# Lesson 11 Servo Neutral Debugging

In order to control the movement of the robot more accurately, you need to perform the neutral adjustment of the servo. The servo neutral debugging is performed on a GUI application and requires you to install the Python running environment.
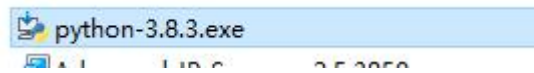
11.1 Downloading and installing Python

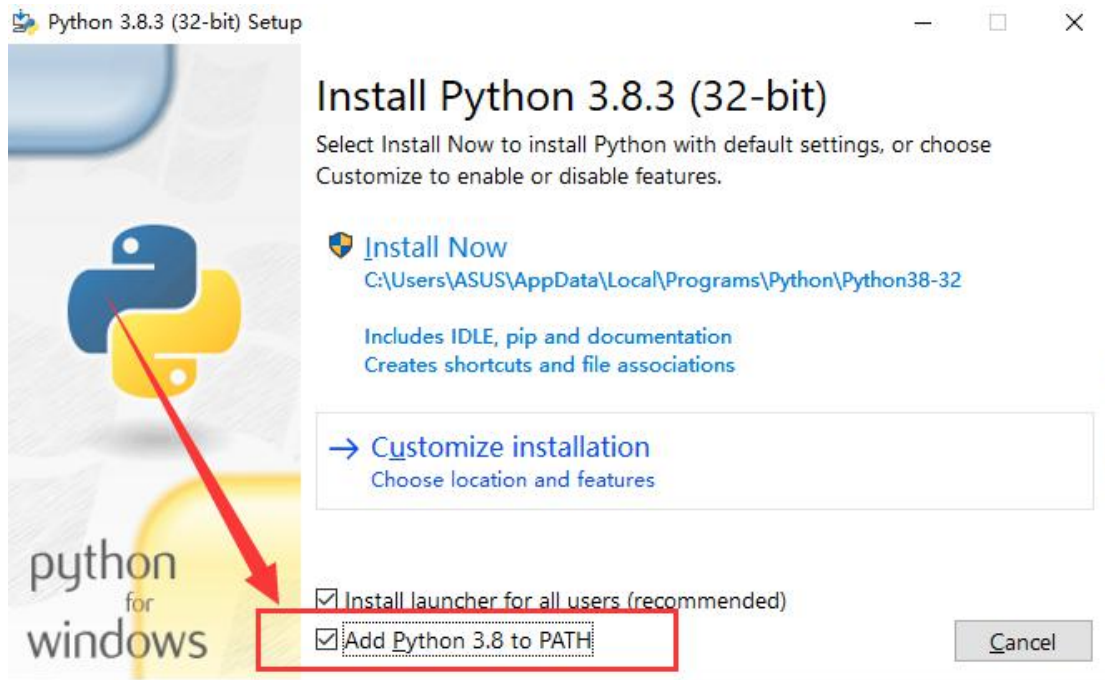(1) Log in to the official website by browser: https://www.python.org/downloads/
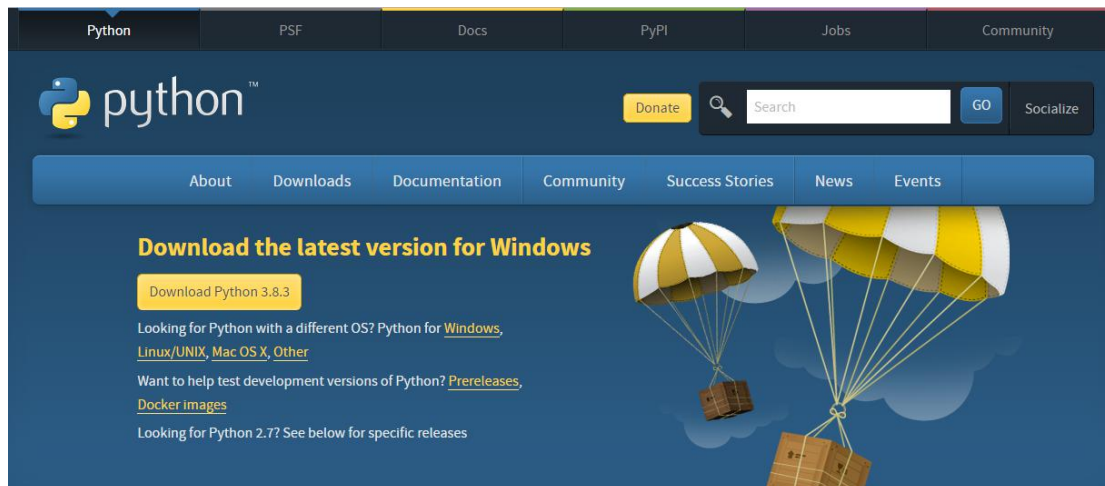
(2) Click the "Download Python 3.8.3" button to download and wait for the download to complete:
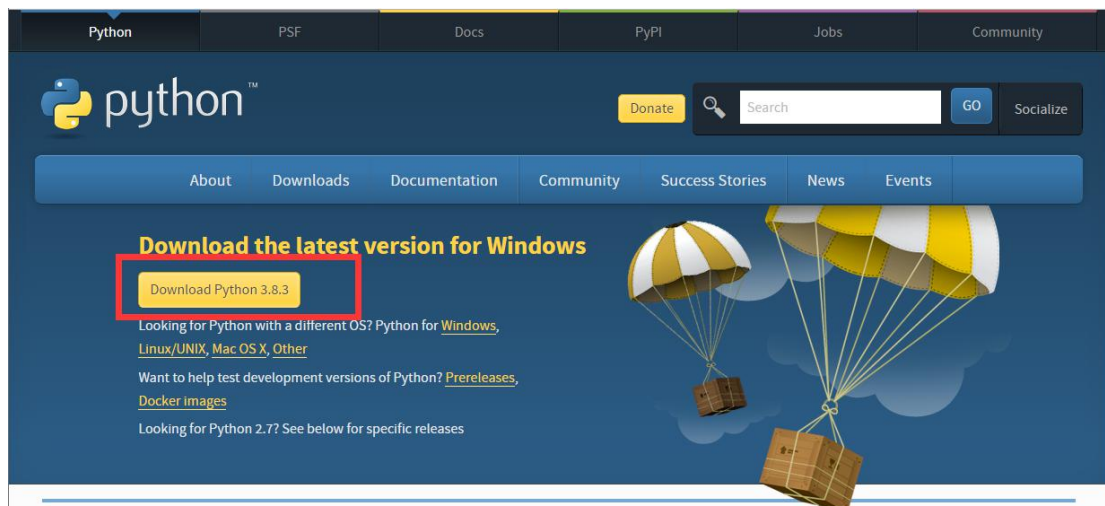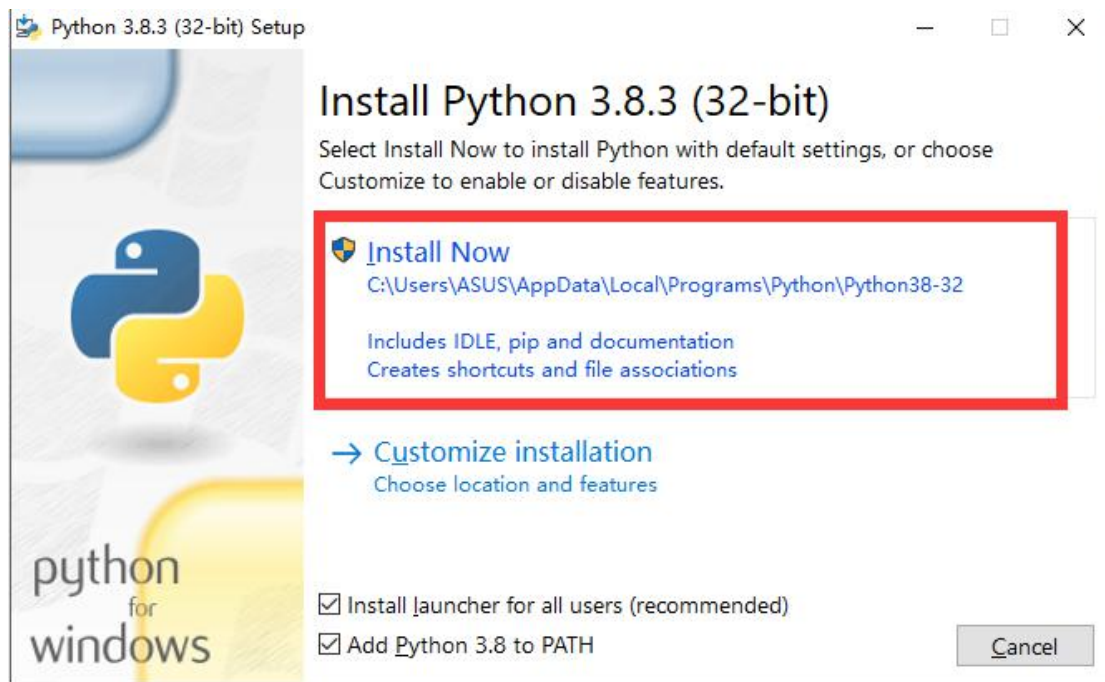
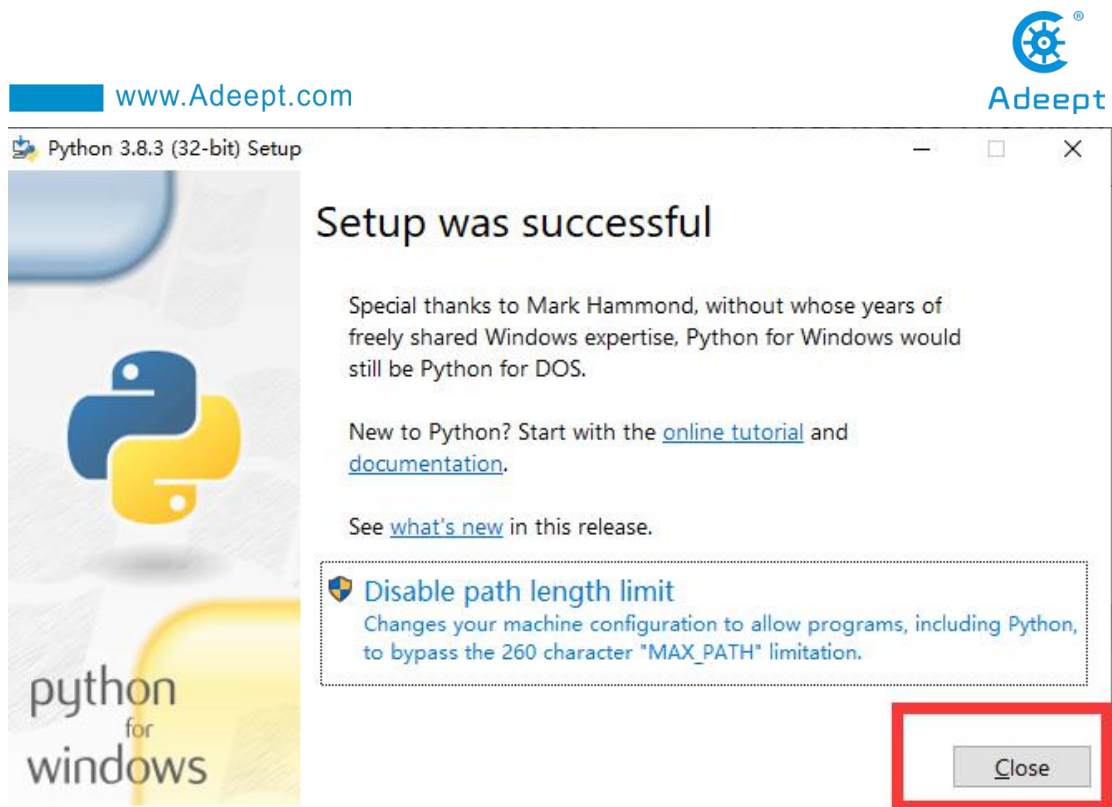(3) Open the downloaded file, double-click to open it to install:

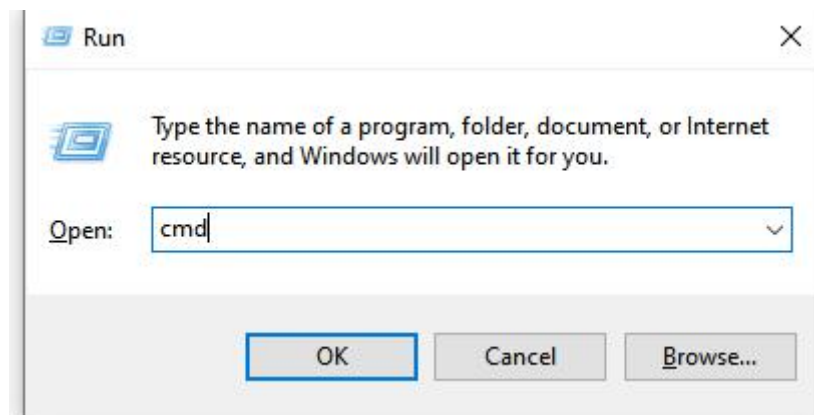(4) Select the "Add Python 3.8 to PATH" option:


(5) Then click "Install Now" to install.

(6) Wait for the Python installation to complete and click "Close" to close.

(7) Check whether Python is installed successfully. Press the shortcut key Win+R, then enter cmd in the run bar, click OK to open the command window:

(8) In the command line window, enter python, then press Enter, the version number checked is consistent with the version number downloaded and installed.
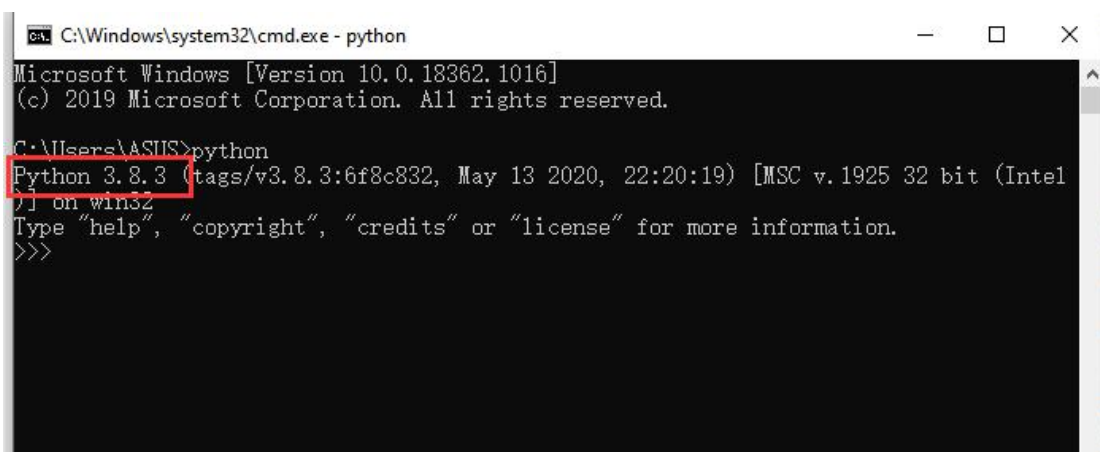
(9) Enter 1+1 to see if the correct result can be calculated.

11.2 Installing pySerial

pySerial encapsulates the serial communication module,supporting Linux, Windows, BSD (may support all operating systems that support POSIX), Jython (Java) and IconPython (.NET and Mono). The pyserial module encapsulates access to the serial port.The port number starts from 0 by default.There is no need to know the port name in the program. APIs like file reading and writing, read and write (readline, etc. are also supported), support binary transmission, no null elimination, no cr-lf conversion. All programs are completed by Python In addition to the standard library, it does not depend on other packages, except pywin32 (windows), JavaComm (Jython). POSIX (Linux, BSD) only depends on the Python standard library.APIs like file read and write, read, write (readline, etc. are also supported), support binary transmission, no null elimination, no cr-lf conversion, all programs are all done by Python, and do not depend on other packages except the standard library, except pywin32 (windows), JavaComm (Jython). POSIX (Linux, BSD) only depends on the Python standard library.

(1) Press Win+R shortcut key to open CMD under Windows 10:
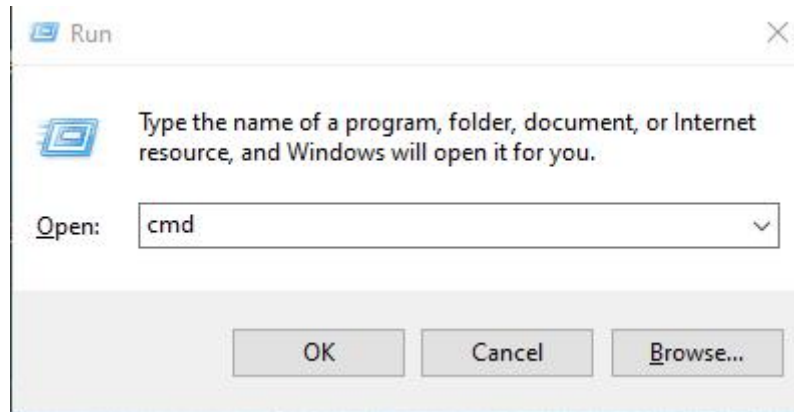
(2) Click "OK":
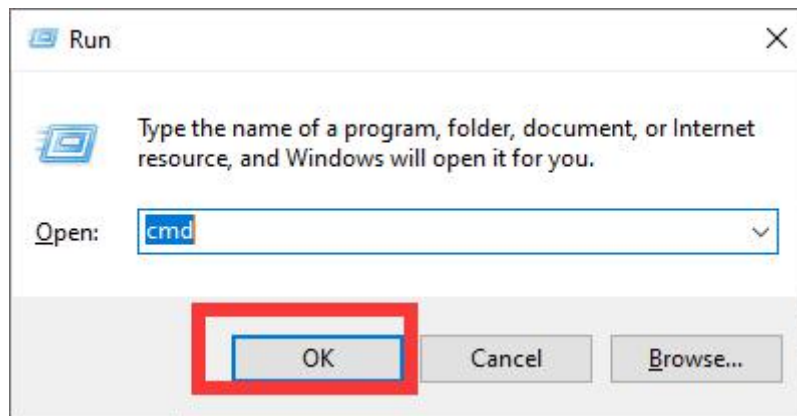
(3) Enter the command in the window:

pip install pyserial

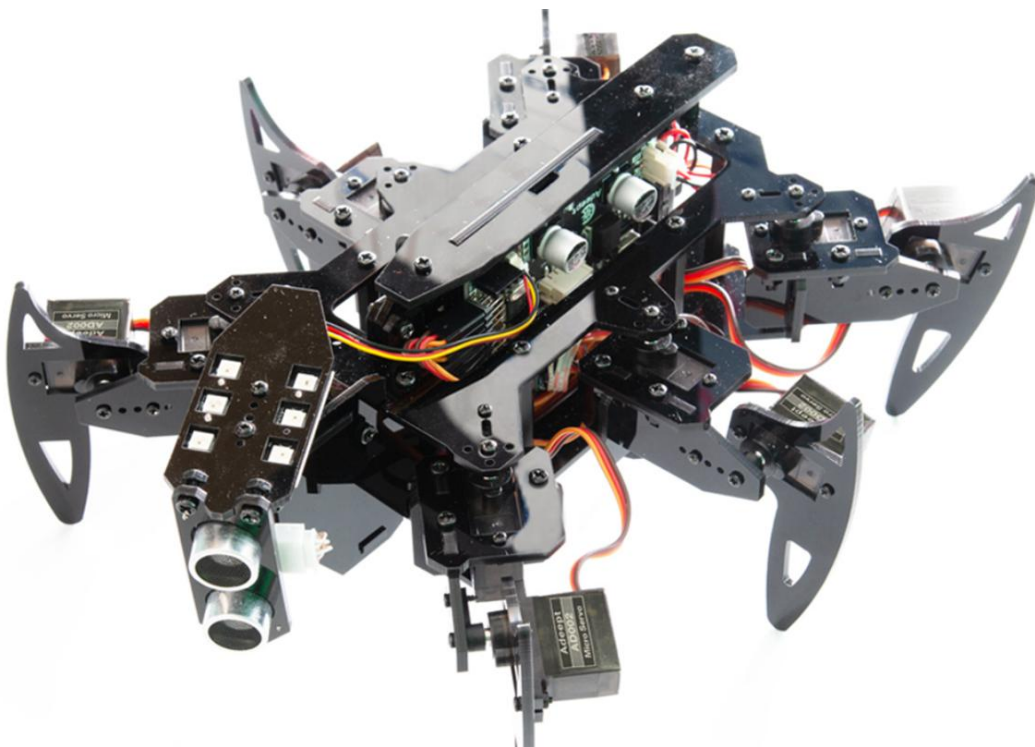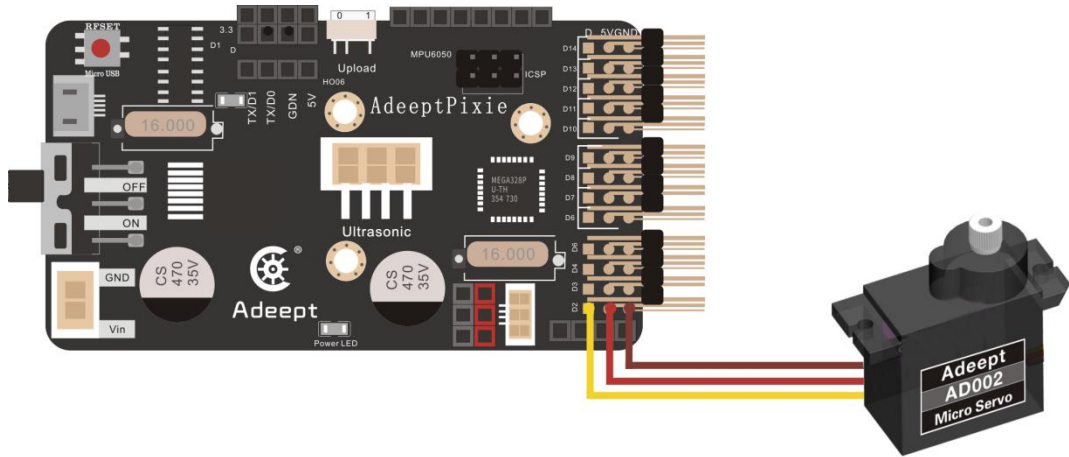Press the Enter and wait for the installation to complete.

11.3 Wiring diagram (circuit diagram)

In this lesson, you need to connect the 13 servos of the robot correctly on the basis of Lesson 10. Connect the AD002 servo cable to the Servo interface of the AdeeptPixie driver board, as shown in the following figure:
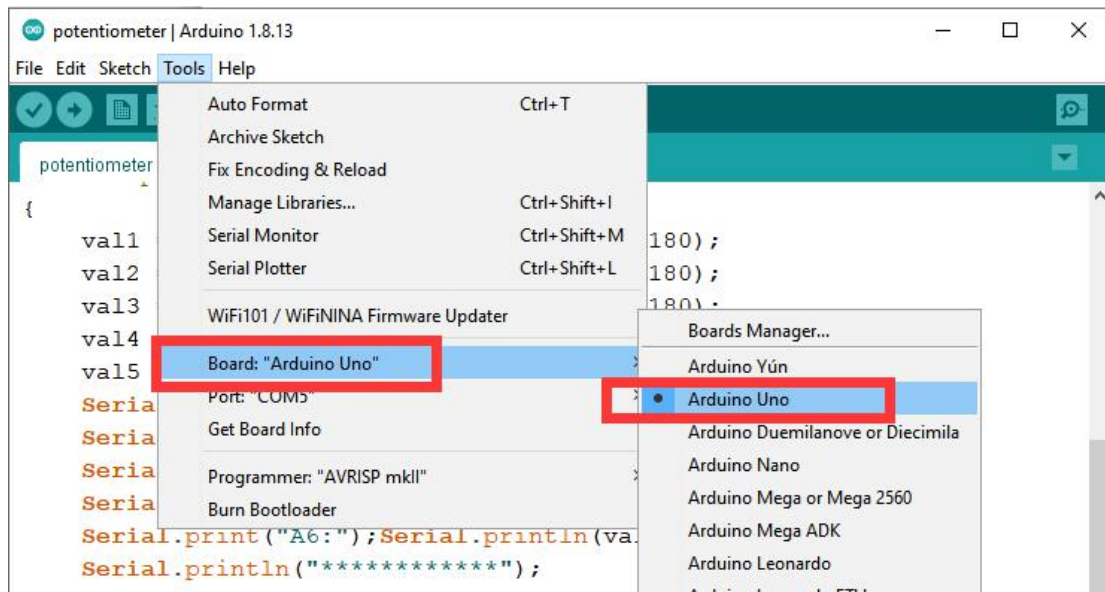
11.4 Servo 90° debugging

You need to prepare all the servos in the robot kit. First, brush a debug program into the servos to turn all the servos to the 90°position.
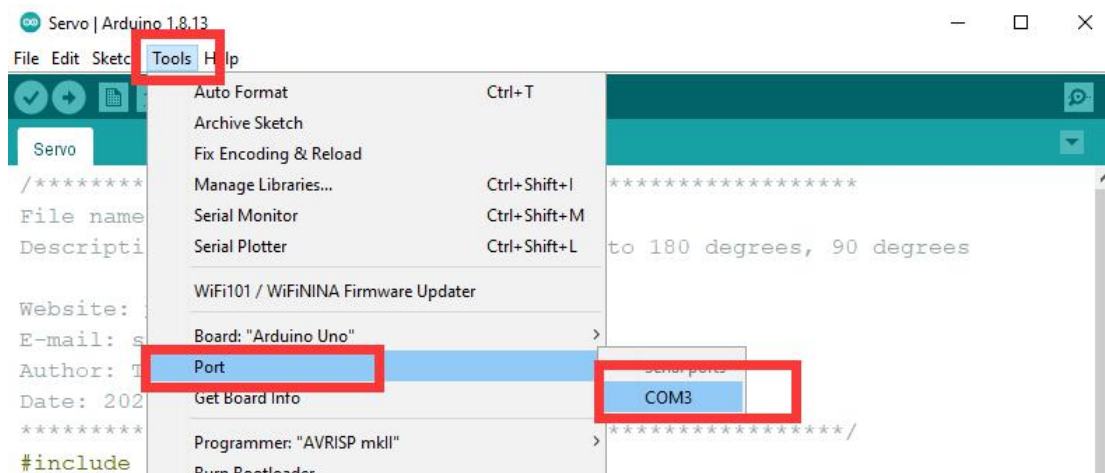
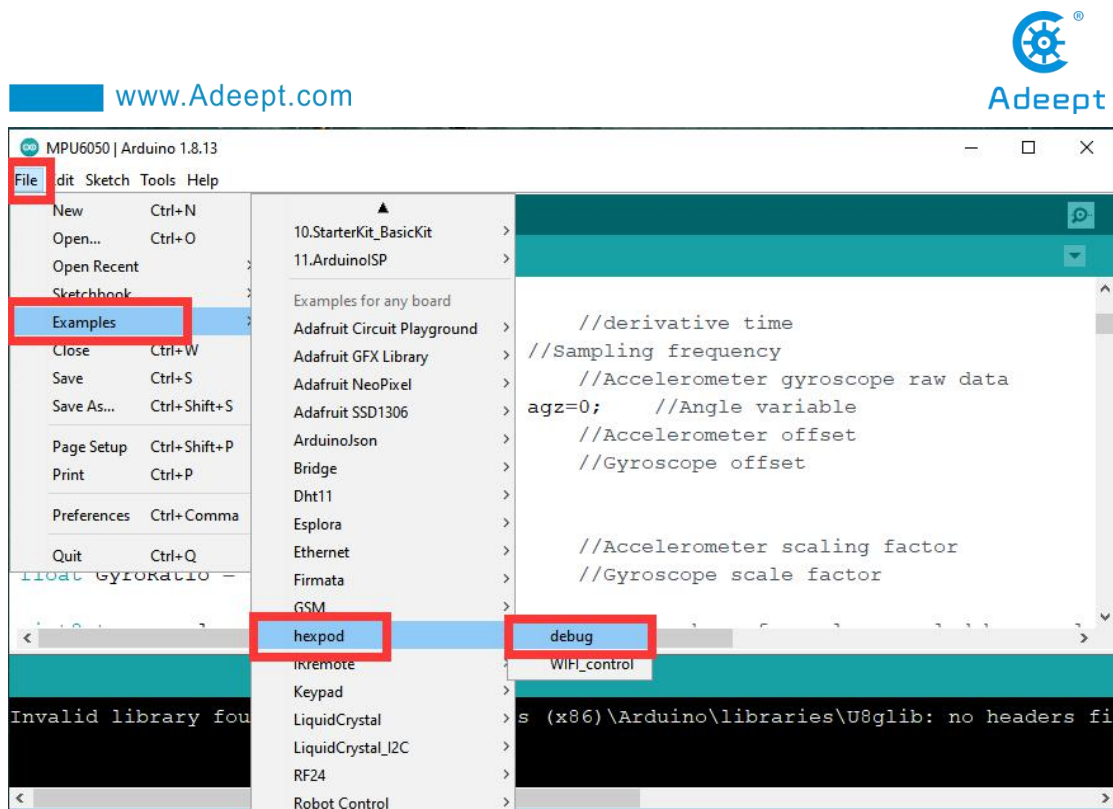1. First, open the Arduino IDE software, as shown below:

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


3. Click "Tools" and select the port number of the connected AdeeptPixie Drive Board in "Port",you have to remember the Port,we will use it later, as shown in the figure below:

4. Click Examples->hexpod->debug under the File drop-down menu:

5. Then a debug program will be opened. You need to turn the "Upload 0 RUN 1" switch on the AdeeptPixie driver board to the 0 position. You need to click to upload the code program to the driver board. After the upload is successful, a text prompt appears in the lower left corner: Done uploading.
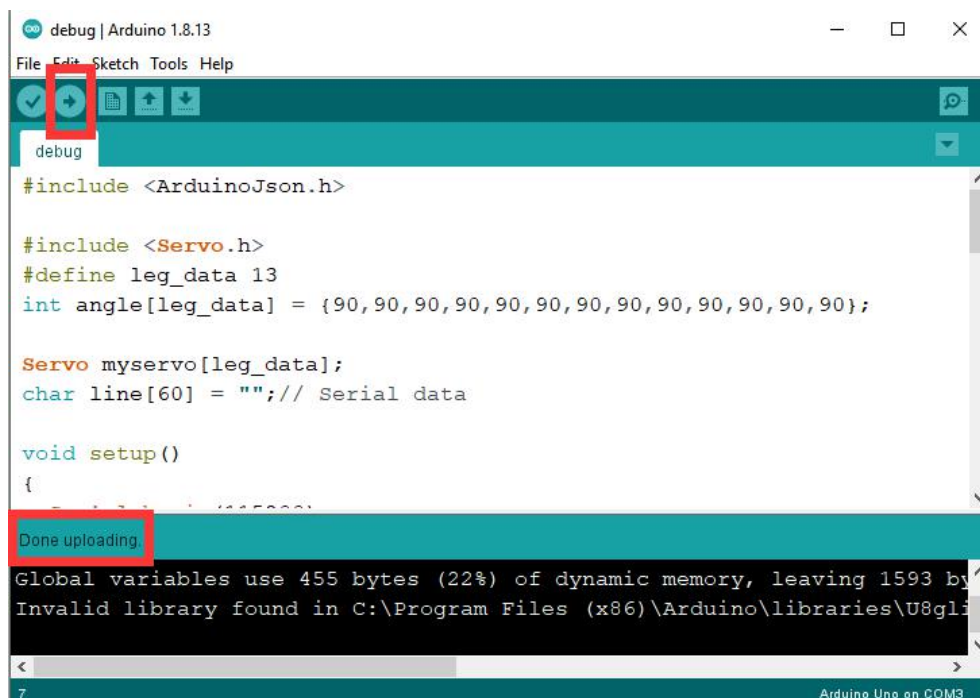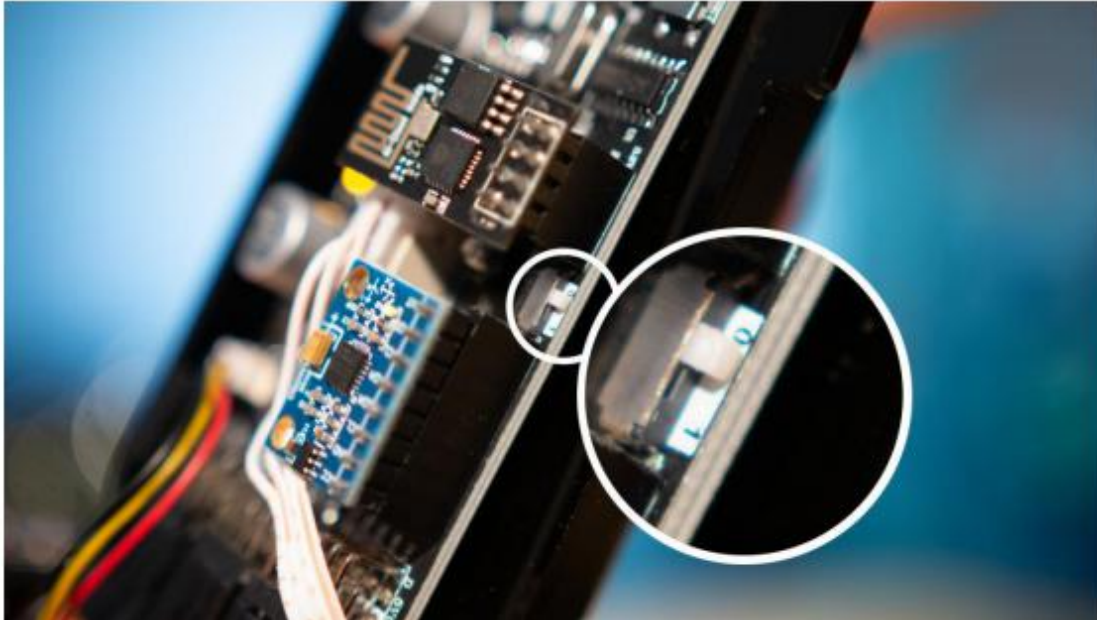

【Pay attention】

If you have already installed the ESP8266 module on your AdeeptPixie driver

board when you proceed to step 5, then you need to flip the "Upload 0 RUN 1" switch on the AdeeptPixie driver board to the 0 position, as shown in the figure below. When you upload the program successfully, you must turn the switch to the 1 position.

6.After upload is complete, you must close the Arduino IDE software.。

11.5 Neutral debugging of servo

1. On the desktop, right-click Arduino to open the file directory where you installed Arduino:

2. Open the C:\Program Files (x86)\Arduino directory and open the libraries file:
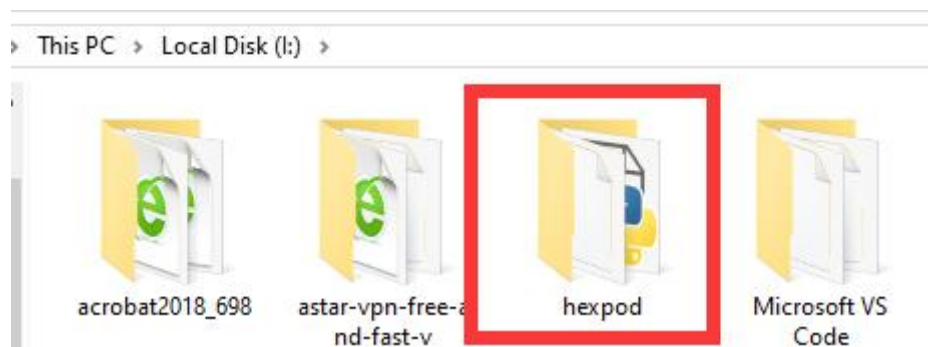
Name	Date modified	Type	Size
drivers	7/1/2020 6:10 PM	File folder	
examples	7/1/2020 6:10 PM	File folder	
hardware	9/1/2020 10:01 AM	File folder	
java	7/1/2020 6:10 PM	File folder	
lib	7/1/2020 6:10 PM	File folder	
libraries	8/31/2020 2:13 PM	File folder	
reference	7/1/2020 6:11 PM	File folder	
tools	7/1/2020 6:11 PM	File folder	
tools-builder	7/1/2020 6:11 PM	File folder	
arduino.exe	6/16/2020 5:44 PM	Application	72 KB
arduino.l4j.ini	6/16/2020 5:44 PM	Configuration sett...	1 KB
arduino_debug.exe	6/16/2020 5:44 PM	Application	69 KB
arduino_debug.l4j.ini	6/16/2020 5:44 PM	Configuration sett...	1 KB
arduino-builder.exe	6/16/2020 5:44 PM	Application	18,137 KB
libusb0.dll	6/16/2020 5:44 PM	Application exten...	43 KB
msvcp100.dll	6/16/2020 5:44 PM	Application exten...	412 KB
msvcr100.dll	6/16/2020 5:44 PM	Application exten...	753 KB
revisions.txt	6/16/2020 5:44 PM	Text Document	94 KB
uninstall.exe	7/1/2020 6:11 PM	Application	404 KB
wrapper-manifest.xml	6/16/2020 5:44 PM	XML Document	1 KB

3. Find the hexpod file. Since the installation location of the Arduino IDE installed in our demo course is on the C drive, it needs permission to modify the data. Therefore, you need to copy the hexpod file to another drive letter, such as copy it to the I drive:

Adafruit_Circuit_Playground	7/1/2020 6:11 PM	File folder
Adafruit_GFX_Library	8/4/2020 10:11 AM	File folder
Adafruit_NeoPixel	7/1/2020 6:14 PM	File folder
Adafruit_SSD1306	8/4/2020 10:11 AM	File folder
ArduinoJson	7/7/2020 3:23 PM	File folder
Bridge	7/1/2020 6:11 PM	File folder
Dht11	7/7/2020 3:23 PM	File folder
Esplora	7/1/2020 6:11 PM	File folder
Ethernet	7/1/2020 6:11 PM	File folder
Firmata	7/1/2020 6:11 PM	File folder
GSM	7/1/2020 6:11 PM	File folder
hexpod	8/31/2020 2:13 PM	File folder
IRremote	7/7/2020 3:23 PM	File folder
Keyboard	7/1/2020 6:11 PM	File folder

4. Open the hexpod file copied to the I disk directory, double-click to open servosGUI.py:
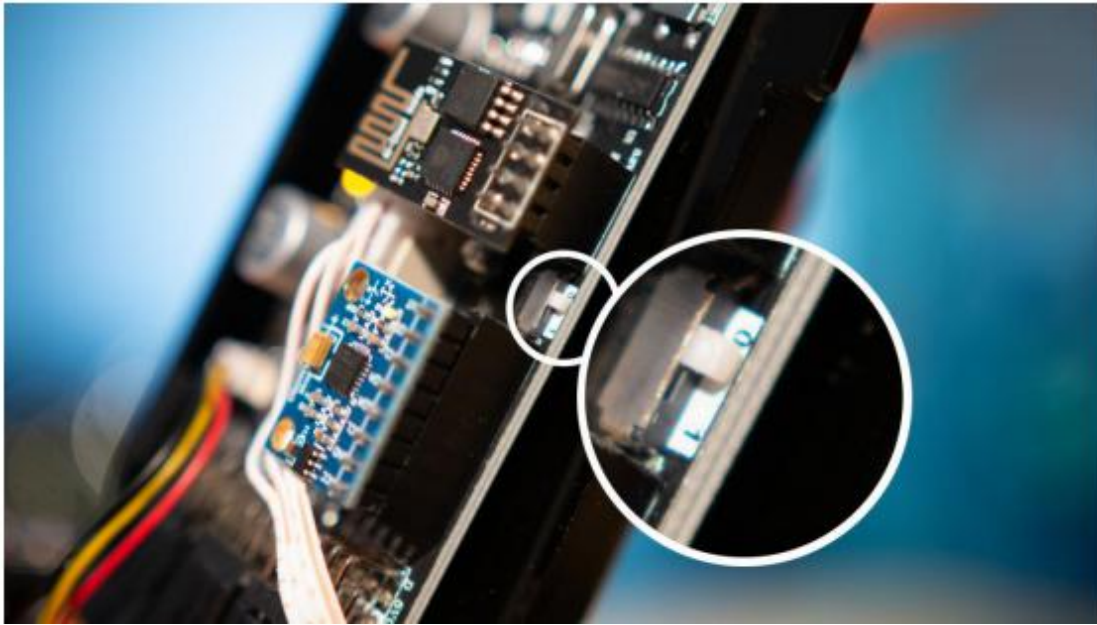

(5) The interface after opening is as follows:
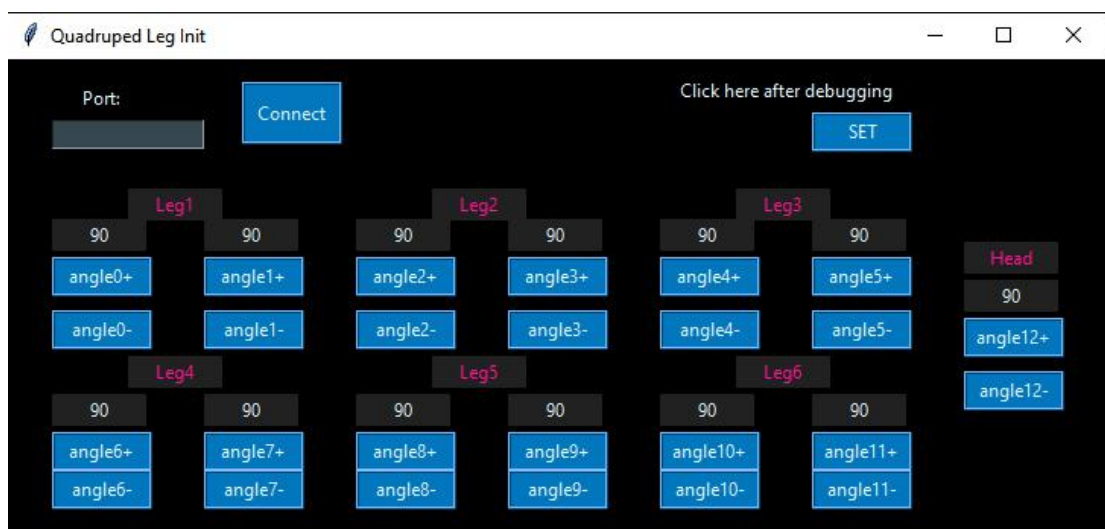
【attention】:

Turn the "Upload 0 RUN 1" switch on the AdeeptPixie drive board to the 0 position, as shown in the figure below:

(6) In the GUI control interface, you need to enter the port number COM3 you remembered in the third step of "11.4 Servo 90° Debugging" in the Port (this port number is different), then click Connect, after successful connection, "COM3: Succes" will be prompted in the upper left corner.
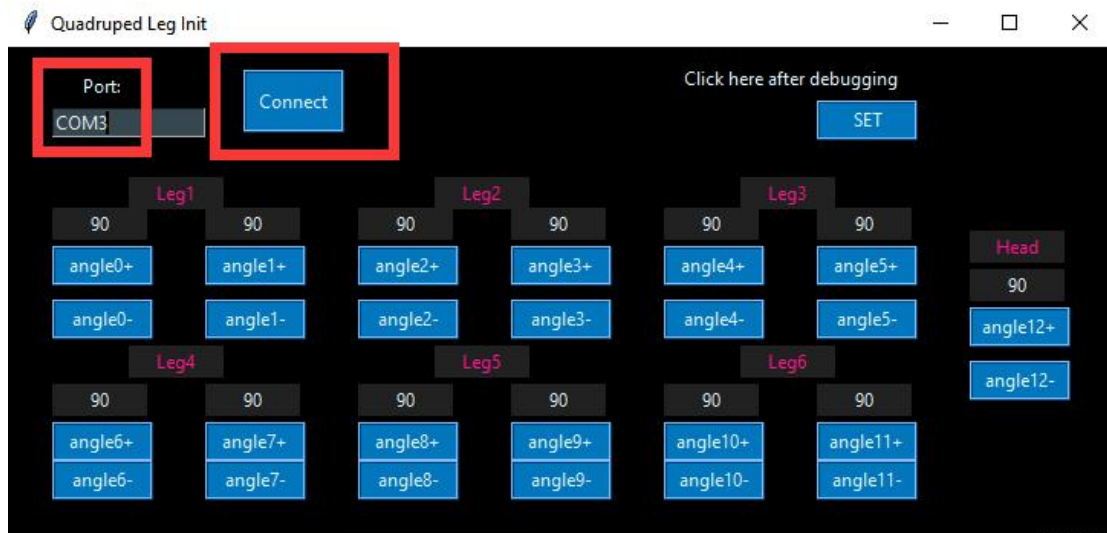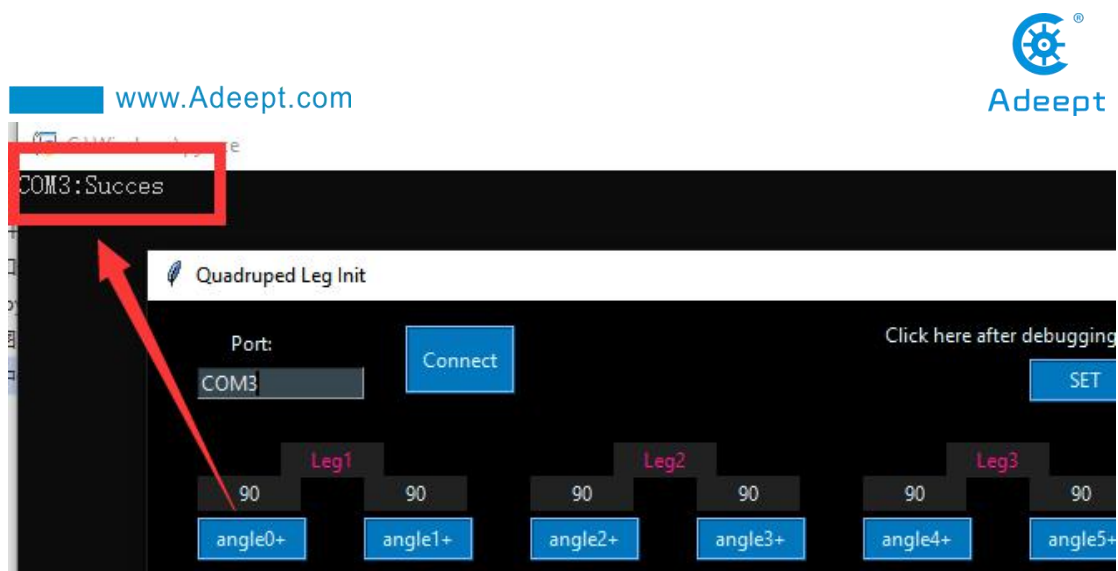
【Pay attention】:

1. If there is no prompt "COM3: Succes", it means that the recognition of the com port has failed. Please plug in the USB data cable again to restart the robot, and then click Connect repeatedly.

2. After you enter COM3, if the following situation occurs, you need to turn the "Upload 0 RUN 1" switch on the AdeeptPixie driver board to the 0 position, and then try to control again.


(7) The figure below is a schematic diagram of the servo structure of a robot. This figure can help you to debug the servo in the middle.
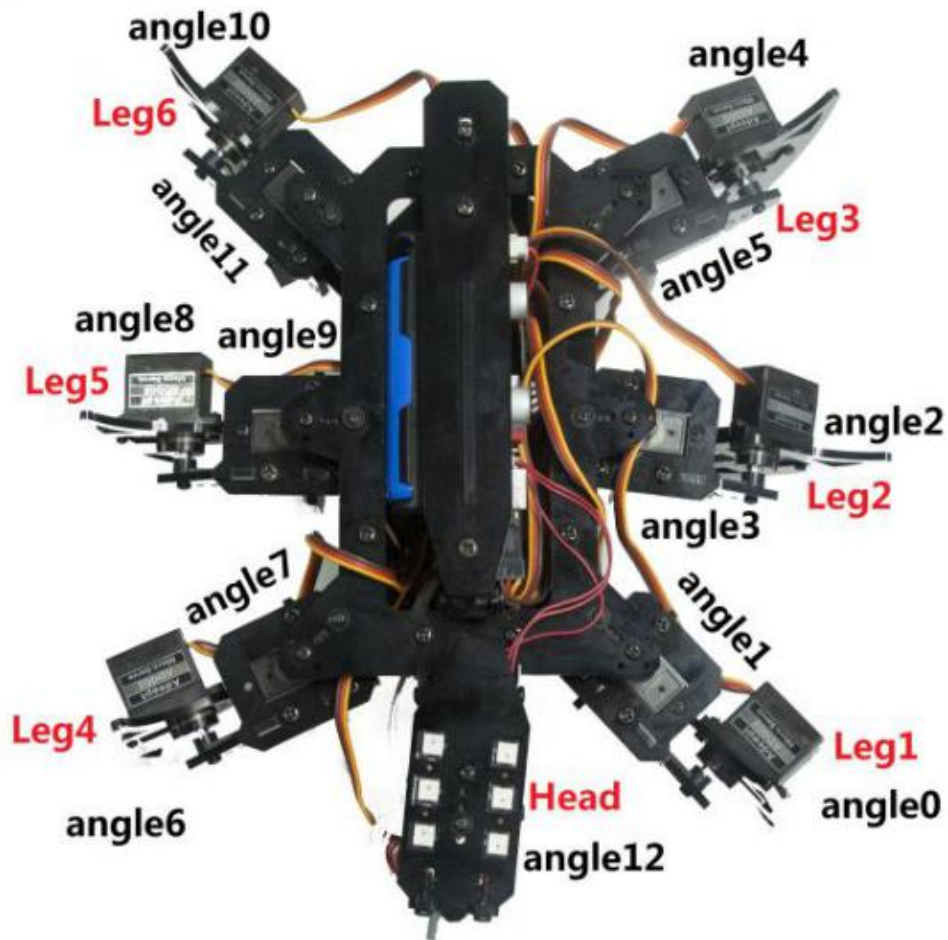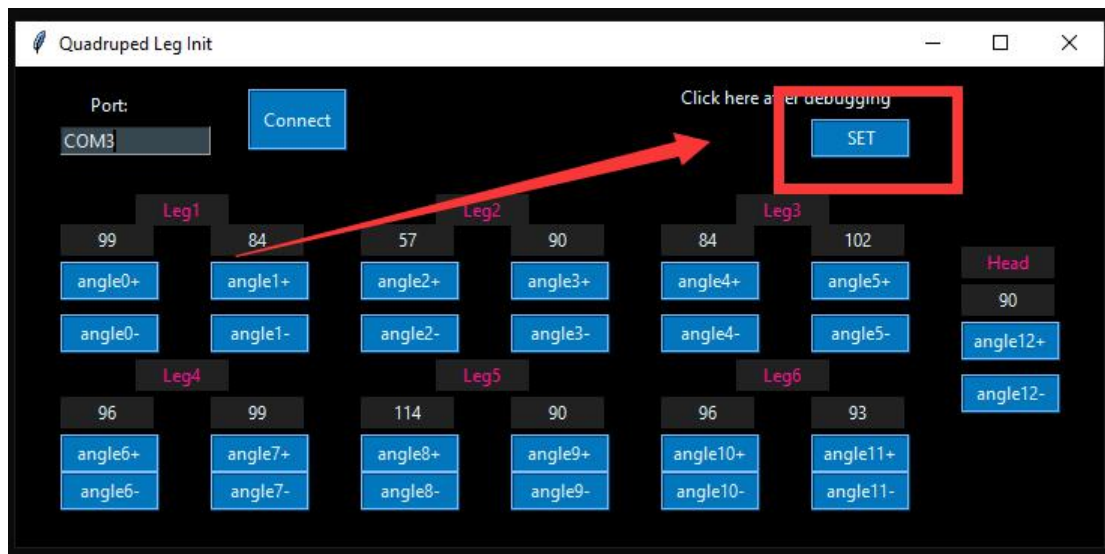
(8) In the red area in the figure below, there are two debugging function areas under Leg1: angle0+ and angle1+, corresponding to the angle0 and angle1 servos in the robot Leg1 servo structure. You can debug the servo by clicking the corresponding button.
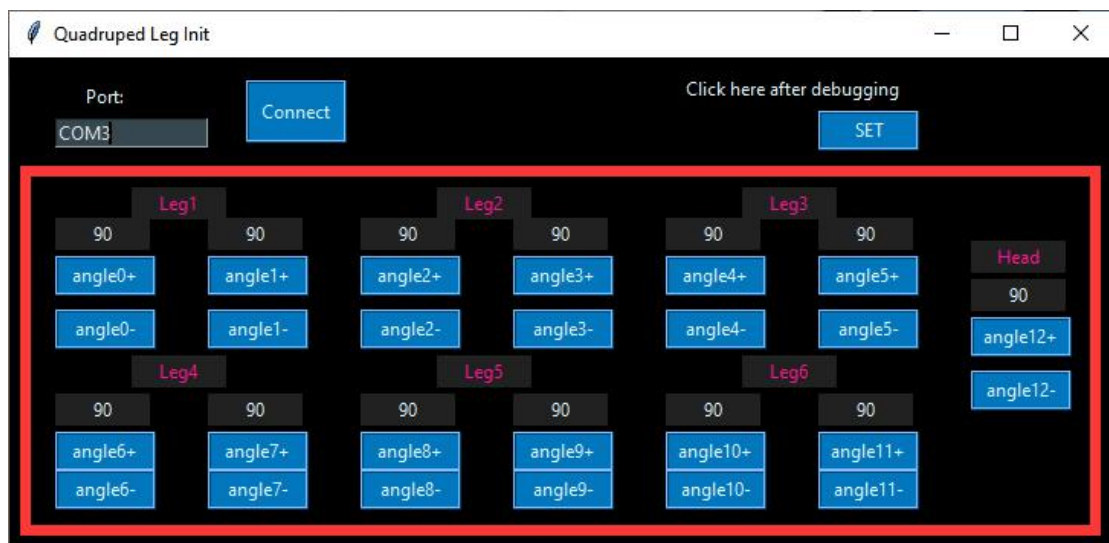
(9) The mid-position debugging of the servo is to adjust the 6 legs of the robot to be perpendicular to the ground and parallel on the same horizontal straight line, as shown in the lines A, B, and C in the following figure.
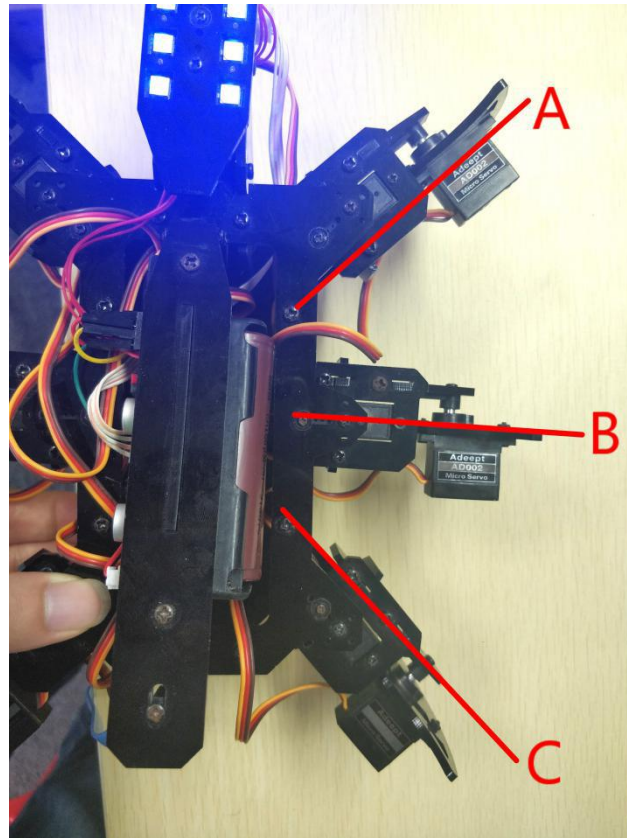

(10) The figure below is the mid-position debugging angle of the servo of our course demonstration robot. After debugging all the servos to a suitable angle, click the button [SET] to save the initial angle of the robot's servo. When the robot is turned on next time, the robot will stand at the angle of this servo.

The servo angle data saved by clicking the button [SET] is stored in this file:
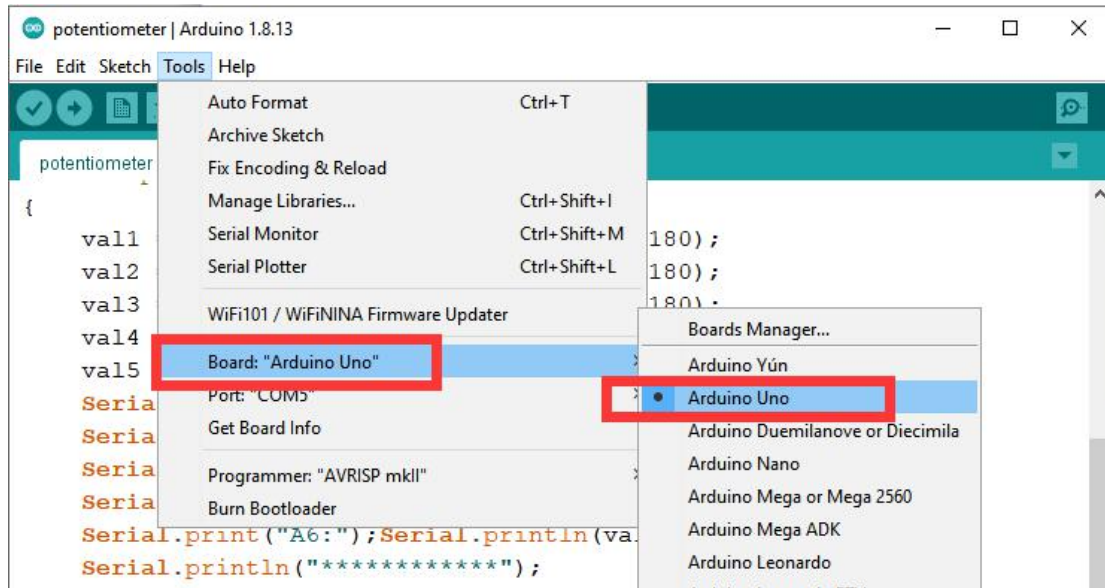

(11) Copy the debug hexpod file in the I disk again to the library file directory where you installed the Arduino IDE, as shown in the figure below:
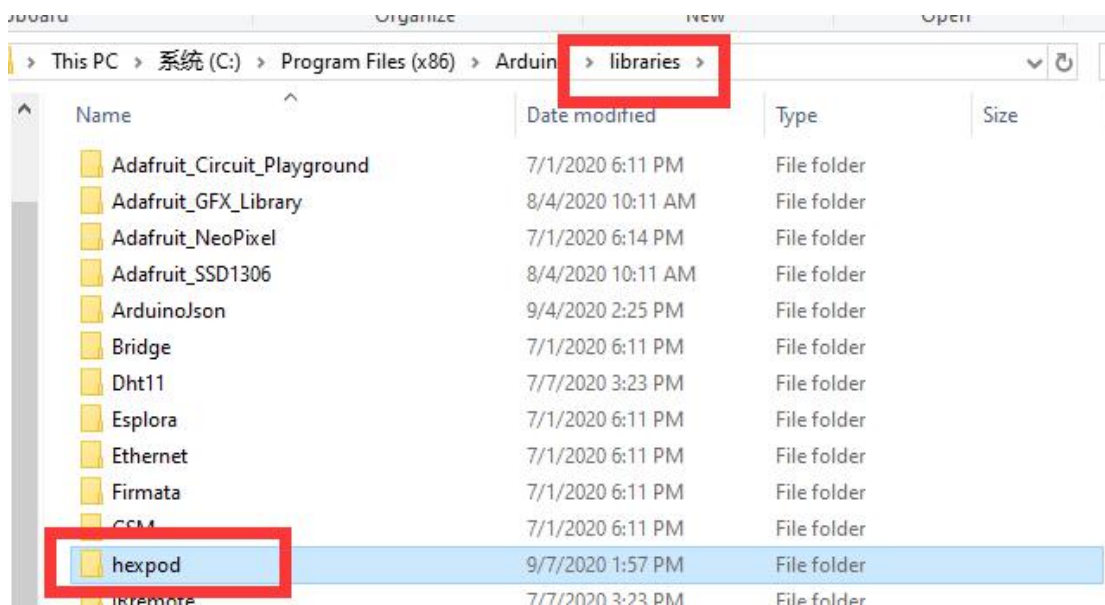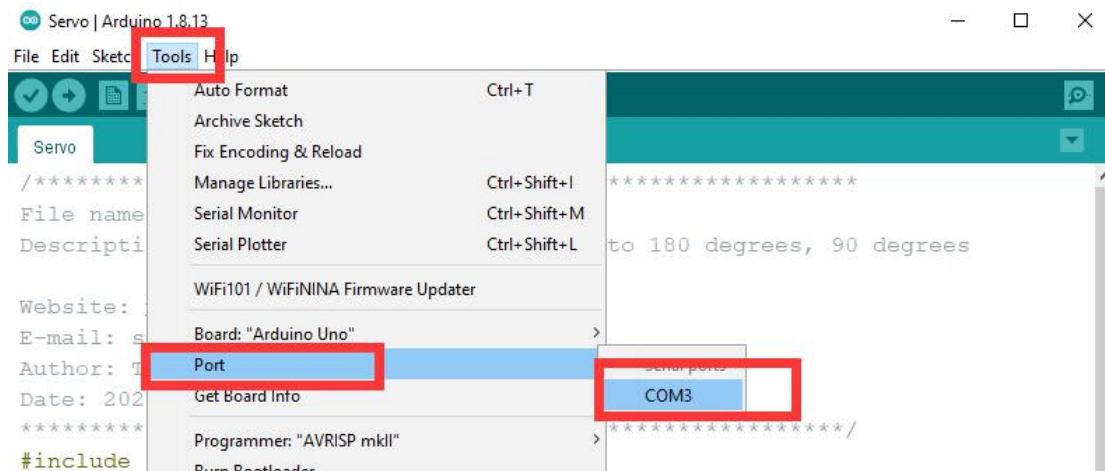

(12) First, open the Arduino IDE software, as shown below:

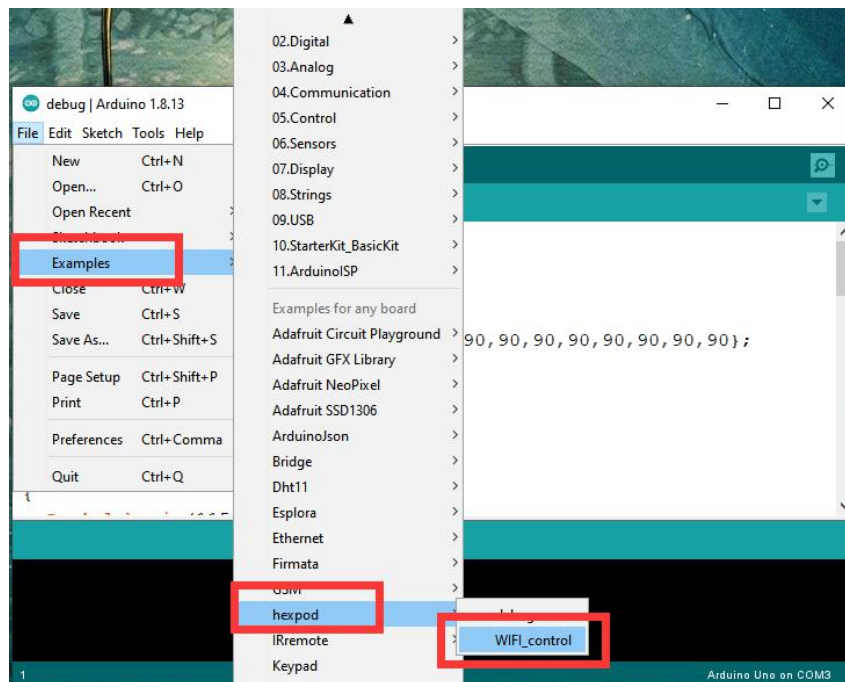(13) In the Tools toolbar, find Board and select Arduino Uno, as shown below:

(14) In the Tools toolbar, find Port and select the port number of the AdeeptPixie driver board, as shown below:


(15) Click Examples->hexpod->WIFI_control under the File drop-down menu:

(16) Then a WIFI_control program will be opened, your AdeeptPixie driver board has already installed the ESP8266 module, then you need to flip the "Upload 0 RUN 1" switch on the AdeeptPixie driver board to the 0 position, then you click to upload the code program to the driver board. After the upload is successful, a text prompt appears in the lower left corner: Done uploading.
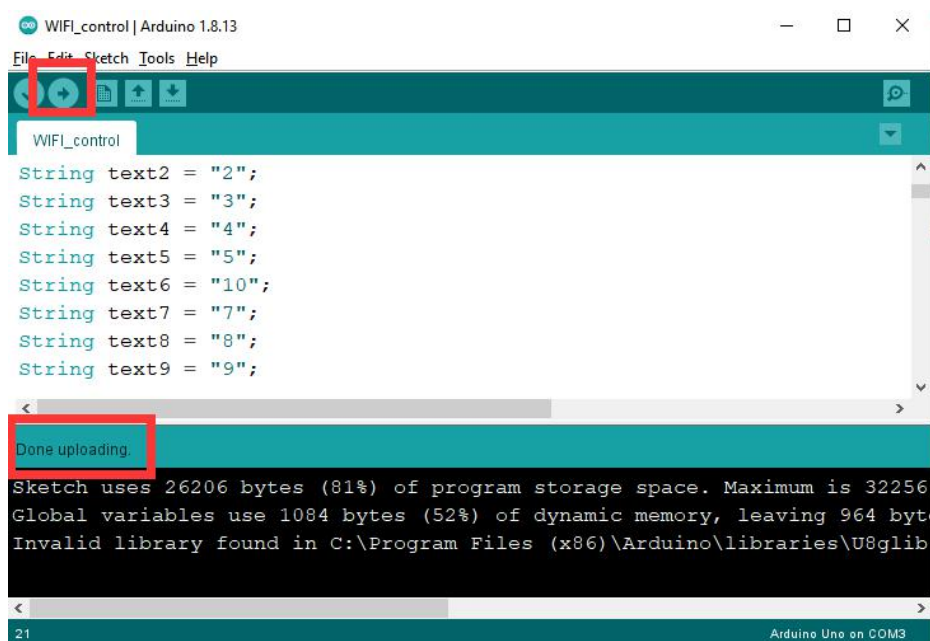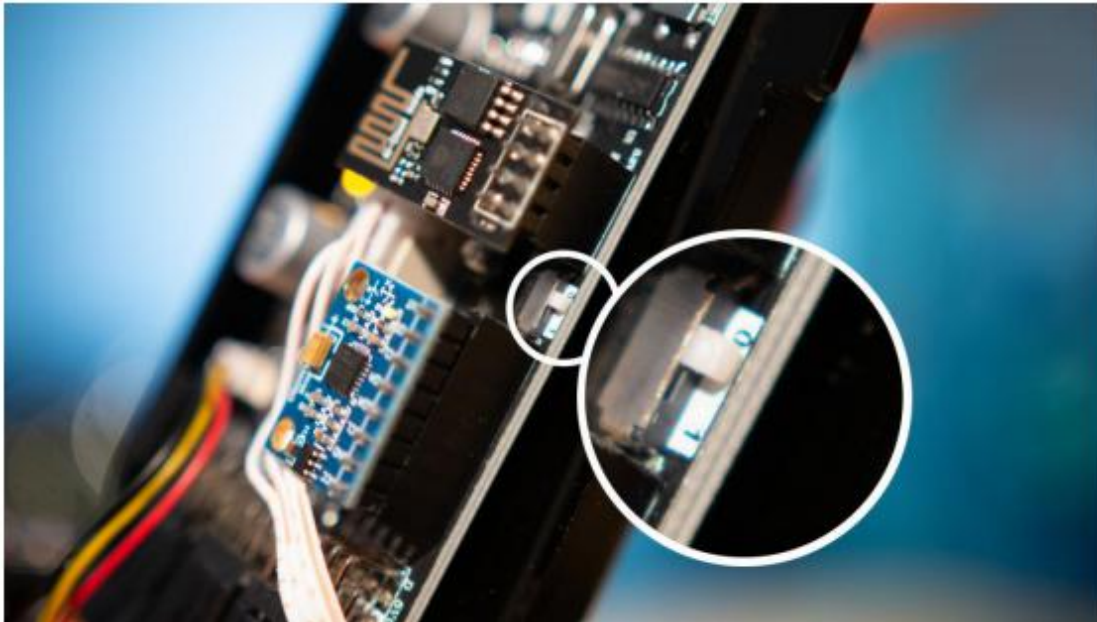

【Pay attention】

If you have already installed the ESP8266 module on your AdeeptPixie driver

board when you proceed to step 5, then you need to flip the "Upload 0 RUN 1" switch on the AdeeptPixie driver board to the 0 position, as shown in the figure below. When you upload the program successfully, you must turn the switch to the 1 position.

Press the reset button again. At this time, the USB cable does not need to be connected to the robot.
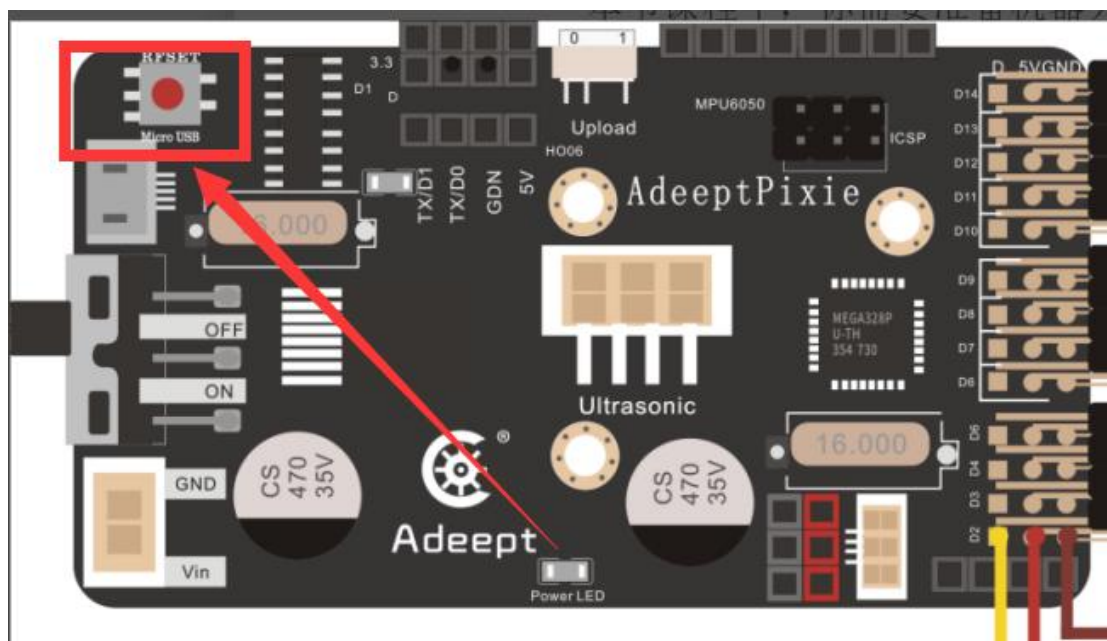
(17) At this time, the mid-position debugging of the servo has been completed. You can turn off the power of the robot, and then restart the robot. You will observe that the robot will automatically stand to the neutral position of the servo we just

debugged.