

ARM® ARM926EJ-S
32-bit Microprocessor

NuMaker NuWicam
Samples

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1 INTRODUCTION

In this document, we will describe how to construct the NuMaker NuWicam^[1] samples. These samples include LEDs controlling, get temperature value from digital or analog sensor. These samples can be executed on Arduino UNO, Nuduo or Nubed board. We will describe more details in sub-chapter as below.

- Arduino(or Nuduo) UNO board
- Nubed board

[1] NuWicam is short for NuMaker NuWicam.

2 ARDUINO UNO (OR NUDUINO UNO) BOARD

2.1 Board schematics

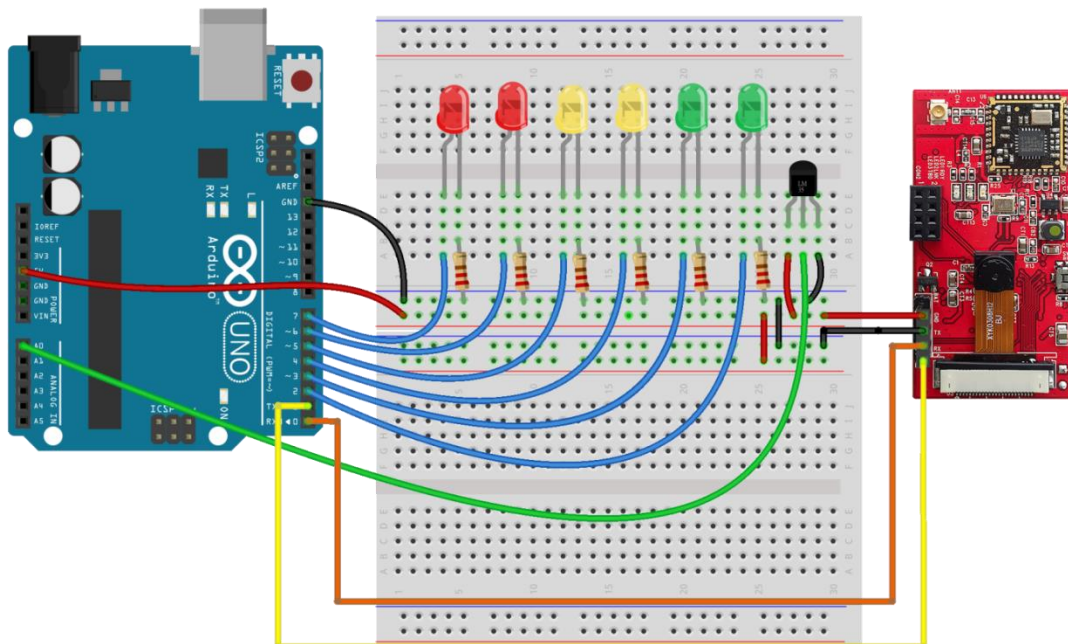


Figure 2-1 NuWicam-VGA board with Arduino UNO

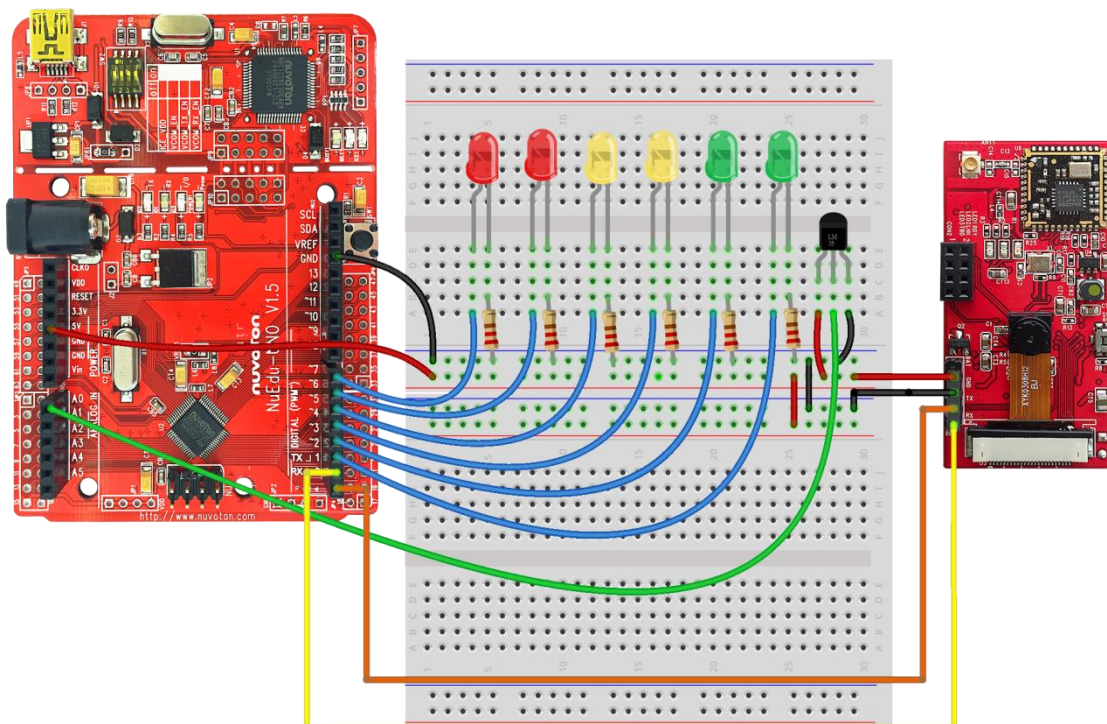


Figure 2-2 NuWicam-VGA board with Nuduo UNO

2.2 Requirement

2.2.1 Hardware

- NuWicam board with firmware x 1
- Geduino UNO(or Nuduino UNO) board x 1 (with USB Line, DC Power adapter)
 - **If your board is Nuduino UNO, please remember to switch 2, 3 and 4 of SW2 to 'OFF' on the board.**
- Red LEDs x 2, Green LEDs x 2 and Blue LEDs x 2
- 220 ohm resistor x 6
- Some dupont lines
- LM35 analog temperature sensor
- USB power adapter(5V/1A).

2.2.2 Software

- Arduino IDE v1.6.9 (or later)
 - You can refer the page to install arduino IDE for NuEdu-UNO.
<https://github.com/OpenNuvoton/NuEdu-UNO>
- Modified Modbus-Master-Slave-for-Arduino Modbus library
 - Please download library on github server.
 - Path:
https://github.com/OpenNuvoton/NuMaker_NuWicam_Samples/NuMaker_NuWiCam_Arduino_UNO/Modbus-Master-Slave-for-Arduino.zip
- NuWicam sample code for Arduino UNO/Mega board.
 - Please download source on github server.
 - Path:
https://github.com/OpenNuvoton/NuMaker_NuWicam_Samples/NuMaker_NuWiCam_Arduino_UNO

2.3 Purchasing information

- **Nuduino UNO board**
 URL: <https://world.tmall.com/item/523268526584.htm?spm=a312a.7700824.w4011-6765047385.25.2qjifz&id=523268526584&rn=93873a1038dd4952f86ee4c2766ccae0&abbucket=10>
- **LM35 analog temperature sensor module**
 URL: <https://world.taobao.com>

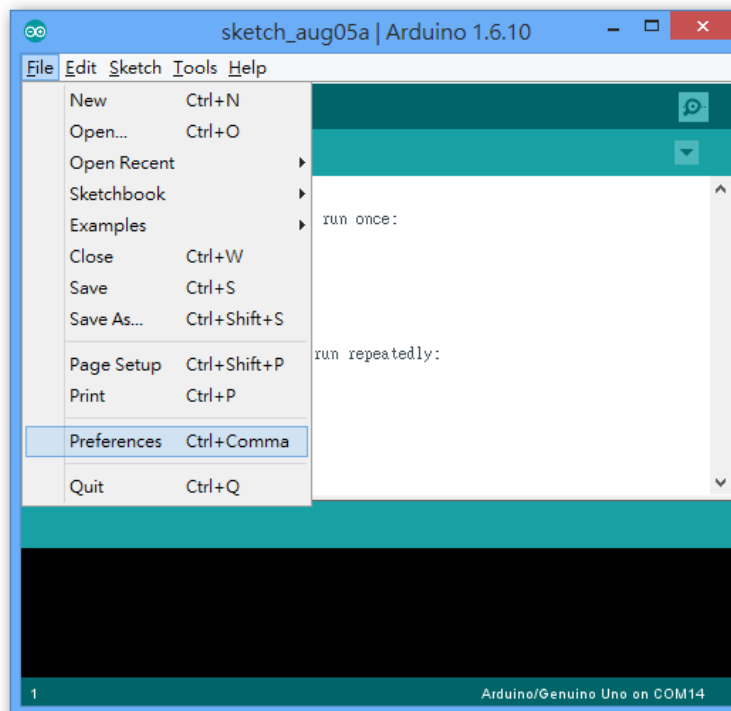
2.4 Arduino IDE installation

Step 1: Download Arduino 1.6.10 IDE from <https://www.arduino.cc/en/Main/Software>



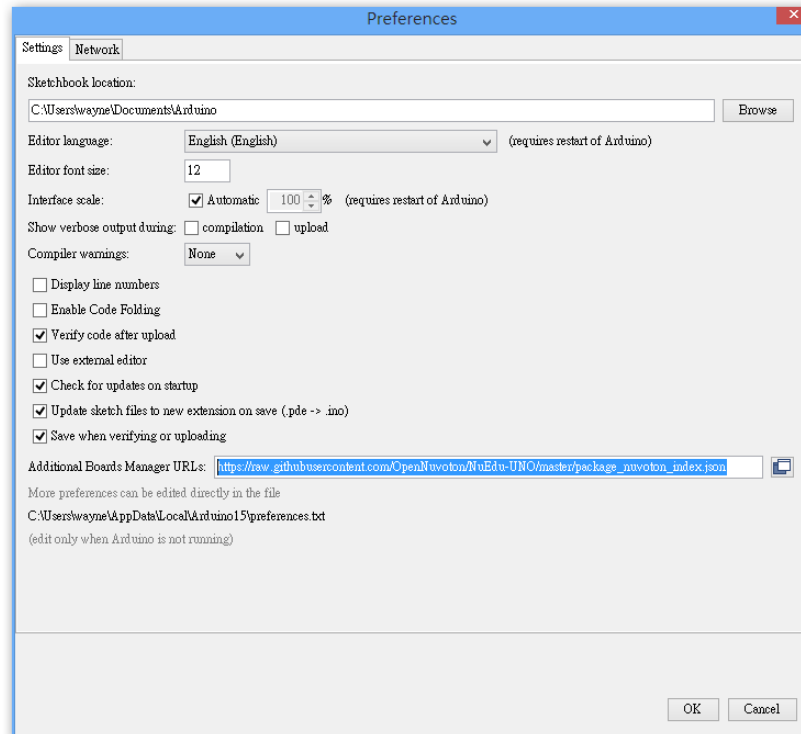
Step 2: Extract arduino-1.6.10-windows.zip to c:\arduino-1.6.10.

Step 3: Double-click arduino.exe, and then go to File->Preferences.

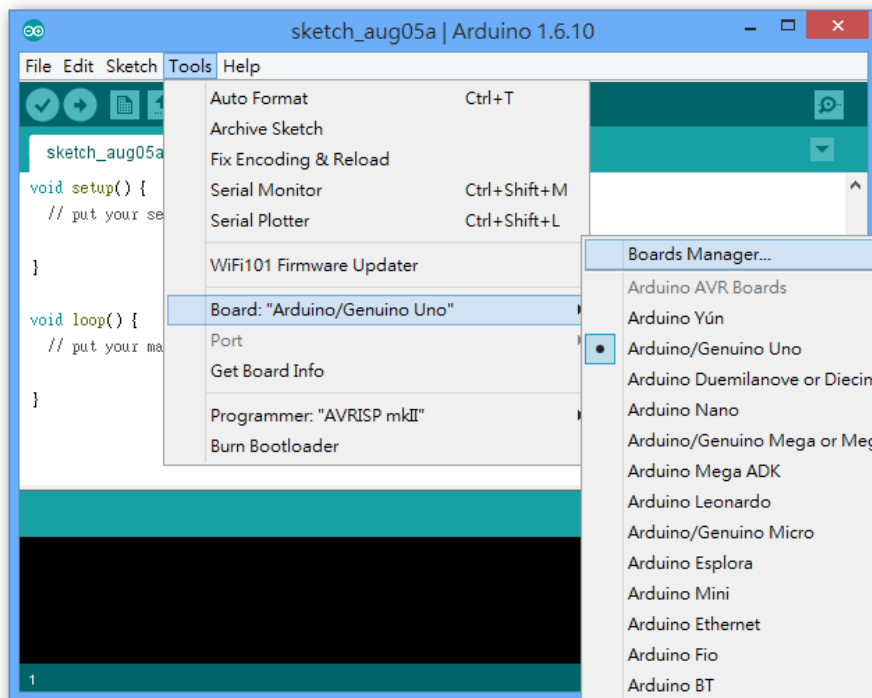


Step 4: Paste following URL to 'Additional Boards Manager URLs' input field:

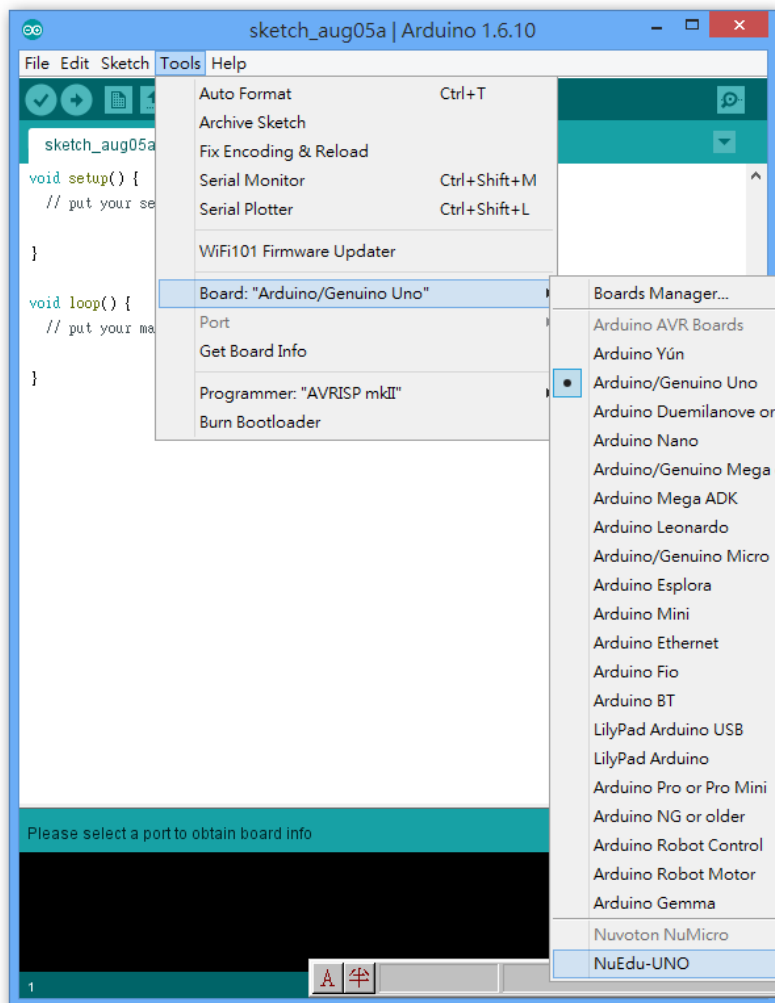
https://raw.githubusercontent.com/OpenNuvoton/NuEdu-UNO/master/package_nuvoton_index.json



Step 5: Under Tools->Board->Boards Manger, search NuEdu-UNO by Nuvoton, click Install



Step 6: You can select NuEdu-UNO in Arduino IDE now.

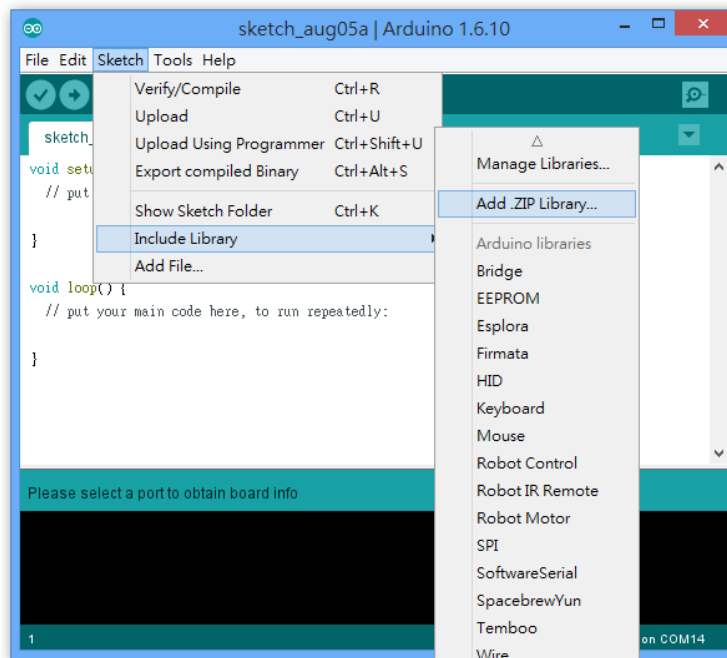


2.5 Sample code building

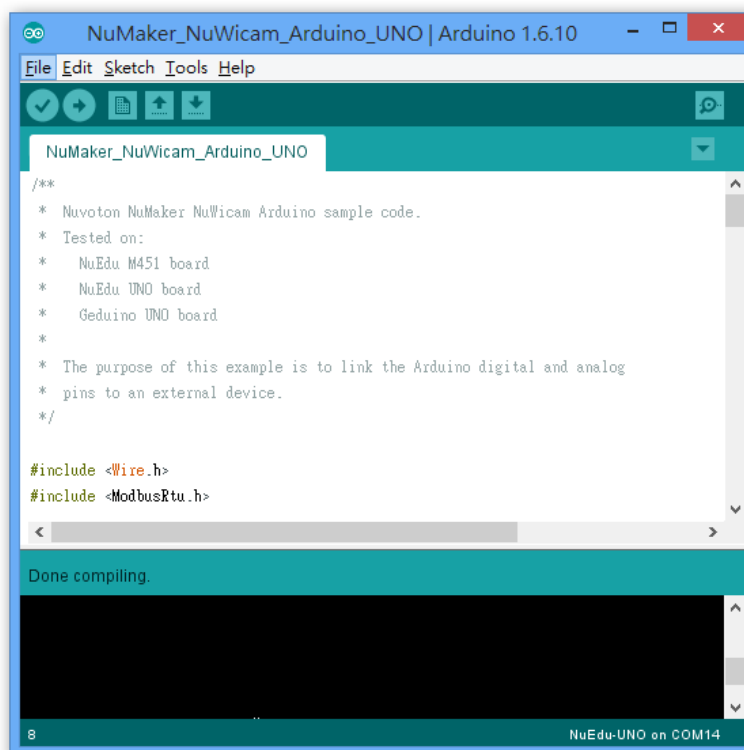
Please follow below steps to build executable binary.

Step 1: Import the modified Modbus-Master-Slave-for-Arduino Modbus.zip library

<Sketch> → <Include Library> → <Add .ZIP library ...> → Select the .zip file path. → <Open>

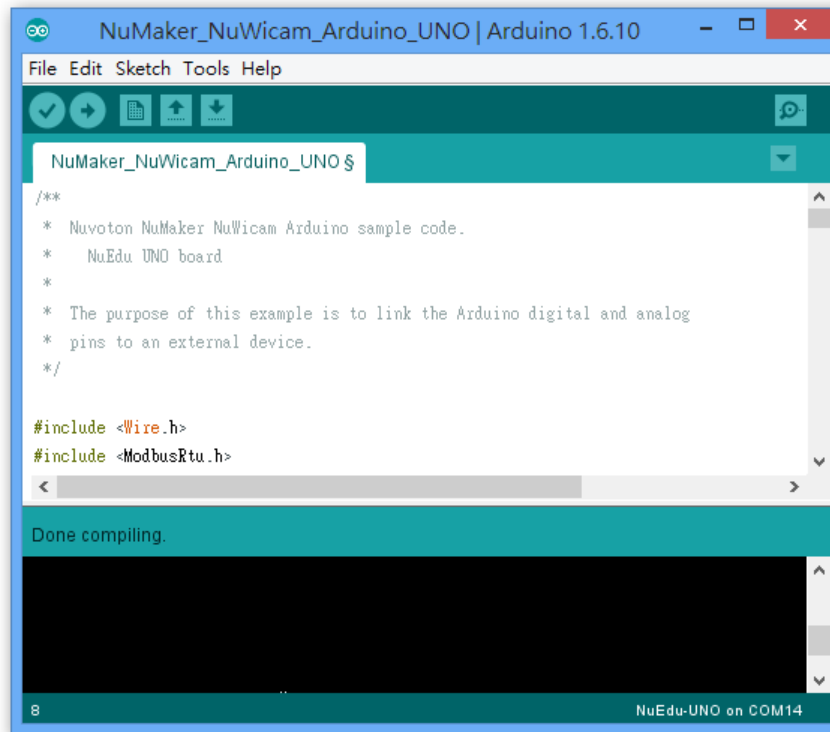


Step 2: Load NuWicam sample code for Arduino UNO board.



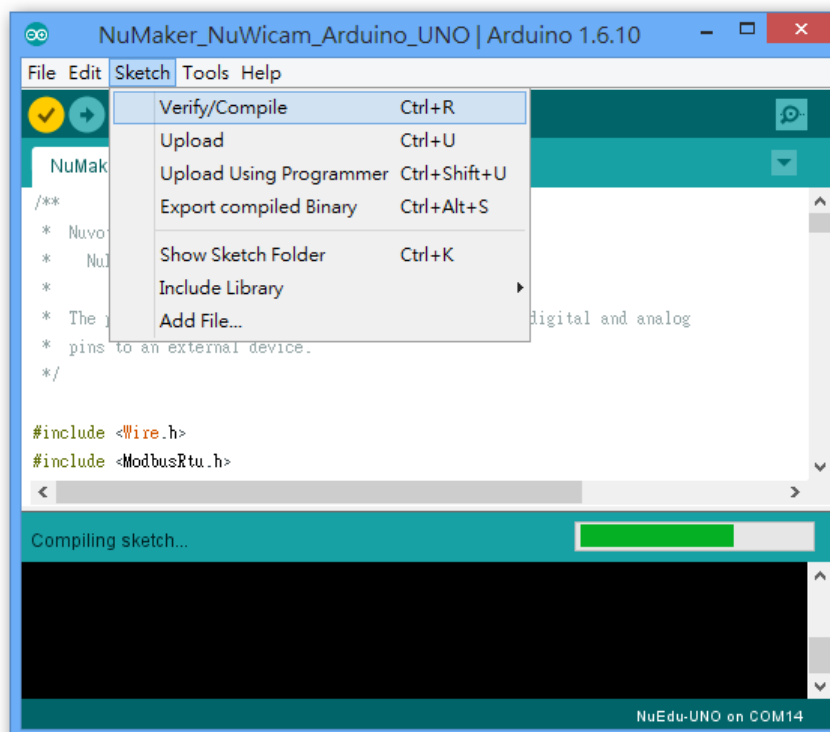
Step 3: Select configuration for Geduino UNO board.

<Tools> → <Board: “Arduino/Geduino UNO”> → Select Arduino/Geduino UNO.



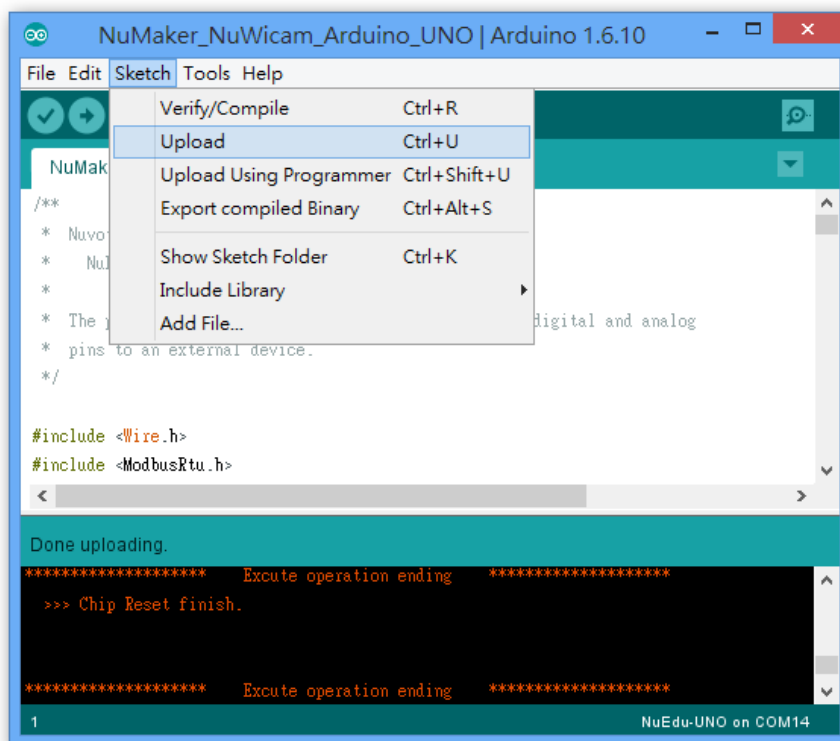
Step 4: Build sample code.

<Sketch> → <Verify/Compile>



Step 5: Upload executable binary to board.

<Sketch> → <Upload>



2.6 Function testing

Open NuMaker NuWicam Player mobile APP to test function. As below figure, it shows a temperature value on the screen and these six circles are for every LED controllers. You can press these circles to light on/off LED.



3 NUDUINO MEGA BOARD

3.1 Board schematics

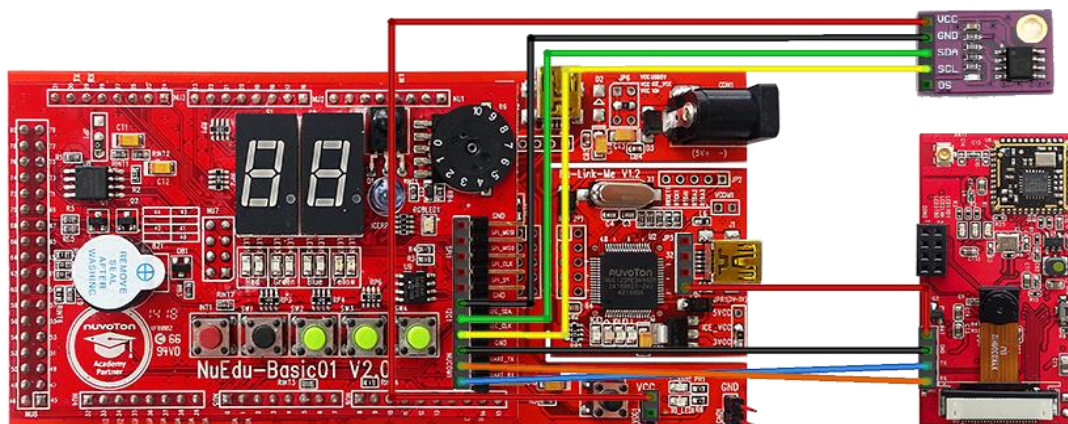


Figure 3-1 NuWicam-VGA board with Nuduoino MEGA and its daughter board

3.2 Requirement

3.2.1 Hardware

- NuWicam board with firmware x 1
- Nuduoino board x 1 (with USB Line, and NuEdu basic board)
- TI LM75a temperature sensor module board.
- Some dupont lines
- USB power adapter(5V/1A).

3.2.2 Software

- Arduino IDE v1.5.8 (**Must**)
 - Download path: <https://www.arduino.cc/en/Main/OldSoftwareReleases#previous>
- NuWicam sample code and patch files for Nuduoino board.
 - Path: https://github.com/OpenNuvoton/NuMaker_NuWicam_Samples/NuMaker_NuWiCam_Nuduoino/numaker_nuwicam_arduino_1.5.8_patch.exe

3.3 Purchasing information

- Nuduoino board x1
- If you need to Nuduoino board, we provide purchasing information for you. About more information, please visit the Nuvoton on-line store on Tmall(天貓).

URL: <https://world.tmall.com/item/43127043123.htm?spm=a312a.7700824.w4011-6765047385.25.Usfy8Y&id=43127043123&rn=7b5af4061de8905a6de7032ec4af54a8&abucket=3>

- TI LM75a temperature sensor module board

URL: <https://world.taobao.com/item/534877355522.htm?spm=a312a.7700714.0.0.Z5quaZ#detail>

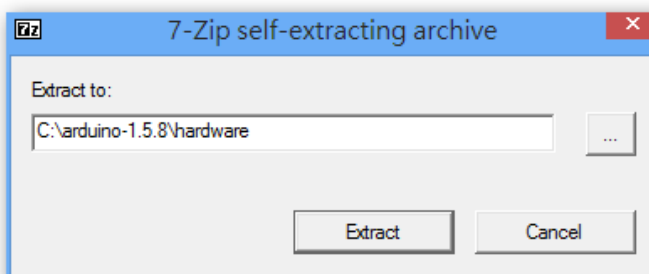
Notice: Please remember to short A0, A1 and A2 switch to GND.

3.4 Sample code building

Please follow below steps to build executable binary.

Step 1: Install NuWicam patch files for Nuduino board

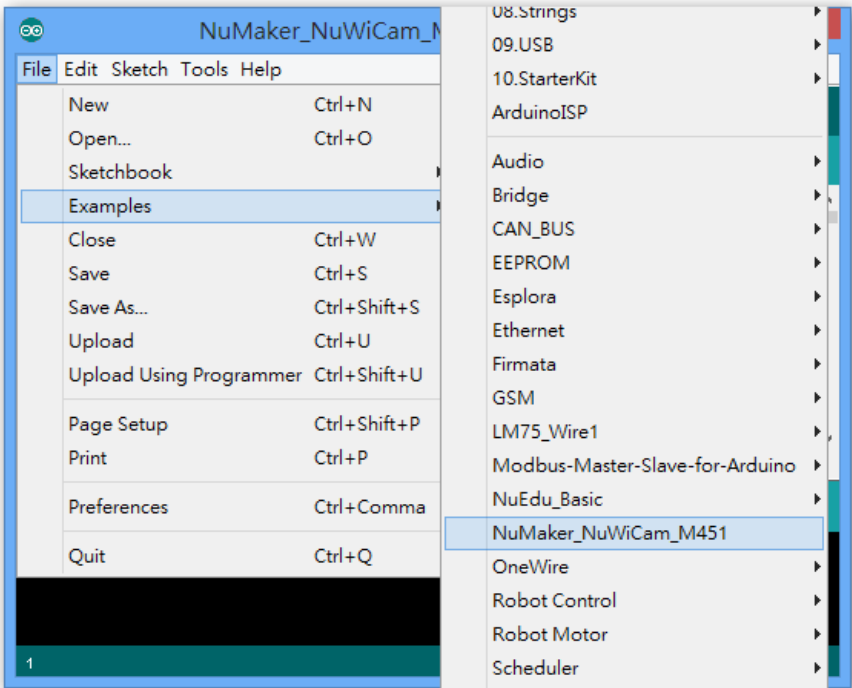
You should specify the arduino-1.5.8 IDE installation path. For example, the arduino-1.5.8 IDE installation path is 'C:\arduino-1.5.8'. You need extract files into 'C:\arduino-1.5.8\hardware'.



Step 2: Load NuWicam sample code for Nuduino board.

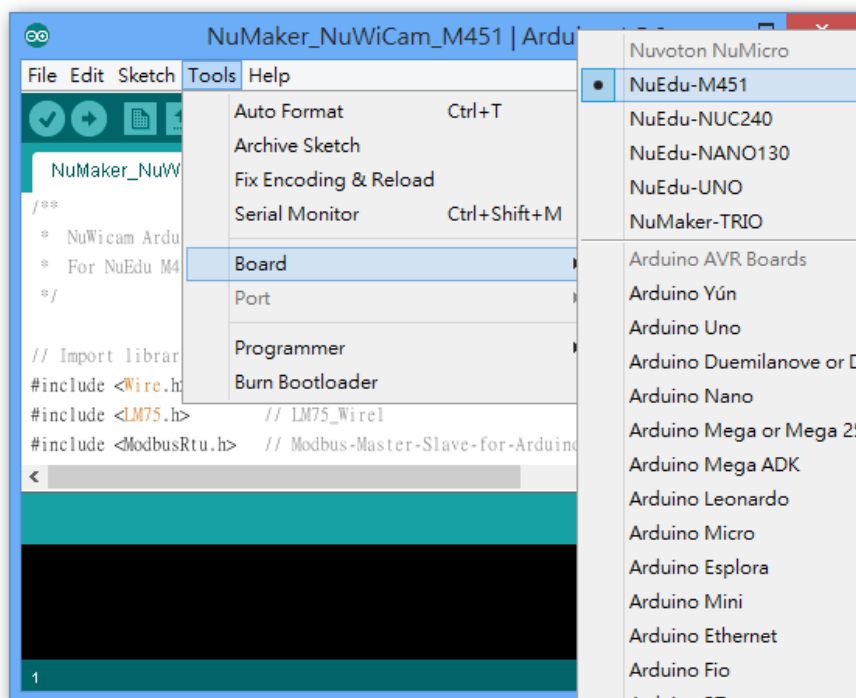
To execute C:\arduino-1.5.8\arduino.exe and Load NuWicam sample code.

<File> → <Examples> → <NuMaker_NuWicam_M451>.



Step 3: Select configuration for Nuduino board.

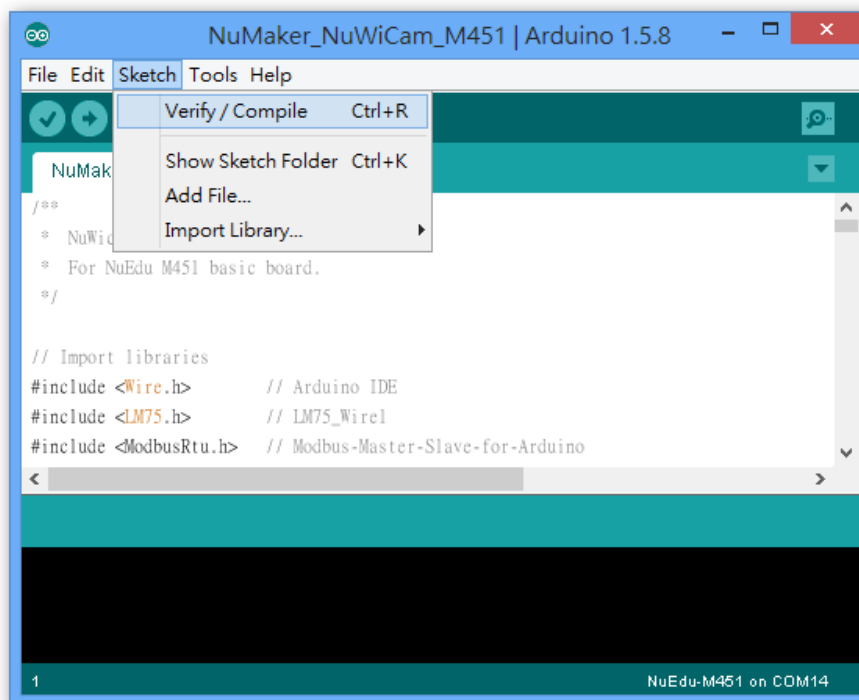
<Tools> → <Board: “NuEdu/M451”> → Select NuEdu-M451.



Step 4: Build sample code.

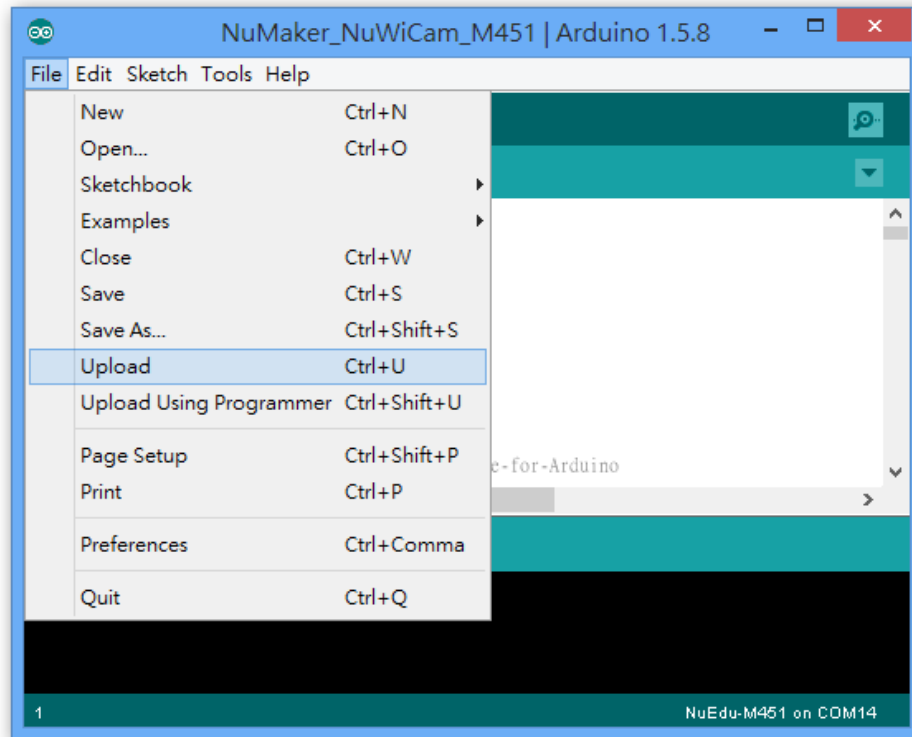
<Sketch> → <Verify/Compile>

Notice: The NuWicam patch for Nuduino already includes modified MODBUS library. You should remove Modbus-Master-Slave-for-Arduino Modbus library if necessary.



Step 5: Upload executable binary to board.

<File> → <Upload>



3.5 Function testing

Current temperature information is shown on 7-segment LEDs. After touching the LM75 temperature sensor module, you can see increased value. You can also open NuMaker NuWicam Player mobile APP to test function. As below figure, it shows a temperature value on the screen and these six circles are for every LED controllers. You can press these circles to light on/off LED.

4 NUBED NU472 BOARD

4.1 Board schematics

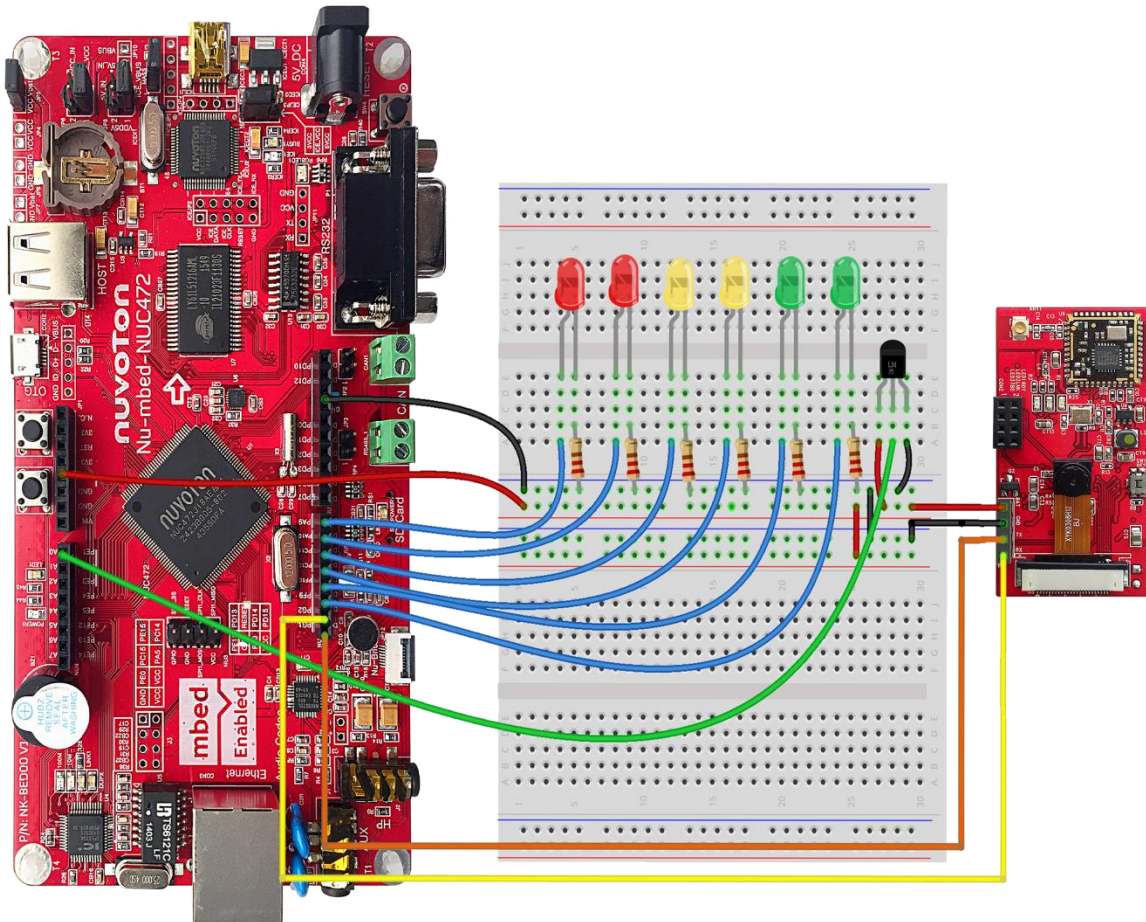


Figure 4-1 NuWicam-VGA board with Nubed NUC472

4.2 Requirement

4.2.1 Hardware

- NuWicam board with firmware x 1
- Nubed NUC472 board x 1 (with USB Line, DC Power adapter)
- Red LEDs x 2, Green LEDs x 2 and Blue LEDs x 2
- 220 ohm resistor x 6
- Some dupont lines
- LM35 analog temperature sensor
- USB power adapter(5V/1A).

4.2.2 Software

- Google Chrome Browser
- NuWicam sample code for Nubed NUC472 board.
 - Please visit ARM website.
 - Path: https://developer.mbed.org/users/wclin/code/NuMaker_NuWicam_Lite/

4.3 Purchasing information

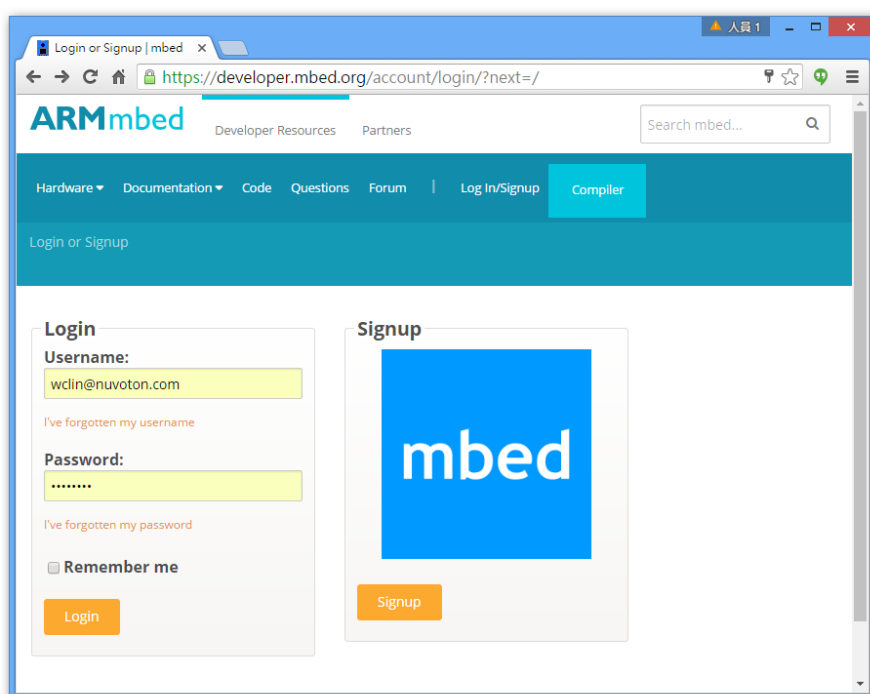
- Nubed NUC472 board
URL: N/A
- LM35 analog temperature sensor module
URL: <https://world.taobao.com>

4.4 Sample code building

Please follow below steps to build executable binary.

Step 1: Open Google Chrome web browser and Login your ARM mbed account.

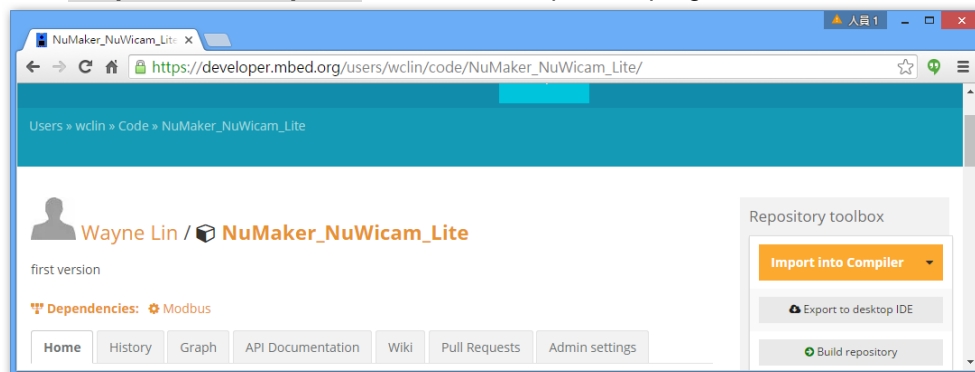
Path: <https://developer.mbed.org/>

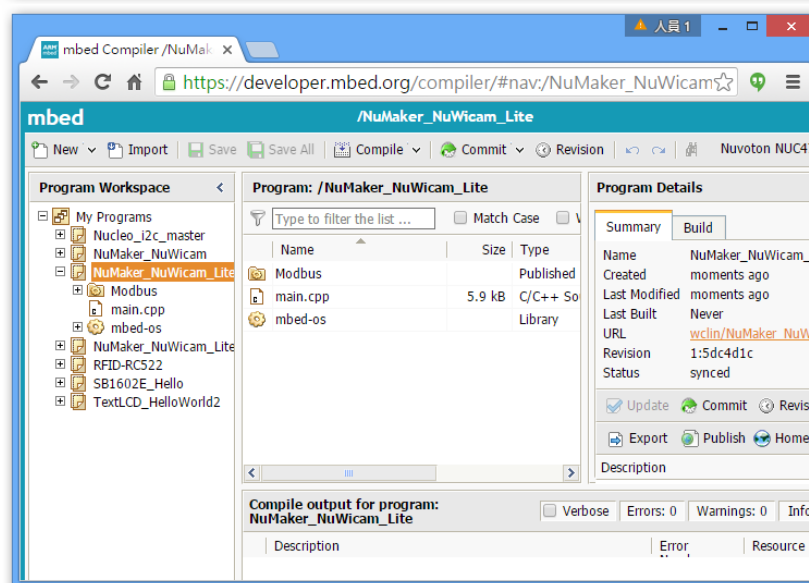
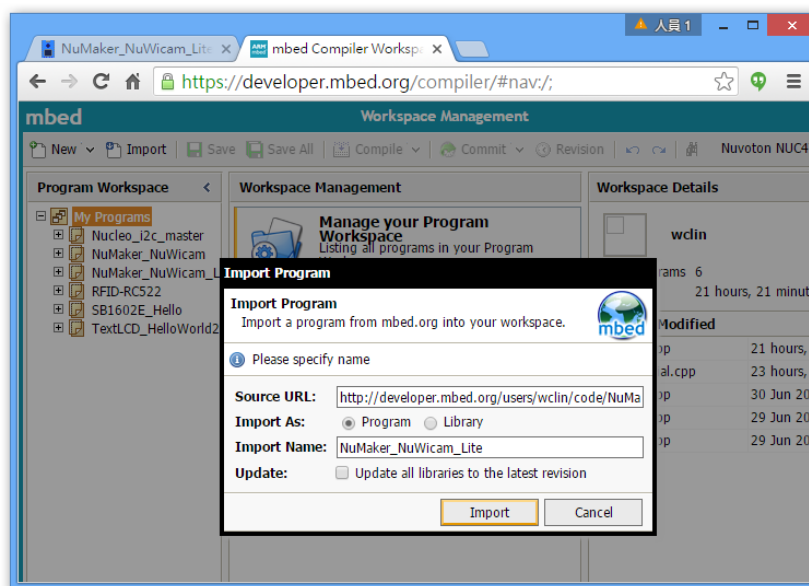




Step 2: Import NuWicam sample into 'ARM mbed Compiler'.

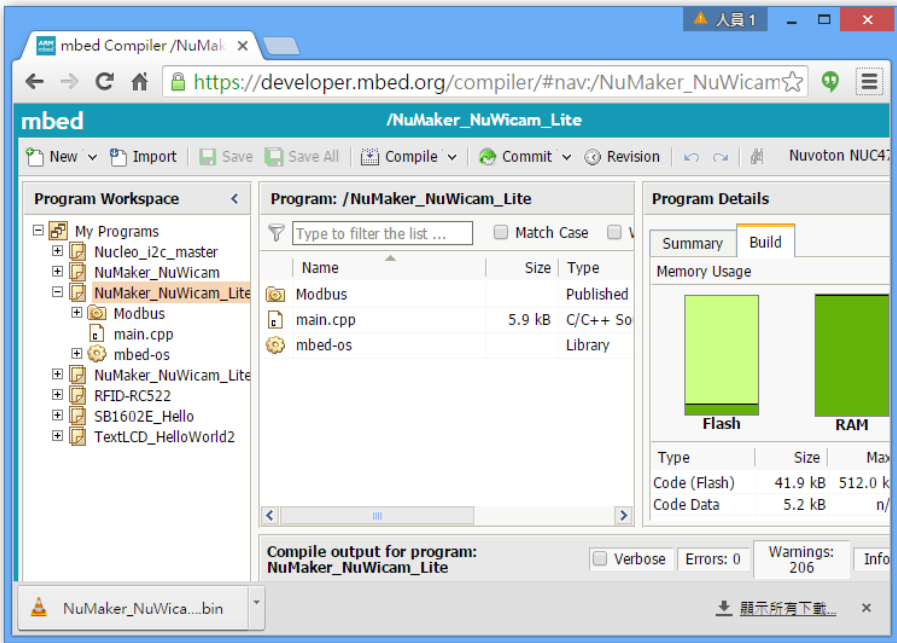
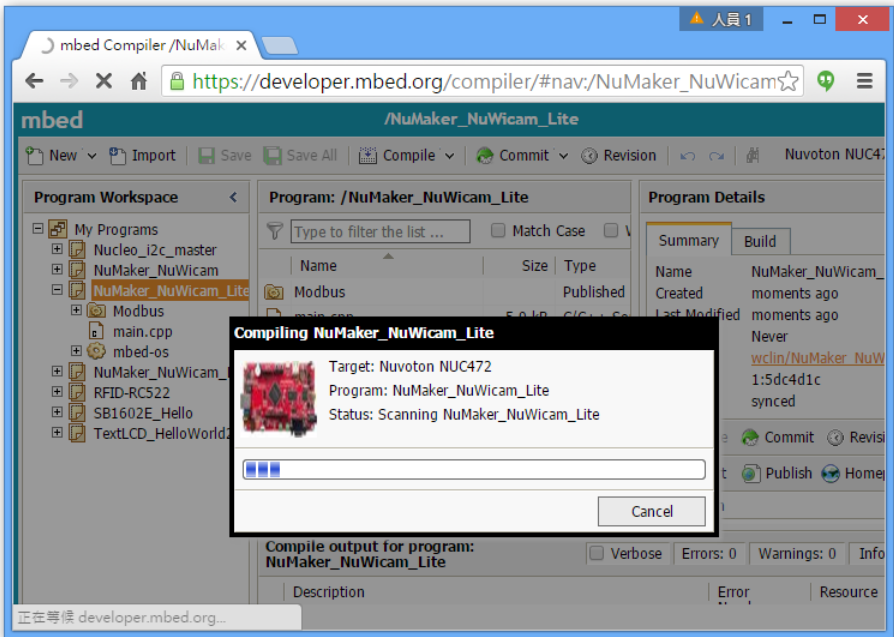
Path: https://developer.mbed.org/users/wcln/code/NuMaker_NuWicam_Lite/
Press **<Import into Compiler>** button, it will import the program.





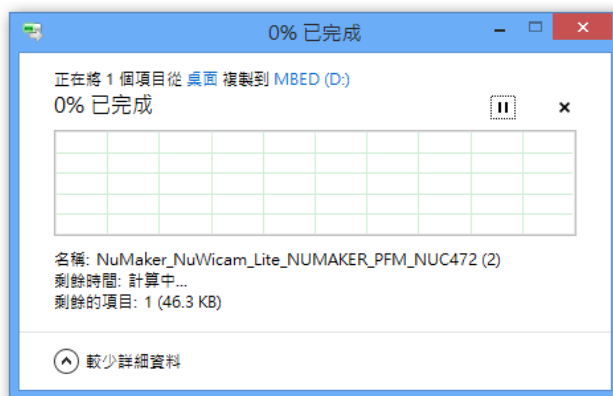
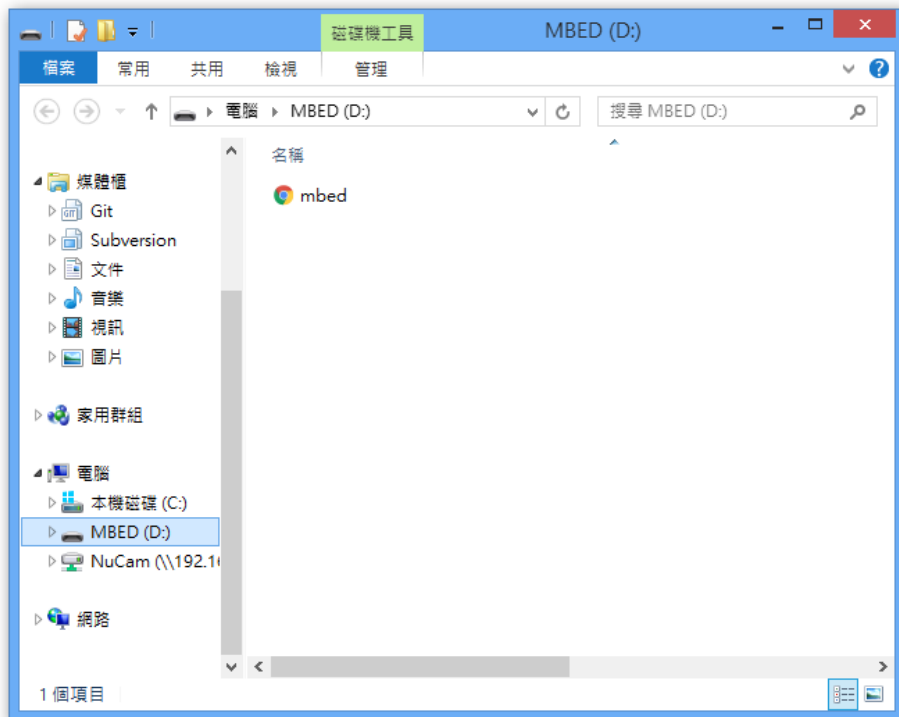
Step 3: Build sample code

Press **<Compile>** to build the sample code. After done, it will produce downloadable file.



Step 4: Upload executable binary to board.

Copy the 'NuMaker_NuWicam_Lite_NUMAKER_PFM_NUC472.bin' to mbed disk. You can find the mbed disk in your computer manager.



4.5 Function testing

Current temperature information is shown on 7-segment LEDs. After touching the LM75 temperature sensor module, you can see increased value. You can also open NuMaker NuWicam Player mobile APP to test function. As below figure, it shows a temperature value on the screen and these six circles are for every LED controllers. You can press these circles to light on/off LED.

5 REVISION HISTORY

Date	Revision	Description
2016.08.10	1.00	1. Initially issued.

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