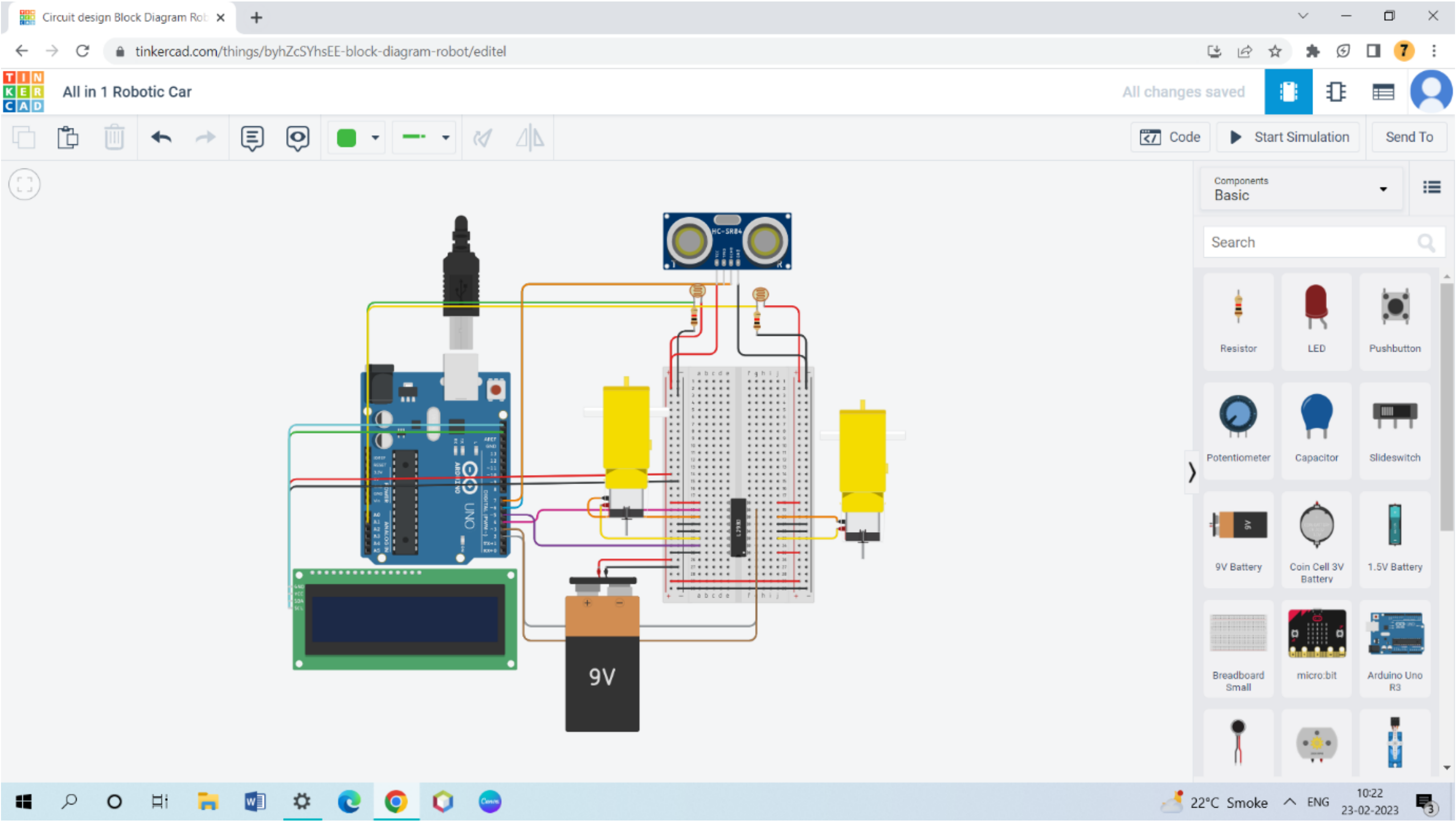
Title: All in 1 Car (Self Driving + Lane Follow + Obstacle Avoidance)

Overview:

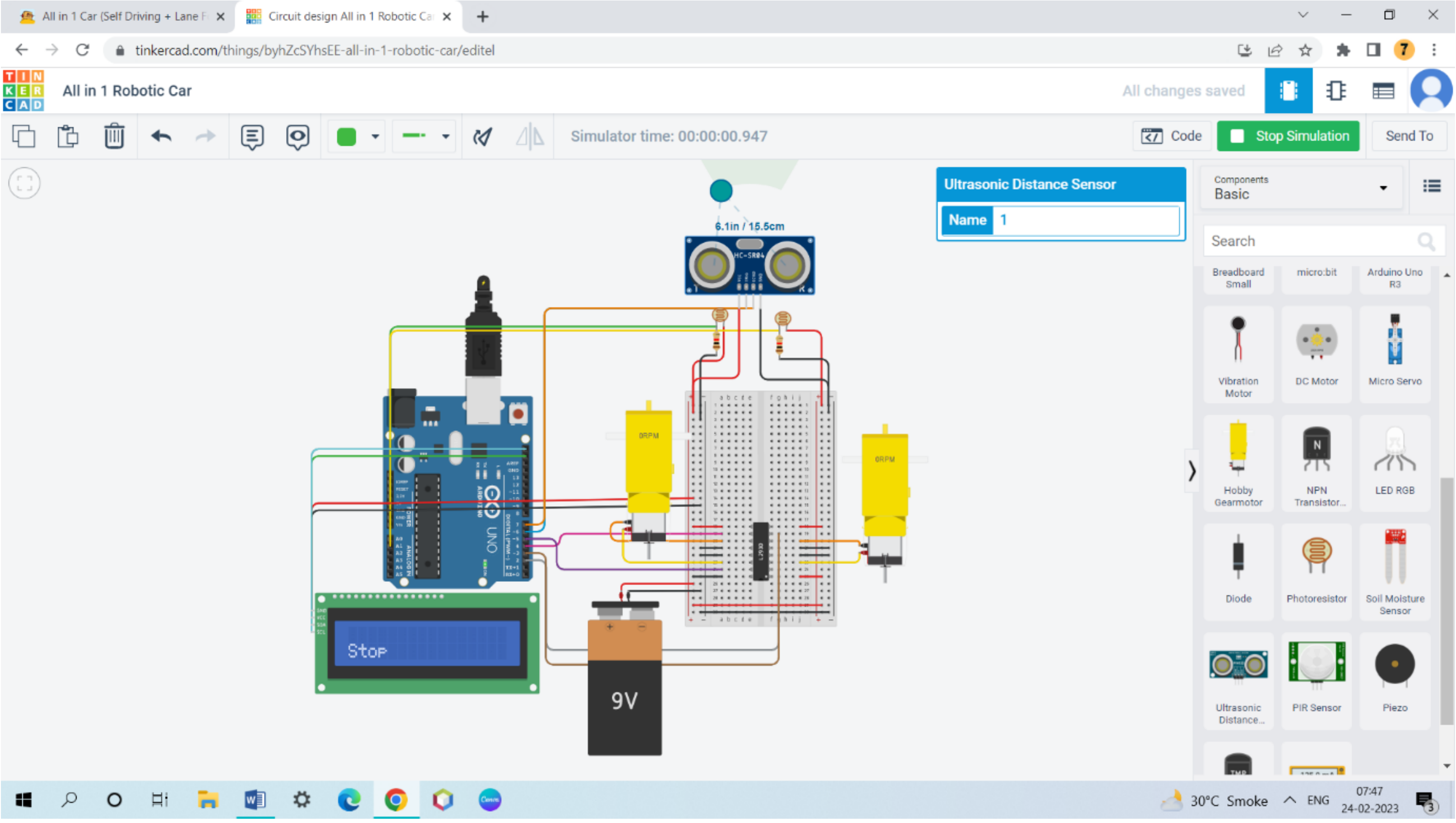
- Idea: This is all in 1 car which drives itself sensing the obstacle, and can moves in other directions automatically sensing data.
- This is also lane following car which means car can move on, in the center of given path.
- This is real world based project which can be used for many applications like self-driving car, Agriculture Robots, Robotics etc.

The Following Diagram is the hardware connection of the car.



Now let's see the images of project

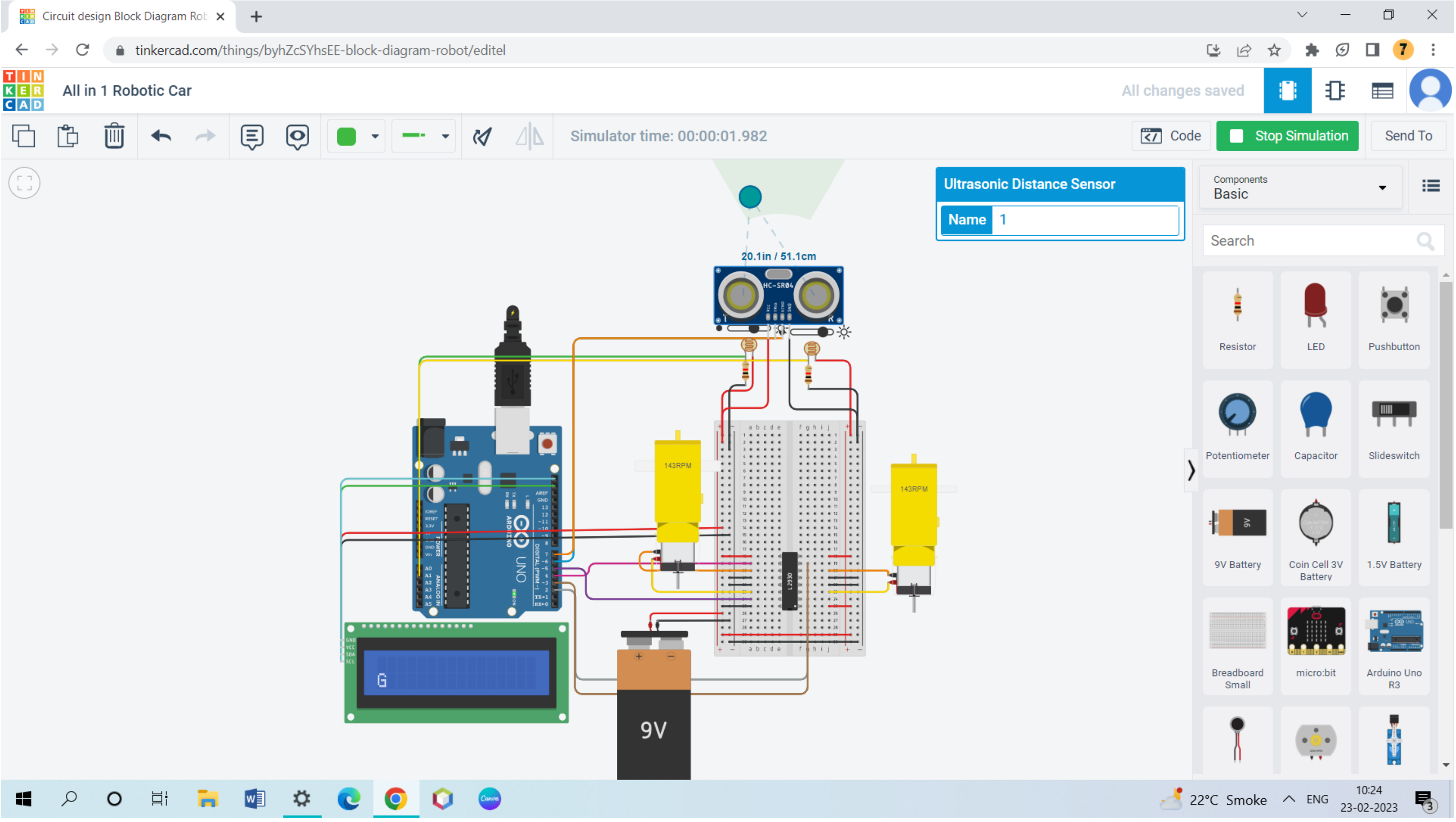
Image 1:



At initial the car is in stop mode.

As well as on LCD "STOP" is printed to get more idea about it!

Image 2:

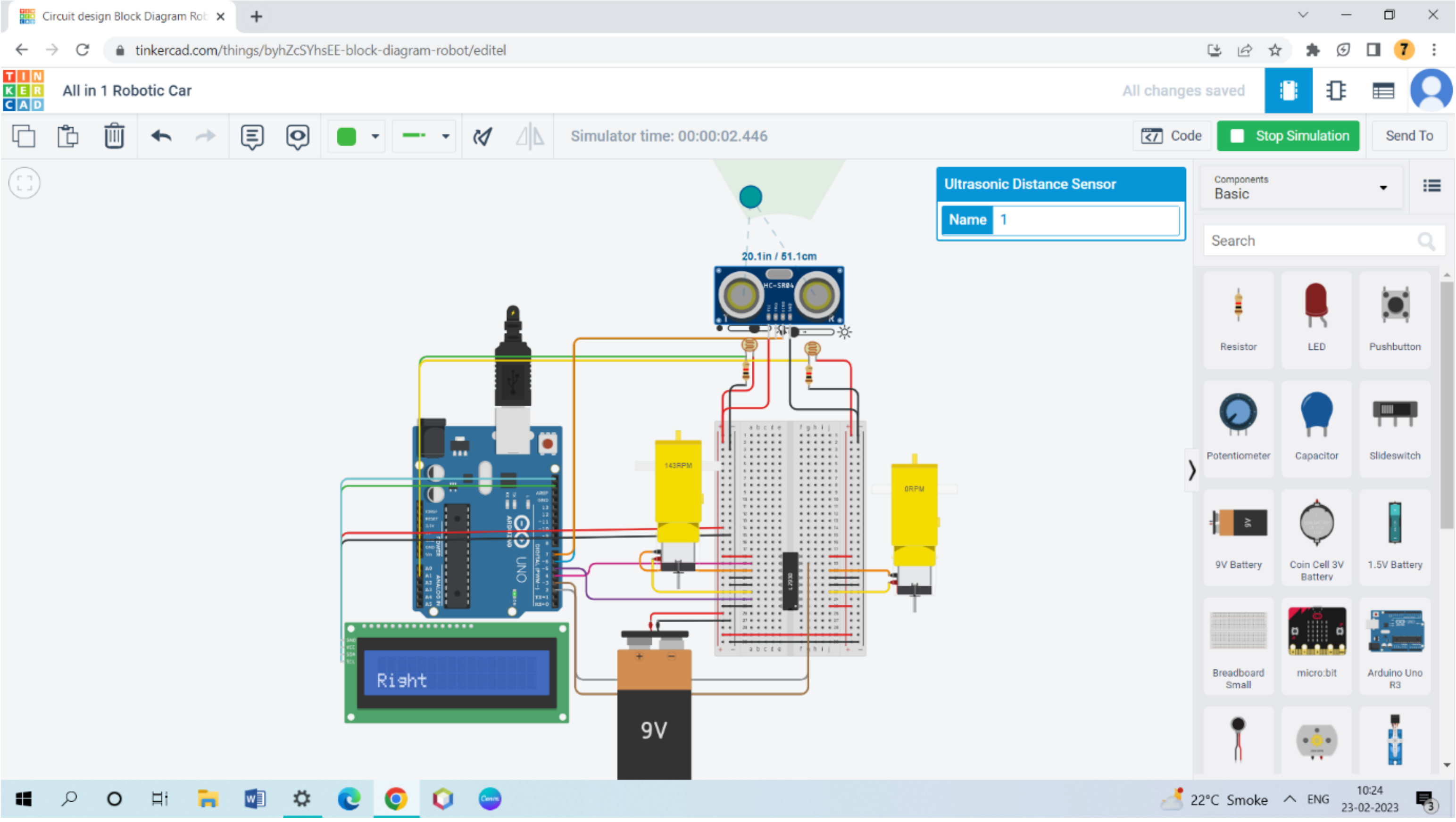


Here distance is >20 cm. So car will move forward.

You will see 143RPM on Motor which means car is moving forward.

As well as on LCD “GO” is printed. (the screenshot was taken early, before ‘O’ letter was printed. Sorry for this).

Image 3:



Simulator time: 00:00:02.446

Ultrasonic Distance Sensor

Name 1

20.1in / 51.1cm

Right

In this case, distance is >20 cm which means car will move forward.

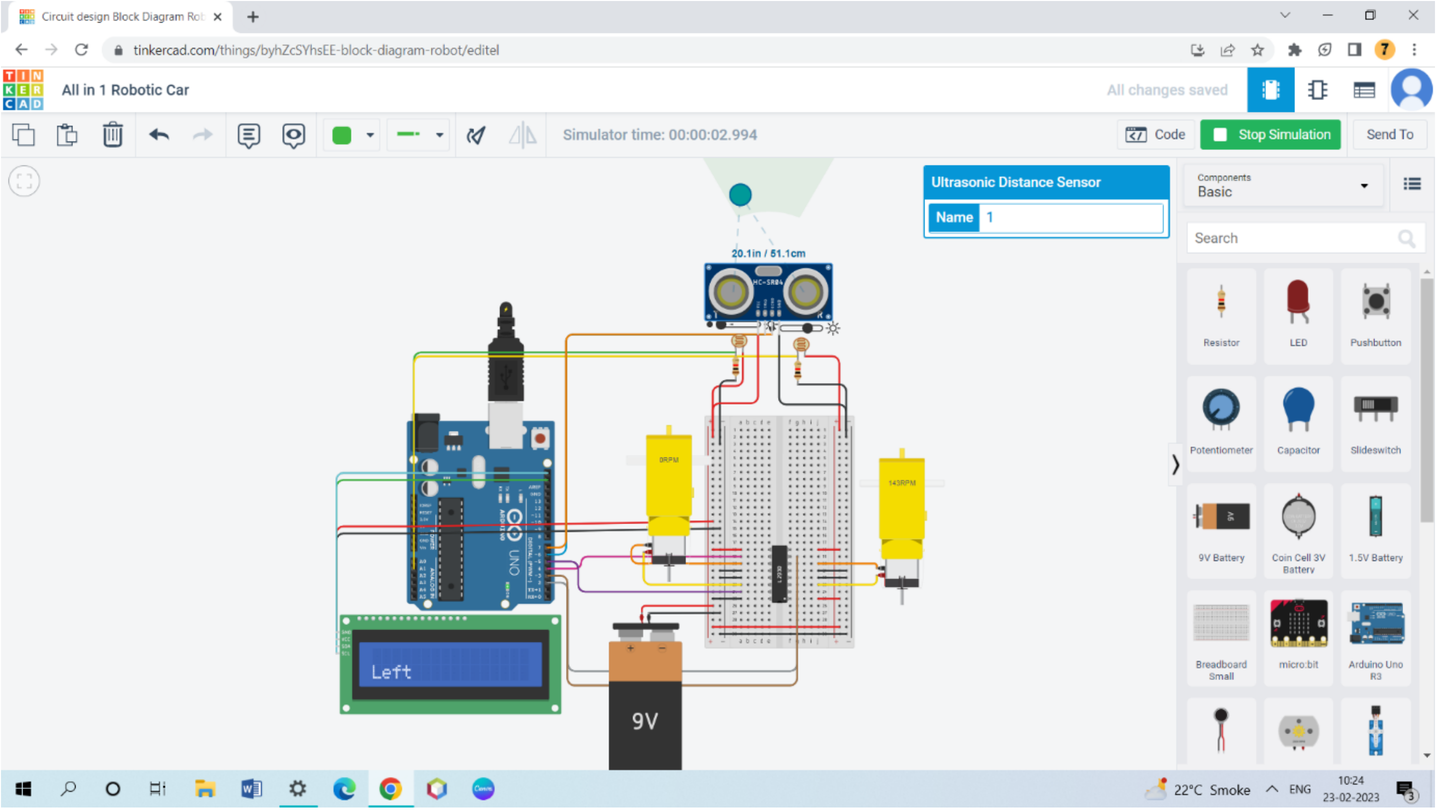
But!!

The value on right photoresistor is <100 which means car has to turn right to be on the center.

So left wheel will move, and right wheel stops which will make car to turn right.

On LCD “Right” is printed.

Image 4:



Simulator time: 00:00:02.994

Ultrasonic Distance Sensor

Name 1

In this case, distance is >20 cm which means car will move forward.

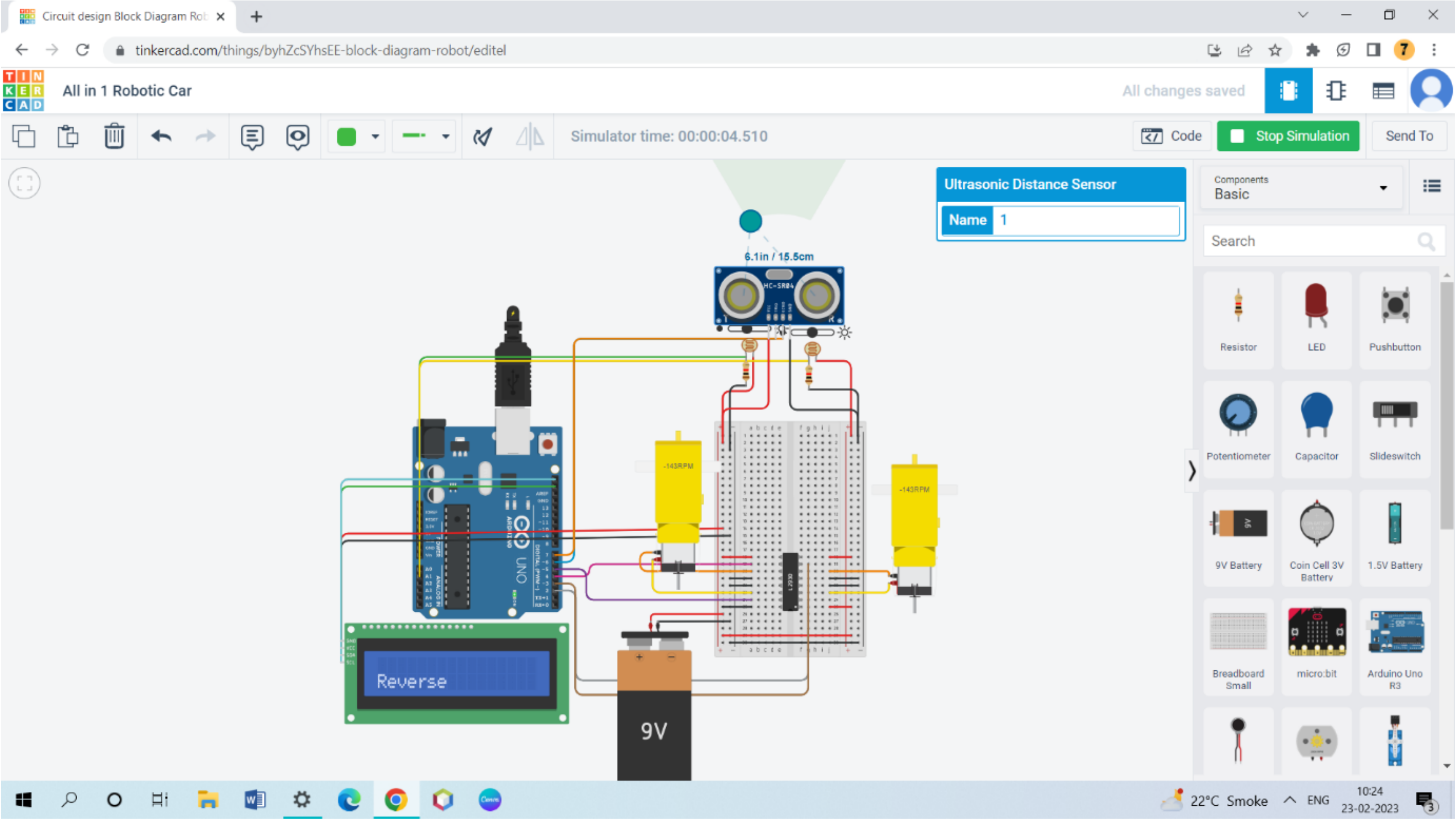
But!!

The value on left photoresistor is <100 which means car has to turn left to be on the center.

So right wheel will move, and left wheel stops which will make car to turn left.

On LCD “Left” is printed.

Image 5:



Now here, both the photoresistor values are >100 which means car is already on center.

But!!

There is an obstacle identified by ultrasonic sensor, so now the car will move reverse direction to prevent dashing with obstacle.

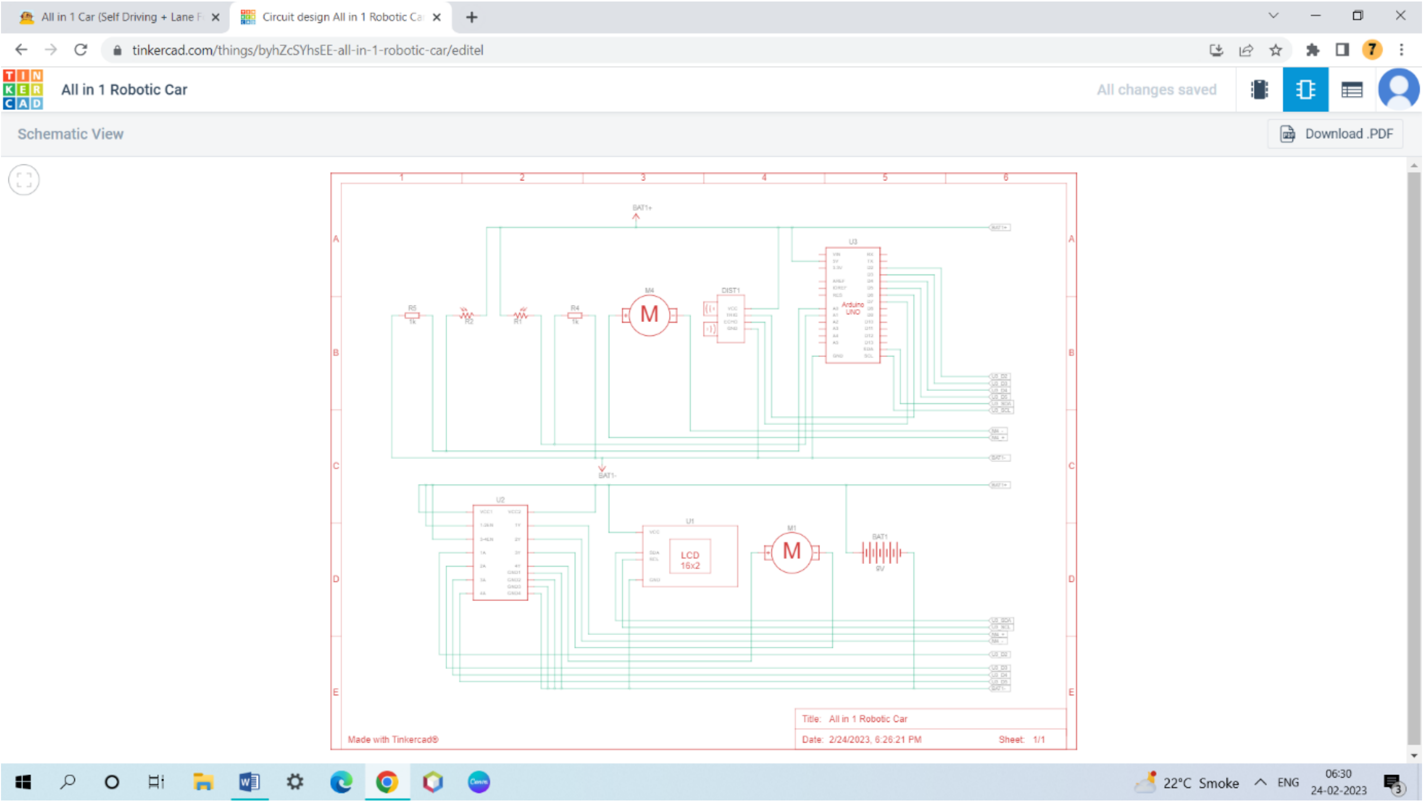
You will see on both the motor (-143 value is printed) which will move wheels back to make car reverse.

On LCD "Reverse" is printed.

Hardware required to build this project:

1. 1 Arduino UNO Microcontroller
2. 1 Ultrasonic Sensor
3. 2 DC Motor or Gearmotor (for wheels)
4. 1 (9 Volt) Battery for Power Supply
5. 1 I2C lCD (here you can use 16*2 LCD as well as per your preference)
6. 2 Photoresistor
7. 1 L239D (H – Bridge Motor Driver)
8. Few Wires
9. 2 Resistor (Value 1K ohm)
10. Breadboard

Schemetic View

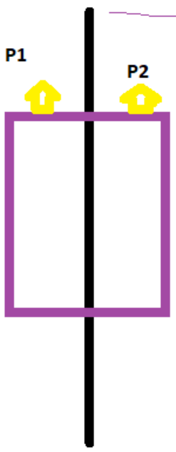

All in 1 Car (Self Driving + Lane F
Circuit design All in 1 Robotic Ca
tinkercad.com/things/byhZcSYhsEE-all-in-1-robotic-car/editel
All in 1 Robotic Car
All changes saved
Schematic View
Download .PDF
BAT1+
BAT1-
R5
R6
R7
R4
M4
M
DIST1
U3
Arduino UNO
U2
U1
LCD 16x2
M1
M
BAT1
9V
Title: All in 1 Robotic Car
Date: 2/24/2023, 6:26:21 PM
Sheet: 1/1
Made with Tinkercad®
22°C Smoke
ENG
06:30
24-02-2023

NOTE: Please read this before going to steps

Logic

Imagine road of white color
& black line as center

our car needs to keep center

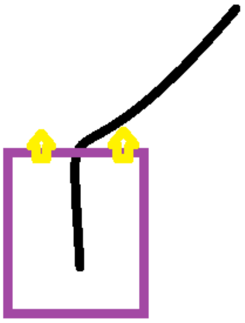


Imagine this black line as center of road

This both yellow part is photoresistor
imagine p1 as left photoresistor &
p2 as right photoresistor

Photoresistor sense the light.
Here is logic.
if there is high light (approx thresold > 100 (just demo))
then our car is on the center of road

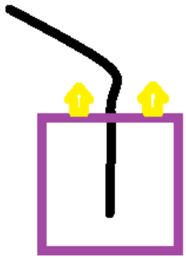
Case 1



Here there is right curve road.
Now as you see right side photoresistor
will measure low light due to black
color

so car will move RIGHT SIDE to make
center

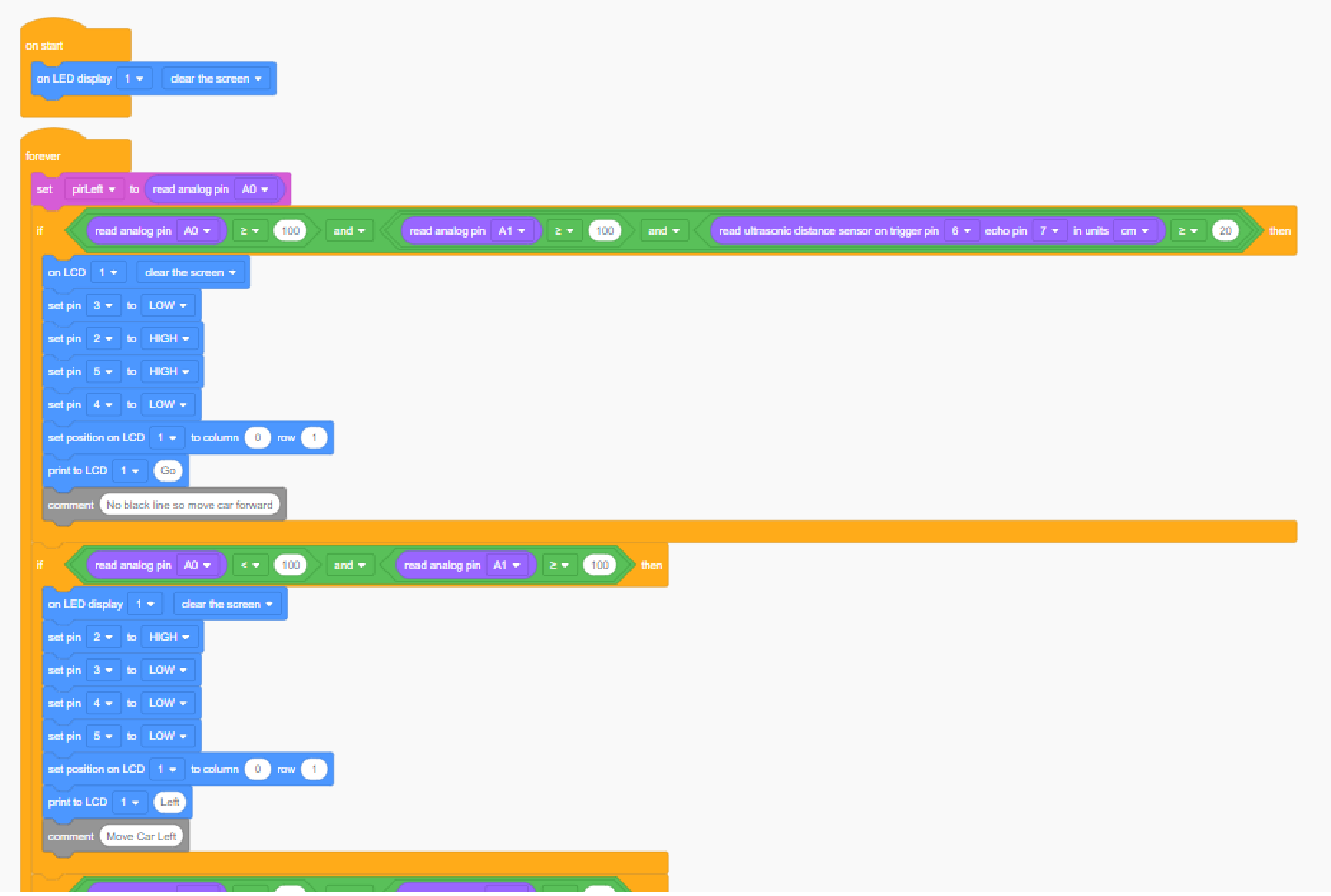
Case 2



Similarly here left photoresistor will have less light (low
value than thresold value)
so car will turn LEFT SIDE to make a center

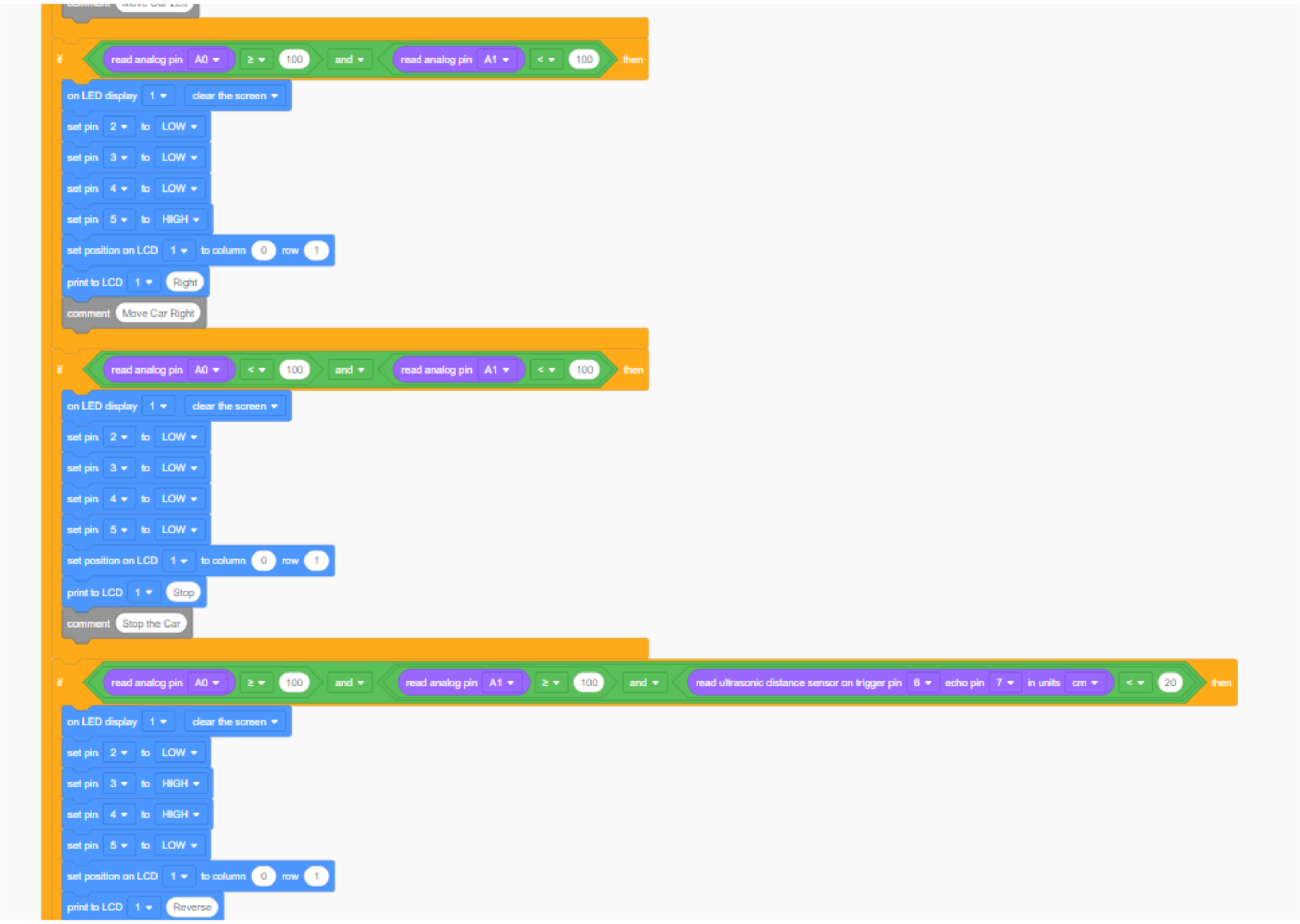
STEPS:

Step 1:



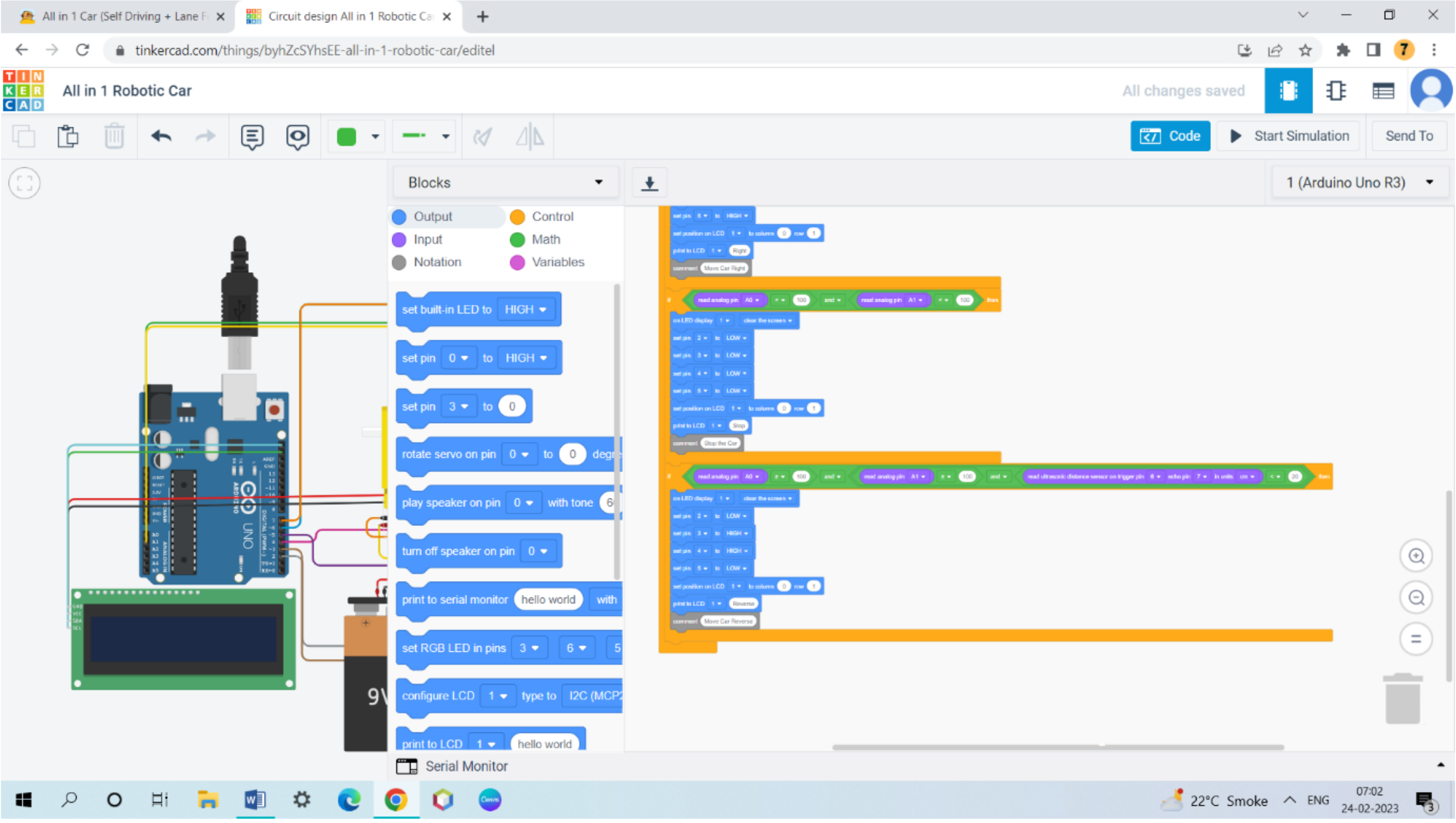
```
on start
  on LED display 1 clear the screen

forever
  set pirLeft to read analog pin A0
  if read analog pin A0 ≥ 100 and read analog pin A1 ≥ 100 and read ultrasonic distance sensor on trigger pin 6 echo pin 7 in units cm ≥ 20 then
    on LCD 1 clear the screen
    set pin 3 to LOW
    set pin 2 to HIGH
    set pin 5 to HIGH
    set pin 4 to LOW
    set position on LCD 1 to column 0 row 1
    print to LCD 1 Go
    comment No black line so move car forward
  if read analog pin A0 < 100 and read analog pin A1 ≥ 100 then
    on LED display 1 clear the screen
    set pin 2 to HIGH
    set pin 3 to LOW
    set pin 4 to LOW
    set pin 5 to LOW
    set position on LCD 1 to column 0 row 1
    print to LCD 1 Left
    comment Move Car Left
```

Step 2:



```
if read analog pin A0 ≥ 100 and read analog pin A1 < 100 then
    on LED display 1 clear the screen
    set pin 2 to LOW
    set pin 3 to LOW
    set pin 4 to LOW
    set pin 5 to HIGH
    set position on LCD 1 to column 0 row 1
    print to LCD 1 Right
    comment Move Car Right
if read analog pin A0 < 100 and read analog pin A1 < 100 then
    on LED display 1 clear the screen
    set pin 2 to LOW
    set pin 3 to LOW
    set pin 4 to LOW
    set pin 5 to LOW
    set position on LCD 1 to column 0 row 1
    print to LCD 1 Stop
    comment Stop the Car
if read analog pin A0 ≥ 100 and read analog pin A1 ≥ 100 and read ultrasonic distance sensor on trigger pin 6 echo pin 7 in units cm < 20 then
    on LED display 1 clear the screen
    set pin 2 to LOW
    set pin 3 to HIGH
    set pin 4 to HIGH
    set pin 5 to LOW
    set position on LCD 1 to column 0 row 1
    print to LCD 1 Reverse
```

Step 3: (it’s full pic of step 2)



All in 1 Car (Self Driving + Lane F
Circuit design All in 1 Robotic Ca
tinkercad.com/things/byhZcSYhsEE-all-in-1-robotic-car/editel
All in 1 Robotic Car
All changes saved
Code
Start Simulation
Send To
Blocks
1 (Arduino Uno R3)
Output
Control
Input
Math
Notation
Variables
set built-in LED to HIGH
set pin 0 to HIGH
set pin 3 to 0
rotate servo on pin 0 to 0 degr
play speaker on pin 0 with tone 6
turn off speaker on pin 0
print to serial monitor hello world with
set RGB LED in pins 3 6 5
configure LCD 1 type to I2C (MCP2
print to LCD 1 hello world
Serial Monitor
UNO
9V
22°C Smoke
ENG
07:02
24-02-2023

```
    set pin 5 to HIGH
    set position on LCD 1 to column 0 row 1
    print to LCD 1 Right
    comment Move Car Right
if read analog pin A0 < 100 and read analog pin A1 < 100 then
    on LED display 1 clear the screen
    set pin 2 to LOW
    set pin 3 to LOW
    set pin 4 to LOW
    set pin 5 to LOW
    set position on LCD 1 to column 0 row 1
    print to LCD 1 Stop
    comment Stop the Car
if read analog pin A0 ≥ 100 and read analog pin A1 ≥ 100 and read ultrasonic distance sensor on trigger pin 6 echo pin 7 in units cm < 20 then
    on LED display 1 clear the screen
    set pin 2 to LOW
    set pin 3 to HIGH
    set pin 4 to HIGH
    set pin 5 to LOW
    set position on LCD 1 to column 0 row 1
    print to LCD 1 Reverse
    comment Move Car Reverse
```

This is simple but interesting project. I hope this helps!

If you have any queries please feel free to comment down, I’ll be happy to help.