

Arduino

Is YOUR friend!



What is “Arduino”



- A teaching tool for technology Artists
- The name ARDUINO comes from the name of the pub where the concept was designed on a napkin.
- It is a simple MICRO-CONTROLLER
- It is fully programmable
- It is inexpensive
- It has low power requirements

What can you do with an Arduino

- Control relays or drive transistors
- Timing or sequencing
- Run Open or Closed control loops with 1 or many variables
- Run multiple programs with many different processes
- Use it to expand your knowledge
- As you start using it you will learn the C/C++ programming language

<https://www.arduino.cc/>



Wait...is there more than 1 type of Arduino

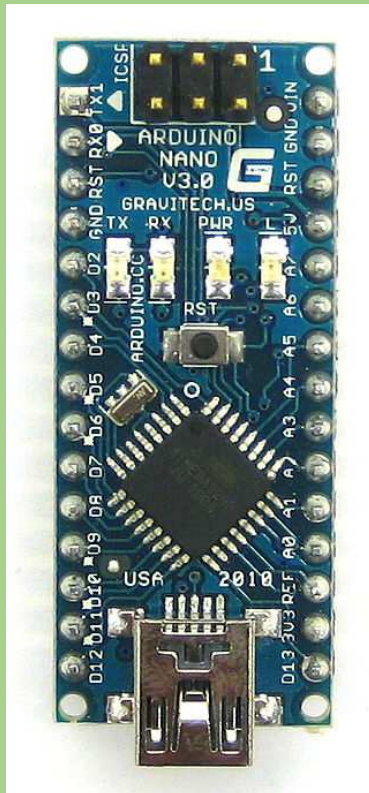
- YES....and the capabilities are different between models
- Most are based on the same family of controller chips
- They are even available as kits

<http://www.instructables.com/id/Intro-to-Arduino/>



instructables

Let's look at some of the versions....

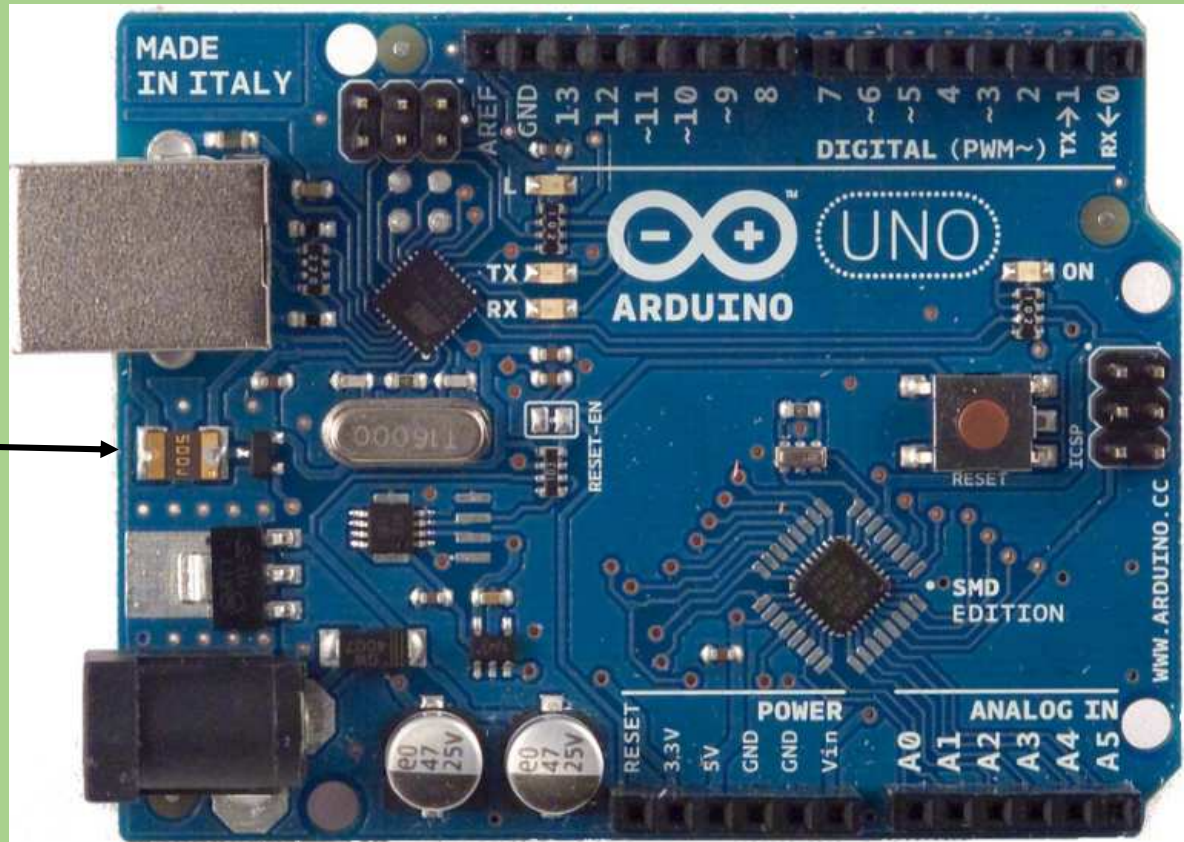


NANO



Uno

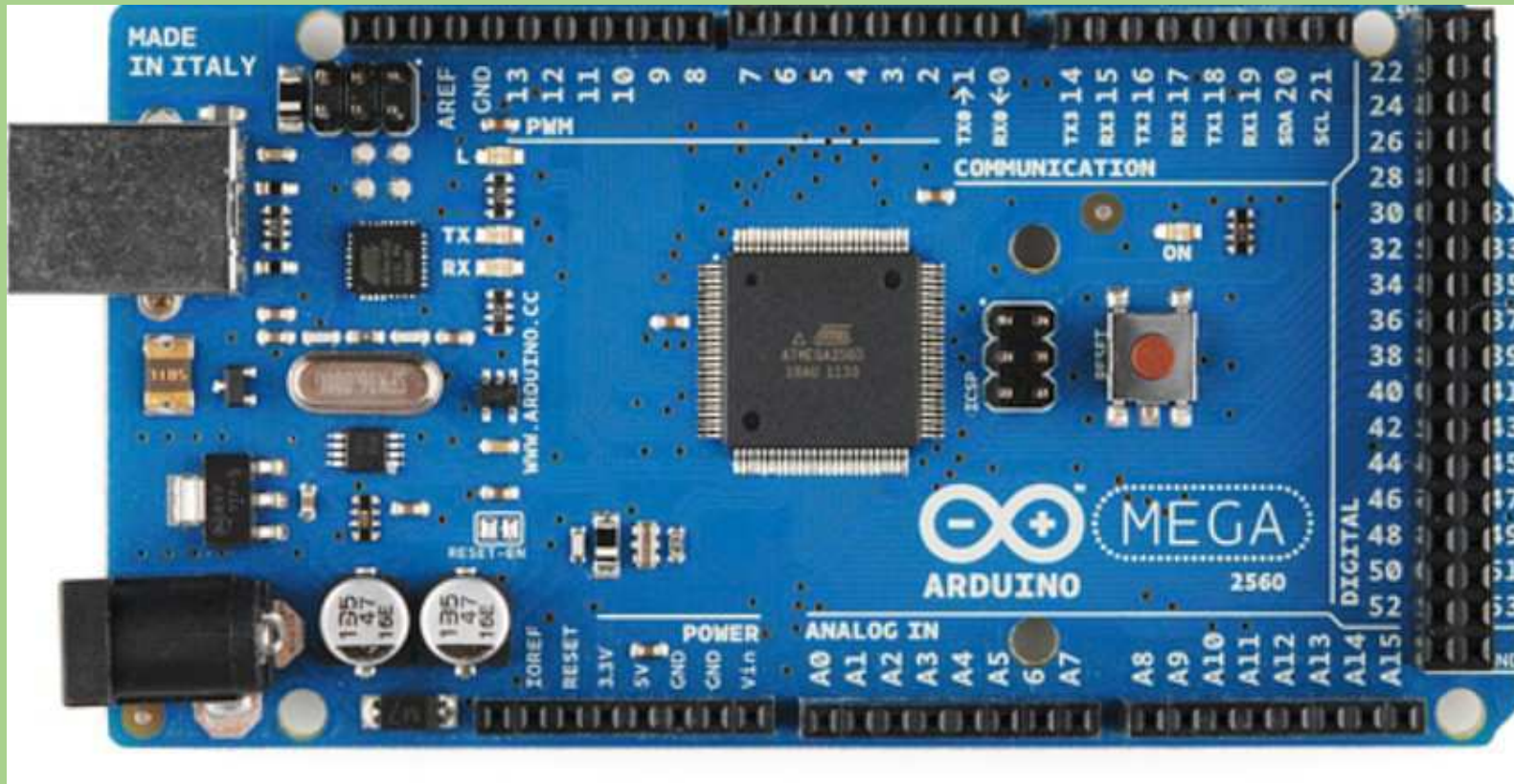
Another Uno unit with SMD and reset button moved



REAL Arduino have a GOLD toned component near the USB, clones do not

A Genuine UNO \$20-\$30
A clone UNO \$3-\$8
BUT THEY BOTH WORK!

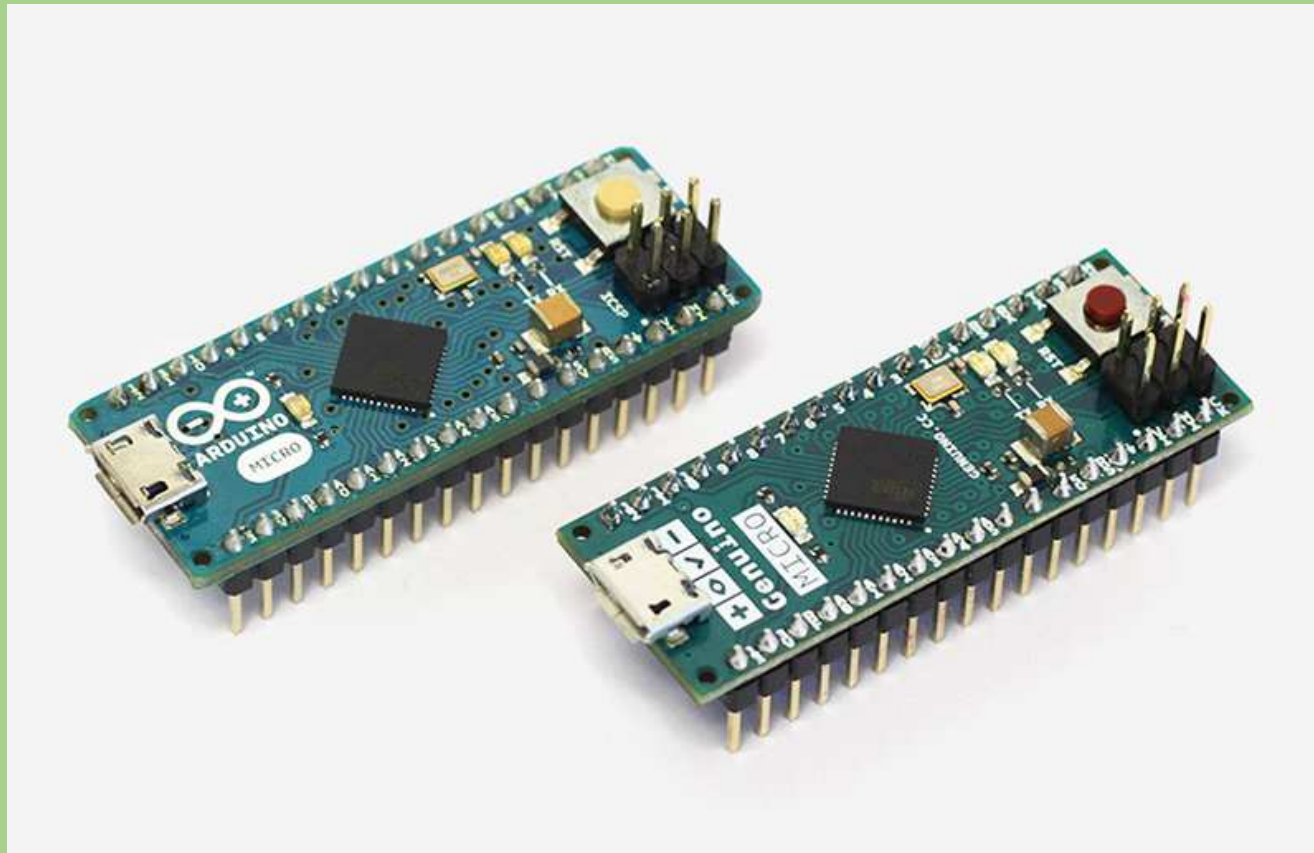
More Models



**Genuine
MEGA2560
\$20-\$60**

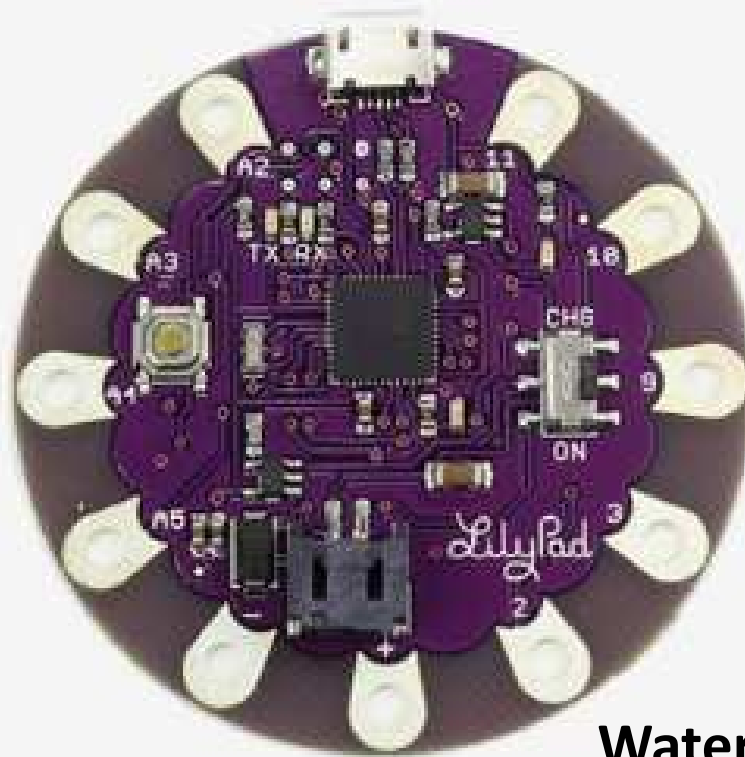
**Clone MEGA
\$5 - \$12**

The tiny Arduino Micro – Size of an IC



Novelty Arduino – Sewn into fabric!

LilyPad



Waterproof!

Arduino Esplora (Gamers model)



Joystick

Programmable
Buttons

Power Requirements

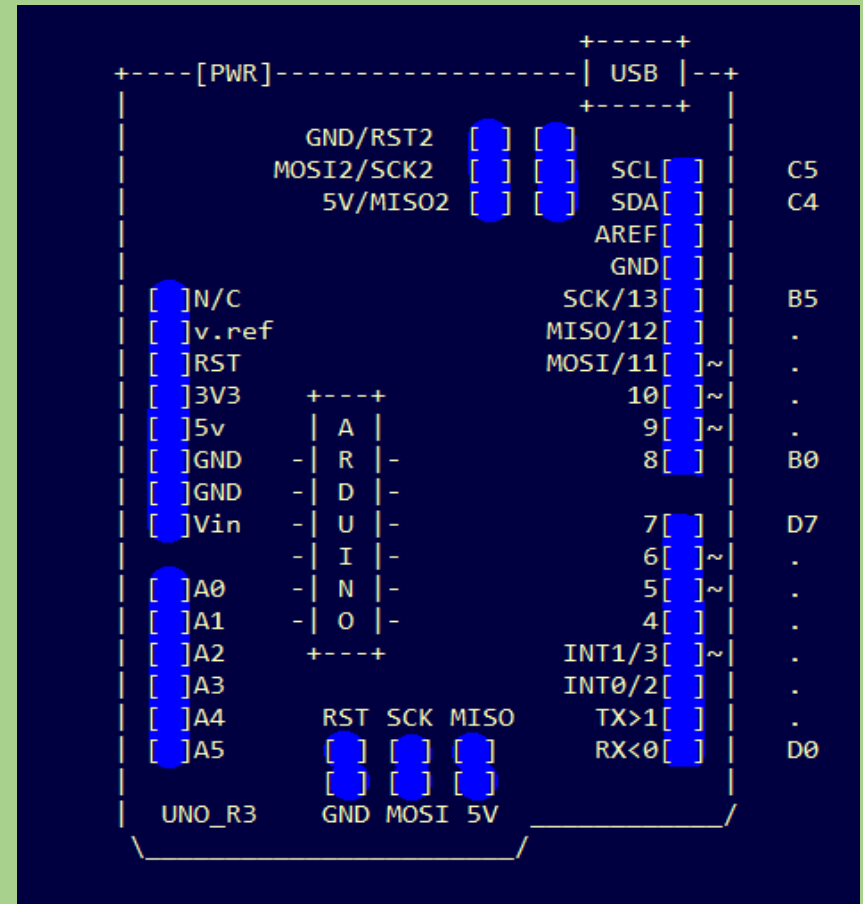
- Most All Arduinos can be powered from a USB connector (5vdc), but few are 3.3vdc.
- The Uno and Mega have external power connectors and voltage regulators that allow them to be powered from 6-20 VDC. The 7-12 VDC range is suggested however.

How do you program an Arduino?

- **IDE – Integrated Development Environment**
 - Program input
 - Compiler
 - File management
 - Loader
 - Serial monitor control
 - USB connection and Port selection

OK, so how do I connect to the Arduino?

- 6 analog (Inputs/Outputs)
- 13 digital pins (Input / Output)
- 6 of the digital can be Pulse Width Modulated outputs ~
- 1 UART channel out of the digitals
- 16 Mhz Clock, 32k flash memory
- FTDI chipset for USB-Serial onboard



On the Mega2560

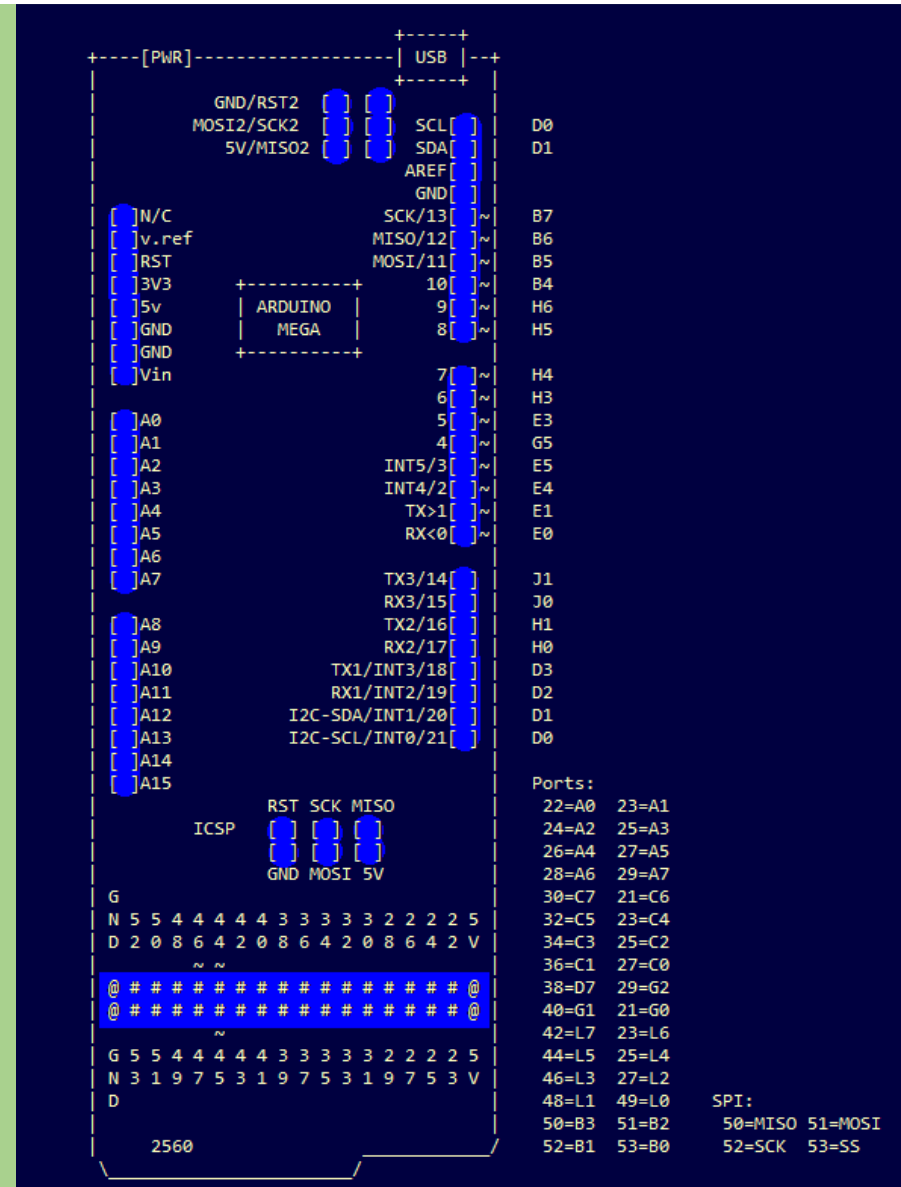
16 analog inputs

54 digital pins (input/output)

14 of the digital can be PWM (Pulse Width Modulated) outputs ~

4 UART channels out of the digital
FTDI chipset for USB-Serial onboard

256k Flash Memory



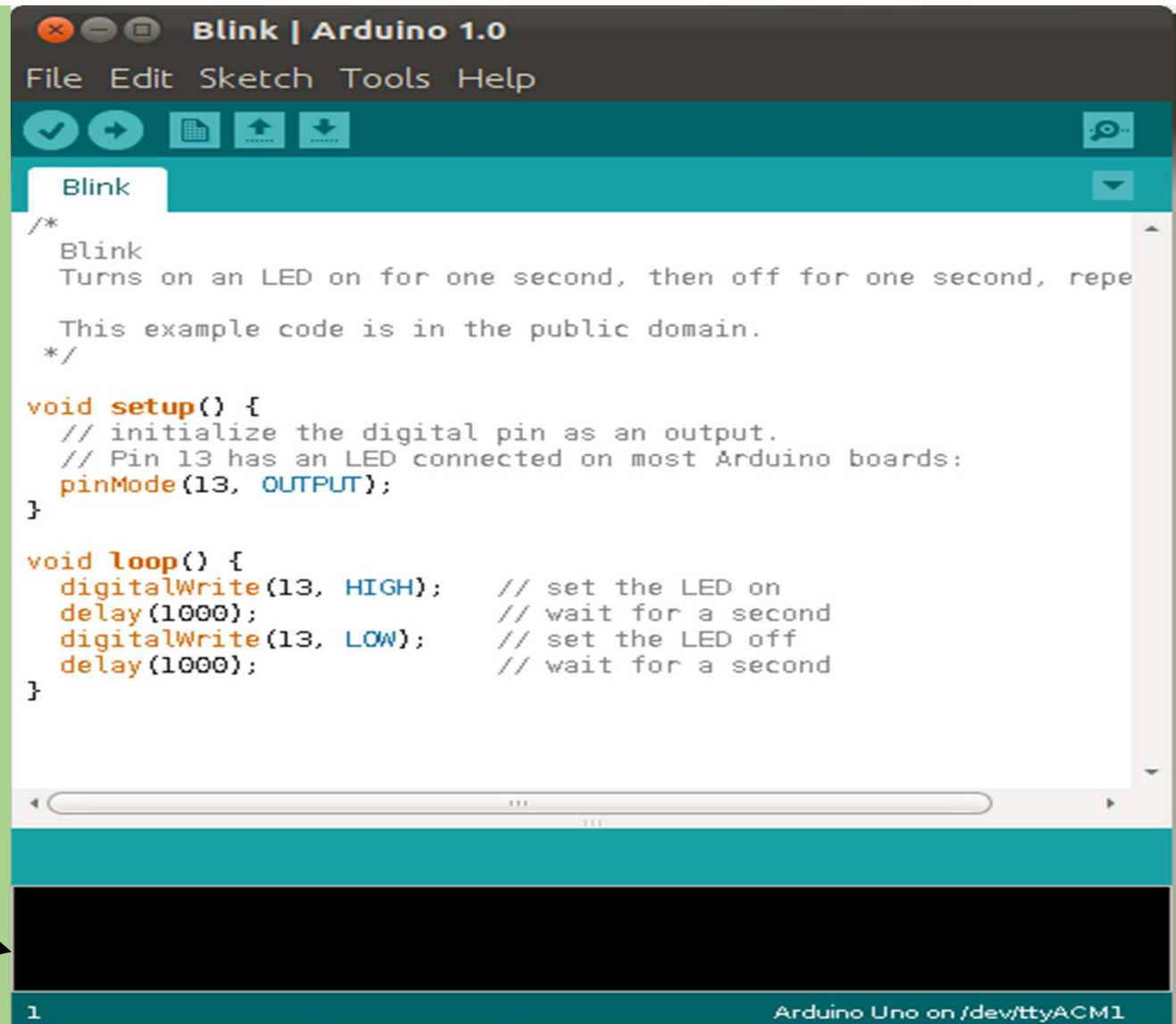
The programming language is basically C++

- **Do you need to know C++ to start?** **NO**
- **Is it easy to learn** **YES**
- **Do I have to be an expert programmer** **NO**
- **Are there lots of examples to *BORROW* from?** **YES**

Enough reading....let's see it

The IDE program

Arduino programs are called SKETCHES. You create the SKETCH in the IDE window. This example is installed on a Linux computer.



The screenshot shows the Arduino IDE interface. The title bar reads "Blink | Arduino 1.0". The menu bar includes "File", "Edit", "Sketch", "Tools", and "Help". Below the menu bar is a toolbar with icons for saving, running, and uploading. The main editor window displays the following code:

```
/*
  Blink
  Turns on an LED on for one second, then off for one second, repe

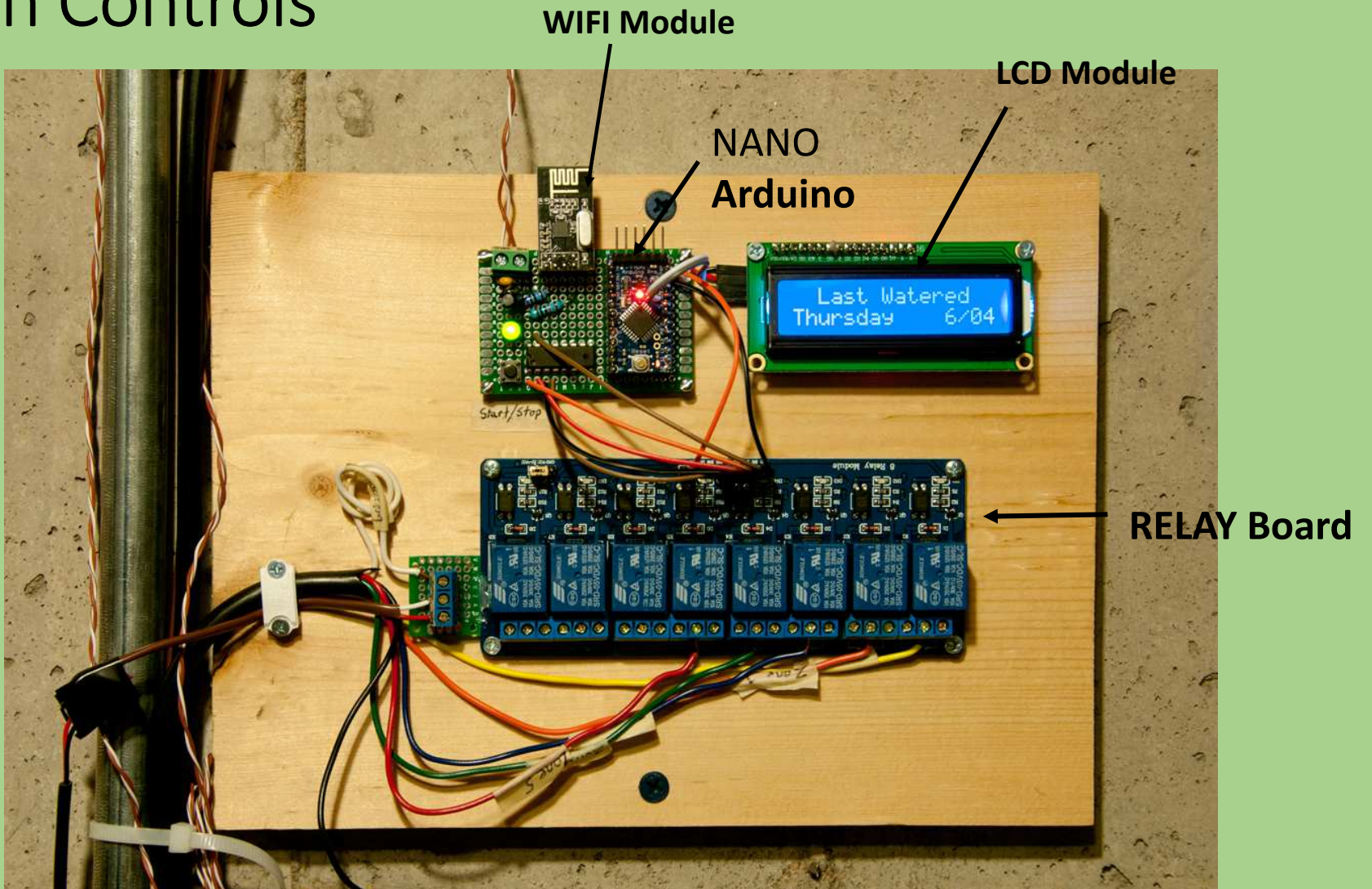
  This example code is in the public domain.
  */

void setup() {
  // initialize the digital pin as an output.
  // Pin 13 has an LED connected on most Arduino boards:
  pinMode(13, OUTPUT);
}

void loop() {
  digitalWrite(13, HIGH); // set the LED on
  delay(1000);           // wait for a second
  digitalWrite(13, LOW); // set the LED off
  delay(1000);           // wait for a second
}
```

At the bottom of the IDE, there is a debugging window. An arrow points to this window with the label "Debugging window". The debugging window shows the text "1" on the left and "Arduino Uno on /dev/ttyACM1" on the right.

Irrigation Controls



Guitar with Arduino PedalShield Effects & Touchscreen



Arduino PHONE! V. 2

- <http://www.instructables.com/id/ArduinoPhone-20-an-Open-Source-Mobile-Phone-Based-/?ALLSTEPS>



Time to go LIVE!

- (Now is the time to turn on the webcam dummy!)
- Connect to the Arduino (select model and port)
- Write a simple sketch
- Check the sketch
- Insert components in the Protoboard
- Add the wiring
- Upload to the Arduino
- Disconnect from the computer & power up externally