

Lesson 17 Line Tracking Car Function

Reflective Optical Sensor (including Line Tracking Sensor) should be avoided using in environment with infrared interference, like sunlight. Sunlight contains a lot of invisible light such as infrared and ultraviolet.

Under environment with intense sunlight, Reflective Optical Sensor cannot work normally.

17.1 Components used in this course

The assembled Uno Car.

17.2 Introduction the Line Tracking Function

The table below shows the values for all cases when the three tracking sensors detect objects of different colors. A detection of a black object or no object represents 1, and a detection of a white object represents 0. Value represents the value composed of three signals, which is used to judge the moving direction of the car. The program we provide uses the decimal value as the judgment value.

Left	Middle	Right	Value(Binary)	Value(Decimal)
0	0	0	000	0
0	0	1	001	1
0	1	0	010	2
0	1	1	011	3

1	0	0	100	4
1	0	1	101	5
1	1	0	110	6
1	1	1	111	7

17.3 Wiring diagram

Make a simple video line inspection environment for testing the Line Tracking function.

Example: Paste a piece of black tape on A4 paper. We used tape about 1.5cm wide.

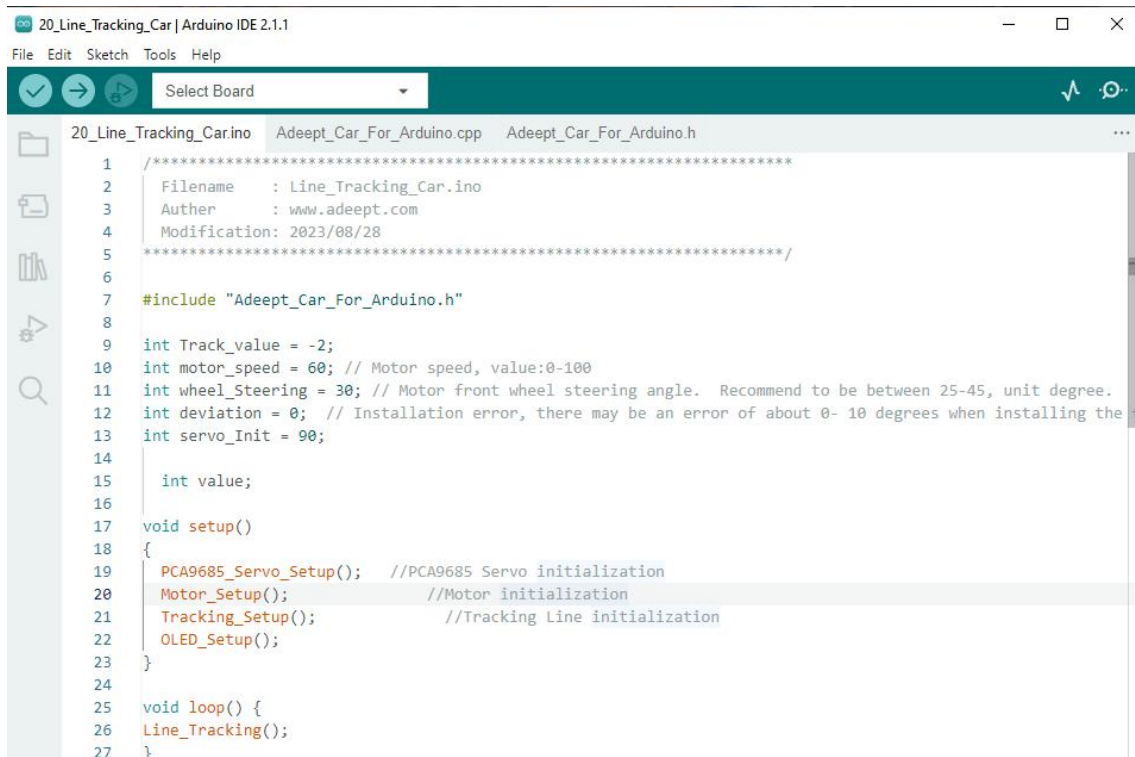




Adeept

17.4 How to control Line Tracking module

1. Connect your computer and Adeept Robot Control Board with a USB cable.
2. Open “17_Line_Tracking_Car” folder in “/Code”, double-click “[17_Line_Tracking_Car.ino](#)”.



```

1  /*****
2  Filename   : Line_Tracking_Car.ino
3  Author    : www.adeept.com
4  Modification: 2023/08/28
5  *****/
6
7  #include "Adeept_Car_For_Arduino.h"
8
9  int Track_value = -2;
10 int motor_speed = 60; // Motor speed, value:0-100
11 int wheel_Steering = 30; // Motor front wheel steering angle. Recommend to be between 25-45, unit degree.
12 int deviation = 0; // Installation error, there may be an error of about 0- 10 degrees when installing the f
13 int servo_Init = 90;
14
15 int value;
16
17 void setup()
18 {
19   PCA9685_Servo_Setup(); //PCA9685 Servo initialization
20   Motor_Setup();         //Motor initialization
21   Tracking_Setup();       //Tracking Line initialization
22   OLED_Setup();
23 }
24
25 void loop() {
26   Line_Tracking();
27 }

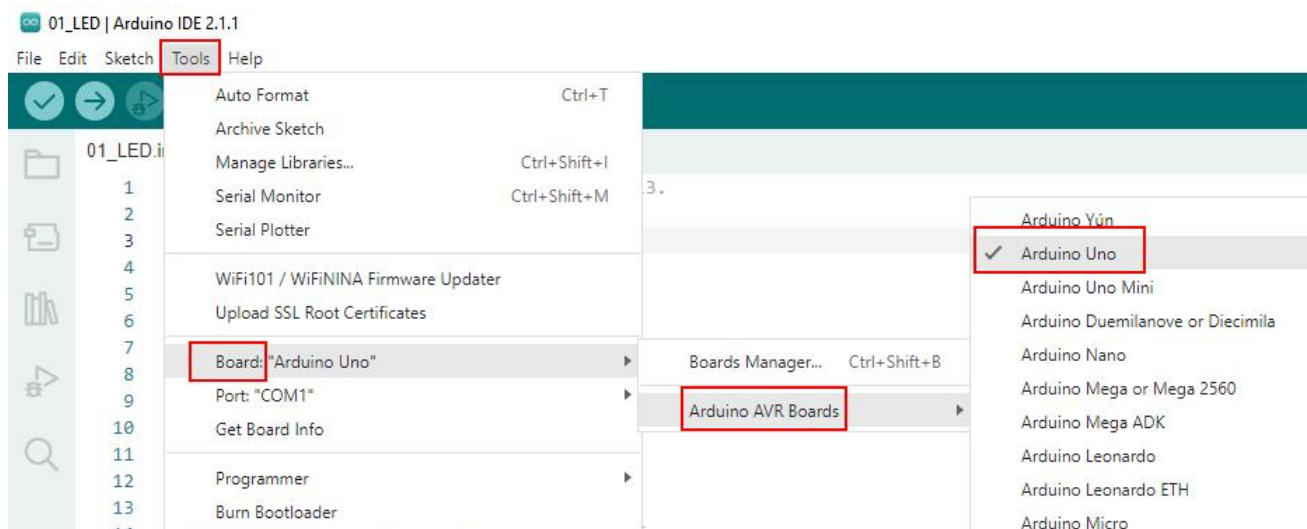
```

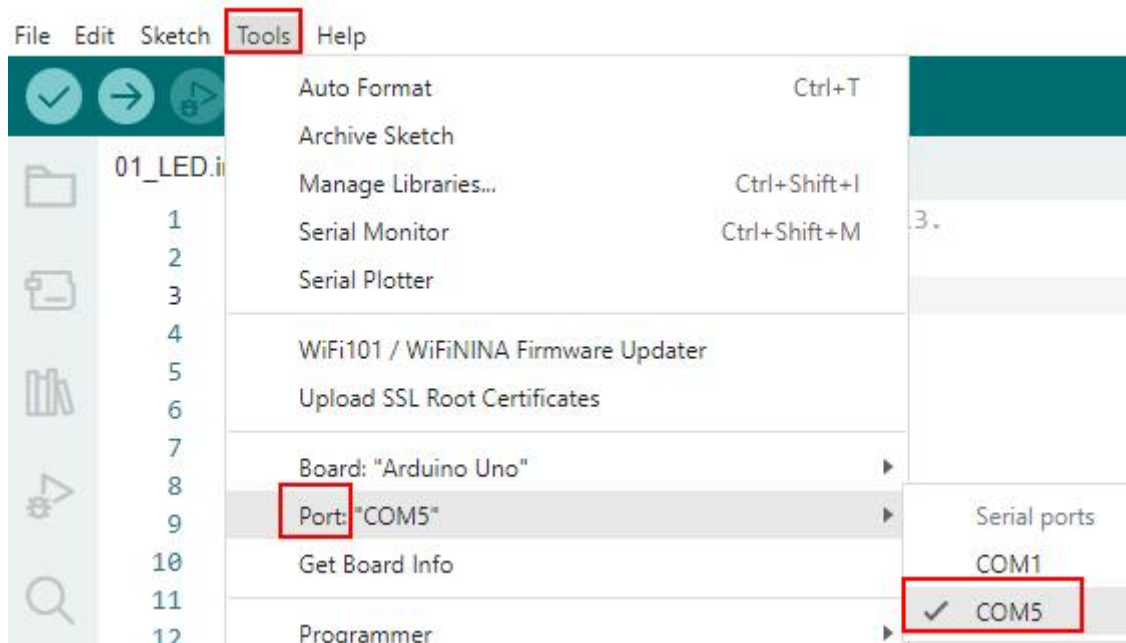
3. Select development board and serial port.


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

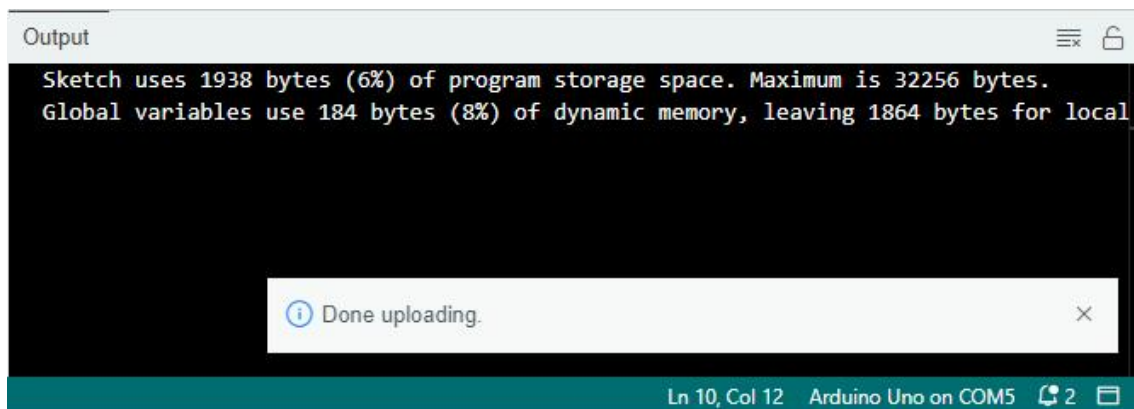
Port: Tools --->Port--->COMx

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





4. 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.



5. Place the trolley on the made test line track, and lift the rear wheel of the trolley slightly to avoid the trolley from moving. Move the front wheel of the trolley left and right to observe whether the steering of the front wheel of the trolley is consistent with the position of the test track.

If the value detected by the tracking module is abnormal, you can use tools such as a screwdriver to try to adjust the blue potentiometer of the tracking module.

After the test is completed, you can make a car tracking line. It may be necessary to adjust the car motor speed, the steering angle of the front wheel of the car and other parameters according to the actual track.

17.5 Code

```
1.  /*****
2.   Filename      : Line_Tracking_Car.ino
3.   Auther       : www.adeept.com
4.   *****/
5.
6.   #include "Adeept_Car_For_Arduino.h"
7.
8.   int Track_value = -2;
9.   int motor_speed = 60; // Motor speed, value:0-100
10.  int wheel_Steering = 30; // Motor front wheel steering angle. Recommend to be
    between 25-45, unit degree.
11.  int deviation = 0; // Installation error, there may be an error of about 0- 10
    degrees when installing the front wheel servo of the trolley.
12.  int servo_Init = 90;
13.
14.  int value;
15.
16.  void setup()
17.  {
18.    PCA9685_Servo_Setup(); //PCA9685 Servo initialization
19.    Motor_Setup();         //Motor initialization
20.    Tracking_Setup();      //Tracking Line initialization
21.    // OLED_Setup();
22.  }
23.
24.  void loop() {
25.    Line_Tracking();
```

```
26. }
27.
28.
29.
30. void Line_Tracking(){
31.     value = Track_Read(); //Read the value of the tracking module.
32.     // Serial.println(value);
33.     switch (value)
34.     {
35.         case 0: //000 stop
36.             // Servo_1_Angle(servo_Init + deviation); // Left Find the black line
37.             Servo_Angle(1, servo_Init + deviation); // mid
38.             Motor(1, -1, motor_speed);
39.             Motor(2, -1, motor_speed);
40.             Motor(3, 1, motor_speed);
41.             Motor(4, 1, motor_speed);
42.             if (Track_value != 0){
43.                 // OLED_clear();
44.                 // OLED(2,0,0,"Control: Stop");
45.                 // OLED(2,0,30,"Value: 0 0 0");
46.                 // OLED(1,20,50,"www.adeept.com");
47.
48.                 // OLED(1,0,0,"Control: Stop");
49.                 // OLED(2,0,20,"Value:");
50.                 // OLED(2,30,40,"0 0 0");
51.
52.                 // OLED(1,0,0,"Control: Stop");
53.                 // OLED(2,0,20,"Value:");
54.                 // OLED(2,30,40,"0 1 1");
55.                 // OLED_dispaly();
56.             }
57.             Track_value = 0;
58.             break;
59.
60.         case 1: //010 forward
61.             // Servo_1_Angle(servo_Init+ deviation);
62.             Servo_Angle(1, servo_Init + deviation); // mid
63.             Motor(1, 1, motor_speed); //Motor1 forward
64.             Motor(2, 1, motor_speed); //Motor2 forward
65.             Motor(3, 1, motor_speed); //Motor3 forward
66.             Motor(4, 1, motor_speed); //Motor4 forward
67.             if (Track_value != 2){
```

```
68.         // OLED_clear();
69.         // OLED(2,0,0,"Control: Forward");
70.         // OLED(2,0,30,"Value: 0 1 0");
71.         // OLED(1,20,50,"www.adeept.com");
72.         // OLED(1,0,0,"Control: Forward");
73.         // OLED(2,0,20,"Value:");
74.         // OLED(2,30,40,"0 1 0");
75.     }
76.     Track_value = 2;
77.     break;
78.
79.     case 2:    //100 left
80.
81.         Motor(1, -1, motor_speed);
82.         Motor(2, -1, motor_speed);
83.         Motor(3, 1, motor_speed);
84.         Motor(4, 1, motor_speed);
85.
86.         if (Track_value != 4){
87.             // OLED_clear();
88.             // OLED(2,0,0,"Control: Left");
89.             // OLED(2,0,30,"Value: 1 0 0");
90.             // OLED(1,20,50,"www.adeept.com");
91.             // OLED(1,0,0,"Control: Left");
92.             // OLED(2,0,20,"Value:");
93.             // OLED(2,30,40,"1 0 0");
94.         }
95.         Track_value = 4;
96.         break;
97.
98.     case 3:    //110 left
99.         Motor(1, -1, motor_speed);
100.        Motor(2, -1, motor_speed);
101.        Motor(3, 1, motor_speed);
102.        Motor(4, 1, motor_speed);
103.        if (Track_value != 6){
104.            // OLED_clear();
105.            // OLED(2,0,0,"Control: Left");
106.            // OLED(2,0,30,"Value: 1 1 0");
107.            // OLED(1,20,50,"www.adeept.com");
108.            // OLED(1,0,0,"Control: Left");
109.            // OLED(2,0,20,"Value:");
```



```
110.         // OLED(2,30,40,"1 1 0");
111.     }
112.     Track_value = 6;
113.     break;
114.
115.     case 4:    //001 right
116.         Motor(1, 1, motor_speed);
117.         Motor(2, 1, motor_speed);
118.         Motor(3, -1, motor_speed);
119.         Motor(4, -1, motor_speed);
120.         if (Track_value != 1){
121.             // OLED_clear();
122.             // OLED(2,0,0,"Control: Right");
123.             // OLED(2,0,30,"Value: 0 0 1");
124.             // OLED(1,20,50,"www.adeept.com");
125.             // OLED(1,0,0,"Control: Right");
126.             // OLED(2,0,20,"Value:");
127.             // OLED(2,30,40,"0 0 1");
128.         }
129.         Track_value = 1;
130.         break;
131.
132.     case 5:    //011 right
133.         Motor(1, 1, motor_speed);
134.         Motor(2, 1, motor_speed);
135.         Motor(3, -1, motor_speed);
136.         Motor(4, -1, motor_speed);
137.
138.         if (Track_value != 3){
139.             // OLED_clear();
140.             // OLED(2,0,0,"Control: Right");
141.             // OLED(2,0,30,"Value: 0 1 1");
142.             // OLED(1,20,50,"www.adeept.com");
143.             // OLED(1,0,0,"Control: Right");
144.             // OLED(2,0,20,"Value:");
145.             // OLED(2,30,40,"0 1 1");
146.         }
147.         Track_value = 3;
148.         break;
149.
150.     case 6:    //111 stop
151.         // Serial.println("1111111111111111");
```

```
152.      // Servo_1_Angle(servo_Init + deviation); // stop
153.      Servo_Angle(1, servo_Init + deviation);    // mid
154.      Motor(1, 1, 0);
155.      Motor(2, 1, 0);
156.      Motor(3, 1, 0);
157.      Motor(4, 1, 0);
158.
159.      // Serial.println("11111111333");
160.      if (Track_value != 7){
161.          // OLED_clear();
162.          // OLED(1,0,0,"Control: Stop");
163.          // OLED(2,0,20,"Value:");
164.          // OLED(2,30,40,"0 1 1");
165.          // OLED_dispaly();
166.      }
167.      Track_value = 7;
168.      break;
169.  case 7:  //101 forward
170.      // Servo_1_Angle(servo_Init+ deviation);
171.      Servo_Angle(1, servo_Init + deviation);    // mid
172.      Motor(1, 1, motor_speed); //Motor1 forward
173.      Motor(2, 1, motor_speed); //Motor2 forward
174.      Motor(3, 1, motor_speed); //Motor3 forward
175.      Motor(4, 1, motor_speed); //Motor4 forward
176.      if (Track_value != 5){
177.          // OLED_clear();
178.          // OLED(2,0,0,"Control: Forward");
179.          // OLED(2,0,30,"Value: 1 0 1");
180.          // OLED(1,20,50,"www.adeept.com");
181.          // OLED(1,0,0,"Control: Forward");
182.          // OLED(2,0,20,"Value:");
183.          // OLED(2,30,40,"1 0 1");
184.      }
185.      Track_value = 5;
186.      break;
187.  default:
188.      break;
189.  }
190.  // delay(100);
191. }
```