Lesson 14 Control Air Pump

1. Working Principle

By setting the level of air pump, it can be controlled to suck the block after powering on.

The path to the source code of the program is 5.MaxArm Hardware Basic Learning/Arduino Development/Game Programs/Control Air Pump/ **Nozzle_Control/Nozzle_Control.ino**

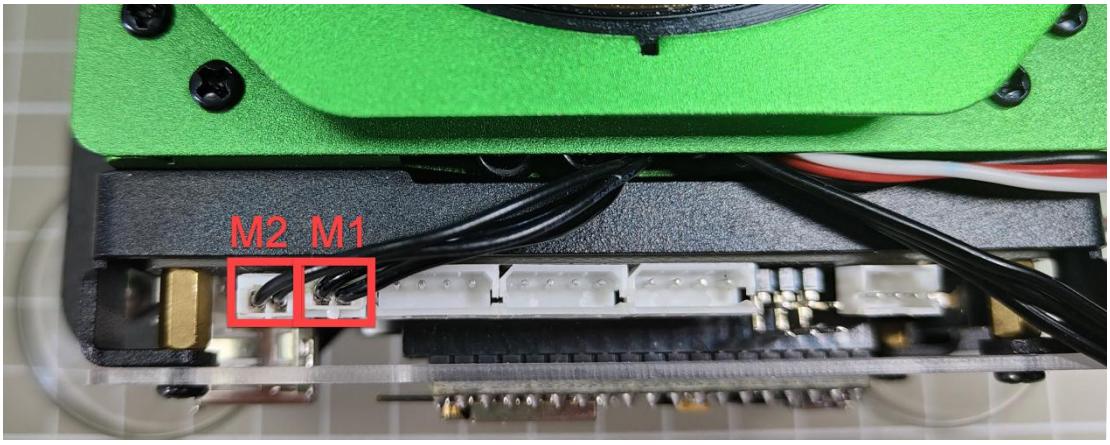
```
void setup() {
  // put your setup code here, to run once:
  Nozzle_init(); // Initialize driving library
  Serial.begin(9600);
  Serial.println("start...");
}

bool start_en = true;
void loop() {
  // put your main code here, to run repeatedly:
  if(start_en){
    Pump_on(); // Turn on air pump
    delay(2000); // The delay of 2000ms
    Valve_on(); // Turn on the valve and turn off the air pump
    delay(500);
    Valve_off(); // Turn off the valve
    delay(2000);
    start_en = false;
  }
  else{
    delay(500); // The delay of 500ms
  }
}
```

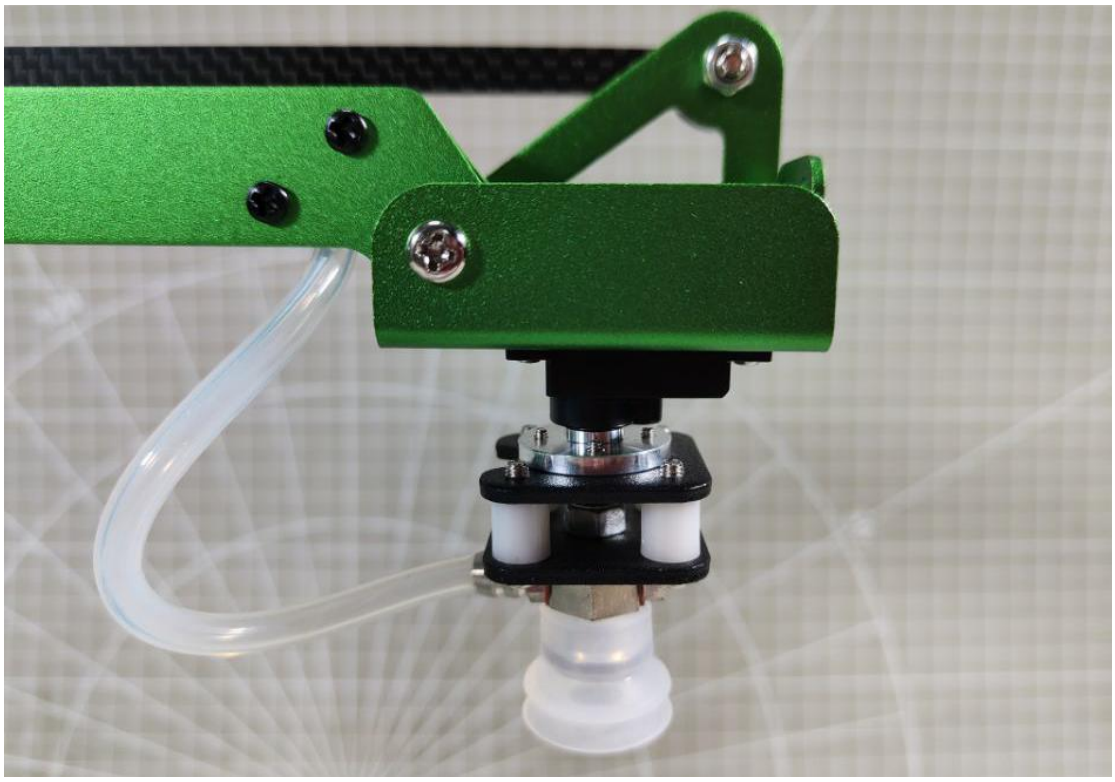
The air pump is controlled to suck object by calling on() function in SuctionNozzle library file and to release object by calling off() function.

2. Preparation

2.1 Hardware

Use the built-in air pump and the solenoid valve of MaxArm. (Air pump is connected to M1 port and the solenoid valve to M2 port). The position of ports are shown in the following image:





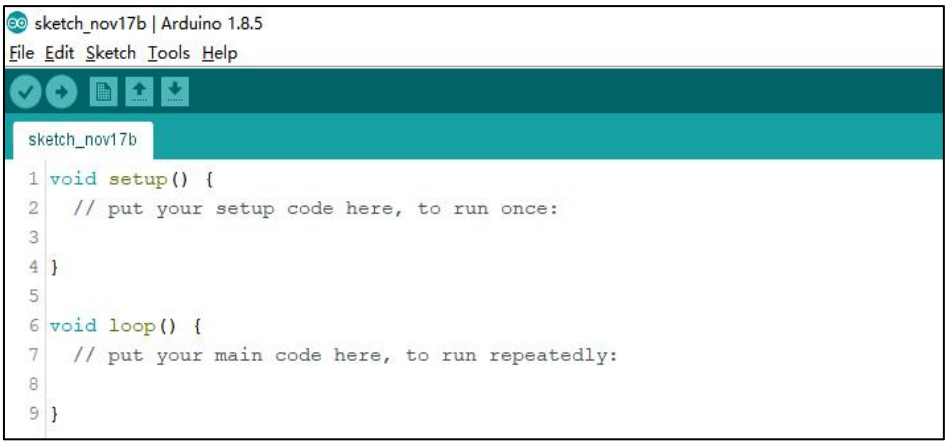
2.2 Software

Please refer to the material in folder “4.MaxArm Underlying Program Learning

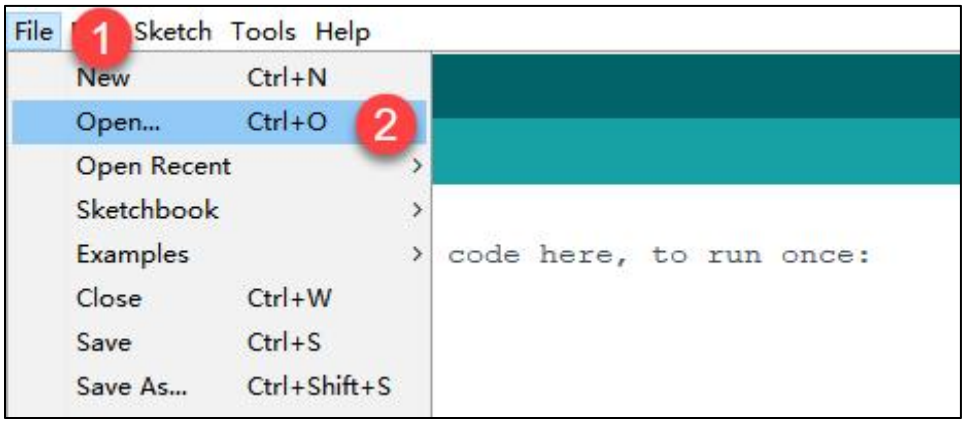
/Arduino Development/Lesson 1 Set Development Environment" to connect ESP32 controller to Arduino Editor.

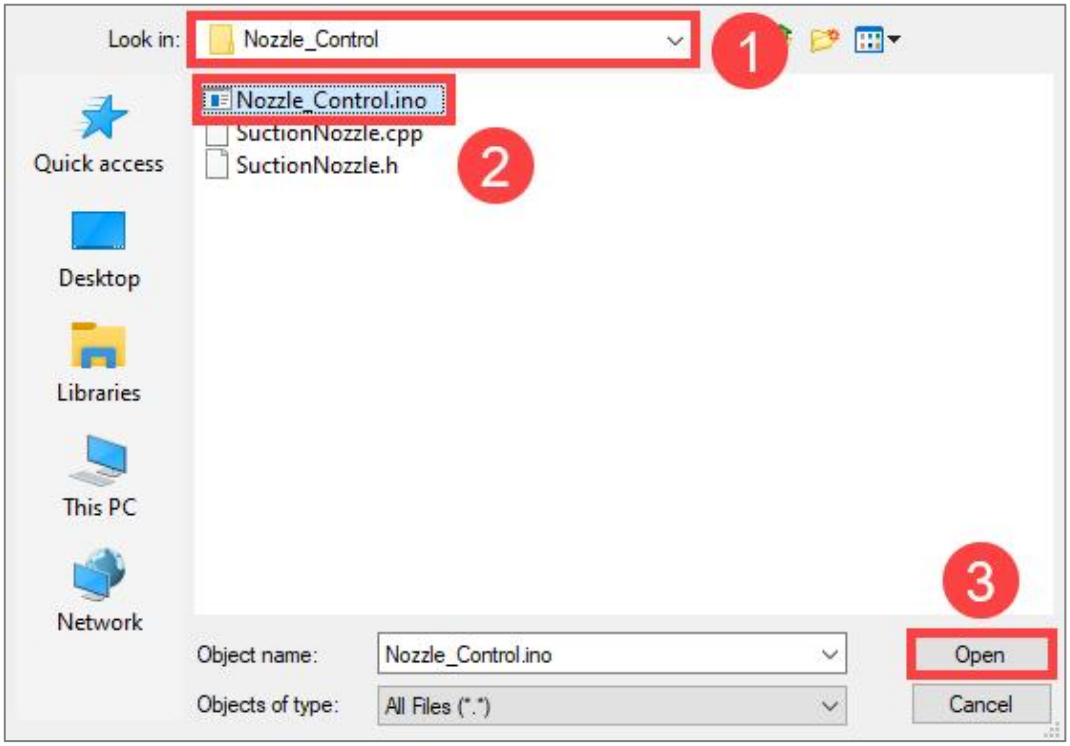
3. Operation Steps

1) Double click on  icon to open Arduino IDE.

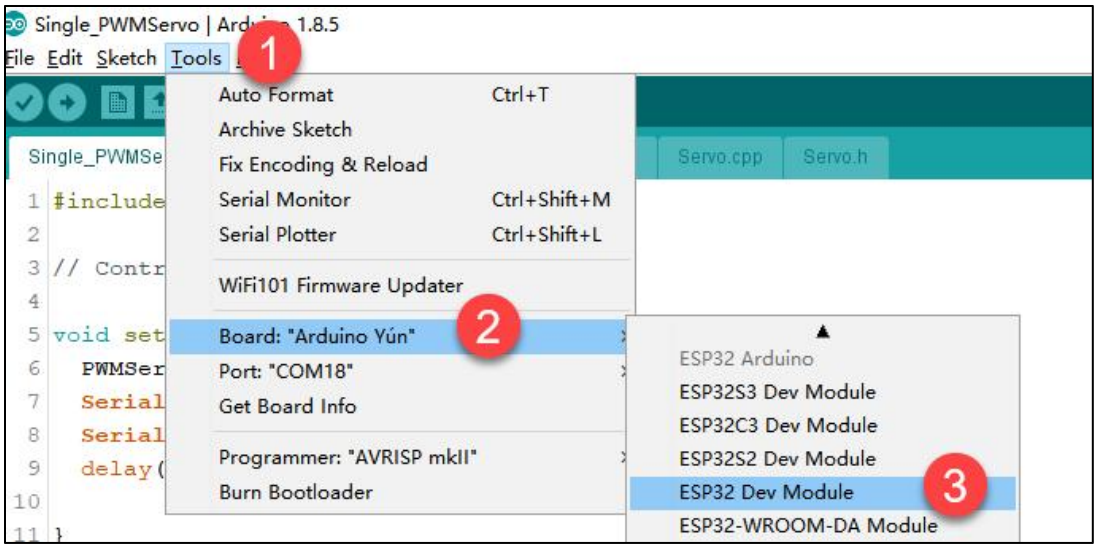


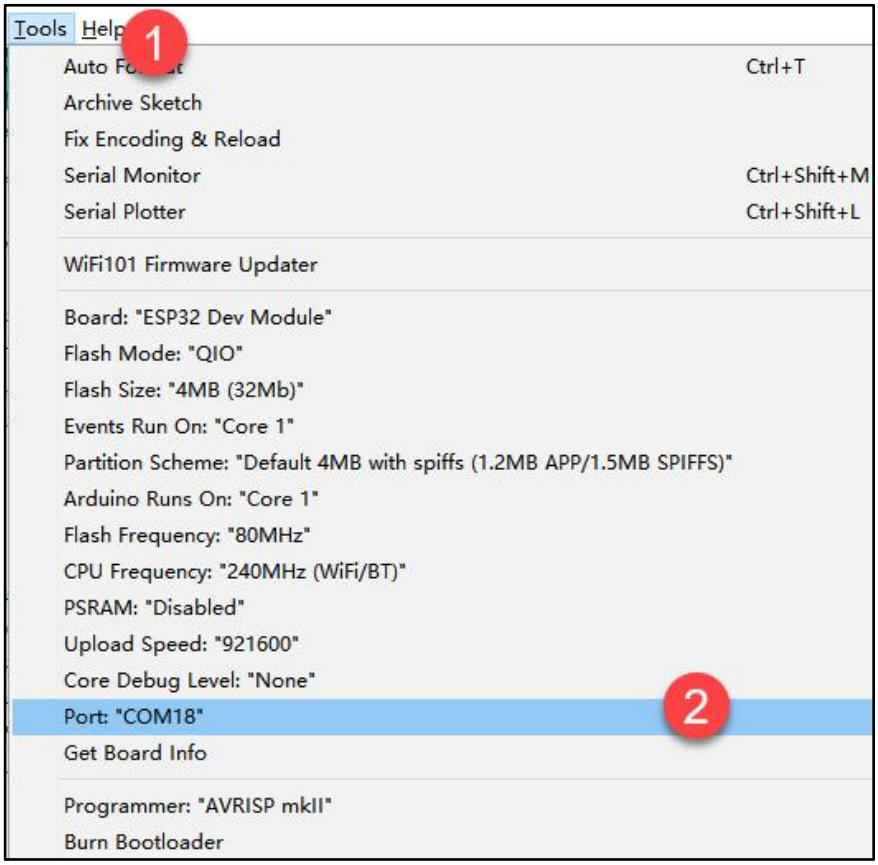
2) Click "File->Open" in turn, and select the program "**Nozzle_Control.ino**" in the folder "5.MaxArm Hardware Basic Learning/Arduino Development/Game Programs/Control Air Pump/**Nozzle_Control**".



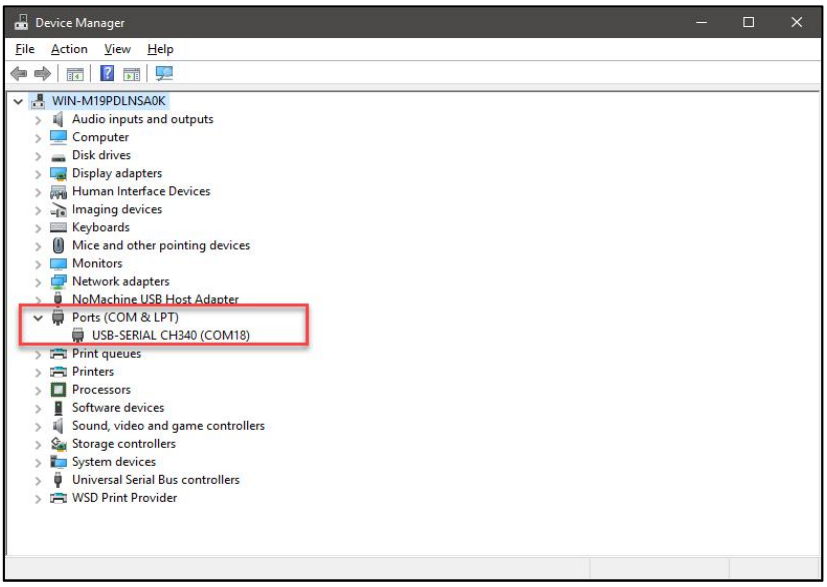


3) Select the corresponding port of ESP32 controller in “Tools->Port”. (Here take the port “COM5” as example. Please select the port based on your computer. If COM1 appears, please do not select because it is the system communication port but not the actual port of the development port.)



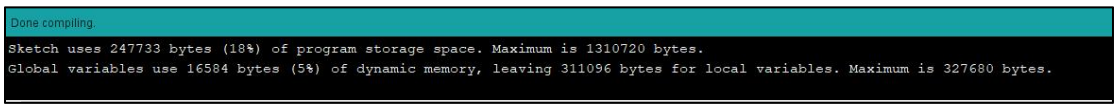


4) If you're not sure about the port number, please open the "This PC" and click "Properties->Device Manger" in turns to check the corresponding port number (the device is with CH340).

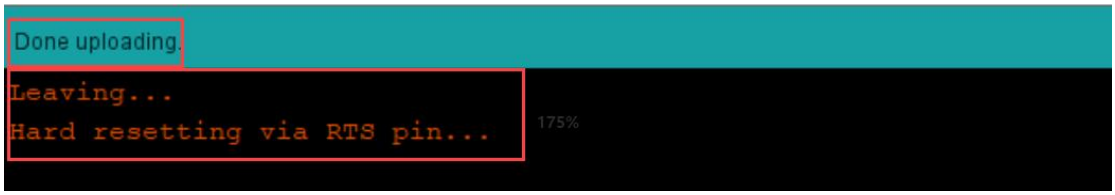


5) After selecting, confirm the board “ESP32 Dev Module” in the lower right corner and the port number “COM5” (it is an example here, please refer to the actual situation).

6) Then click on  icon to verify the program. If no error, the status area will display “Compiling->Compile complete” in turn. After compiling, the information such as the current used bytes, and occupied program storage space will be displayed.



7) After compiling, click on  icon to upload the program to the development board. The status area will display “Compiling->Uploading->Complete” in turn. After uploading, the status area will stop printing the uploading information.



4. Project Outcome

When the program is running, the air pump will start pumping so that the suction cup can suck the object. Then the air pump stops pumping to release the block after 2s. After the program stops running, exit the program automatically.