



Lesson 2 Controlling the Servo

In this lesson, we will learn how to control the Servo.

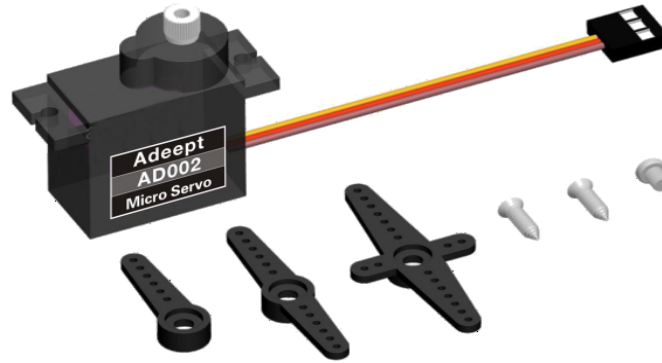
2.1 Components used in this course

Components	Quantity	Picture
Aadept Arm Drive Board	1	
Micro USB Cable	1	
Servo	1	

2.2 The introduction of the Servo

2.2.1 Servo

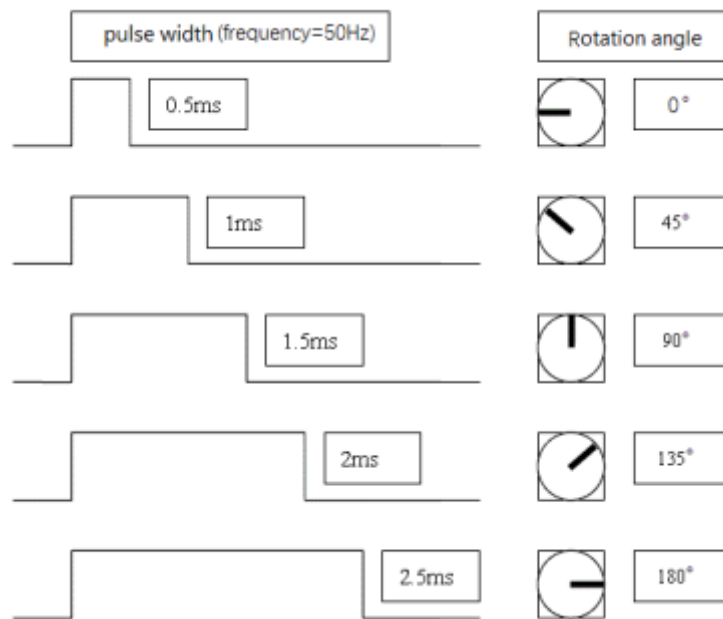
Servo motor refers to the engine that controls mechanical component operation in the servo system. It is a kind of auxiliary motor indirect transmission device. The servo motor is a gear motor that can rotate only 180 degrees. It is controlled by sending pulses from the microcontroller. These pulses tell the server where to move. The servo motor system includes housing, circuit board, non-core motor, gearing and position detection. Servo motor is shown in the figure:



2.2.2 The working principle of the Servo

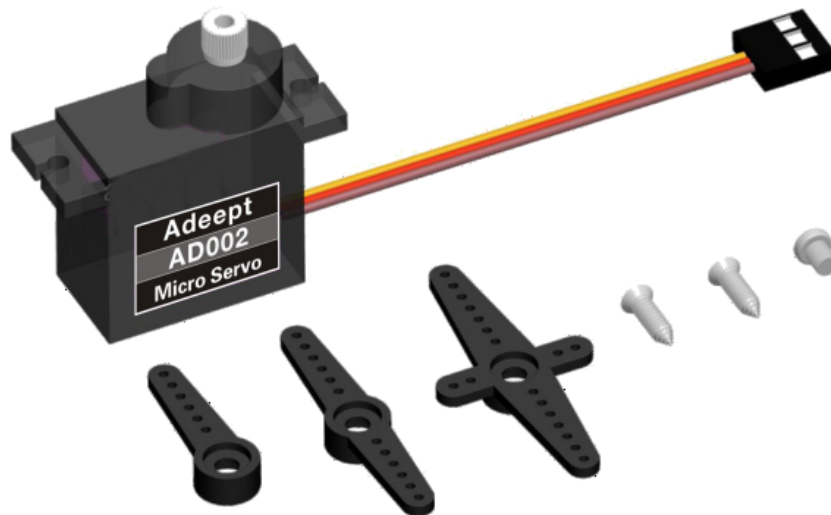
The servo mechanism is an automatic control system that enables the object's position, orientation, state and other output controlled quantities to follow arbitrary changes in the input target (or given value). The servo mainly depends on Pulse for location. Basically, it can be understood that the servo motor receives an impulse and rotates the angle corresponding to the impulse to realize displacement. Because the servo motor itself has the function of sending out pulses, the servo motor rotates every time at an angle, and a corresponding number of pulses will be sent out. In this way, the pulses received by the servo motor form a response, or a closed loop. In this way, the system will know how many pulses are sent to the servo motor and how many pulses are received. In this way, it is possible to precisely control the rotation of the motor, thereby achieving precise positioning.

Adeept Arm Drive Board sends a PWM signal to a servomotor, which is then processed by an IC on the circuit board to calculate the rotation direction of the drive motor, which is then transmitted through a reduction gear to the swing arm. At the same time, the position detector returns a position signal to determine whether the set position has been reached or not.



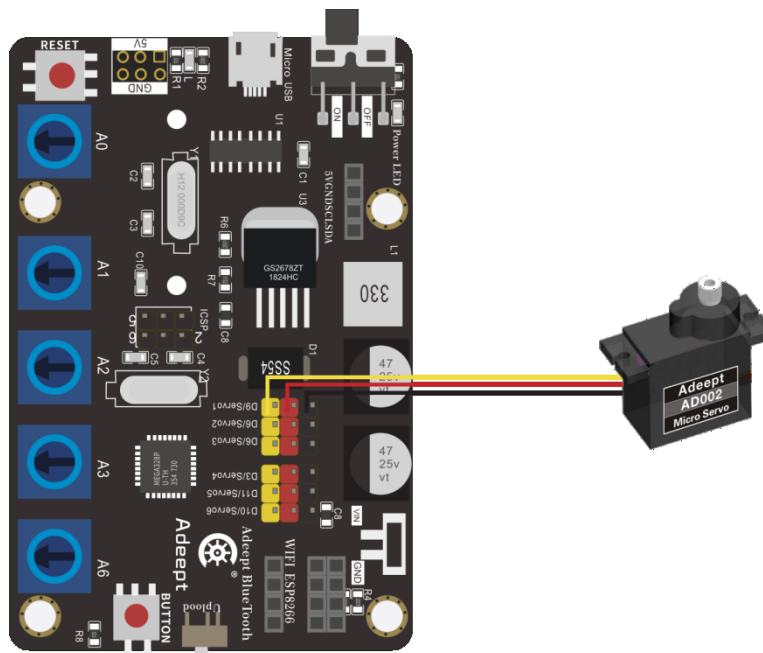
2.2.3 The principle of write () function

In the program, we use the write() function to control the rotation of the servo. For standard servos, the write() function will rotate the servo axis to the corresponding angular position. For the continuous rotation type of servo, the write() function can set the rotation speed of the servo (0 indicates that the servo rotates at full speed in one direction, 180 indicates that the servo rotates at full speed in another direction, and 90 indicates that the servo is stationary. The servo which is used this time is a standard servo.



2.3 Wiring diagram (Circuit diagram)

Connect Servo to the servo port on the Adeept Arm Drive Board, as shown below:



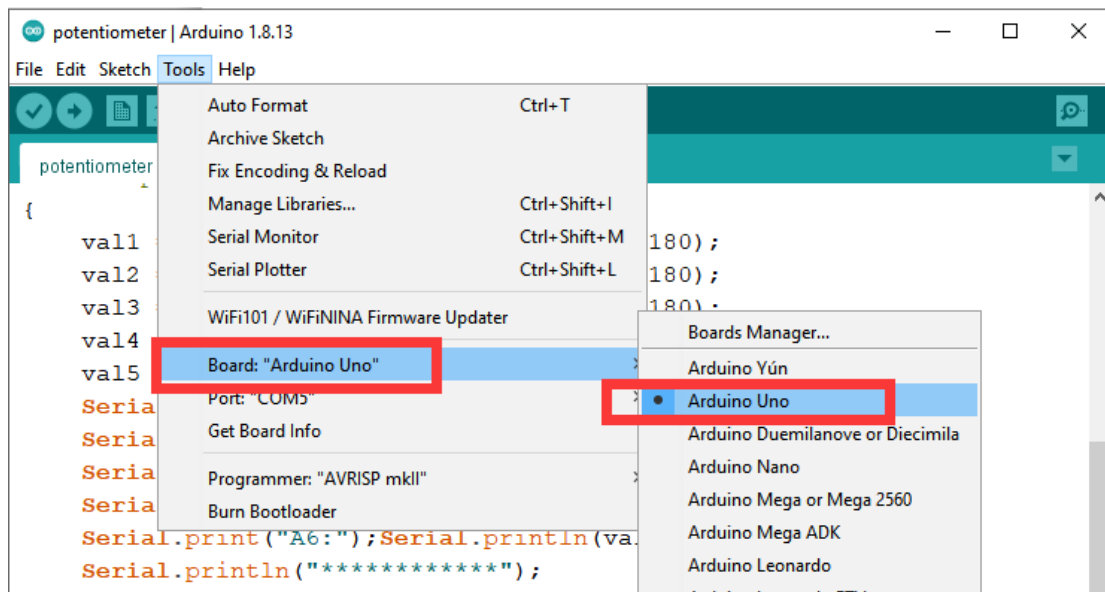
2.4 How to control Servo

2.4.1 Compile and run the code program of this course

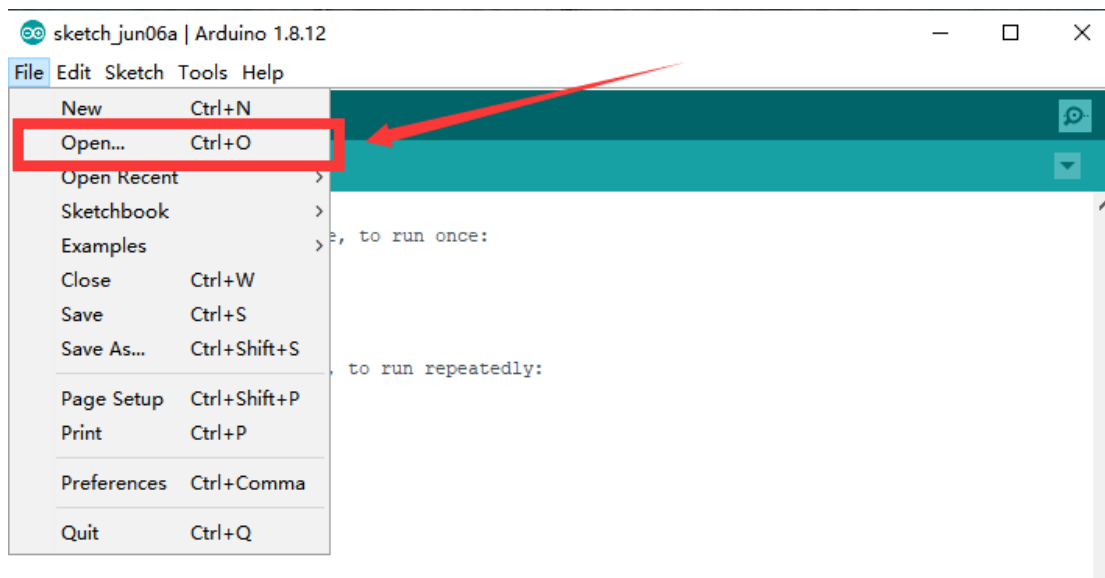
1. Open the Arduino IDE software, as shown below:



2. In the Tools toolbar, find Board and select Arduino Uno, as shown below:

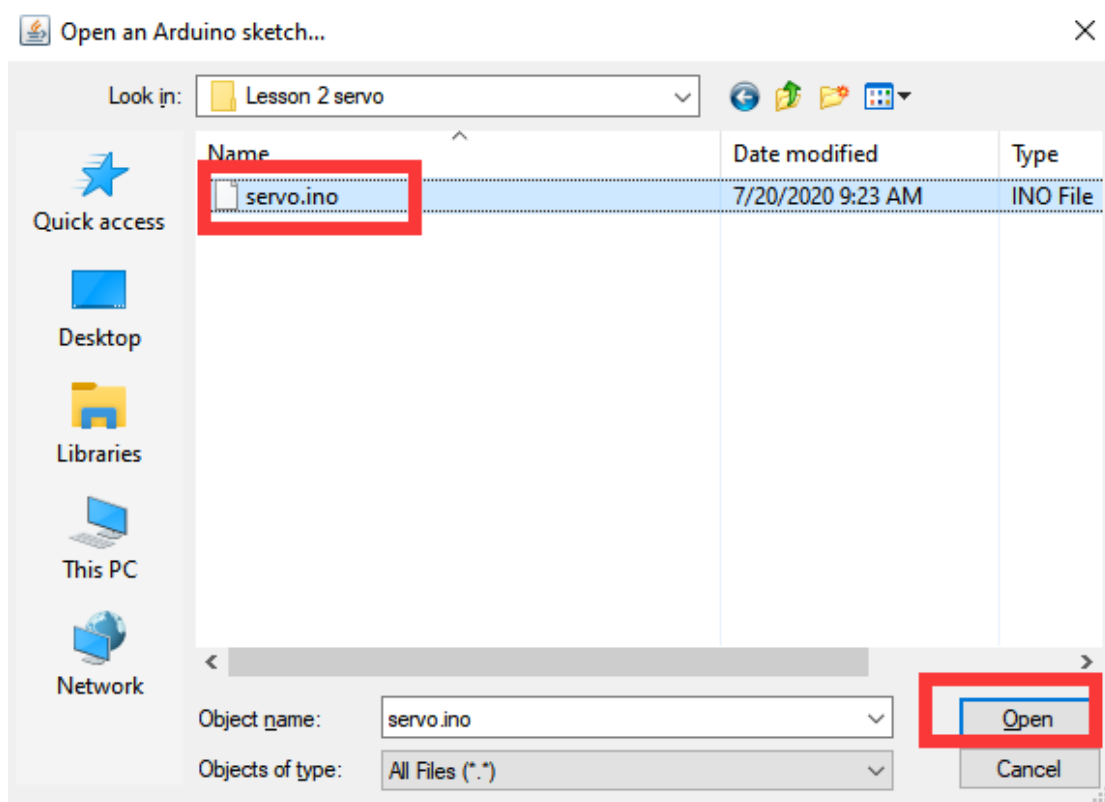



3. Click Open in the File drop-down menu:

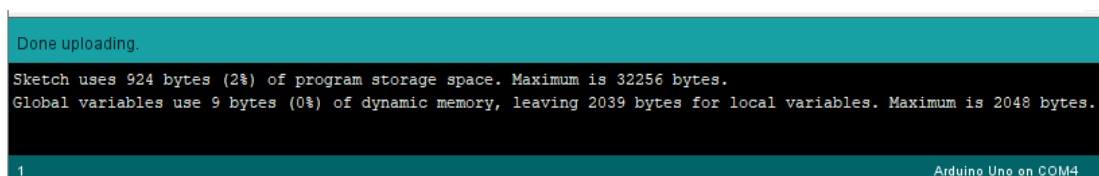


4. Find the folder AdeeptRoboticArmforArduinoV3_5 that we provide to the user. Open the folder 02 Course Code in it. Enter the Lesson 2 servo directory. Select

servo.ino. This file is the code program we need in this course. Then click Open.



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



6. After successfully running the program, you will observe the movement of the servo.

2.4.2 Learning the code program of this lesson

Create servo object to control a servo.

```
Servo myservo; //create servo object to control a servo
```

In the setup() function, attach the servo on pin 9 to servo object; back to 0 degrees;

wait for a second.

```
void setup()
{
  myservo.attach(9); //attachs the servo on pin 9 to servo object
  myservo.write(0); //back to 0 degrees
  delay(1000); //wait for a second
}
```

In the loop() function, respectively control Servo to turn to different angles.

```
void loop()
{
  myservo.write(180); //goes to 180 degrees
  delay(2000); //wait for a second

  myservo.write(90); //goes to 90 degrees
  delay(2000); //wait for a second.33

  myservo.write(0); //goes to 0 degrees |
  delay(2000); //wait for a second.33
}
```