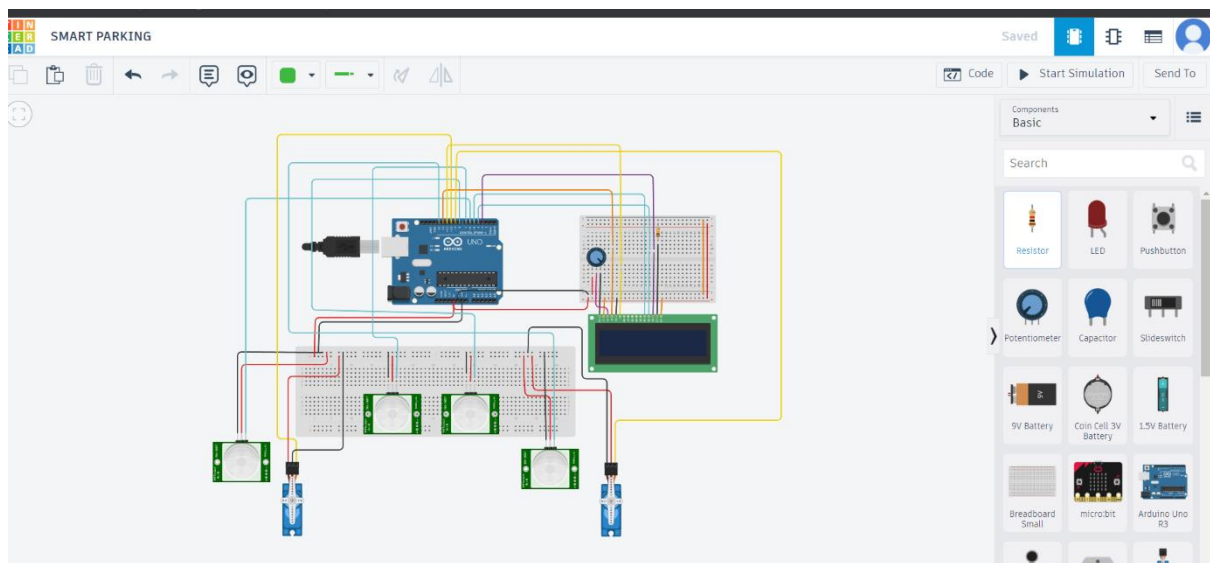
```

}
else
{
  S2.write(pos);
}
}

```

Step 5: Simulate and Test

Click the "Start Simulation" button in Tinkercad to test your circuit and code. Ensure that the LCD displays parking availability correctly based on sensor readings.



Step 6: Iterate and Expand

You can add more ultrasonic sensors to monitor multiple parking spaces and modify the code accordingly. You may also consider adding features like real-time monitoring via Wi-Fi or Bluetooth.

Remember to continuously iterate and test your design in Tinkercad to ensure it works as expected. Once you are satisfied with the simulation, you can move on to building the physical prototype.