

Course 9 ---PWM dimming

The purpose of the experiment:

Arduino controller has six PWM (Pulse Width Modulation) interface, which are digital interface 3, 5, 6, 9, 10, 11. In this course, we input the different analog voltage by adjusting the adjustable resistor, and the microcontroller recognizes the corresponding proportional PWM wave to control the brightness of the LED lights.

Introduction of PWM:

PWM is used in many places, dimmable lighting, motor speed regulation, sound production and so on.

Its three basic parameters:

1. Pulse width
2. The pulse period (the reciprocal of the number of pulses in one second).
3. Voltage height (for example: 0V-5V)

List of components required for the experiment:

Arduino UNO board *1

USB cable *1

220 Ω Resistor *1

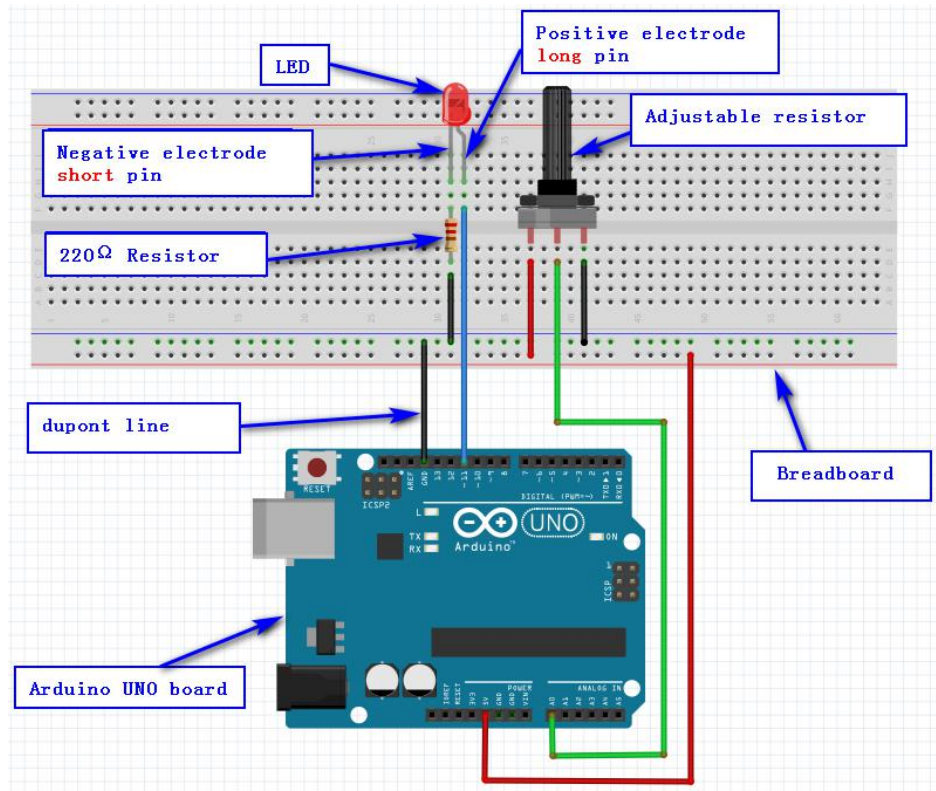
Adjustable resistor *1

Breadboard *1

Dupont line *1bunch

Actual object connection diagram:

We need to connect the circuit as shown in the figure below.

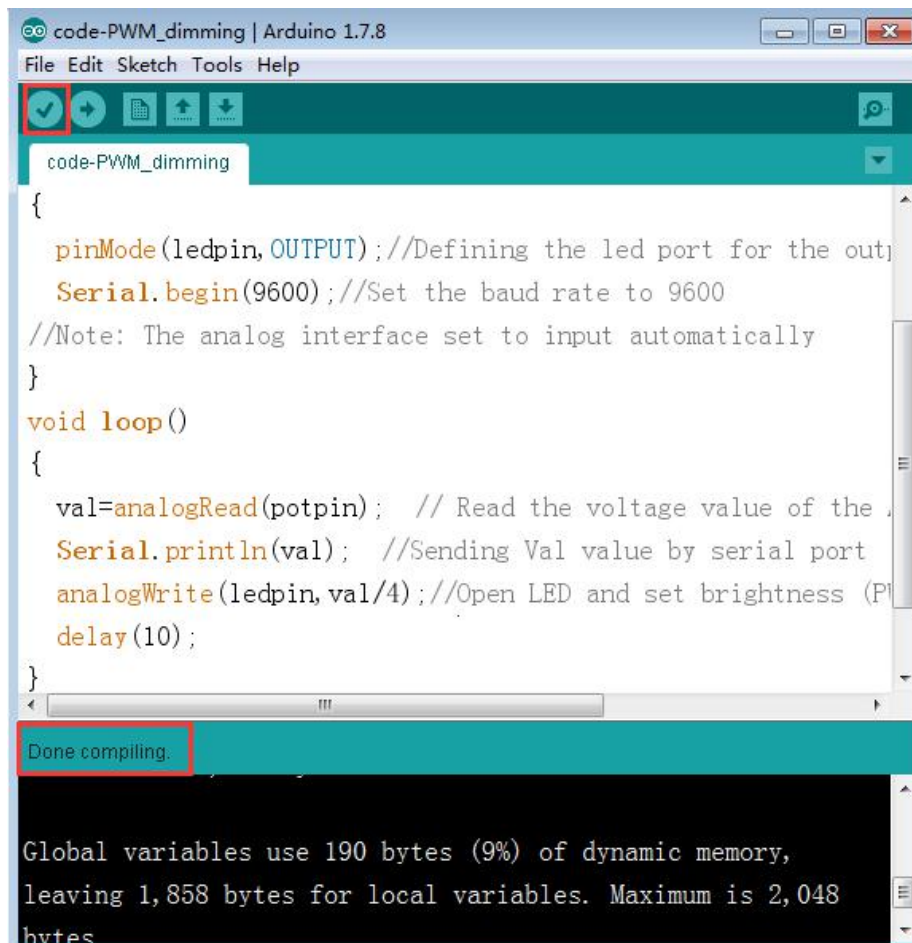


Experimental code analysis:

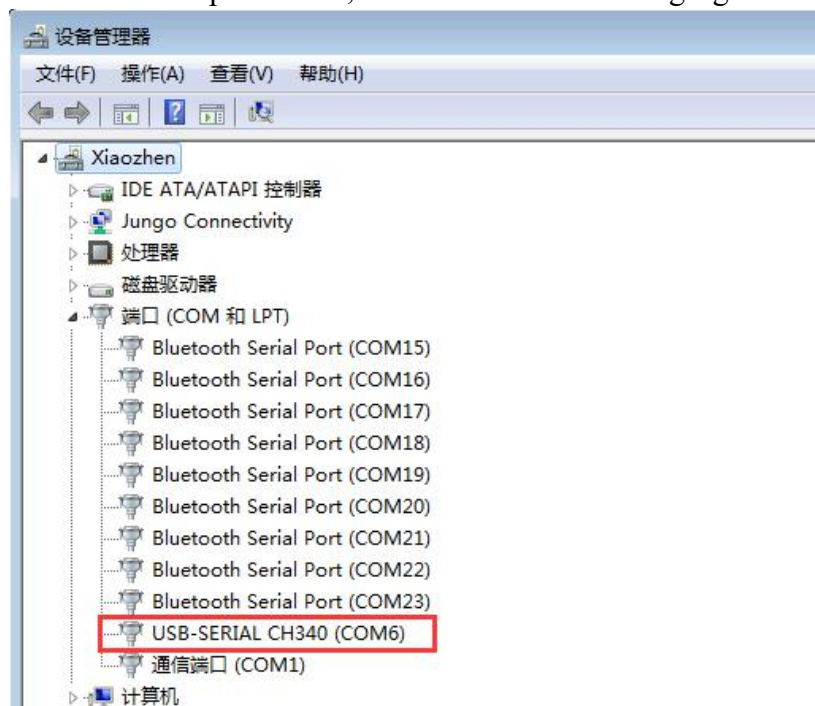
```
int potpin=A0; //Defining the analog port A0
int ledpin=13; //Defining the led port 13
int val=0; //Declarations of temporary variables
void setup()
{
  pinMode(ledpin,OUTPUT); //Defining the light port for the output port
  Serial.begin(9600); //The baud rate is 9600
}
void loop()
{
  val=analogRead(potpin); //Read the voltage value of the A0 port and assign it to val
  Serial.println(val); //Sending Val value by serial port
}
```

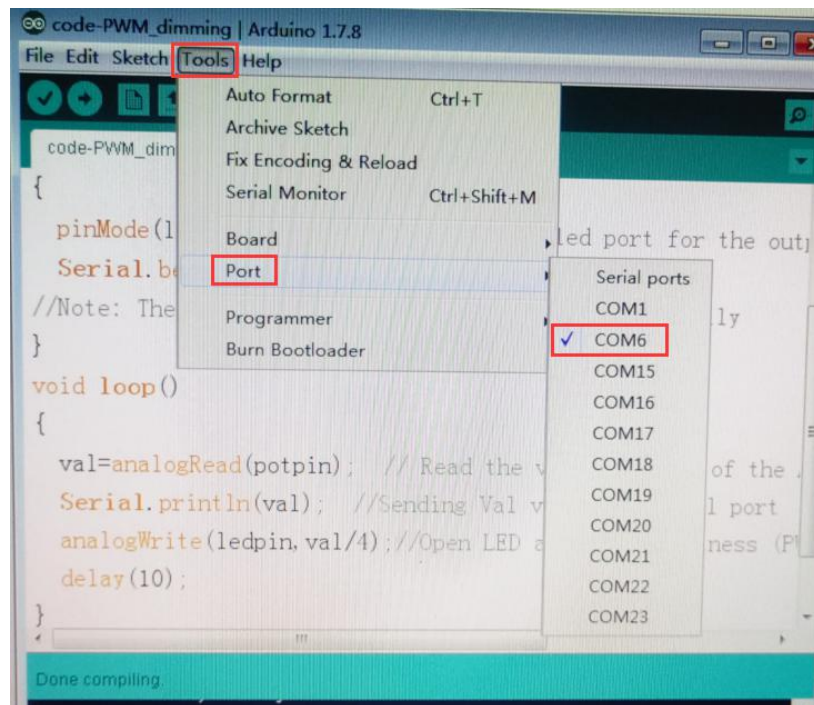
Experimental steps:

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

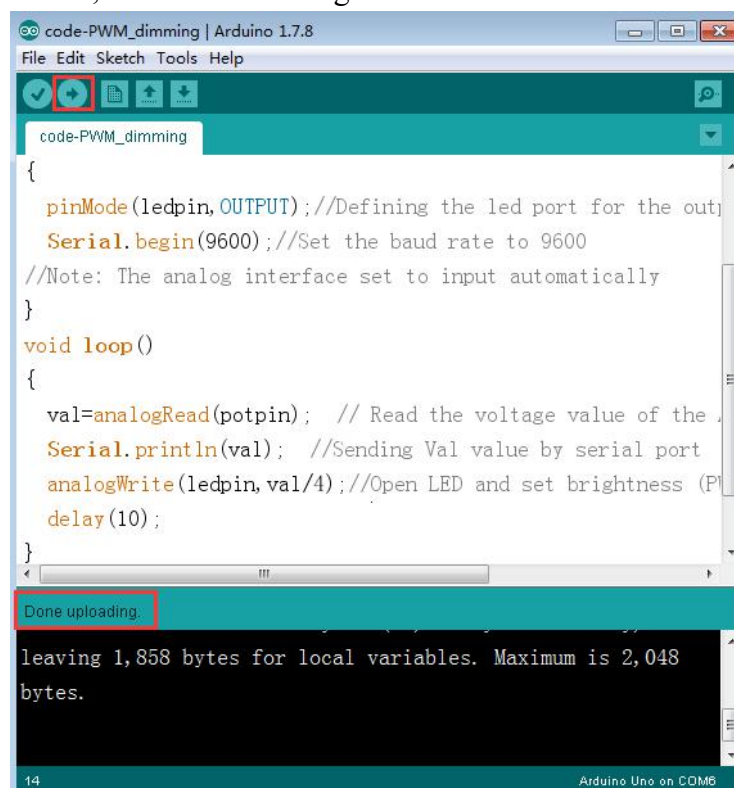


2. In the menu bar of Arduino IDE, we need to select **Tools** --- **Port** --- selecting the port that the serial number displayed by the device manager just now, as shown in the figure below. For example: COM6, as shown in the following figure.

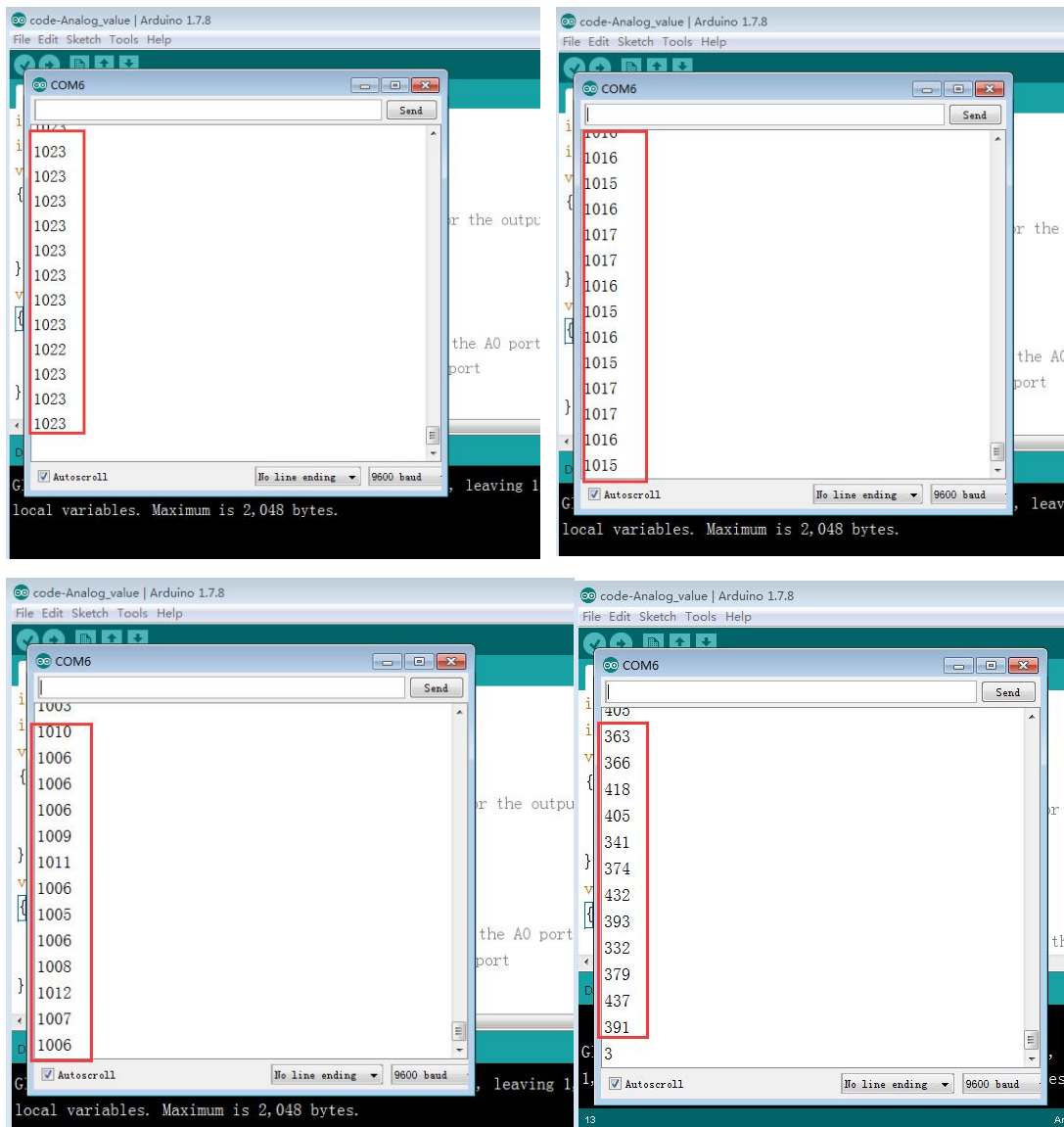




3. After the selection is completed, you need to click “→” under the menu bar to upload the program to the Arduino UNO board. When the word “**Done uploading**” appears in the lower left corner, the program has been successfully uploaded to the Arduino UNO board, as shown in the figure below.



4. After the program is uploaded. When we adjust the adjustable resistance, we will see the change in the brightness of the LED. If you turn on the serial port monitor at the same time, you can also see the change of the printed values.



The code of the experiment: