

# CarRun

## The purpose of the experiment:

As with the previous experimental project, after uploading the program, open the power switch at the rear of the smart car and pause for 2 seconds, the Smart Car starts to move backward, forward, left turn, right turn, rotate right, rotate left.

## List of components required for the experiment:

Arduino Smart Car \*1

USB cable \*1



## Experimental code analysis:

```
int Left_motor_back=9;    //(IN1)
int Left_motor_go=5;      //(IN2)
int Right_motor_go=6;     //(IN3)
int Right_motor_back=10;  //(IN4)
void setup()
{
    //Initialize the motor drive IO for output mode
    pinMode(Left_motor_go,OUTPUT); // PIN 5 (PWM)
    pinMode(Left_motor_back,OUTPUT); // PIN 9 (PWM)
    pinMode(Right_motor_go,OUTPUT); // PIN 6 (PWM)
    pinMode(Right_motor_back,OUTPUT); // PIN 10 (PWM)
}
void run(int time)
{
    digitalWrite(Right_motor_go,HIGH);
    digitalWrite(Right_motor_back,LOW);
    analogWrite(Right_motor_go,200); //PWM ratio 0~255 speed control,
```

```

        //the difference of left and right wheel slightly increase or
decrease
    analogWrite(Right_motor_back,0);
    digitalWrite(Left_motor_go,HIGH);
    digitalWrite(Left_motor_back,LOW);
    analogWrite(Left_motor_go,200); //PWM ratio 0~255 speed control,
        //the difference of left and right wheel slightly increase or
decrease
    analogWrite(Left_motor_back,0);
    delay(time * 100); //execution time, can be adjusted
}
void brake(int time)
{
    digitalWrite(Right_motor_go,LOW);
    digitalWrite(Right_motor_back,LOW);
    digitalWrite(Left_motor_go,LOW);
    digitalWrite(Left_motor_back,LOW);
    delay(time * 100); //execution time, can be adjusted
}
void left(int time) //turn left (The left wheel stop, the right wheel run)
{
    digitalWrite(Right_motor_go,HIGH); // Right motor go
    digitalWrite(Right_motor_back,LOW);
    analogWrite(Right_motor_go,200);
    analogWrite(Right_motor_back,0); //PWM ratio 0~255 speed control
    digitalWrite(Left_motor_go,LOW); //left motor stop
    digitalWrite(Left_motor_back,LOW);
    analogWrite(Left_motor_go,0);
    analogWrite(Left_motor_back,0); //PWM ratio 0~255 speed control
    delay(time * 100); //execution time, can be adjusted
}
void spin_left(int time) //Turn left in place(The left wheel back, the right
wheel run)
{
    digitalWrite(Right_motor_go,HIGH); // Right motor go
    digitalWrite(Right_motor_back,LOW);

```

```

analogWrite(Right_motor_go,200);
analogWrite(Right_motor_back,0); //PWM ratio 0~255 speed control
digitalWrite(Left_motor_go,LOW); //left motor back
digitalWrite(Left_motor_back,HIGH);
analogWrite(Left_motor_go,0);
analogWrite(Left_motor_back,200); //PWM ratio 0~255 speed control
delay(time * 100); //execution time, can be adjusted
}

void right(int time) //turn right(The right wheel stop, the left wheel run)
{
    digitalWrite(Right_motor_go,LOW); //right motor stop
    digitalWrite(Right_motor_back,LOW);
    analogWrite(Right_motor_go,0);
    analogWrite(Right_motor_back,0); //PWM ratio 0~255 speed control
    digitalWrite(Left_motor_go,HIGH); //left motor go
    digitalWrite(Left_motor_back,LOW);
    analogWrite(Left_motor_go,200);
    analogWrite(Left_motor_back,0); //PWM ratio 0~255 speed control
    delay(time * 100); //execution time, can be adjusted
}

void spin_right(int time) //turn right in place(The right wheel back, the left
wheel run)
{
    digitalWrite(Right_motor_go,LOW); //right motor back
    digitalWrite(Right_motor_back,HIGH);
    analogWrite(Right_motor_go,0);
    analogWrite(Right_motor_back,200); //PWM ratio 0~255 speed control
    digitalWrite(Left_motor_go,HIGH); //left motor go
    digitalWrite(Left_motor_back,LOW);
    analogWrite(Left_motor_go,200);
    analogWrite(Left_motor_back,0); //PWM ratio 0~255 speed control
    delay(time * 100); //execution time, can be adjusted
}

void back(int time) //car back
{
    digitalWrite(Right_motor_go,LOW); //right motor back

```

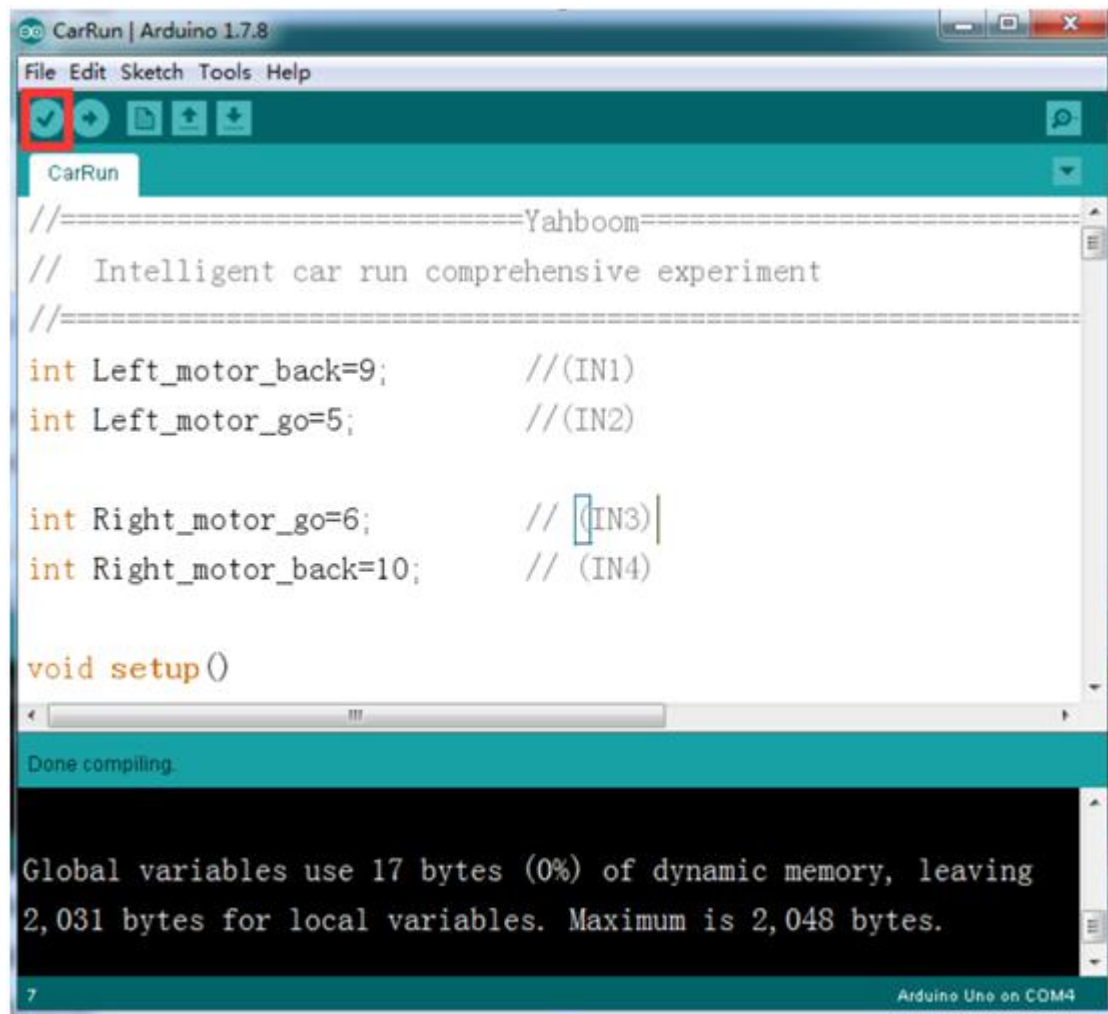
```

digitalWrite(Right_motor_back,HIGH);
analogWrite(Right_motor_go,0);
analogWrite(Right_motor_back,150); //PWM ratio 0~255 speed control
digitalWrite(Left_motor_go,LOW); //left motor back
digitalWrite(Left_motor_back,HIGH);
analogWrite(Left_motor_go,0);
analogWrite(Left_motor_back,150); //PWM ratio 0~255 speed control
delay(time * 100); //execution time, can be adjusted
}
void loop()
{
  delay(2000); //Start up after delay 2s
  back(10); //back 1s
  brake(5); //stop 0.5s
  run(10); //run 1s
  brake(5); //stop 0.5s
  left(10); //turn left 1s
  right(10); //turn right 1s
  spin_right(20); //turn left in place 2s
  spin_left(20); //turn right in place 2s
  brake(5); //stop
}

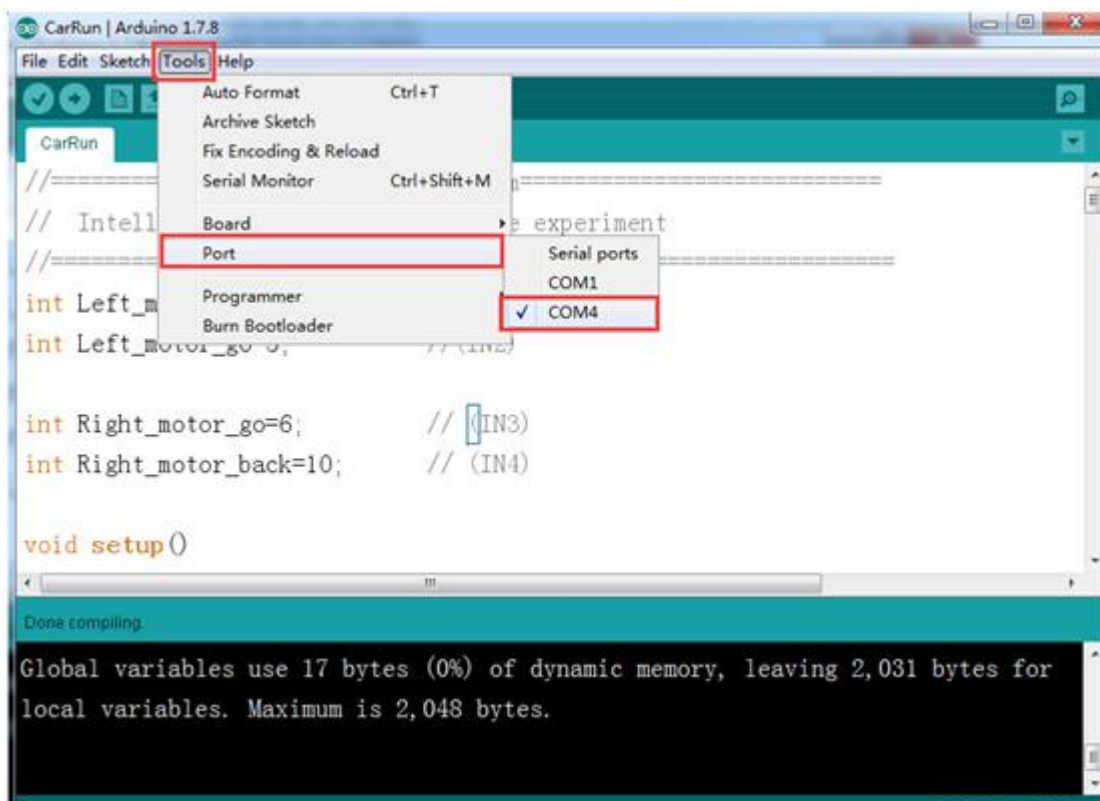
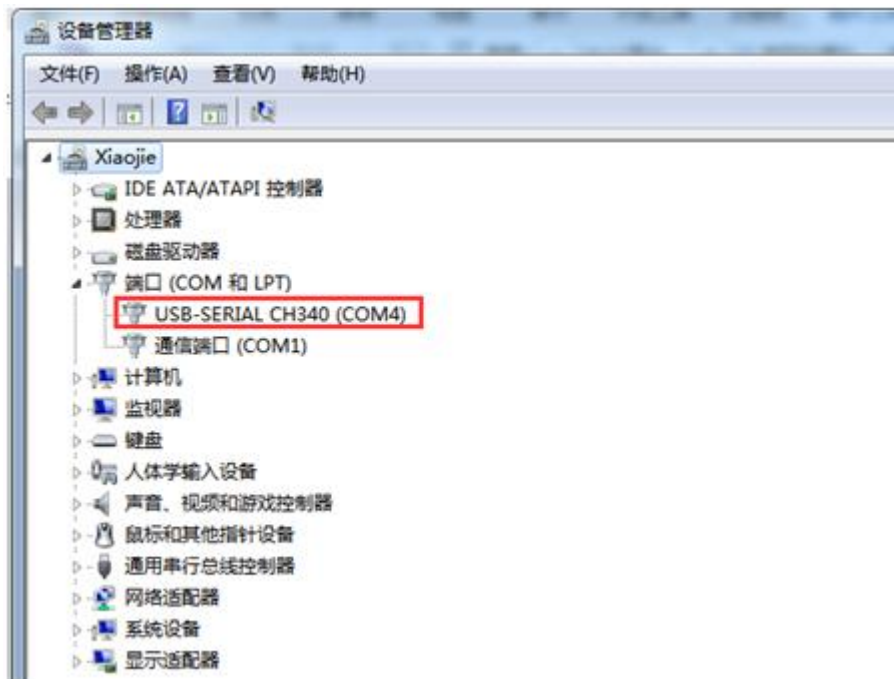
```

### **Experimental steps:**

1. We need to open the code of this experiment: **CarRun.ino**, click“√” under the menu bar to compile the code, and wait for the word "**Done compiling** " in the lower right corner,as shown in the figure below.



2. In the menu bar of Arduino IDE, we need to select **【Tools】** --- **【Port】** --- selecting the port that the serial number displayed by the device manager just now, as shown in the figure below.



3. After the selection is completed, you need to click “→” under the menu bar to upload the code to the Arduino UNO board. When the word “**Done uploading**” appears in the lower left corner, the code has been successfully uploaded to the Arduino UNO board, as shown in the figure below.

```
CarRun | Arduino 1.7.8
File Edit Sketch Tools Help
CarRun
//=====Yahboom=====
// Intelligent car run comprehensive experiment
//=====
int Left_motor_back=9;      //(IN1)
int Left_motor_go=5;        //(IN2)

int Right_motor_go=6;       //(IN3)
int Right_motor_back=10;    //(IN4)

void setup()
```

Done uploading.

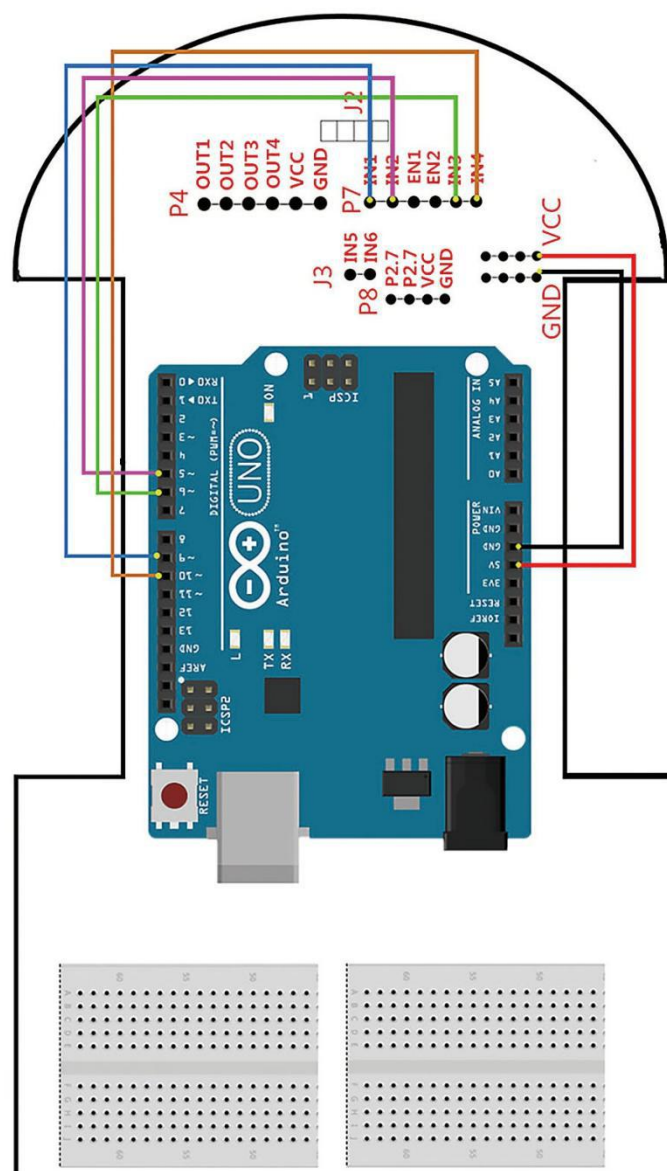
Global variables use 17 bytes (0%) of dynamic memory, leaving 2,031 bytes for local variables. Maximum is 2,048 bytes.

7 Arduino Uno en COM43

4. Please wire the Smart Car as shown below.

## IV. Wiring Instructions

#### 4.1 Motor drive wiring diagram

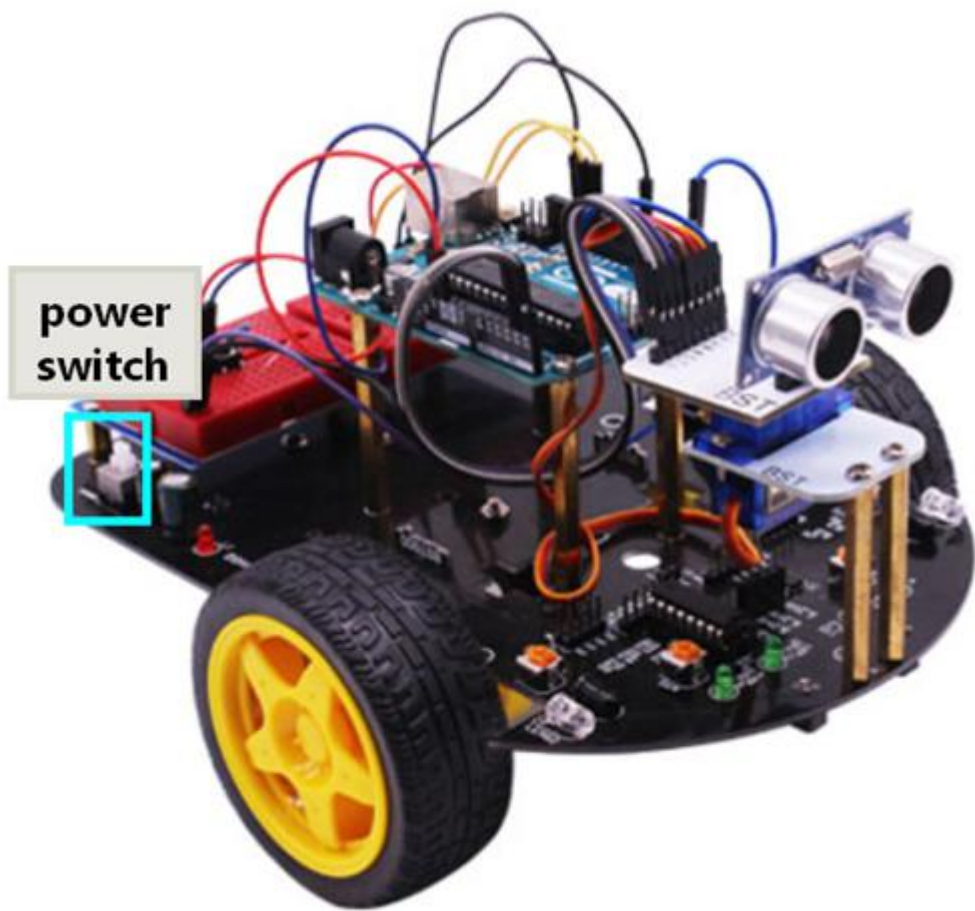


According to this wiring diagram, the smart car can realize forward, backward, left, right, and specified fancy movements after uploading the corresponding program.

'////////////////////////////////////// 08 //'

5. Unplug the USB cable, place the smart car in a wide area, turn on the power switch, and the smart car pauses for two seconds and then starts moving backwards, moving backwards, turning left, turning right, etc.





power  
switch