

Robot Advance

Learning objectives:

In this class, you will learn to use Python programming to make the robot move forward.

Code and analysis:

from microbit import display import buildingbit

buildingbit.car_run(255, 255, 0)
buildingbit.servo(1, 0)
sleep(1000)
buildingbit.servo(1, 180)
sleep(1000)

This experiment uses I2C communication. The PCA9685PW chip can output 16 PWM channels, so we can control the car to move forward by controlling the output of 4 PWM channels.

Programming and downloading:

1. Open the Mu software and enter the code in the editing window as shown in Figure 18-1. Note! All English and symbols should be entered in English mode, and the Tab key should be used for indentation. There must be a space between keywords such as "," and the content. Two blank lines need to be reserved between functions, and the last line ends with a blank program.



```
Mu 1.1.0.beta.5 - main.py
                                                                      C
                                              0
                               绘图器
                                              主题
                                                                 退出
模式
     新建
    from microbit import display
    import buildingbit
    buildingbit.car_run(255, 255, 0)
  5 buildingbit.servo(1, 0)
  6 sleep(1000)
  7 buildingbit.servo(1, 180)
    sleep(1000)
                                                              BBC micro:bit 🗯 🧔
```

2. Click the Check button with the thumb icon to check if there are any errors in our code. If a cursor or underline appears on a line, it means that there is an error in the program on that line. If no cursor or underline appears, it means that there is no error in the code.

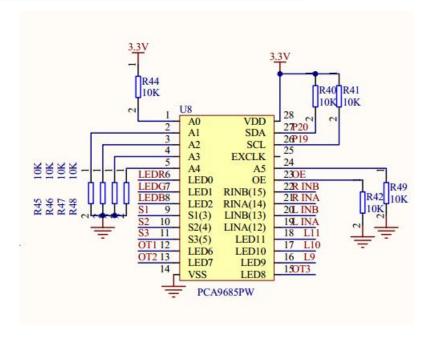
```
•
                                                 Q
                            0
                                   ====
untitled 🔃 💮 main. py 🔣
             elif value == 4095:
 104
                 self.set_pwm(index, 4096, 0)
 105
                 self.set_pwm(index, 0, value)
 107
 108
 109
     # Initialise the PCA9685 using the default address (0x41).
 110
 111 pwm = PCA9685()
 112
 113
    # Configure min and max servo pulse lengths
 servo_min = 150 # Min pulse length out of 4096 0?
 servo_max = 600 # Max pulse length out of 4096: 180?
 116
 117
     # Set frequency to 60hz, good for servos.
 118
 pwm.set_pwm_freq(60)
 120
 121
 pwm.set_pwm(12, 0, 4095)
 pwm.set_pwm(13, 0, 0)
 124 pwm.set_pwm(15, 0, 4095)
 pwm.set_pwm(14, 0, 0)
```



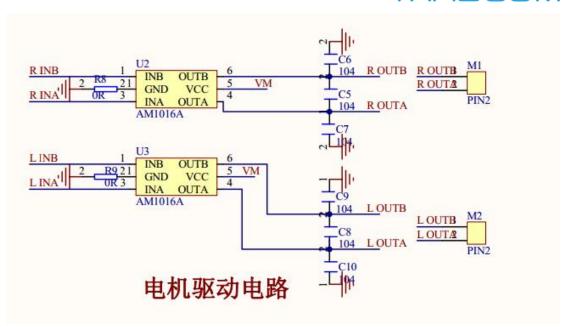
3. Connect the micro:bit to the computer via a micro USB cable, and then click the Flash button to download the program to the micro:bit as shown below.

```
Mu
                         0
          1
                                                                                      C
                                                0
                                                                               ?
                                0
                                                                       Save
                          Flash
                                 Files
                                               Zoom-in
                                                       Zoom-out
          main. py 🔯
 untitled 🗵
                elif value == 4095:
   104
                    self.set_pwm(index, 4096, 0)
   105
   106
                    self.set_pwm(index, 0, value)
   107
   108
   109
       # Initialise the PCA9685 using the default address (0x41).
   110
   111
       pwm = PCA9685()
   112
       # Configure min and max servo pulse lengths
       servo_min = 150 # Min pulse length out of 4096 0?
       servo_max = 600 # Max pulse length out of 4096: 180?
   116
   117
       # Set frequency to 60hz, good for servos.
   118
       pwm.set_pwm_freq(60)
   119
   120
   121
       pwm.set_pwm(12, 0, 4095)
   122
       pwm.set_pwm(13, 0, 0)
   123
       pwm.set_pwm(15, 0, 4095)
   124
       pwm.set_pwm(14, 0, 0)
   125
    126
```

4. The schematic diagram of the robot's PCA9685PW chip and motor is shown below. We can see that the robot's motor is connected to the LINA, LINB, RINA, and RINB pins of the PCA9685PW chip, while the SCL and SDA of the PCA9685PW are connected to the P19 and P20 pins of the micro:bit chip.







5. After downloading the program to micro:bit, you can see the car moving forward.

