

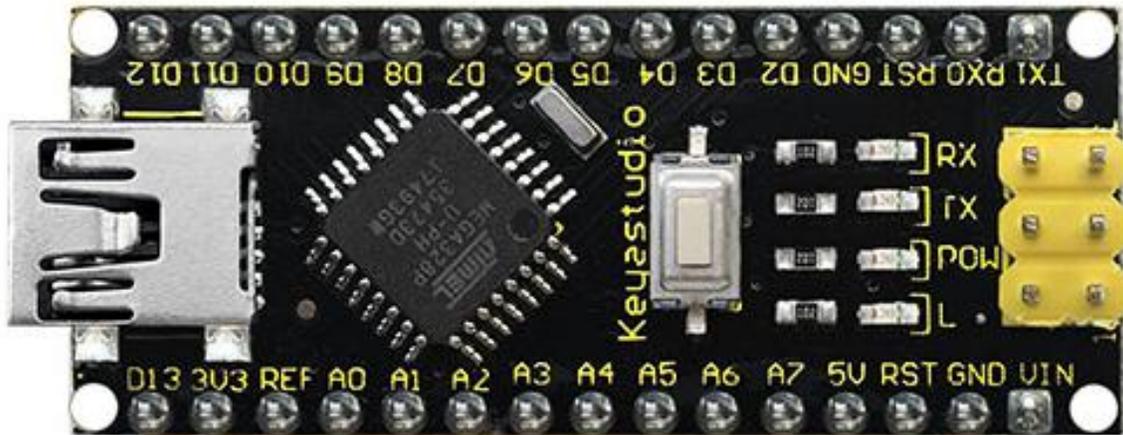
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Keystudio NANO CH340



Introduction:

The keystudio Nano CH340 is a small, complete, and breadboard-friendly board based on the ATmega328P-AU. Compared with ARDUINO NANO, the USB-to-serial port chip used in keystudio Nano is CH340G, so that the using method is the same except the driver installation file.

It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 8 analog inputs, a 16 MHz crystal oscillator, a mini USB port, an ICSP header and a reset button.

Note that ICSP (In-Circuit Serial Programming) header is used to program the firmware to ATMEGA328P-AU, but generally the chip has been preburned before leave the factory. So use it less.

The keystudio Nano can be powered via the Mini-B USB connection, or female headers Vin/GND (DC 7-12V).

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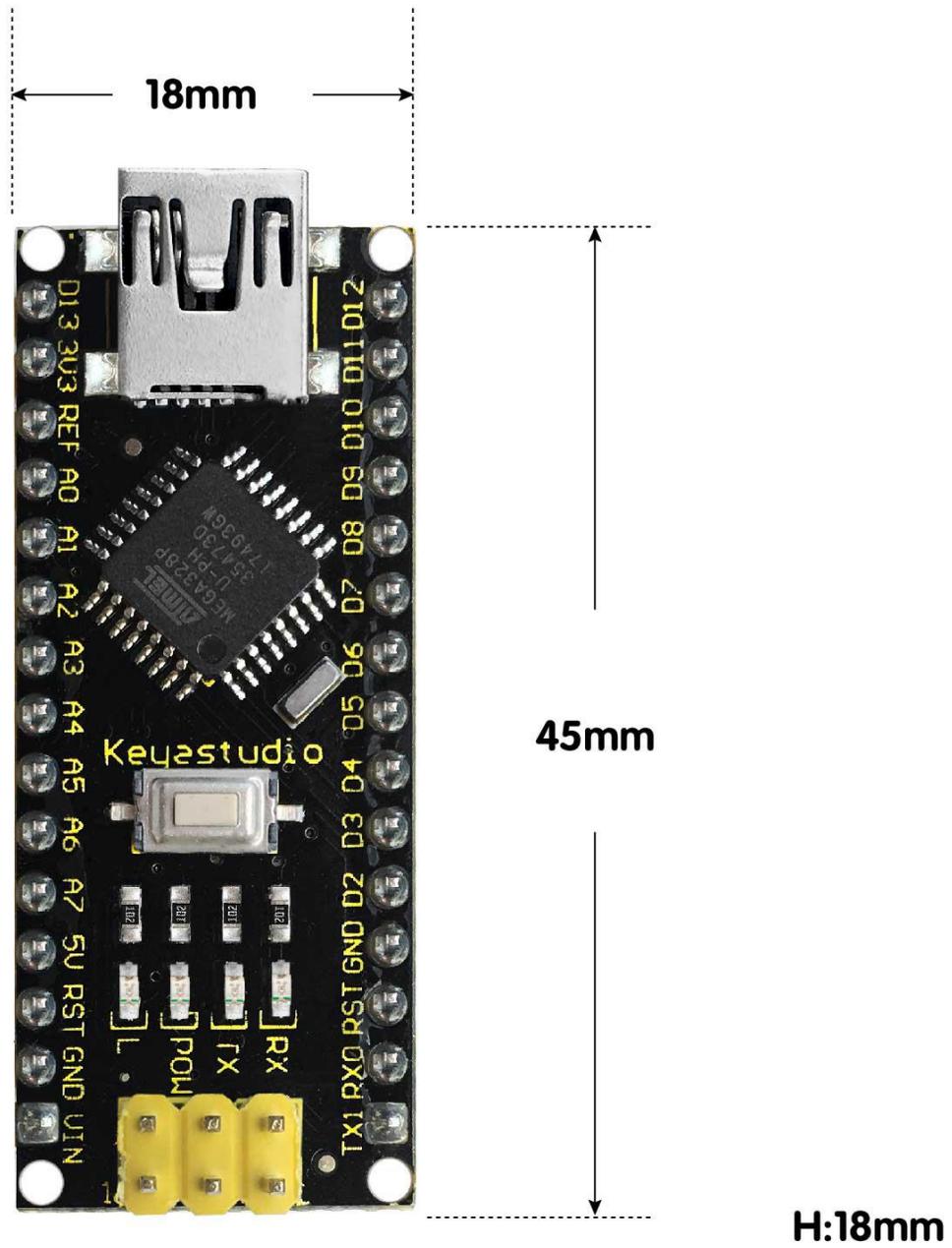
TECH SPECS:

Microcontroller	ATmega328P-AU
Operating Voltage	5V
Input Voltage (recommended)	DC7-12V
Digital I/O Pins	14 (D0-D13) (of which 6 provide PWM output)
PWM Digital I/O Pins	6 (D3, D5, D6, D9, D10, D11)
Analog Input Pins	8 (A0-A7)
DC Current per I/O Pin	40 mA
Flash Memory	32 KB of which 2 KB used by bootloader
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz
LED_BUILTIN	D13

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Details:

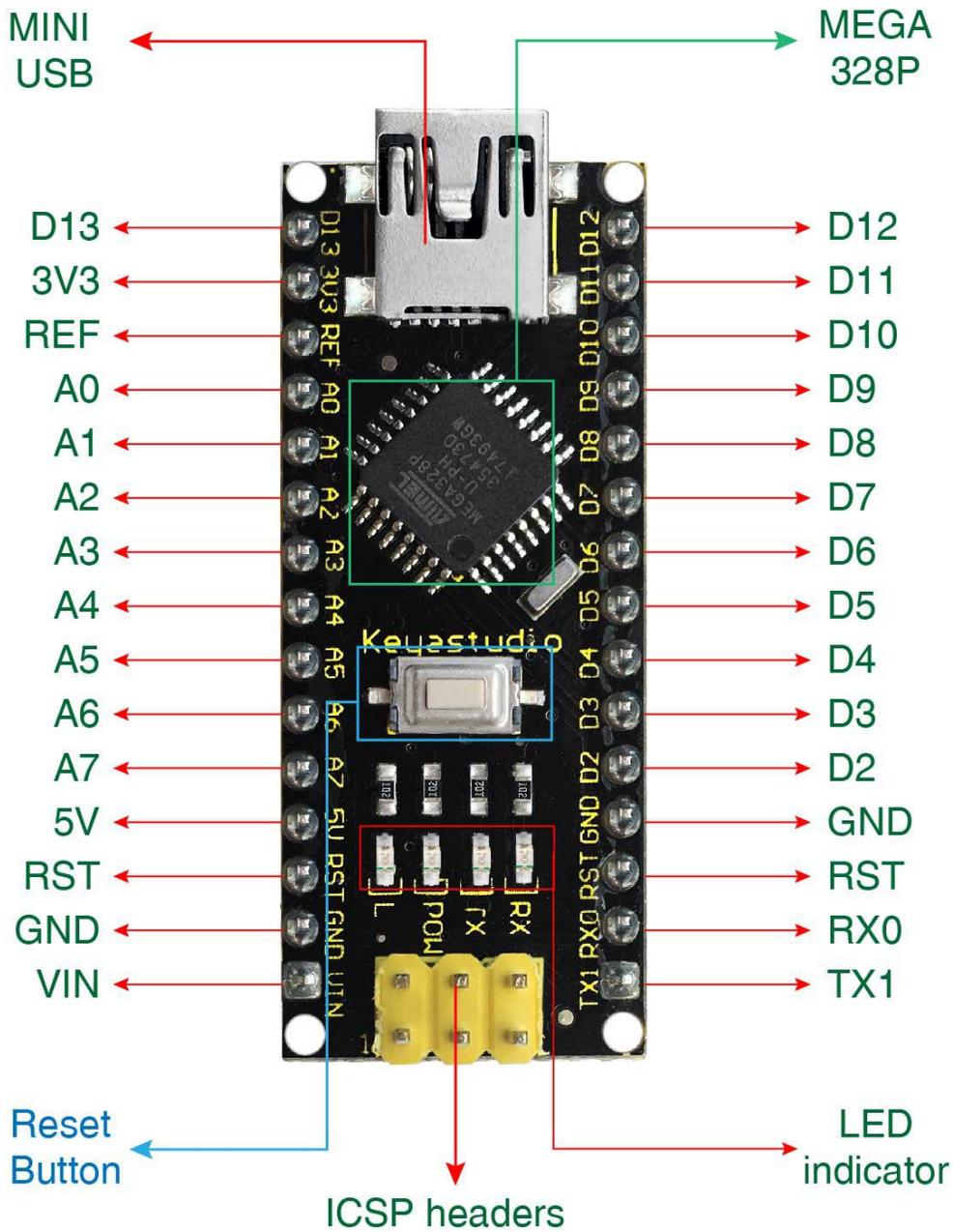
- PCB Dimensions: 18mm x 45mm
- Weight: 7g



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Element and Interfaces:

Here is an explanation of what every element and interface of the board does:



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1	ICSP Header	ICSP (In-Circuit Serial Programming) Header ICSP is the AVR, an micro-program header consisting of MOSI, MISO, SCK, RESET, VCC, and GND. It is often called the SPI (serial peripheral interface) and can be considered an "extension" of output. In fact, slave the output devices under the SPI bus host. When connecting to PC, program the firmware to ATMEGA328P-AU.
2	LED indicator (RX)	Onboard you can find the label: RX(receive) When control board communicates via serial port, receive the message, RX led flashes.
3	LED indicator (TX)	Onboard you can find the label: TX (transmit) When control board communicates via serial port, send the message, TX led flashes.
4	LED indicator (POW)	Power up the control board, LED on, otherwise LED off.
5	LED indicator (L)	There is a built-in LED driven by digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.
6	RX0 (D0) TX1 (D1) D2-D13	It has 14 digital input/output pins D0-D13 (of which 6 can be used as PWM outputs). These pins can be configured as digital input pin to read the logic value (0 or 1). Or used as digital output pin to drive different modules like LED, relay, etc.

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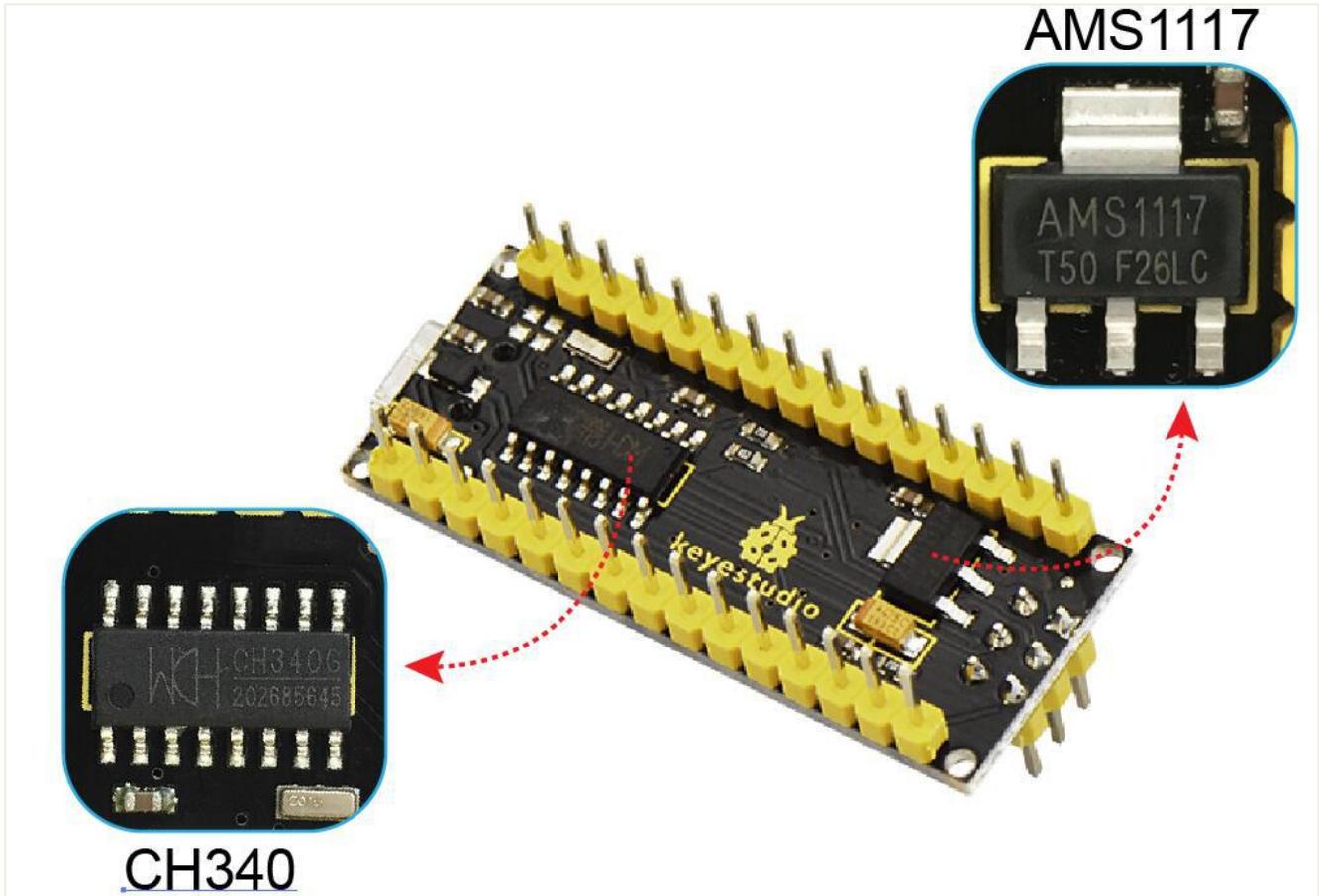
7	RST	Reset pin: connect external button. The function is the same as RESET button.
8	MEGA 328P	<p>Each board has its own microcontroller. You can regard it as the brain of your board.</p> <p>Microcontrollers are usually from ATMEL. Before you load a new program on the Arduino IDE, you must know what IC is on your board. This information can be checked at the top surface of IC.</p> <p>The board's microcontroller is ATMEGA328P-AU.</p> <p>More info. see the datasheet</p>
9	MINI USB	The board can be powered via Mini-B USB connection. Also upload the program to the board via USB port.
10	3V3 pin	Provides 3.3V voltage output
11	REF	Reference external voltage (0-5 volts) for the analog input pins. Used with analogReference() .
12	A0-A7	The Nano has 8 Analog Pins, labeled A0 through A7.
13	5V pin	Provides 5V voltage output

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14	GND	Ground pin
15	VIN	Input an external voltage DC7-12V to power the board.
16	Reset Button	Used to reset the control board
17	CH340G	USB-to-serial port chip, converting the USB signal into Serial port signal.
18	AMS1117	Convert the external voltage input DC7-12V into DC5V, then transfer it to the processor and other elements.

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Nano Back View:



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Specialized Functions of Some Pins:

- **Serial communication:** 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data.
- **PWM (Pulse-Width Modulation):** D3, D5, D6, D9, D10, D11
- **External Interrupts:** D2 (interrupt 0) and D3 (interrupt 1). These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the [attachInterrupt\(\)](#) function for details.
- **SPI communication:** D10 (SS), D11 (MOSI), D12 (MISO), D13 (SCK).
- **IIC communication:** A4 (SDA); A5(SCL)

Tips:

- **Automatic (Software) Reset:**
Rather than requiring a physical press of the reset button before an upload, the Arduino Nano is designed in a way that allows it to be reset by software running on a connected computer.

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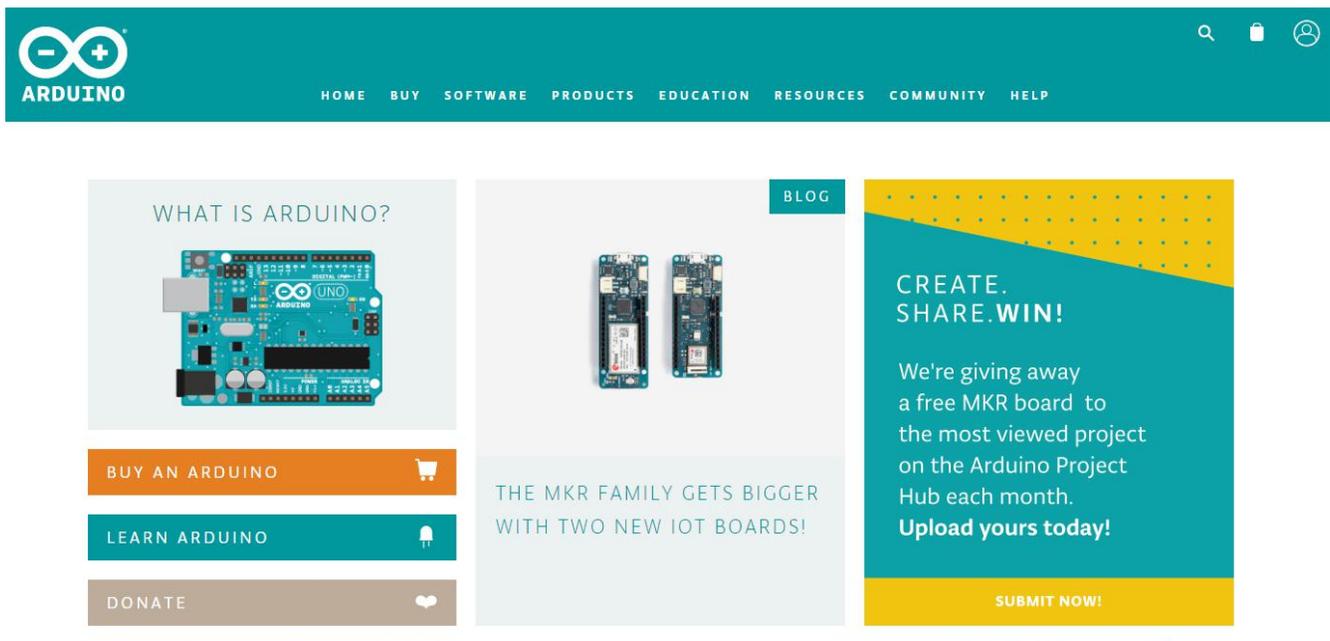
Detailed Use with ARDUINO Software as follows:

Step1 | Download the Arduino IDE

When you get the board, first you should install the Arduino software and driver. We usually use the Windows software Arduino 1.5.6 version. You can download it from the link below:

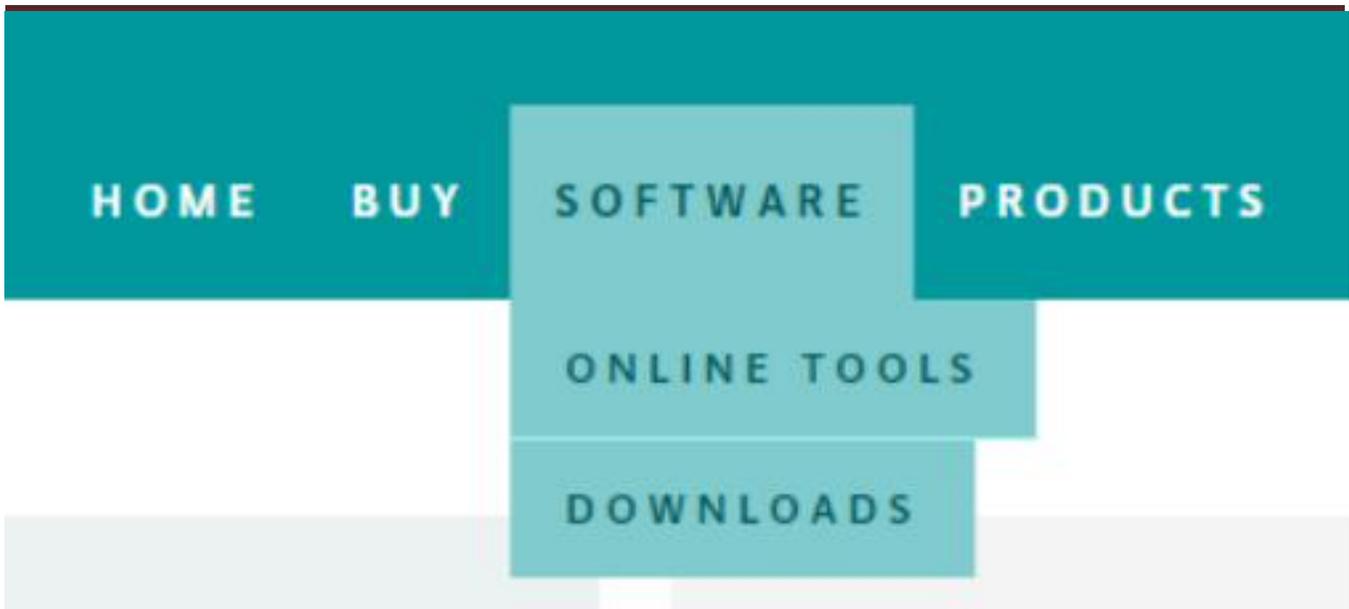
<https://www.arduino.cc/en/Main/OldSoftwareReleases#1.5.x>

Or you can browse the ARDUINO website to download the latest version from this link, <https://www.arduino.cc>, pop up the following interface.



Then click the **SOFTWARE** on the browse bar, you will have two options ONLINE TOOLS and DOWNLOADS.

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Click **DOWNLOADS**, it will appear the latest software version of ARDUINO 1.8.5 shown as below.

Download the Arduino IDE

A screenshot of the Arduino 1.8.5 download page. On the left, there is a circular logo with a minus sign and a plus sign. To the right of the logo, the text reads: 'ARDUINO 1.8.5', 'The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.', and 'This software can be used with any Arduino board. Refer to the [Getting Started](#) page for Installation instructions.' On the right side of the page, there is a teal sidebar with white text listing download options: 'Windows Installer, for Windows XP and up', 'Windows ZIP file for non admin install', 'Windows app Requires Win 8.1 or 10' with a 'Get' button, 'Mac OS X 10.7 Lion or newer', 'Linux 32 bits', 'Linux 64 bits', 'Linux ARM', 'Release Notes', 'Source Code', and 'Checksums (sha512)'.

In this software page, on the right side you can see the version of development software for different operating systems. ARDUINO has a powerful compatibility. You should download the software that is compatible with the operating system of your computer.

We will take **WINDOWS system** as an example here. There are also two options

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under Windows system, one is installed version, the other is non-installed version. For simple installed version, first click **Windows Installer**, you will get the following page.



The screenshot shows a teal background with white text. At the top, it says "Windows Installer, for Windows XP and up" and "Windows ZIP file for non admin install". Below that, it says "Windows app Requires Win 8.1 or 10" with a "Get" button featuring the Windows logo. Further down, it lists "Mac OS X 10.7 Lion or newer", "Linux 32 bits", "Linux 64 bits", and "Linux ARM". At the bottom, there are links for "Release Notes", "Source Code", and "Checksums (sha512)".

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.](#)



The page features three stylized illustrations: an Arduino Uno board, an Arduino Pro Mini board, and a blue brain with a red wire connecting it to the Pro Mini board. To the right of these illustrations, text reads: "SINCE MARCH 2015, THE ARDUINO IDE HAS BEEN DOWNLOADED **24,353,248** TIMES. (IMPRESSIVE!) NO LONGER JUST FOR ARDUINO AND GENUINO BOARDS, HUNDREDS OF COMPANIES AROUND THE WORLD ARE USING THE IDE TO PROGRAM THEIR DEVICES, INCLUDING COMPATIBLES, CLONES, AND EVEN COUNTERFEITS. HELP ACCELERATE ITS DEVELOPMENT WITH A SMALL CONTRIBUTION! REMEMBER: OPEN SOURCE IS LOVE!" Below this text are six circular buttons for contribution amounts: "\$3", "\$5", "\$10", "\$25", "\$50", and "OTHER".

JUST DOWNLOAD

CONTRIBUTE & DOWNLOAD

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This way you just need to click JUST DOWNLOAD, then click the downloaded file to install it.

For non-installed version, first click Windows ZIP file, you will also get the pop-up interface as the above figure.

Click JUST DOWNLOAD, and when the ZIP file is downloaded well to your computer, you can directly unzip the file and click the icon of ARDUINO software to start it.

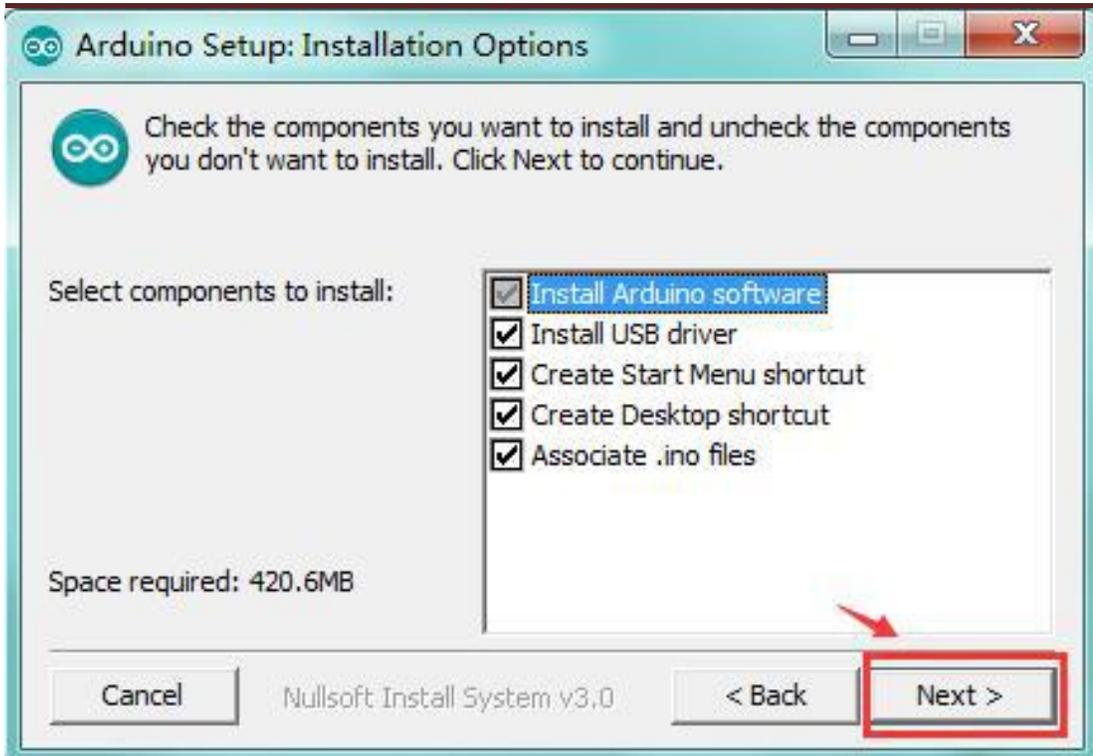
Installing Arduino (Windows):

Install Arduino with the exe. Installation package downloaded well.

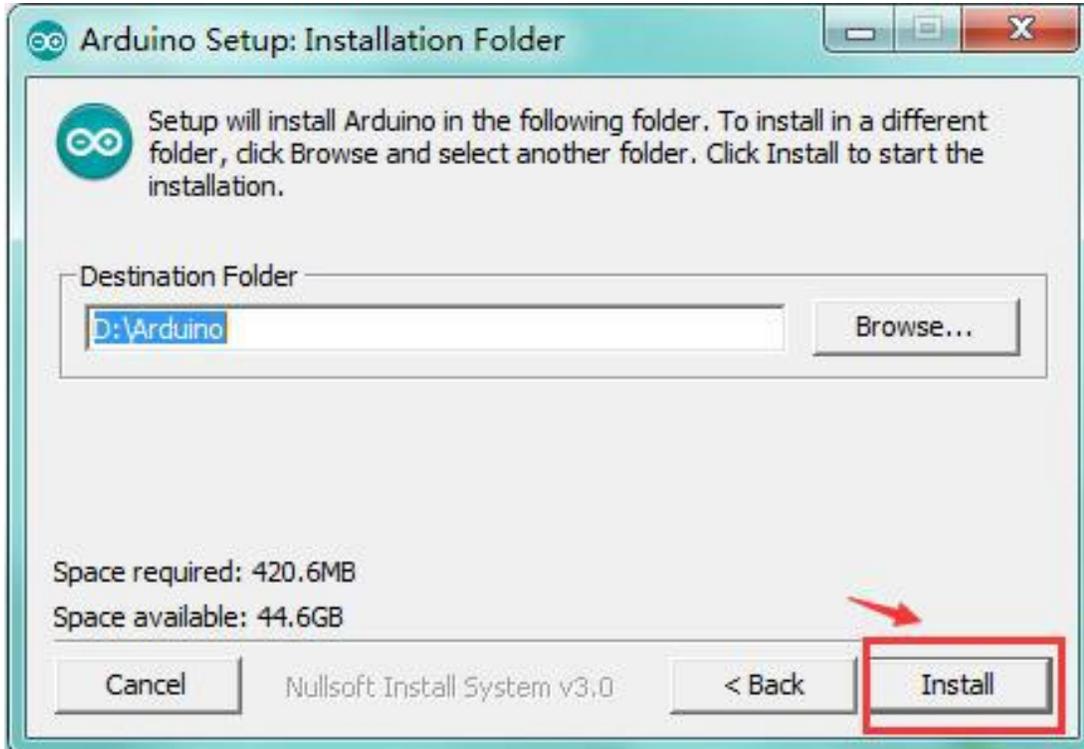


Click "I Agree" to see the following interface.

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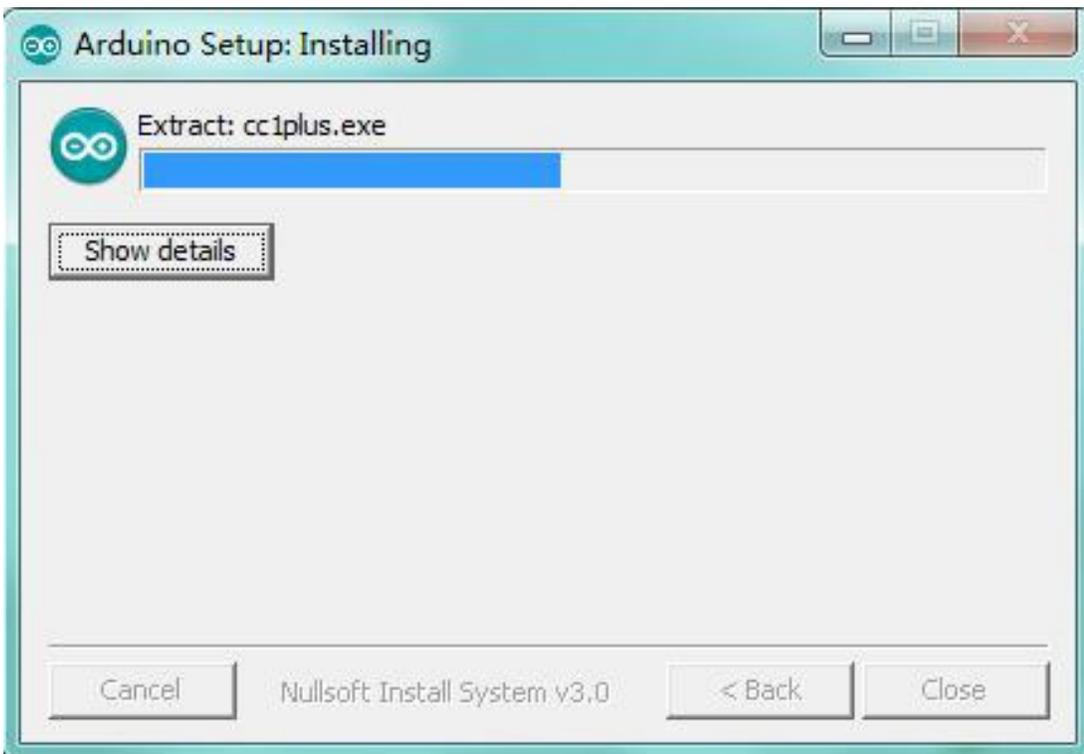


Click "Next". Pop up the interface below.

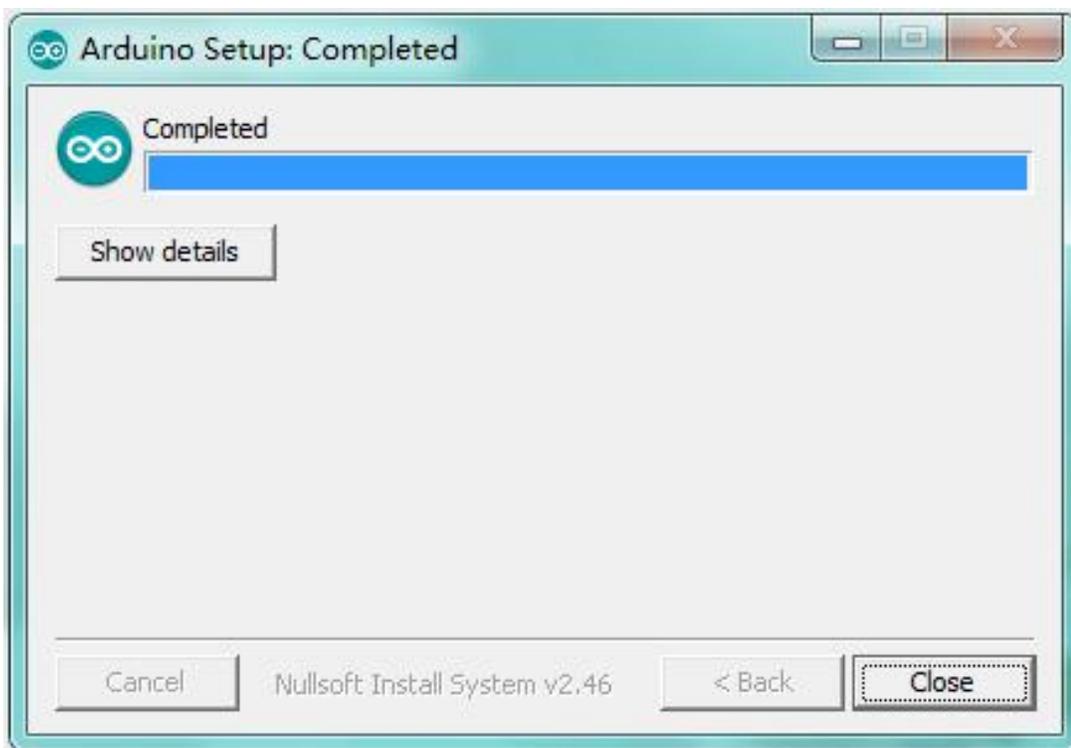


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You can press Browse... to choose an installation path or directly type in the directory you want. Then click "Install" to initiate installation.



Wait for the installing process, if appear the interface of Window Security, just continue to click Install to finish the installation.



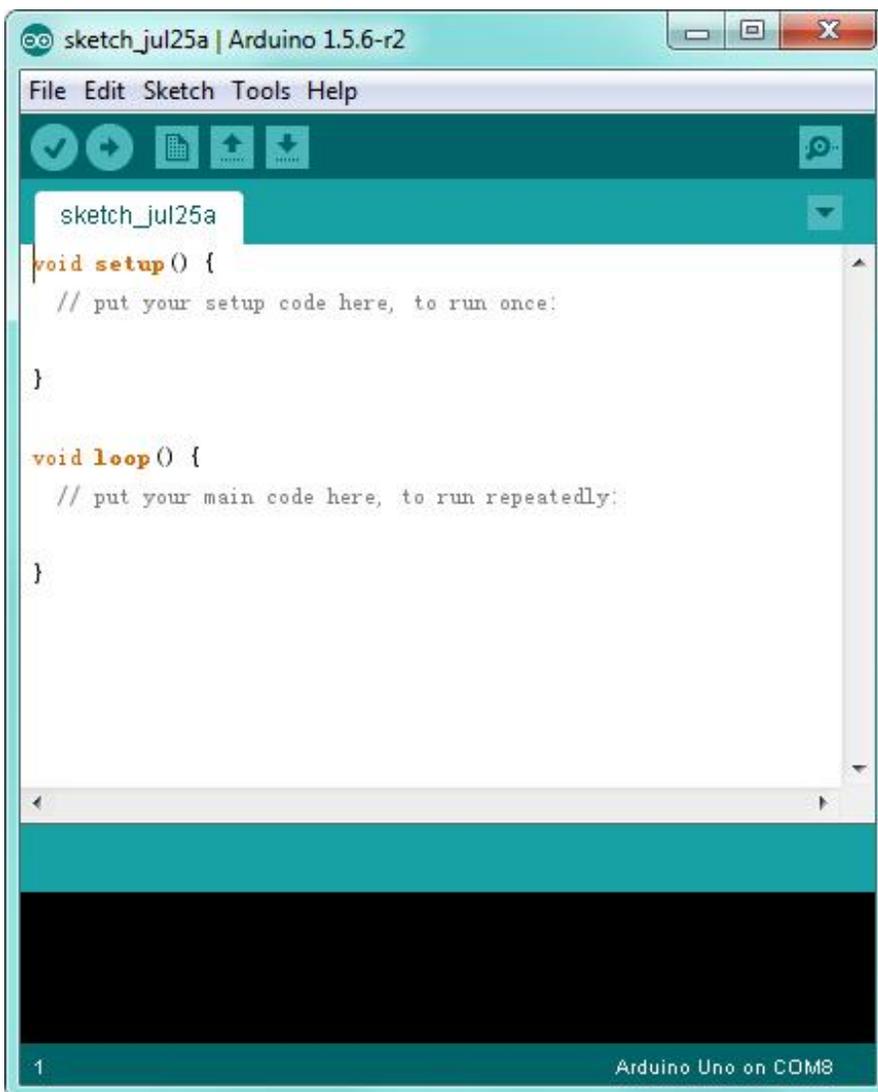
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Introduction for Arduino IDE Toolbar:

Double-click the icon of Arduino software downloaded, you will get the interface shown below.

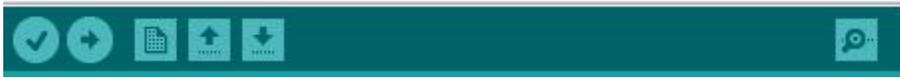


(**Note:** if the Arduino software loads in the wrong language, you can change it in the preferences dialog. See [the environment page](#) for details.)



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The functions of each button on the Toolbar are listed below:



 Verify/Compile	Check the code for errors
 Upload	Upload the current Sketch to the Arduino
 New	Create a new blank Sketch
 Open	Show a list of Sketches
 Save	Save the current Sketch
 Serial Monitor	Display the serial data being sent from the Arduino

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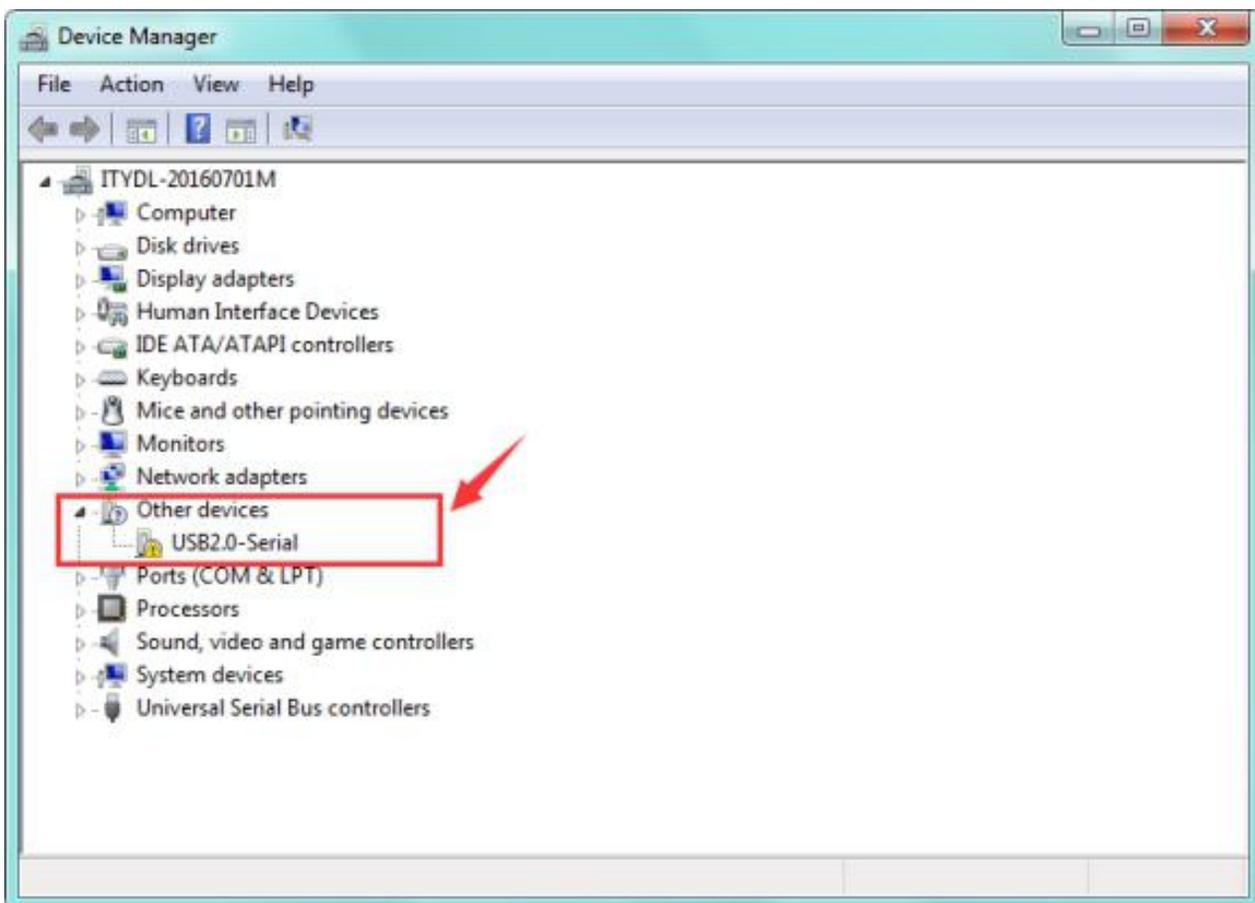
Step2| Installing the Driver

The USB to serial port chip of this control board is CH340G. So you need to install the driver for the chip. You can click the driver file here [usb_ch341_3.1.2009.06](#) to download it.

In different systems, the driver installation is similar. Here we start to install the driver on the Win7 system.

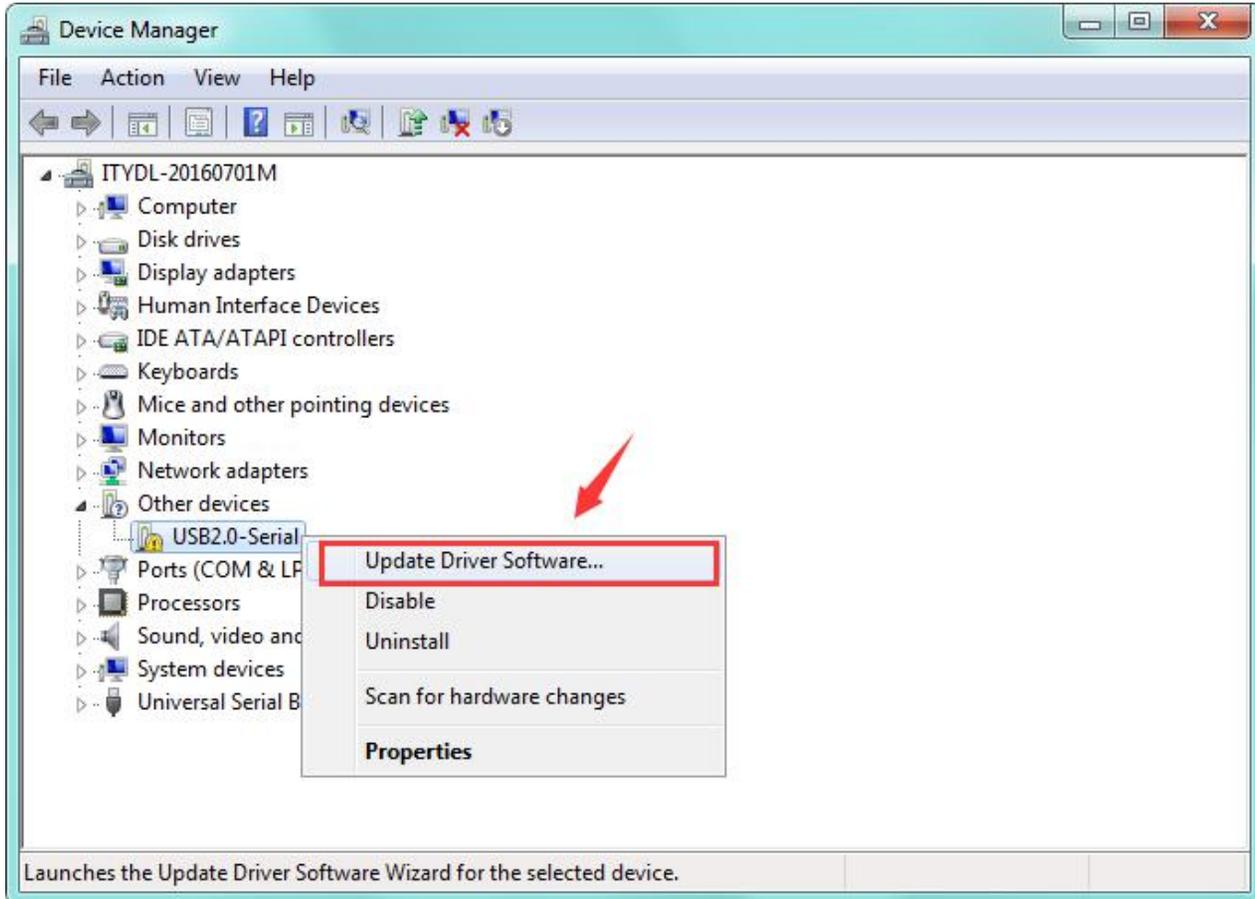
Plug one end of your USB cable into the keystudio NANO and the other into a USB socket on your computer.

When you connect the NANO board to your computer at the first time, right click your "Computer" —>for "Properties"—> click the "Device manager", under Other devices, you should see the "USB2.0-Serial".



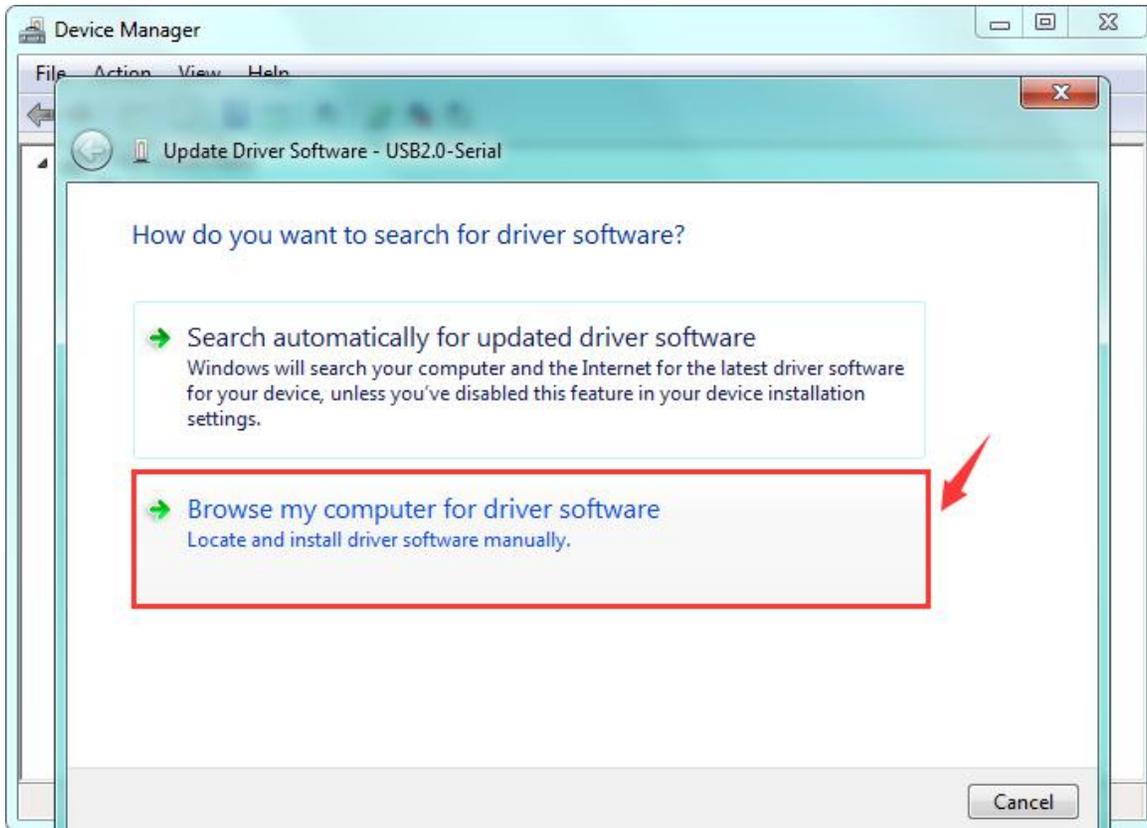
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Then right-click on the USB2.0-Serial and select the top menu option (Update Driver Software...) shown as the figure below.

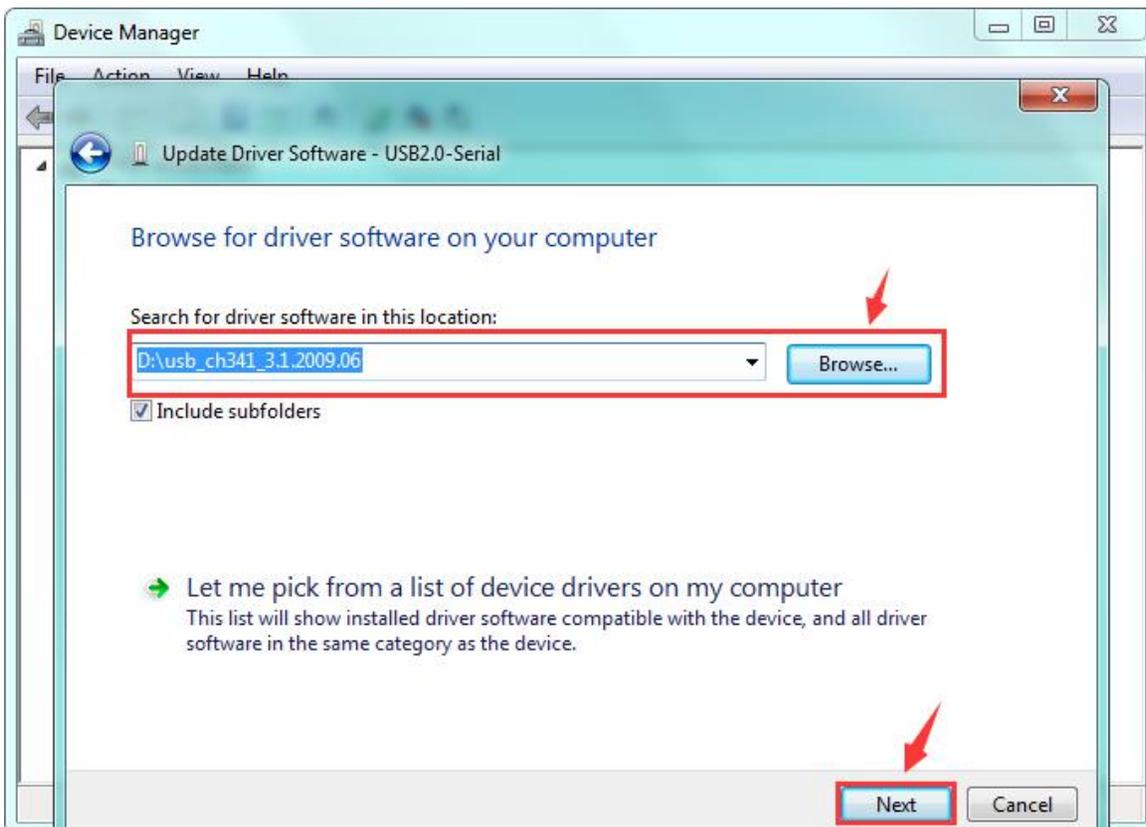


Then it will be prompted to either "Search Automatically for updated driver software" or "Browse my computer for driver software". Shown as below. In this page, select "Browse my computer for driver software".

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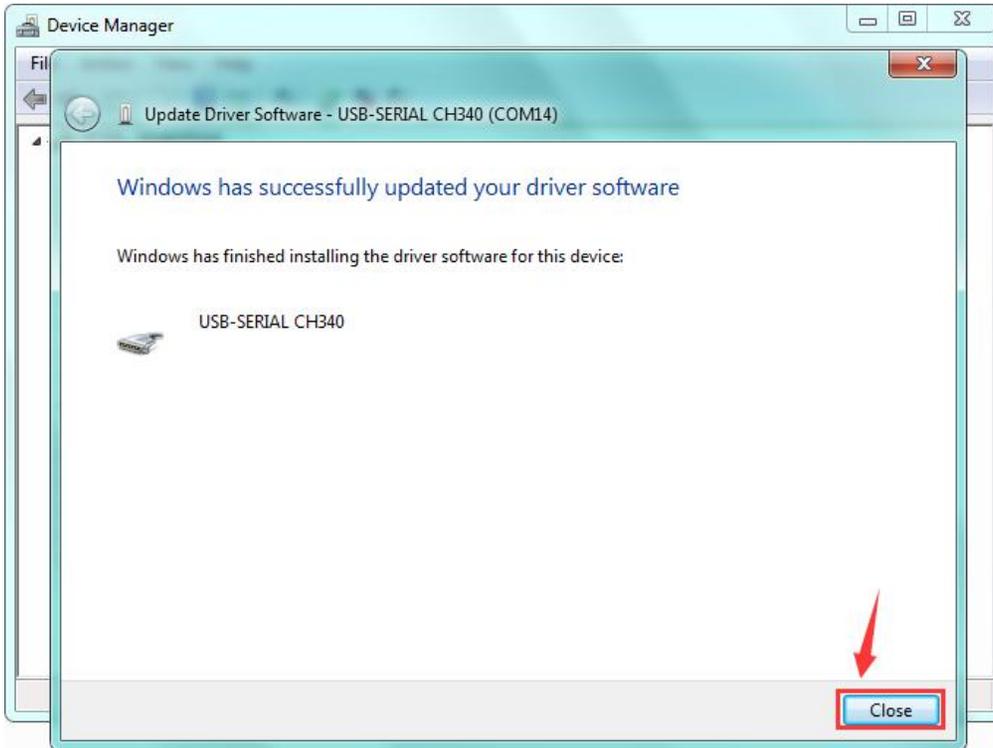


After that, select the option to browse and navigate to the "drivers" folder of usb-ch341 installation.

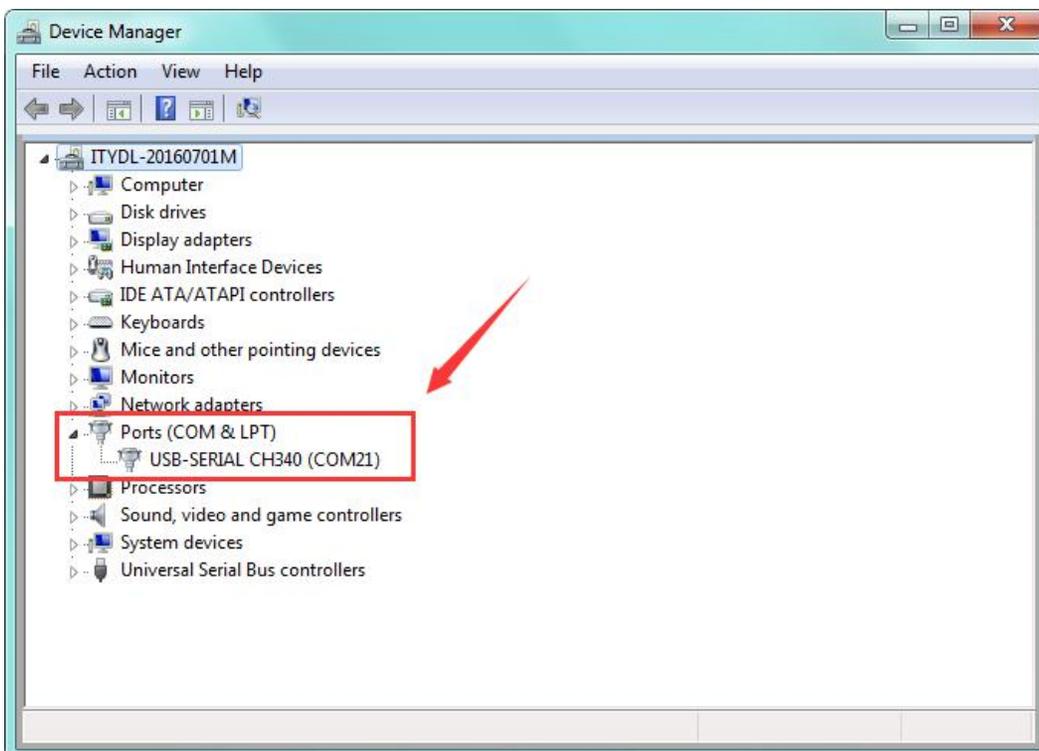


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Once the software has been installed, you will get a confirmation message. Installation completed, click "Close".



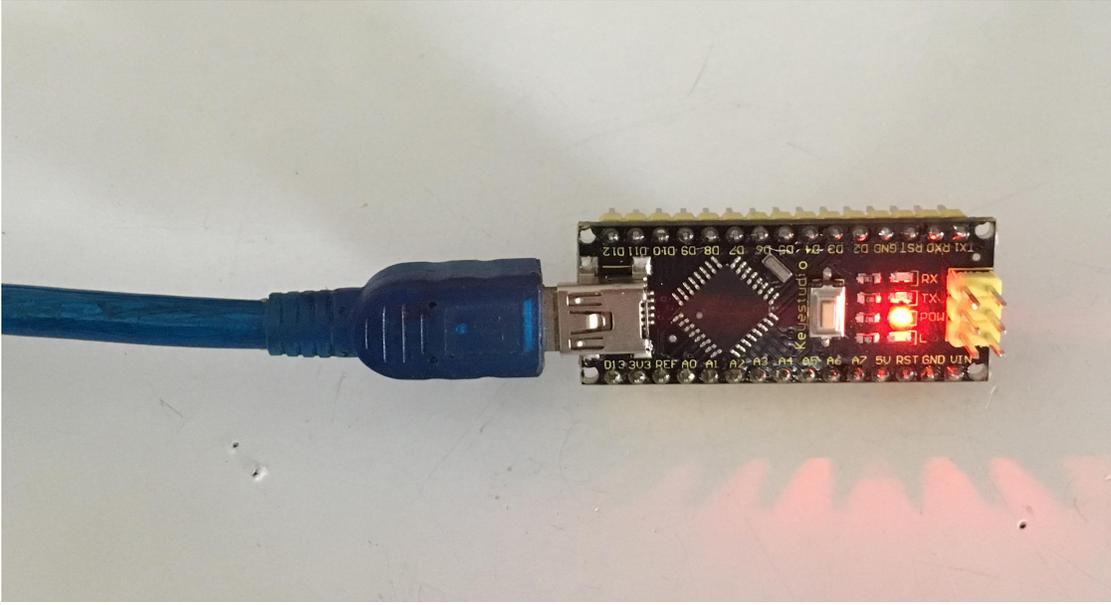
Up to now, the driver is installed well. Then you can right click "Computer" → "Properties" → "Device manager", you should see the device as the figure shown below.



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Step3| Connect the board

Connect the NANO board to your computer using the USB cable. The power LED should go on.

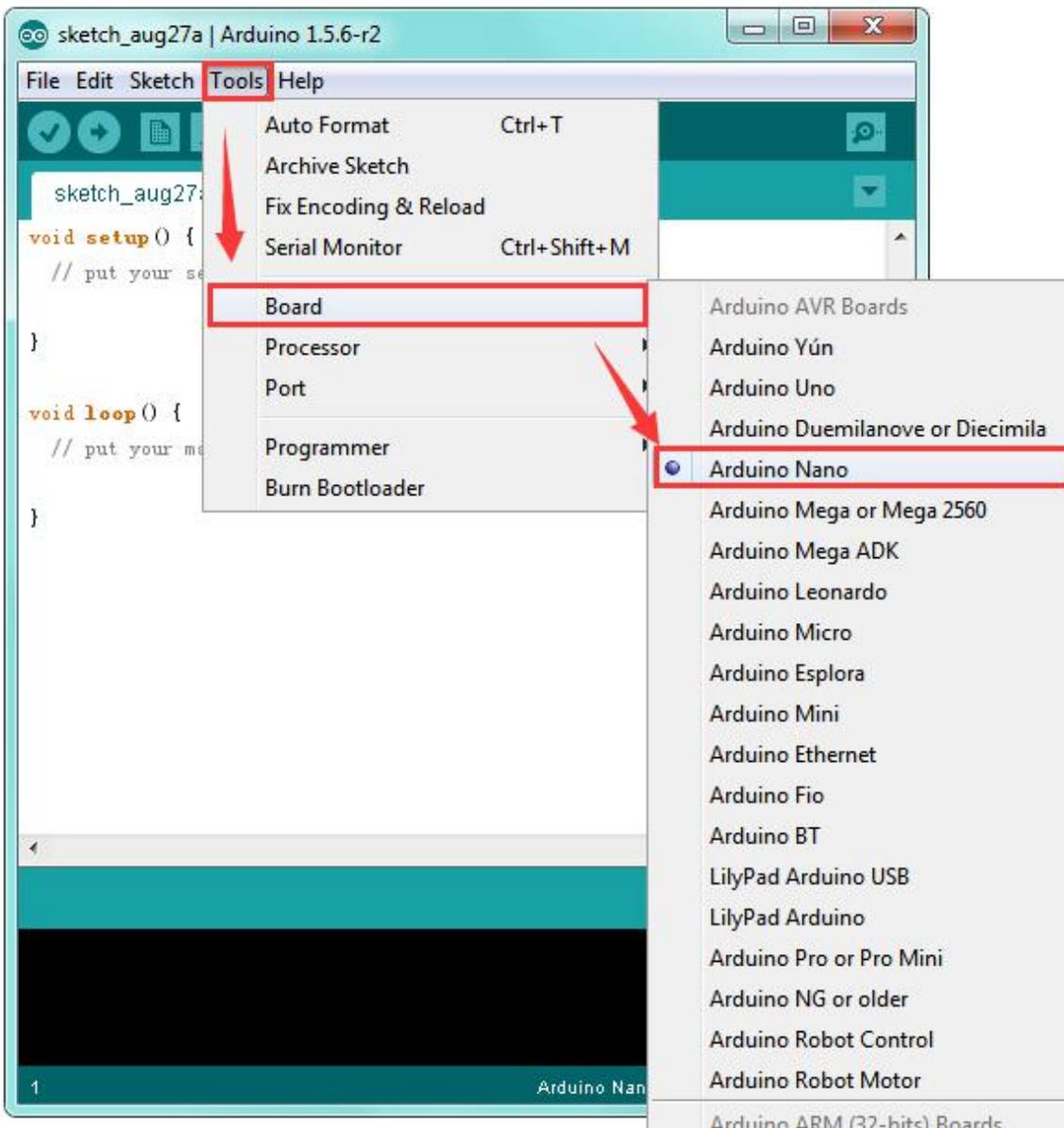


Step4| Select the Arduino Board

Open the Arduino IDE, you'll need to click the "Tools", then select the Board that corresponds to your Arduino.



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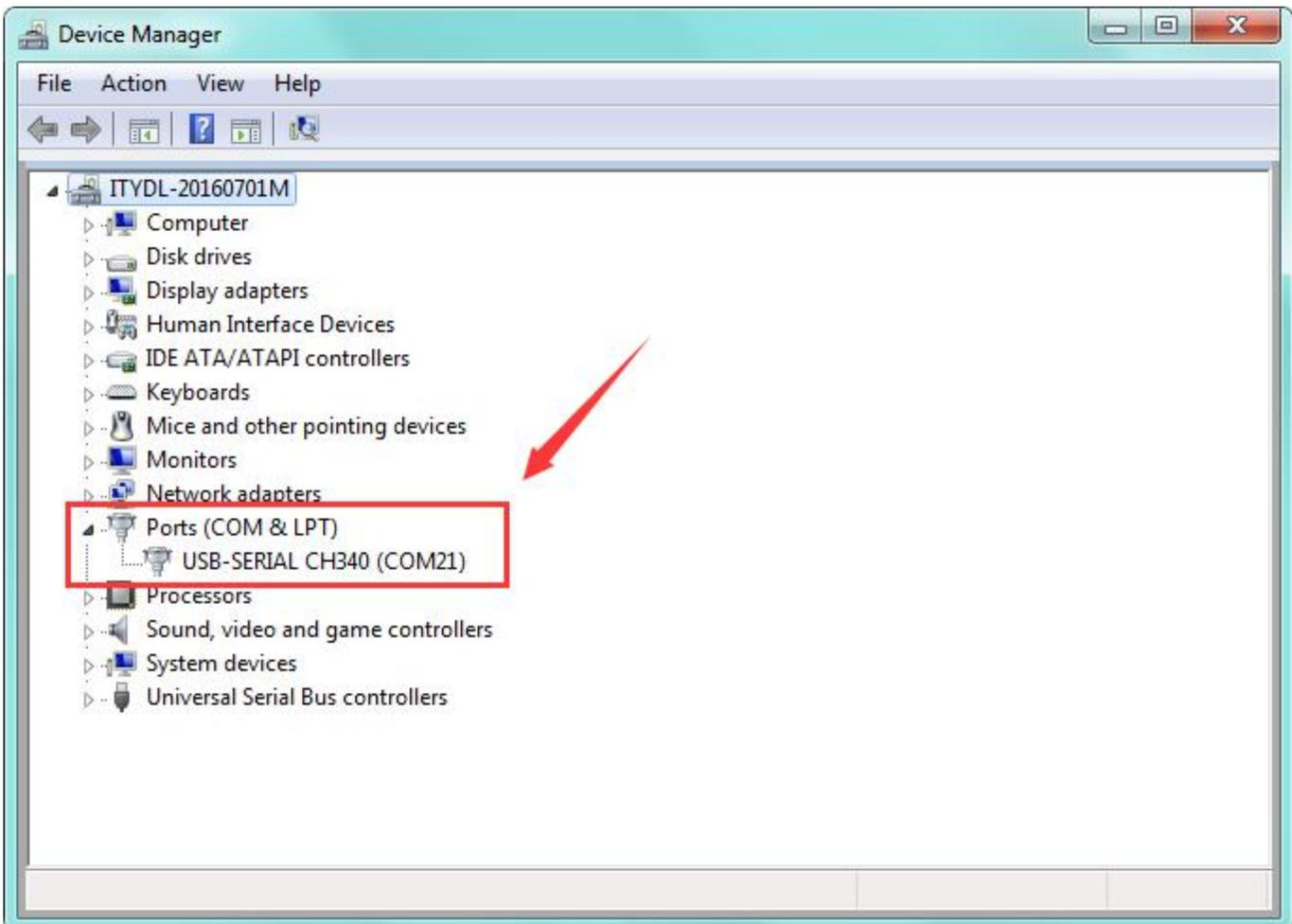


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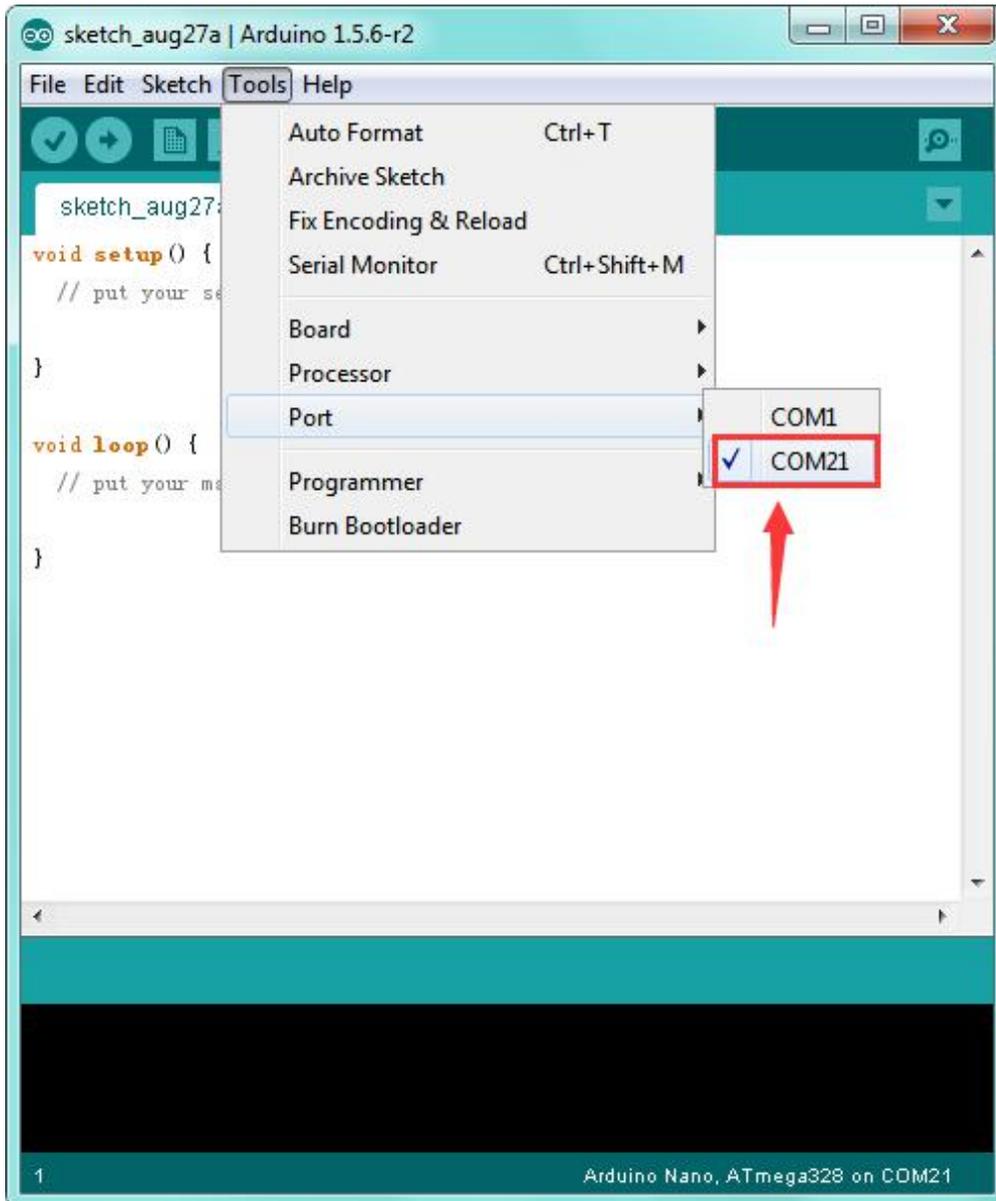
Step5| Select your serial port

Select the serial device of the Arduino board from the **Tools | Serial Port menu**.

Note: to avoid errors, the COM Port should keep the same as the Ports shown on Device Manager.



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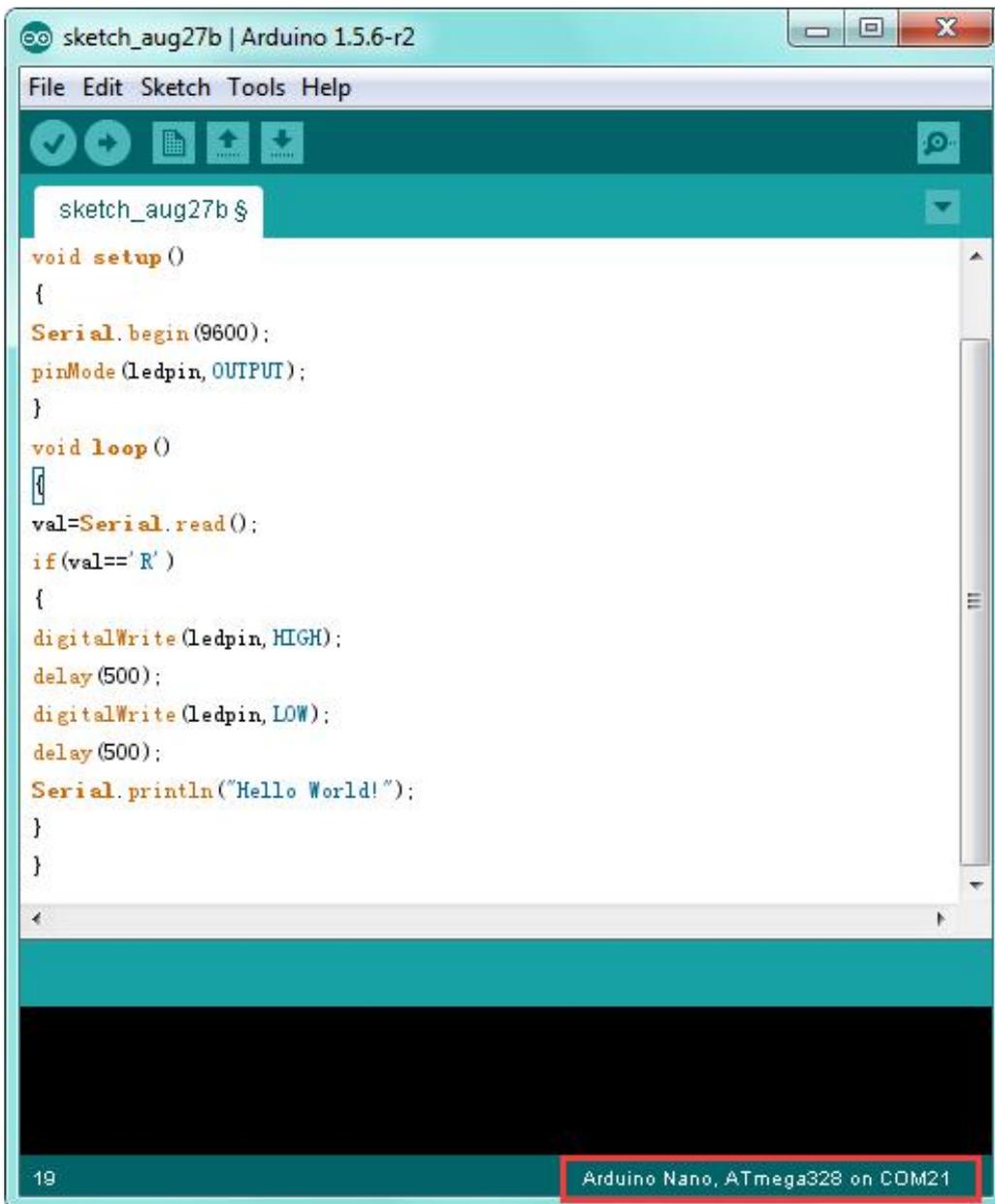
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Step6 | Upload the Code

Below is an example code for displaying the Hello World!
Copy and paste the code to the Arduino environment IDE.

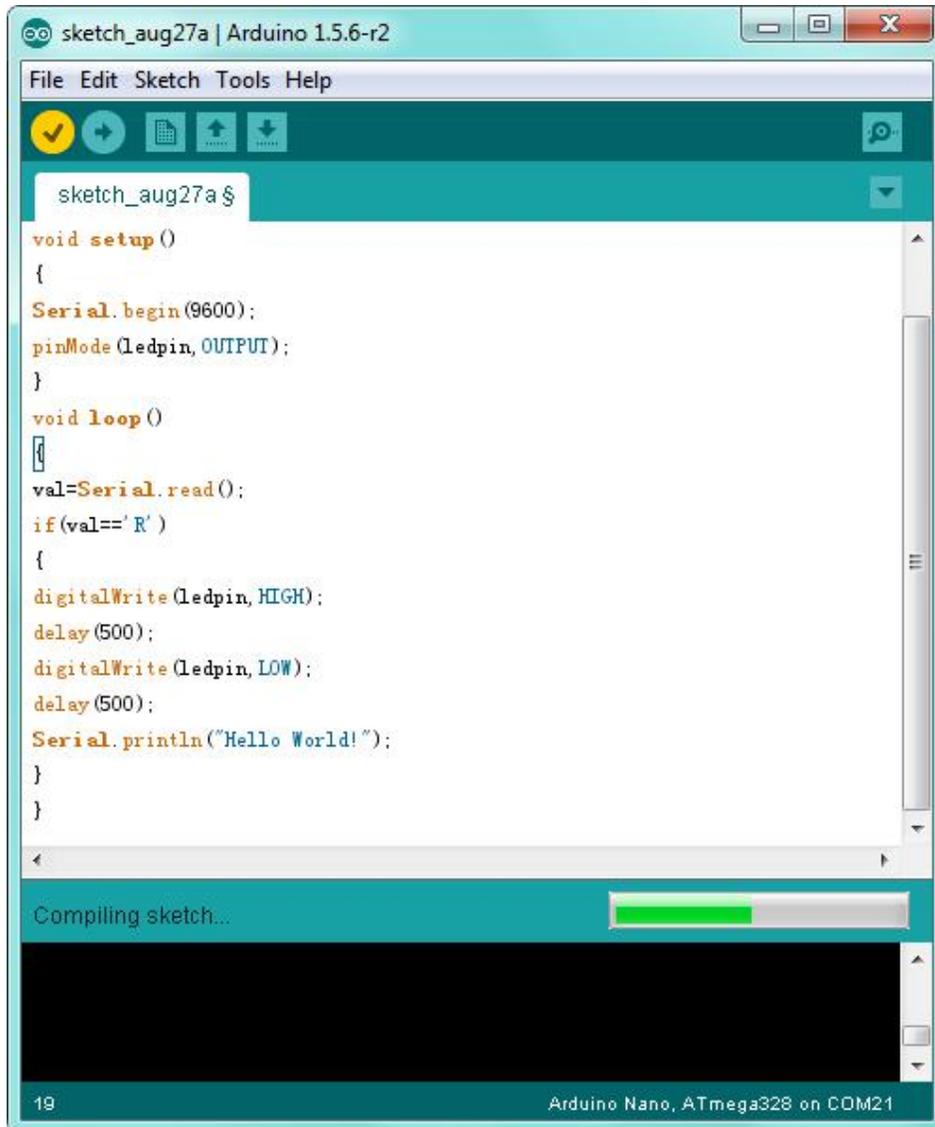
```
////////////////////////////////////  
int val;  
int ledpin=13;  
void setup()  
{  
Serial.begin(9600);  
pinMode(ledpin,OUTPUT);  
}  
void loop()  
{  
val=Serial.read();  
if(val=='R')  
{  
digitalWrite(ledpin,HIGH);  
delay(500);  
digitalWrite(ledpin,LOW);  
delay(500);  
Serial.println("Hello World!");  
}  
}  
////////////////////////////////////
```

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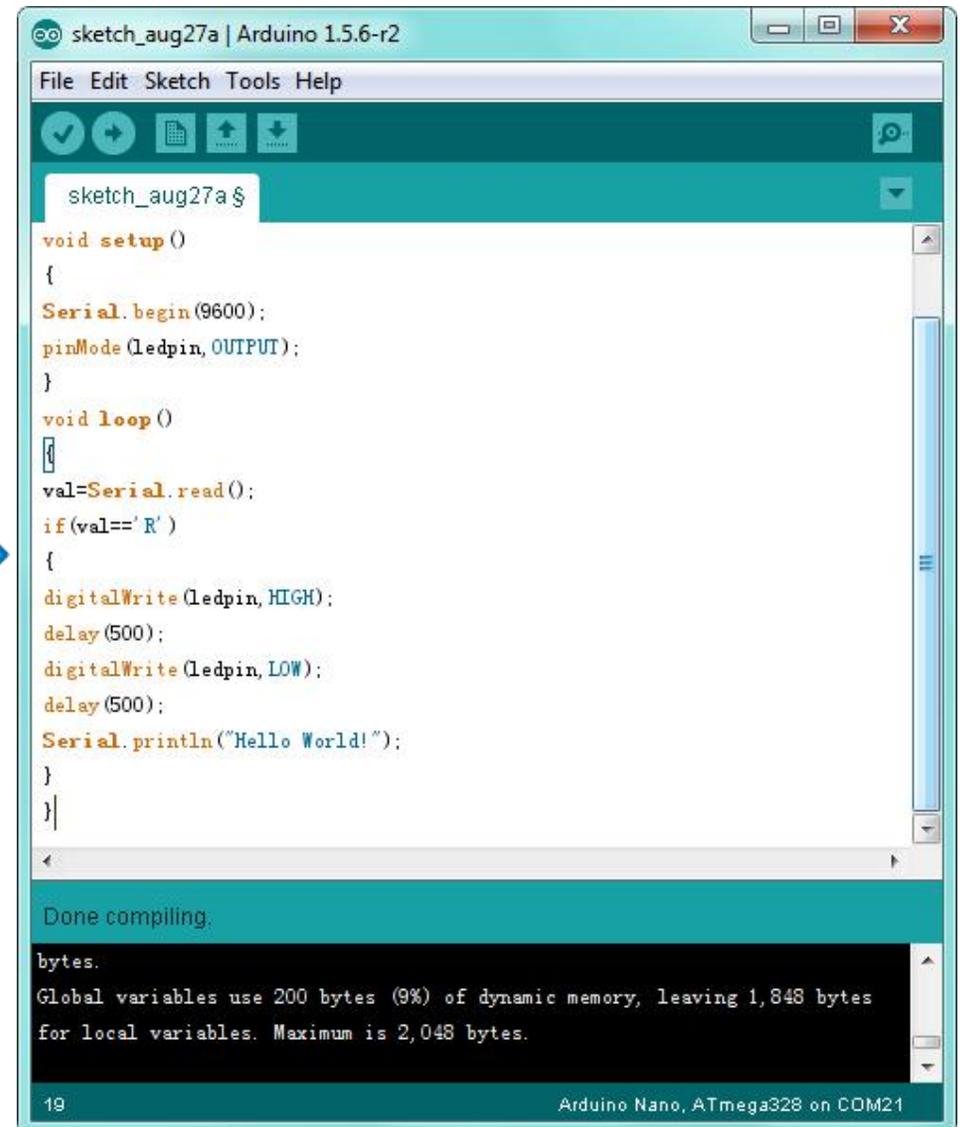


Then click verify button to check the errors. If compiling successfully, the message "Done compiling." will appear in the status bar.

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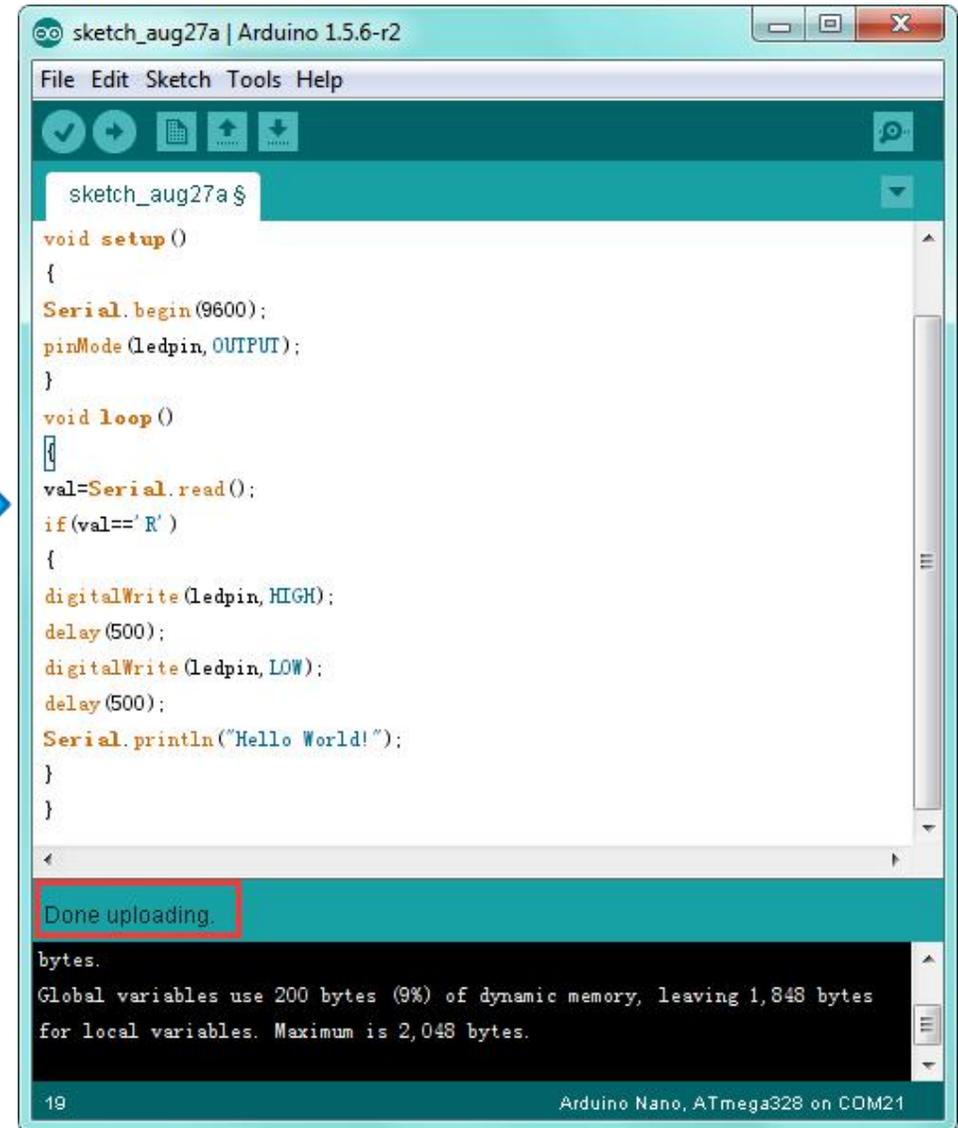
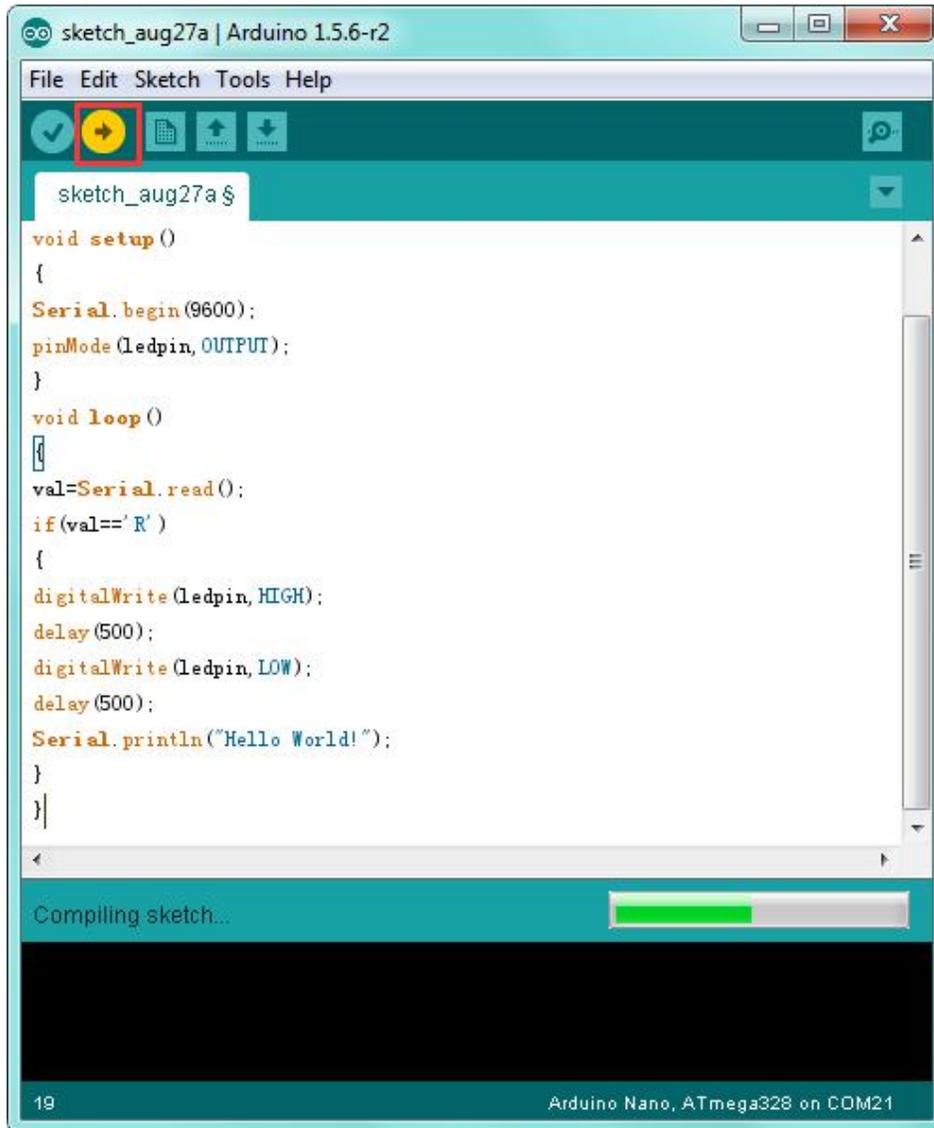
```
sketch_aug27a | Arduino 1.5.6-r2
File Edit Sketch Tools Help
sketch_aug27a $
void setup()
{
  Serial.begin(9600);
  pinMode(ledpin, OUTPUT);
}
void loop()
{
  val=Serial.read();
  if(val=='R')
  {
    digitalWrite(ledpin, HIGH);
    delay(500);
    digitalWrite(ledpin, LOW);
    delay(500);
    Serial.println("Hello World!");
  }
}
Compiling sketch...
```



```
sketch_aug27a | Arduino 1.5.6-r2
File Edit Sketch Tools Help
sketch_aug27a $
void setup()
{
  Serial.begin(9600);
  pinMode(ledpin, OUTPUT);
}
void loop()
{
  val=Serial.read();
  if(val=='R')
  {
    digitalWrite(ledpin, HIGH);
    delay(500);
    digitalWrite(ledpin, LOW);
    delay(500);
    Serial.println("Hello World!");
  }
}
Done compiling.
bytes.
Global variables use 200 bytes (9%) of dynamic memory, leaving 1,848 bytes
for local variables. Maximum is 2,048 bytes.
```

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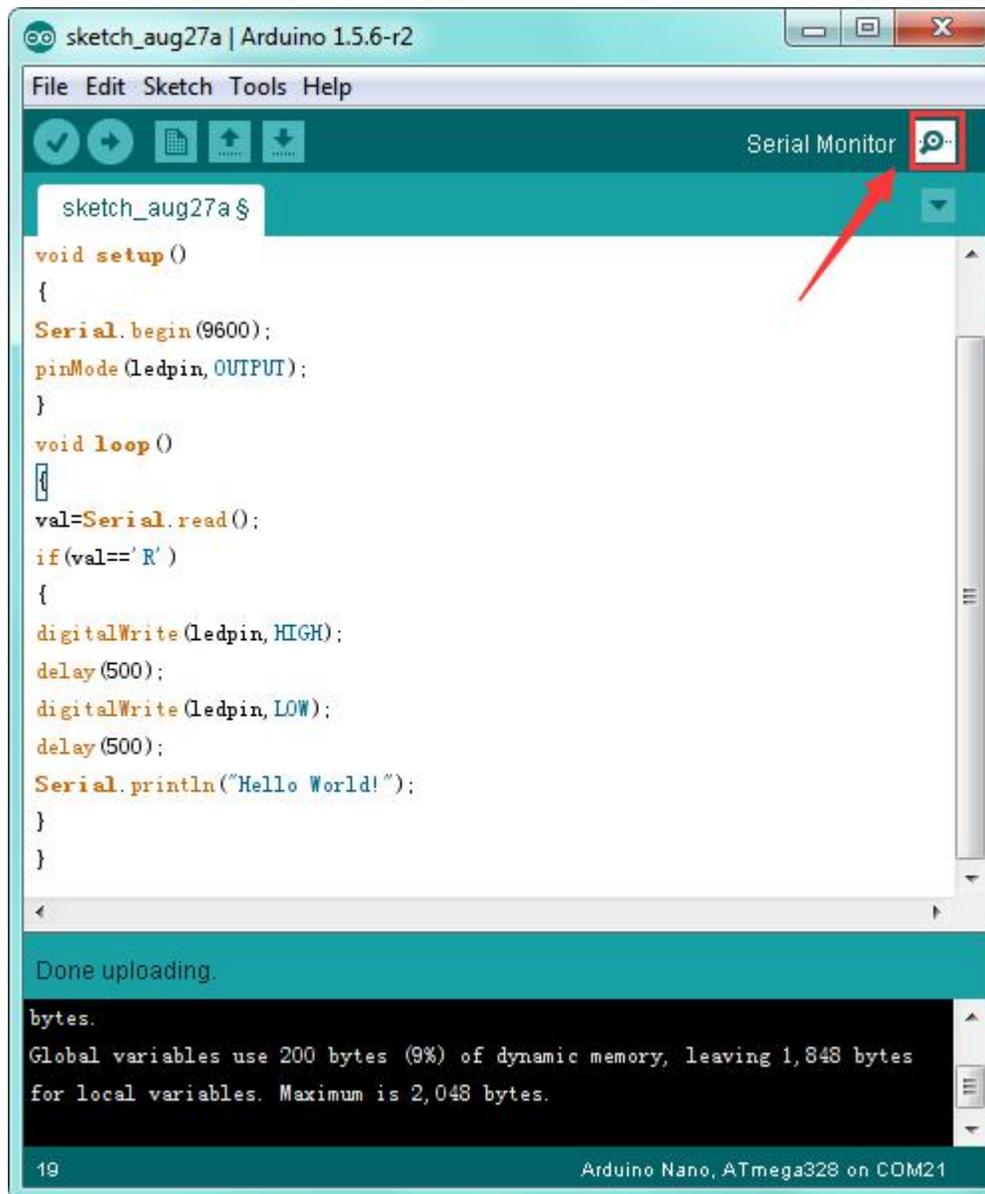
After that, click the "Upload" button to upload the code. If the upload is successful, the message "Done uploading." will appear in the status bar.



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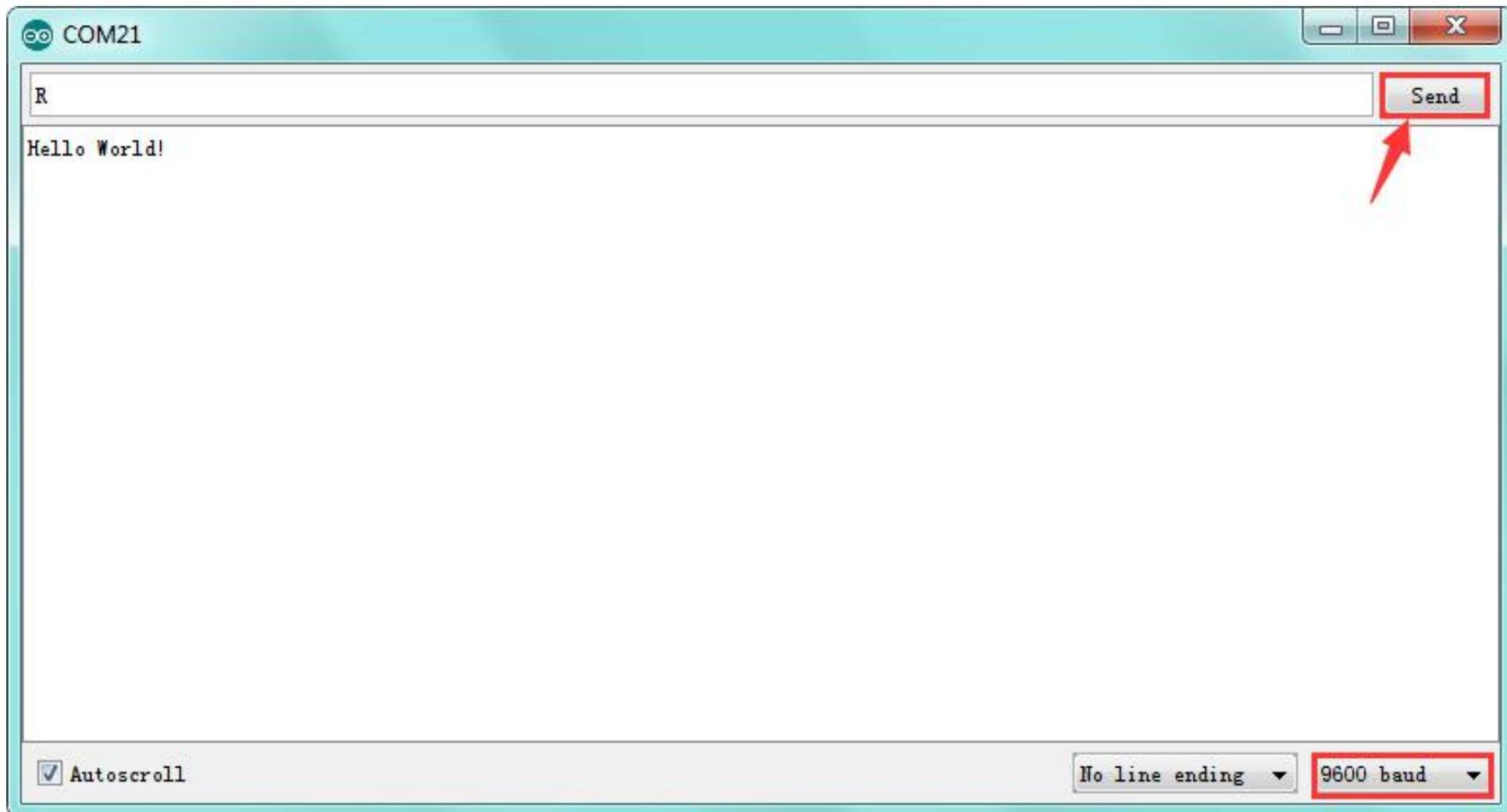
Step7 | Open the Serial Monitor

After that, click the button to open the serial monitor.



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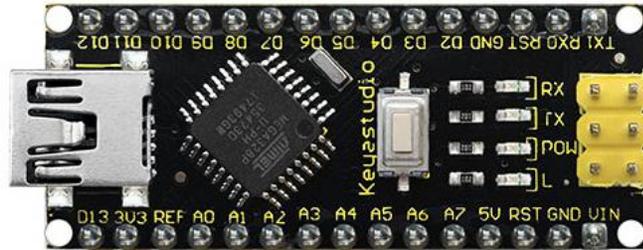
Then set the baud rate to 9600, enter an "R" and click Send, that is, the computer will send the character R. When NANO board receives it, you should see the RX led on the board flash once, and then D13 led flash once; when keyestudio NANO board sends "Hello World!" to the computer, finally you should see the "Hello World!" is showed on the monitor, and TX led on the board flash once.



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Package Included:

- Keystudio NANO ch340 * 1pcs
- 30cm mini USB cable * 1pcs



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Resource Links:

You can download the datasheet from the link:

<https://drive.google.com/open?id=1z4-9cVEQ8I4JIBqw2QsaLjp3i2TUa6wZ>

Download the CH340 Driver File:

<https://drive.google.com/open?id=1MEES7PWMN1aaqZ7wzcxIkv21xYf3CNNi>

You might also want to look at:

[the reference](#) for the Arduino language;

Download ARDUINO Software:

<https://www.arduino.cc/en/Main/OldSoftwareReleases#1.5.x>

Troubleshooting:

If you have problems, please see the [troubleshooting suggestions](#).