

Lesson 3 Building a Robot Operating Environment

1. Arduino development language

Arduino uses C/C++ to write programs, so before learning Arduino, you need to master the C/C++ language. Although C++ is compatible with the C language, these are two different languages. C is a process-oriented programming language, and C++ is an object-oriented programming language. The early Arduino core library was written in C language. Later, object-oriented ideas were introduced. At present, the latest Arduino core library is written in C and C++.

Generally speaking, the Arduino language refers to a collection of various Application Programming Interfaces (APIs) provided by the Arduino core library files. These APIs are formed by secondary packaging of the lower-level microcontroller support library. For example, the core library of Arduino using AVR microcontroller is the secondary packaging of AVR-Libc (GCC-based AVR support library).

In the traditional development method, multiple registers need to be configured to achieve the corresponding functions. In Arduino, the complicated registers are encapsulated into simple APIs, which can be intuitively controlled, enhancing the readability of the program and improving the development efficiency.

2. Arduino program structure

The Arduino program structure is different from the traditional C/C++ program structure-there is no main() function in the Arduino program. In fact, it is not that there is no main() function in the Arduino program, but that the definition of the main() function is hidden in the core library file of the Arduino. In the development of Arduino, the main function is not directly operated, but the two functions of setup() and loop() are used instead.





3. The construction of the Arduino development environment

The IDE of the Arduino development environment can be downloaded from the official website. The download address of the Arduino IDE is: https://store.arduino.cc/usa/

(1) Install Arduino IDE under Windows

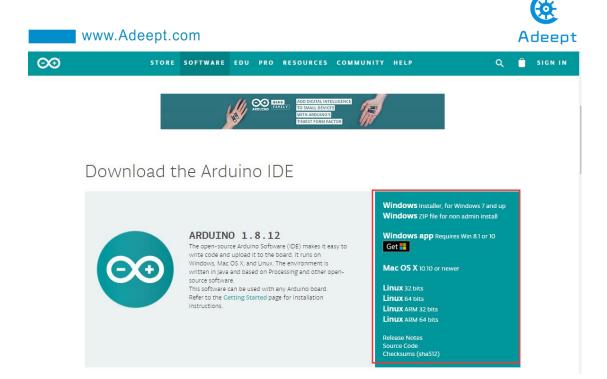
We will teach you how to download and install:

1.Open Google Chrome and enter the URL in the address bar: https://store.arduino.cc/usa/

After successfully opening the interface as shown below, we click DOWNLOADS under SOFTWARE.



2. After jumping to the following interface, slide the mouse to the middle to find the part marked in the red circle. You can find that the official website provides us with installation files for Windows, Mac OS X, and Linux systems.



3. We click the installation package of Windows ZIP file for non admin install. After the interface jumps, we select JUST DOWNLOAD. And then start the download. The download status will be displayed in the lower left of Google Chrome. Then we wait for the download to complete.

Download the Arduino IDE



Contribute to the Arduino Software

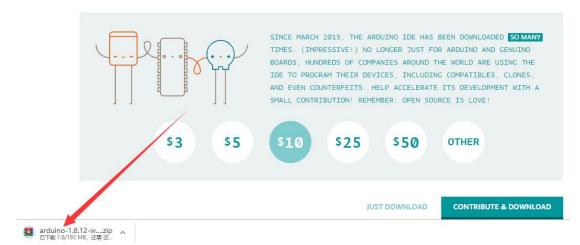
Consider supporting the Arduino Software by contributing to its development. (US tax payers, please note this contribution is not tax deductible). Learn more on how your contribution will be used.





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4.After the download is complete, open the folder. There are downloaded compressed installation files:

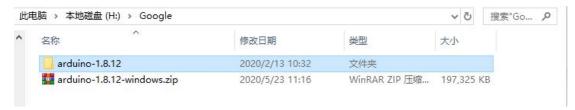
arduino-1.8.12-windows.zip



5. Double-click to open the file and unzip it.



6. The file arduino-1.8.12 appears after decompression. As shown follows;



7. Open the arduino-1.8.12 folder and double-click arduino.exe to open the





arduino_debug.exe

arduino_debug.l4j.ini

software. 名称 修改日期 类型 大小 drivers 2020/2/13 10:32 文件夹 examples 2020/2/13 10:32 文件夹 hardware 2020/2/13 10:32 文件夹 2020/2/13 10:32 java 文件夹 lib 2020/2/13 10:32 文件夹 libraries 2020/2/13 10:32 文件夹 2020/2/13 10:32 reference 文件夹 2020/2/13 10:32 tools 文件夹 2020/2/13 10:32 文件夹 🥯 arduino.exe 395 KB 2020/2/13 10:32 应用程序 arduino.l4j.ini 2020/2/13 10:32 配置设置 1 KB

8. The interface will show as follows after the Arduino software is opened, indicating that our software has been downloaded and installed successfully.

应用程序

配置设置

393 KB

1 KB

2020/2/13 10:32

2020/2/13 10:32

4. Introduction of Arduino software interface

The following figure is the interface introduction of Arduino software



(1)Menu bar

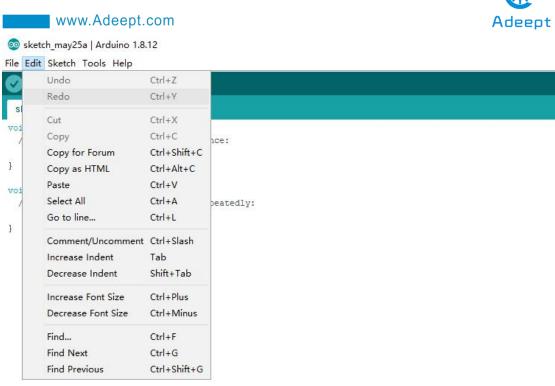
Menu bar contains File, Edit, Sketch, Tools and Help.

(1) "File" can operate new file, open file, save file, close file, save, etc. For the Examples, you can check the official sample program.

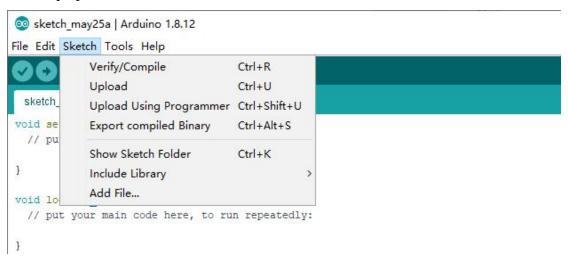


(2) "Edit" has the functions for the program code of editing, copying and pasting, commenting, indenting, searching, etc.



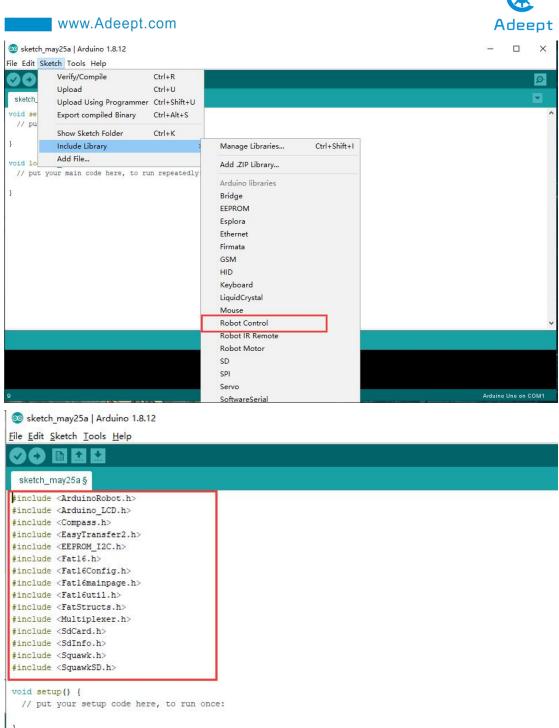


(3) Sketch can perform Verify/Compile, Upload and other operations on the written project.

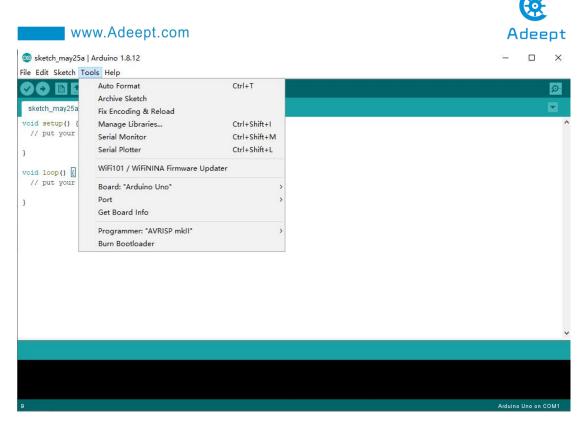


The Include Library can load the library. After selecting the library file in the list, the relevant header files are automatically added in the code editing area.

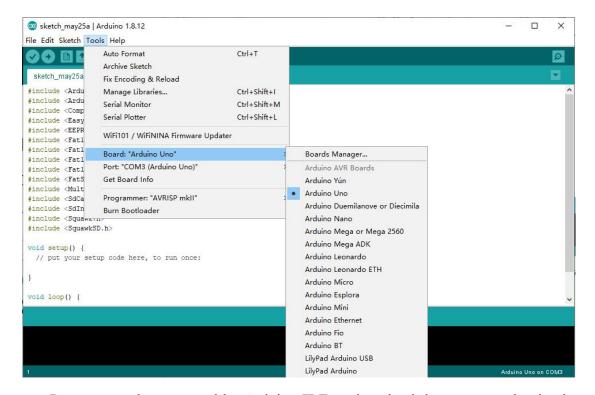




(4) Board and Port are often used in "Tools".



Board can choose different development boards. Our course uses Arduino Uno development board, so we need to choose Arduino Uno. The list contains many Arduino development board models. We choose the corresponding ones according to the model.

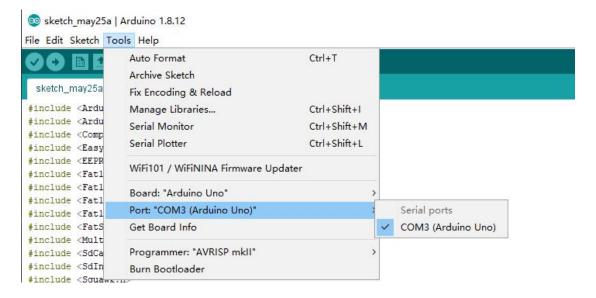


Port can set the port used by Arduino IDE to download the program, that is, the





port number of the development board connected to the computer. The port display of each computer is different. When we use the Arduino Uno to connect to the computer, it displays the COM3 port number.



(2)Button bar

Button bar includes functions of Verifying, Uploading, Building New, Opening and Saving.

(1) Verify:

Checking and compilation. This button is used to check the correctness of your "syntax" or code. If your code has any syntax errors or undefined variables, an error message will appear at the bottom of the IDE screen. At the same time, the line of error code will be marked with a red background color for easy modification. But if it is correct, you will see the message that the compilation is complete.

(2) Upload :

Download the program code to the Arduino development board. It is better to click Verify first, and then click Upload.



Open a new program editing window to create a new project.





(4) Open :

This button can open an existing draft file. You will use it when you need to open a file that you have downloaded or used before.

(5) Save :

Save the program file being edited.

(3)Code editing area

The code editing area is where to write program code and code comments.

(4)Console

The debug window will output information showing various compilation and debugging results. For example, if your code is written incorrectly, you will be prompted about what went wrong.

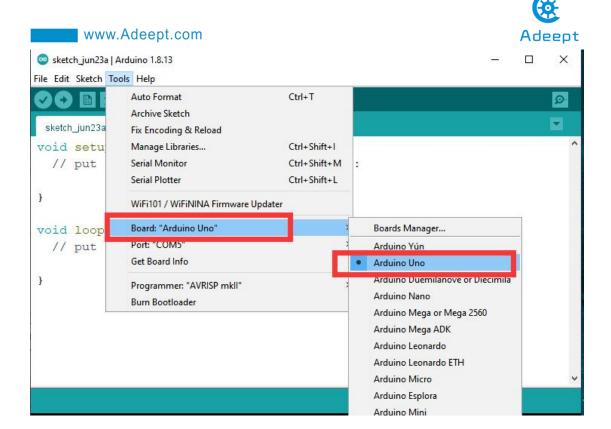
5. Connecting the AdeeptPixie development board and the computer

(1)Connecting the AdeeptPixie development board and the computer

You need to use the USB Cable to connect the AdeeptPixie to the computer.

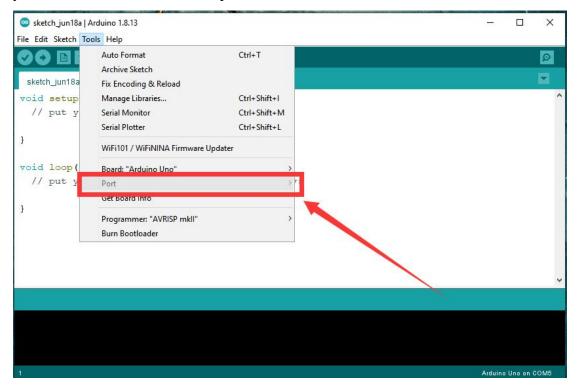
(2) Select the AdeeptPixie development board in Tools

Open Arduino IDE under Tools—>Board.Select Arduino UNO in the list.



(3)Install CH341SER driver

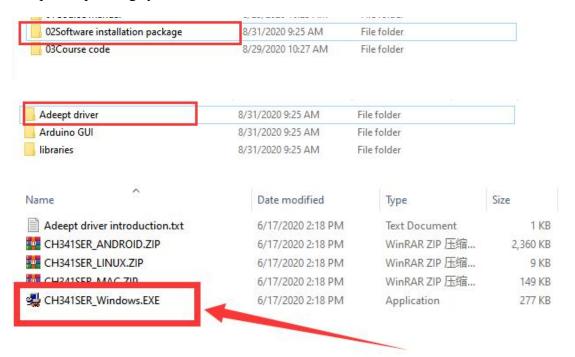
1.Open Arduino IDE, you will see the serial port is not accessible, meaning that you have not installed the serial port driver.





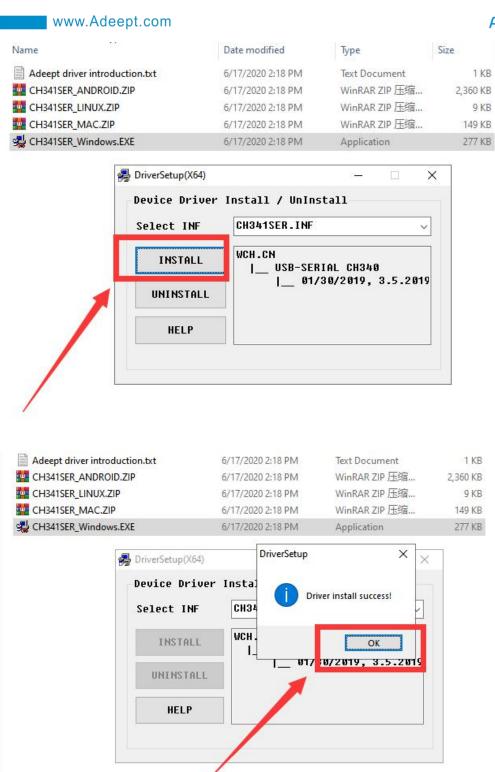


2. You need to find the user folder provided by Adeept: Hexapod 6 Legs Spider Robot Kit for Arduino\02Software installation package, find the "Adeept driver" folder and open it.If you are using a Windows system, you can double-click directly to open CH341SER_Windows.EXE and install corresponding driver according to the computer operating system.

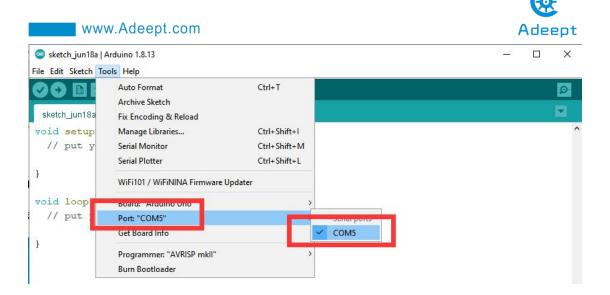


3. Click INSTALL. Wait for the installation to succeed. And click OK.





4. Now you will find the Arduino serial port is accessible (different computer configuration has different serial port). It means that the AdeeptPixie development board has been successfully connected to the computer. You will need to pay attention to this connection step in the following course.



6.The solution for situation that Arduino IDE cannot be opened

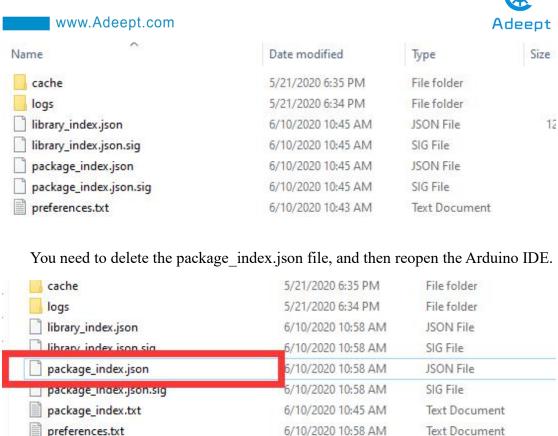
When opening the Arduino IDE, you will suddenly encounter a situation that it cannot be opened.



[Solution]

You need to find the Arduino15 folder in the \Users\ASUS\AppData\Local\Arduino15 directory of the C drive. As shown below:

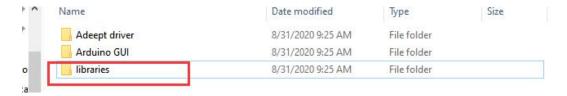




7. Configuring the "libraries" folder of the Arduino **IDE**

Before using Adeept hexapod spider robot, you need to configure the "libraries" folder under the downloaded Arduino IDE directory.

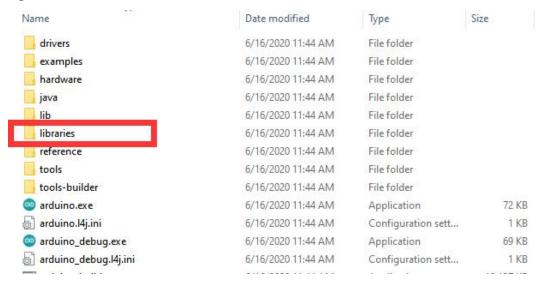
First, You need to find the user folder provided by Adeept: Hexapod 6 Legs Spider Robot Kit for Arduino\02Software installation package, find the "libraries" folder and open it, as shown below:





www.Adeept.com		1.855	Adeep
Adafruit_NeoPixel	8/31/2020 9:25 AM	File folder	
hexpod	8/31/2020 9:25 AM	File folder	4
Servo	8/31/2020 9:25 AM	File folder	
SR04	8/31/2020 9:25 AM	File folder	

You need to copy "Adafruit_NeoPixel", "hexpod", "Servo", "SR04".Copy all four files to the "libraries" under the Arduino IDE installation directory, as shown in the figure below:



Paste the four folders in "libraries". As shown below:

