

## Lesson 19 Avoid Obstacles Car and Follow Car function

### 19.1 Components used in this course

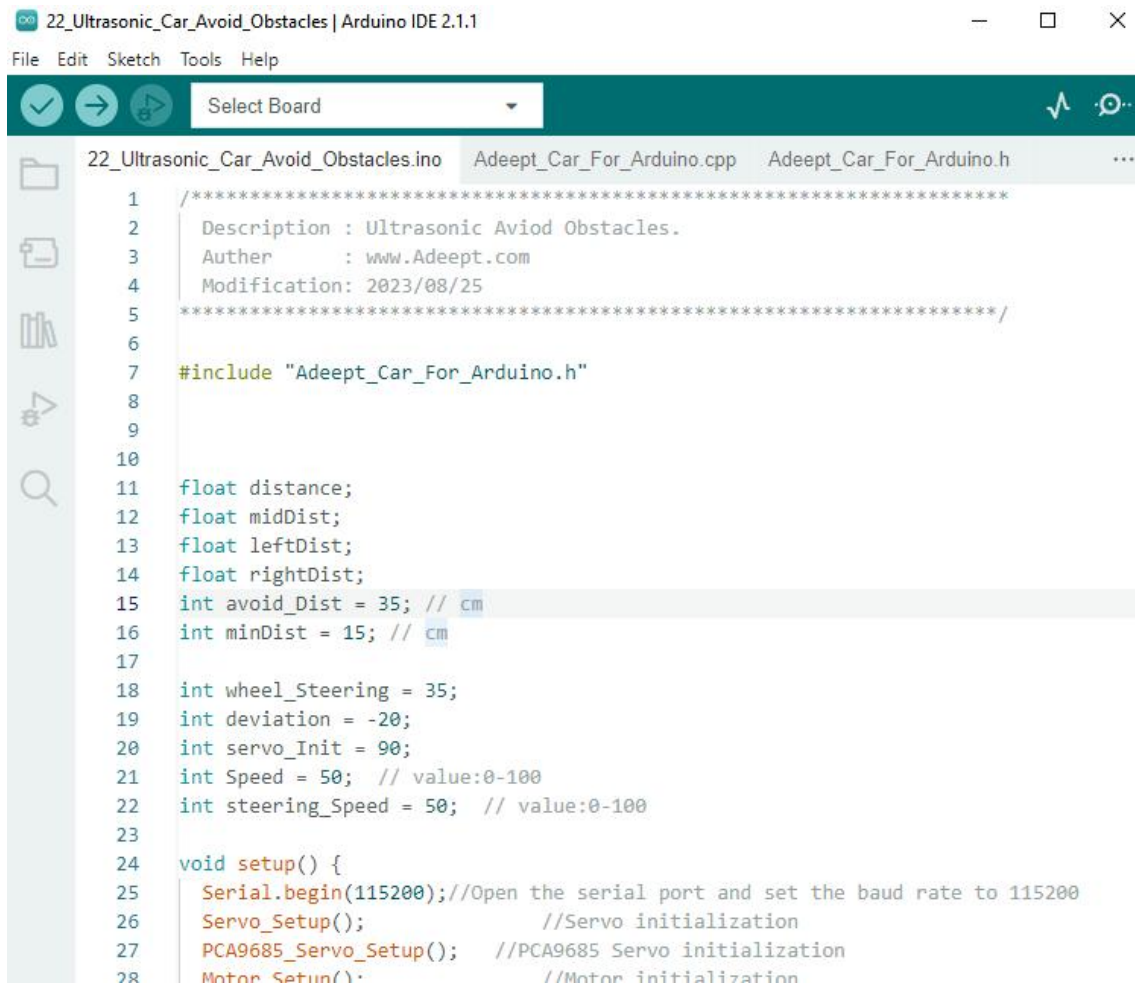
The assembled Uno Car.

### 19.2 Introduction the Avoid Obstacles Function

The obstacle avoidance function is realized through the ultrasonic module. When the ultrasonic module of the car detects that it is close to the obstacle, the car moves to the left and right sides.

### 19.3 How to use Avoid Obstacles Car

1. Before uploading the program, please lift the trolley to avoid damage to items or the trolley caused by the movement of the trolley after the upload program is completed.
2. Connect your computer and Adeept Robot Control Board with a USB cable.
3. Open "19\_Ultrasonic\_Car\_Avoid\_Obstacles" folder in "Code", double-click "19\_Ultrasonic\_Car\_Avoid\_Obstacles".



```
22_Ultrasonic_Car_Avoid_Obstacles.ino | Arduino IDE 2.1.1
File Edit Sketch Tools Help
Select Board

22_Ultrasonic_Car_Avoid_Obstacles.ino Adeept_Car_For_Arduino.cpp Adeept_Car_For_Arduino.h ...

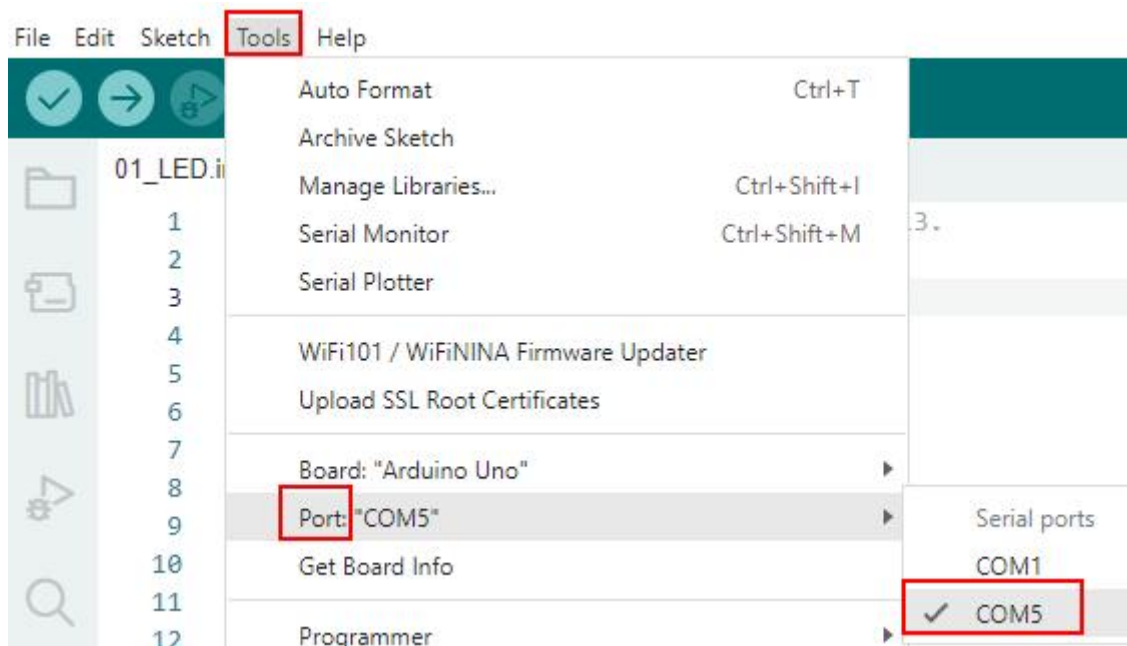
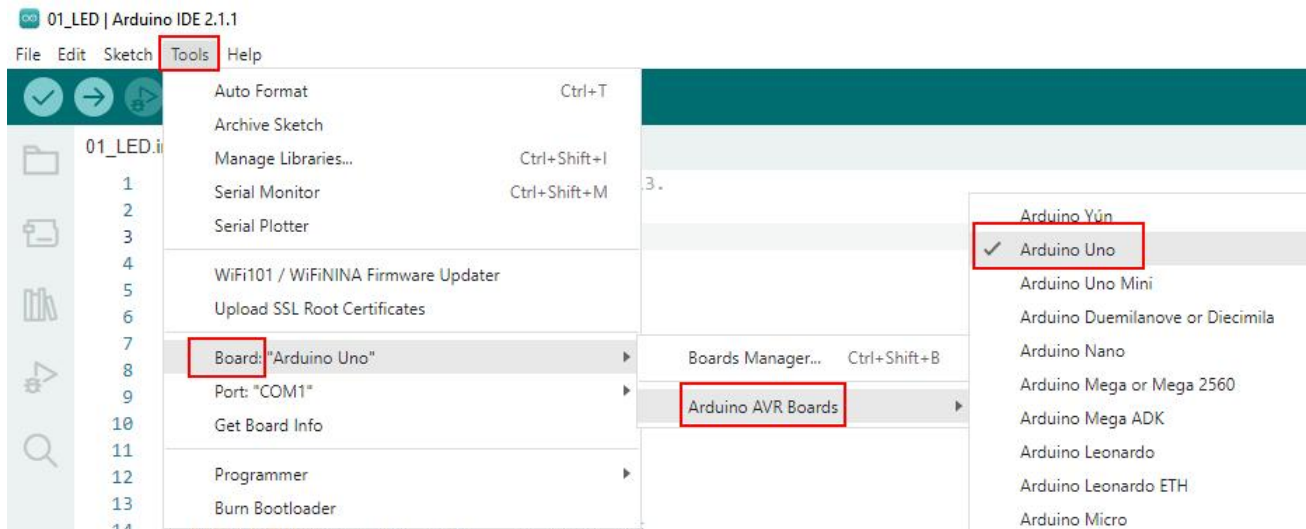
1  /*****
2   Description : Ultrasonic Avidod Obstacles.
3   Author      : www.Adeept.com
4   Modification: 2023/08/25
5   *****/
6
7  #include "Adeept_Car_For_Arduino.h"
8
9
10
11 float distance;
12 float midDist;
13 float leftDist;
14 float rightDist;
15 int avoid_Dist = 35; // cm
16 int minDist = 15; // cm
17
18 int wheel_Steering = 35;
19 int deviation = -20;
20 int servo_Init = 90;
21 int Speed = 50; // value:0-100
22 int steering_Speed = 50; // value:0-100
23
24 void setup() {
25   Serial.begin(115200); //Open the serial port and set the baud rate to 115200
26   Servo_Setup();        //Servo initialization
27   PCA9685_Servo_Setup(); //PCA9685 Servo initialization
28   Motor_Setup();        //Motor initialization
```


4. Select development board and serial port.

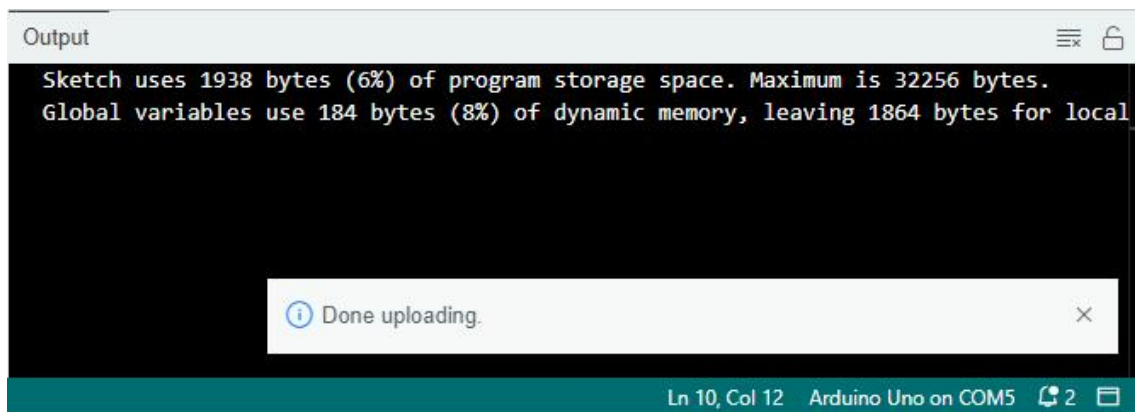
Board: Tools--->Board--->Arduino AVR Boards--->Arduino Uno

Port: Tools --->Port--->COMx

Note: The port number will be different in different computers.



5. After opening, click  to upload the code program to the Arduino. If there is no error warning in the console below, it means that the Upload is successful.

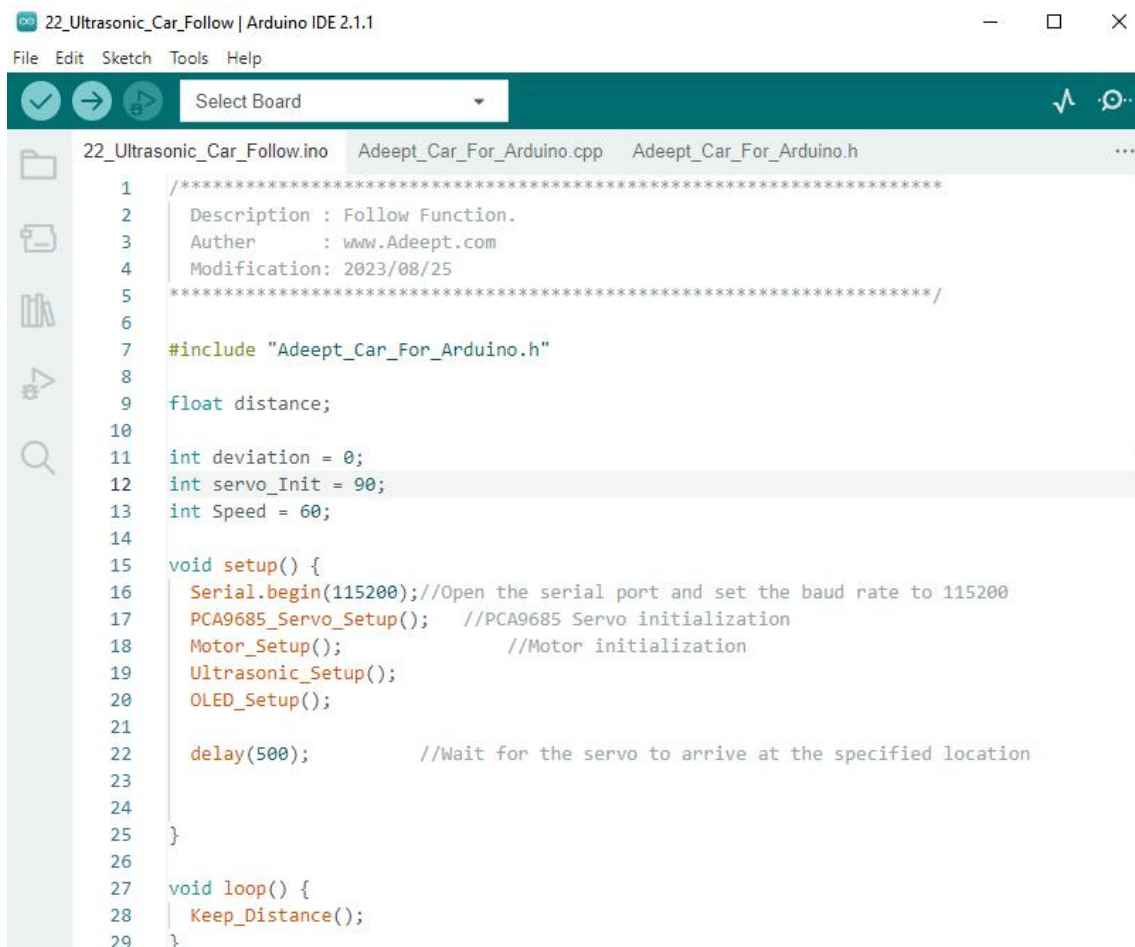


6. Now the car starts to implement the ultrasonic obstacle avoidance function. Please disconnect the USB cable, use the 18650 battery to supply power, and then test the obstacle avoidance function of the car in a suitable place.

## 19.4 Follow Car Function

The car realizes the linear tracking function. The car will keep a distance of 30-40cm from the objects in front.

1. Open "19\_Ultrasonic\_Car\_Follow" folder in ["/Code"](#), double-click ["19\\_Ultrasonic\\_Car\\_Follow"](#).



```
22_Ultrasonic_Car_Follow | Arduino IDE 2.1.1
File Edit Sketch Tools Help
Select Board

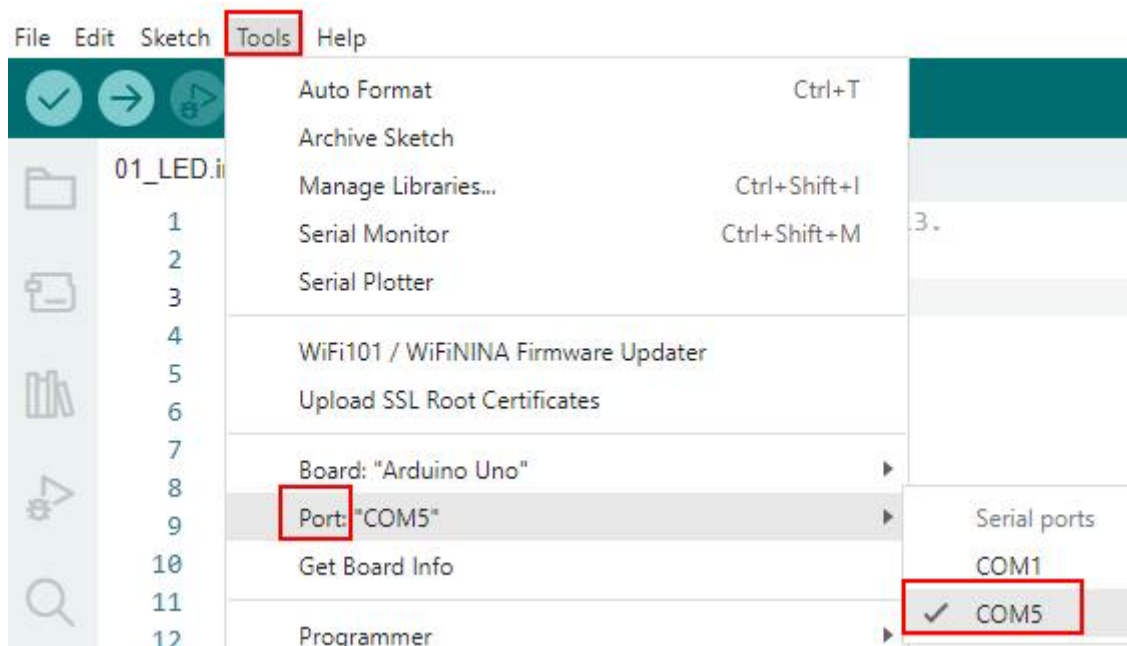
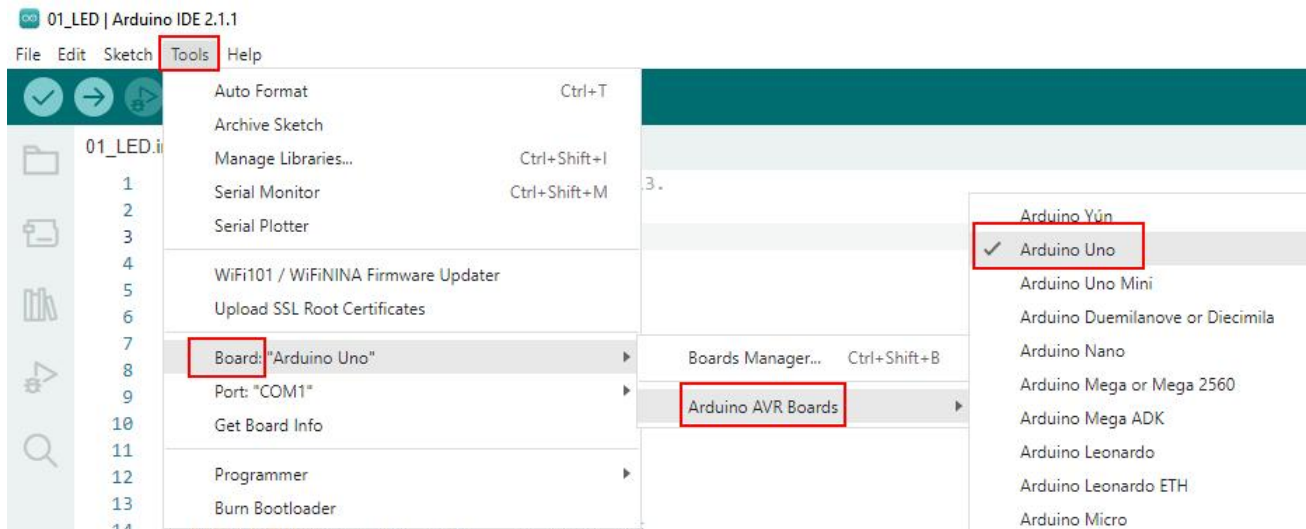
22_Ultrasonic_Car_Follow.ino Adeept_Car_For_Arduino.cpp Adeept_Car_For_Arduino.h
1  /*****
2   Description : Follow Function.
3   Auther      : www.Adeept.com
4   Modification: 2023/08/25
5   *****/
6
7  #include "Adeept_Car_For_Arduino.h"
8
9  float distance;
10
11 int deviation = 0;
12 int servo_Init = 90;
13 int Speed = 60;
14
15 void setup() {
16   Serial.begin(115200); //Open the serial port and set the baud rate to 115200
17   PCA9685_Servo_Setup(); //PCA9685 Servo initialization
18   Motor_Setup();         //Motor initialization
19   Ultrasonic_Setup();
20   OLED_Setup();
21
22   delay(500);             //Wait for the servo to arrive at the specified location
23
24 }
25
26
27 void loop() {
28   Keep_Distance();
29 }
```


7. Select development board and serial port.

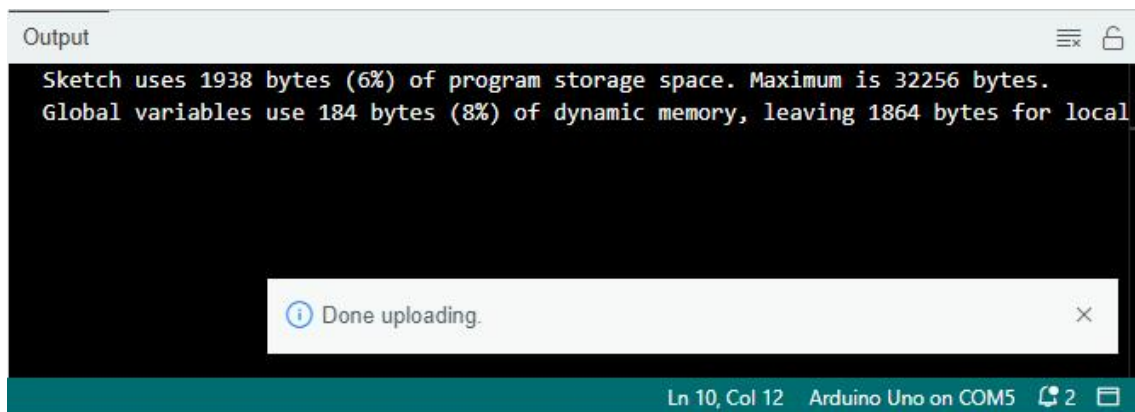
Board: Tools--->Board--->Arduino AVR Boards--->Arduino Uno

Port: Tools --->Port--->COMx

Note: The port number will be different in different computers.



8. After opening, click  to upload the code program to the Arduino. If there is no error warning in the console below, it means that the Upload is successful.



## 19.6 Car Avoid Obstacles Function

```
1. #include "Adeept_Car_For_Arduino.h"
2.
3. float distance;
4. float midDist;
5. float leftDist;
6. float rightDist;
7. int avoid_Dist = 35; // cm
8. int minDist = 15; // cm
9.
10. int wheel_Steering = 35;
11. int deviation = -20;
12. int servo_Init = 90;
13. int Speed = 50; // value:0-100
14. int steering_Speed = 50; // value:0-100
15.
16. void setup() {
17.   Serial.begin(115200); //Open the serial port and set the baud rate to 115200
18.   Servo_Setup(); //Servo initialization
19.   PCA9685_Servo_Setup(); //PCA9685 Servo initialization
20.   Ultrasonic_Setup();
21.   Motor_Setup(); //Motor initialization
22.   // WS2812 OFF
23.   delay(500); //Wait for the servo to arrive at the specified location
24. }
25.
26. void loop() {
27.   // distance = GetDistance();
```

```
28.    // Serial.print(distance);
29.    Avoid_Obstacles();
30.
31. }
32.
33.
34. void Avoid_Obstacles(){
35.
36.    // Servo_Angle(2, 95);
37.    // delay(80);
38.    distance = GetDistance();
39.    Serial.print(distance);
40.    // Motor(1,1,0); //Stop the car
41.    // Motor(2,1,0);
42.    // Motor(3,1,0); //Stop the car
43.    // Motor(4,1,0);
44.
45.    if (distance > 30){
46.        Servo_Angle(2, 95);
47.        Motor(1,1,Speed); //forward
48.        Motor(2,1,Speed);
49.        Motor(3,1,Speed); //forward
50.        Motor(4,1,Speed);
51.    }
52.    else if (distance >= 10 and distance <=30){
53.        Motor(1,1,0); //Stop the car
54.        Motor(2,1,0);
55.        Motor(3,1,0); //Stop the car
56.        Motor(4,1,0);
57.        Servo_Angle(2, 50);
58.        if (distance > 20){
59.            Motor(1,-1,Speed); //Stop the car
60.            Motor(2,-1,Speed);
61.            Motor(3,1,Speed); //Stop the car
62.            Motor(4,1,Speed);
63.            // delay(2000);
64.        }
65.        else{
66.            Servo_Angle(2, 150);
67.            Motor(1,1,Speed); //Stop the car
68.            Motor(2,1,Speed);
69.            Motor(3,-1,Speed); //Stop the car
```



```
70.         Motor(4,-1,Speed);
71.         // delay(2000);
72.     }
73. }
74. // else if (distance >= 10 and distance <=30){
75.     else {
76.         Motor(1,-1,Speed); //Stop the car
77.         Motor(2,-1,Speed);
78.         Motor(3,-1,Speed); //Stop the car
79.         Motor(4,-1,Speed);
80.     }
81.
82. }
```

## 19.7 Car Follow Function

```
1. #include "Adeept_Car_For_Arduino.h"
2.
3. float distance;
4.
5. int deviation = 0;
6. int servo_Init = 90;
7. int Speed = 60;
8.
9. void setup() {
10.   Serial.begin(115200); //Open the serial port and set the baud rate to 115200
11.   PCA9685_Servo_Setup(); //PCA9685 Servo initialization
12.   Motor_Setup(); //Motor initialization
13.   Ultrasonic_Setup();
14.   OLED_Setup();
15.   delay(500); //Wait for the servo to arrive at the specified location
16.
17. }
18.
19. void loop() {
20.   Keep_Distance();
21. }
22.
23.
24.
25. void Keep_Distance(){
26.   distance = GetDistance();
27.   if (distance < 30){
28.     Motor(1,-1,Speed); //backward
29.     Motor(2,-1,Speed);
30.     Motor(3,-1,Speed); //backward
31.     Motor(4,-1,Speed);
32.   }
33.   else if (distance > 40){
34.     Motor(1,1,Speed); //forward
35.     Motor(2,1,Speed);
36.     Motor(3,1,Speed); //forward
37.     Motor(4,1,Speed);
38.   }
39.   else {
40.     Motor(1,1,0); // stop
41.     Motor(2,1,0);
42.     Motor(3,1,0); // stop
```

```
43.     Motor(4,1,0);  
44.     }  
45.     delay(100);  
46.  
47. }
```