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

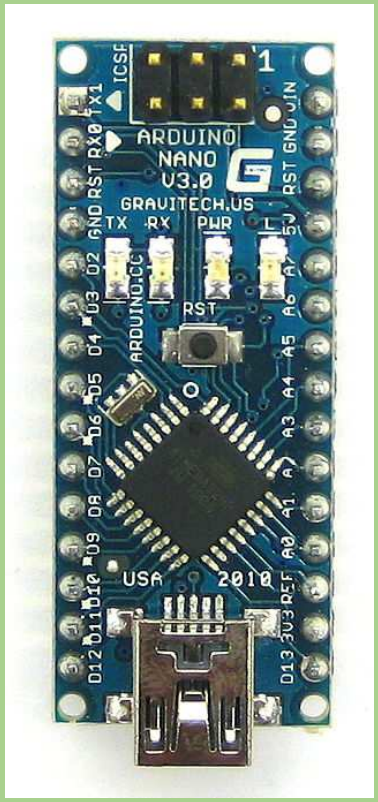
https://www.arduino.cc/

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/

Let’s look at some of the versions….

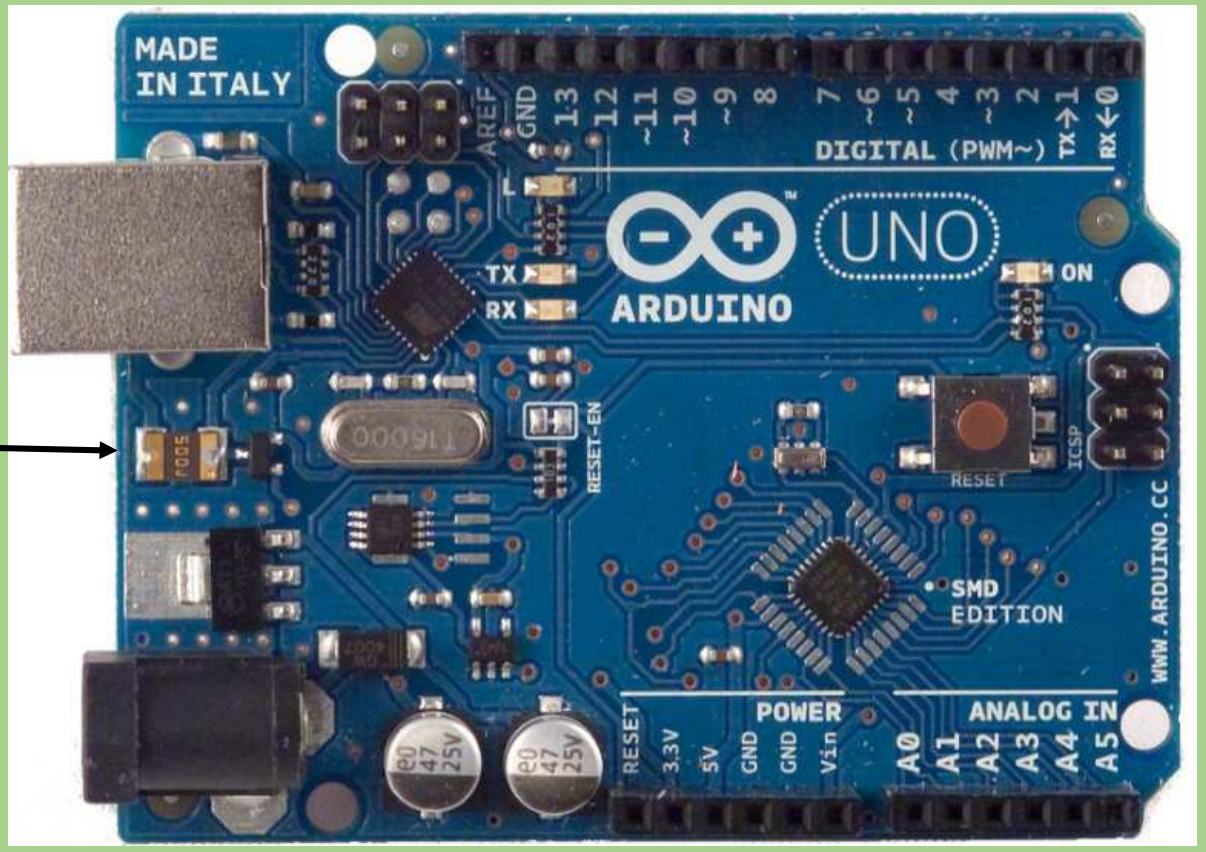


NANO

Uno

Another Uno unit with SMD and reset button moved

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

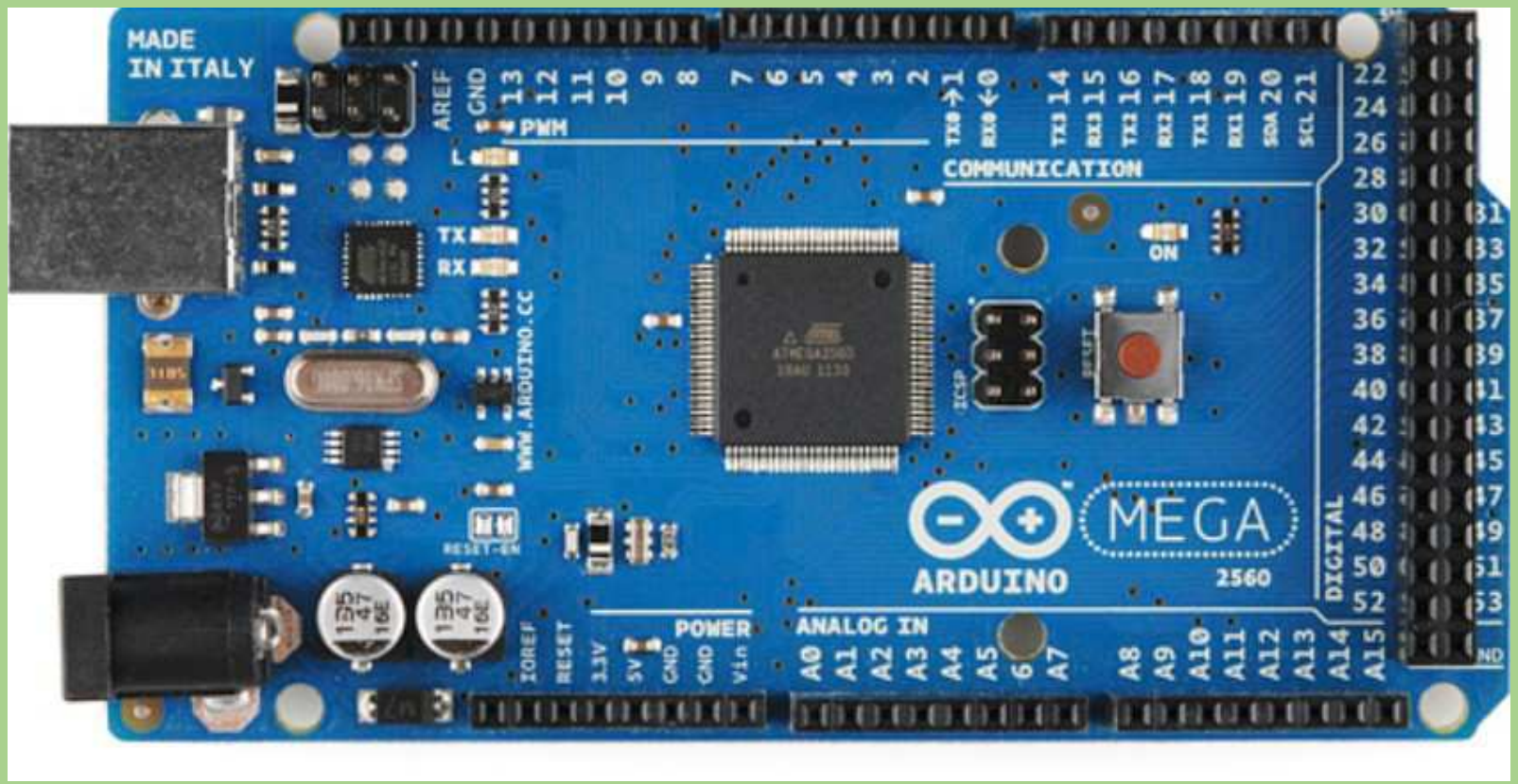


A Genuine UNO $20-$30

A clone UNO $3-$8

BUT THEY BOTH WORK!

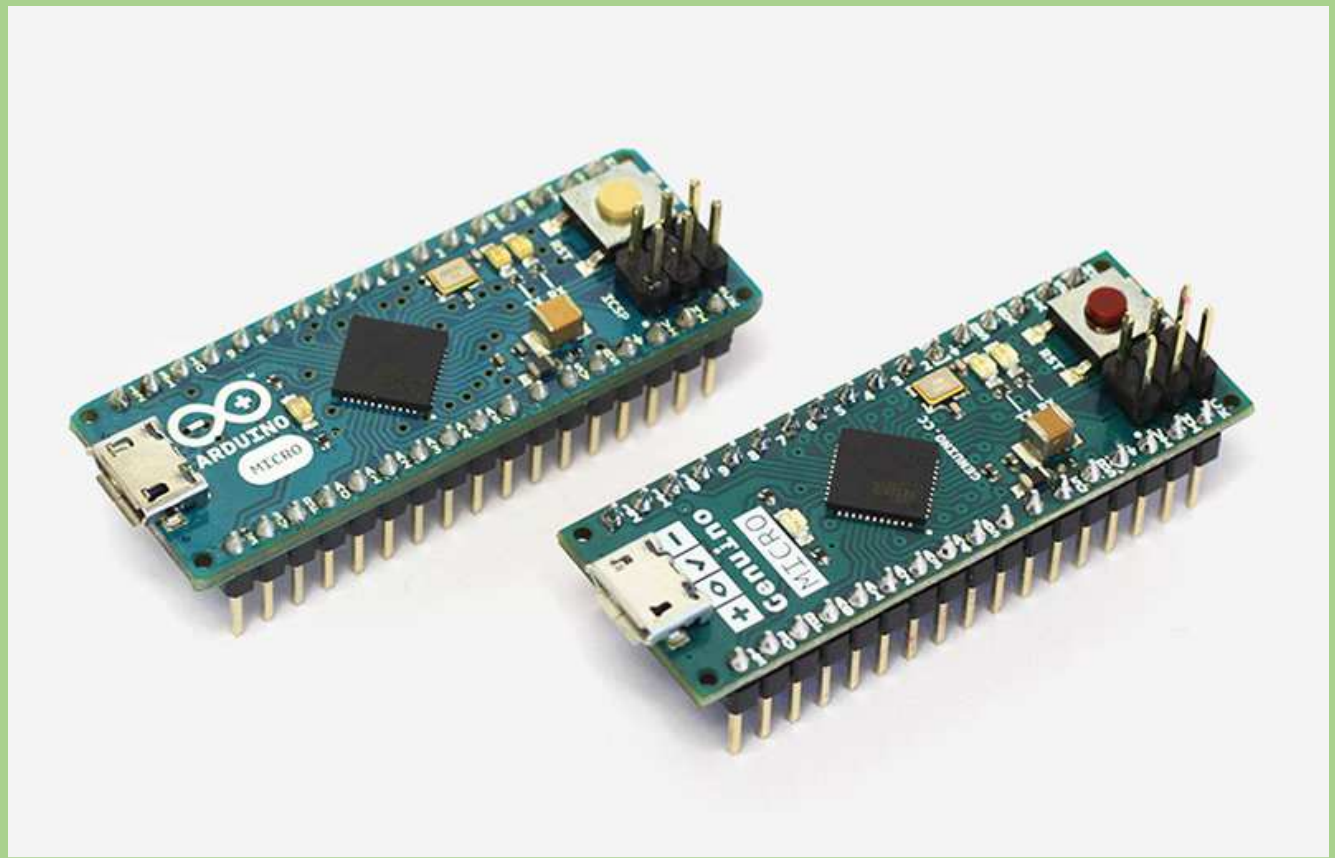
More Models



Genuine MEGA2560 $20-$60

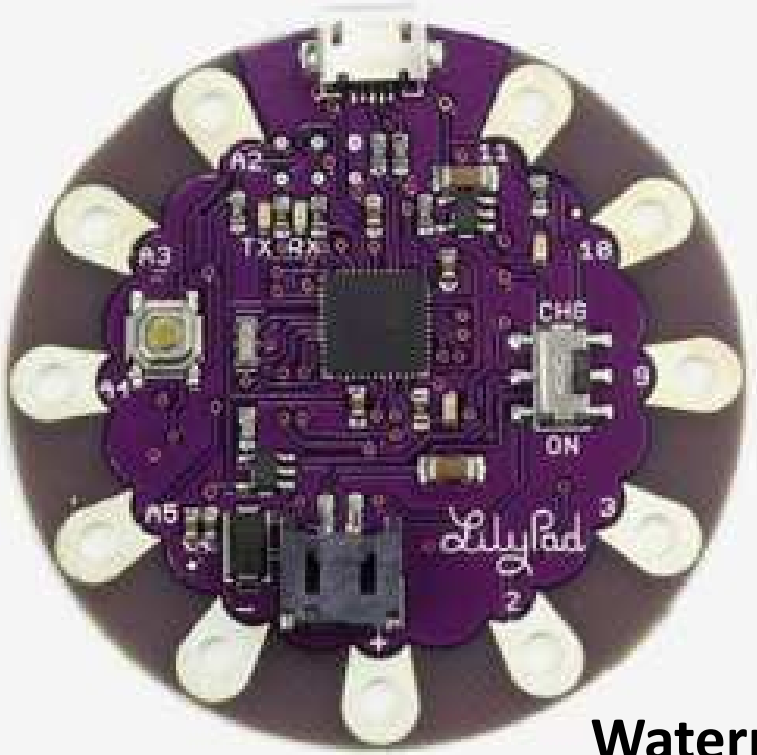
Clone MEGA $5 - $12

The tiny Arduino Micro – Size of an IC



Novelty Arduino – Sewn into fabric!

LilyPad



Waterproof!

Arduino Esplora (Gamers model)

Joystick

Programmable Buttons

Power Requirements

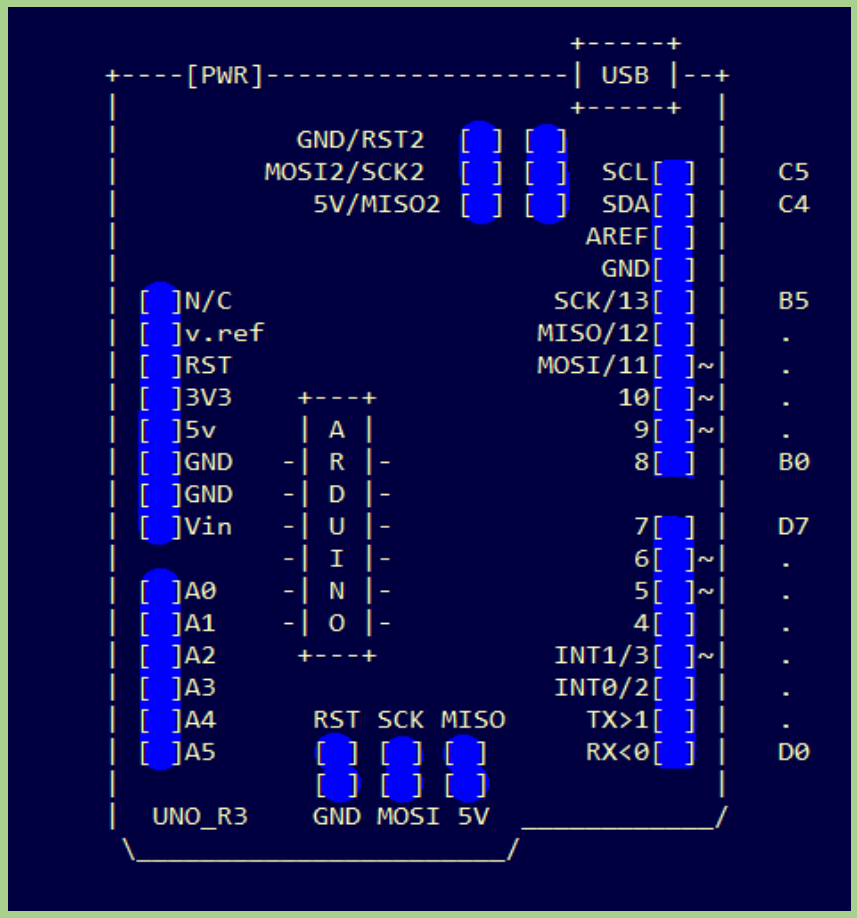
- Most All Arduinos can be powered from a USB connector (5vdc), but few are 3.3vdc.
- The Uno and Mega have external power connectors and voltage regulators that allow them to be powered from 6-20 VDC. The 7-12 VDC range is suggested however.

How do you program an Arduino?

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

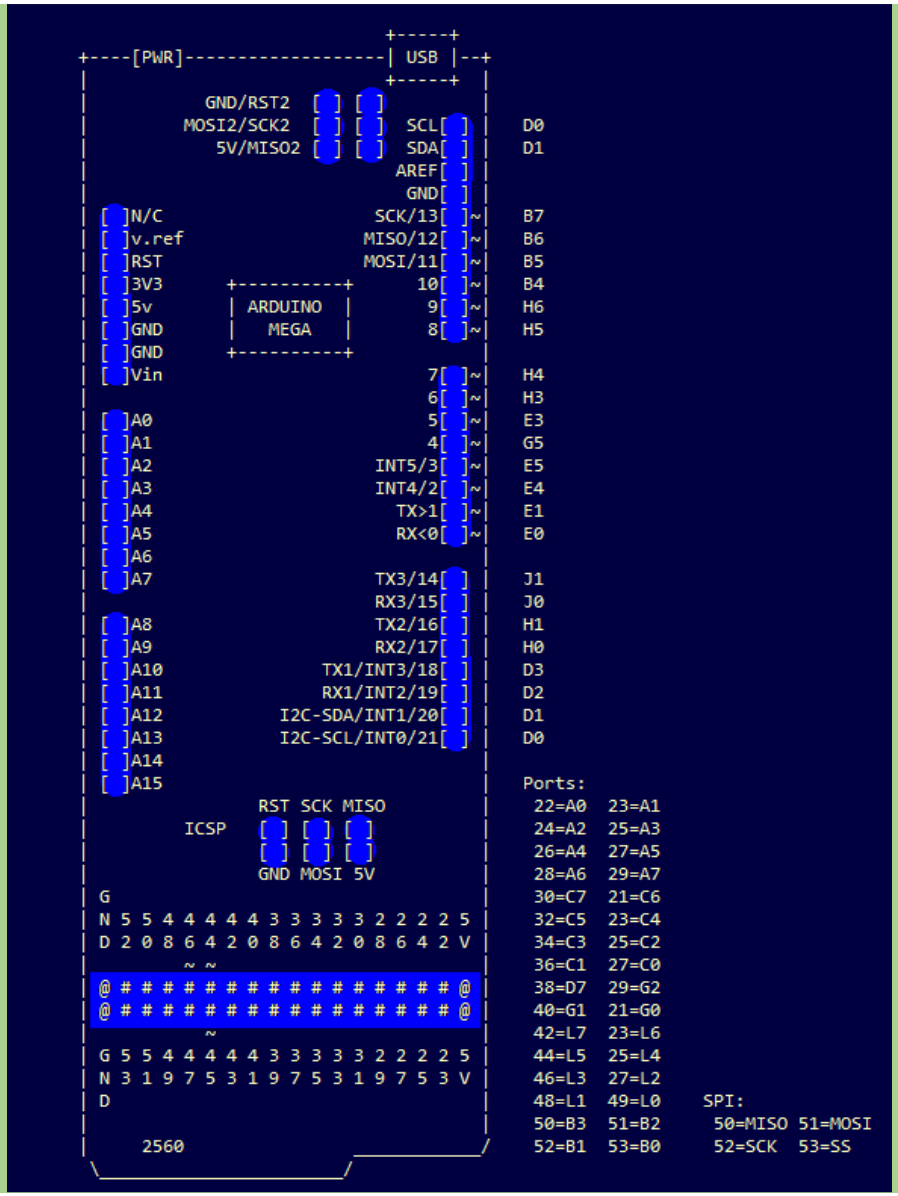
OK, so how do I connect to the Arduino?

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



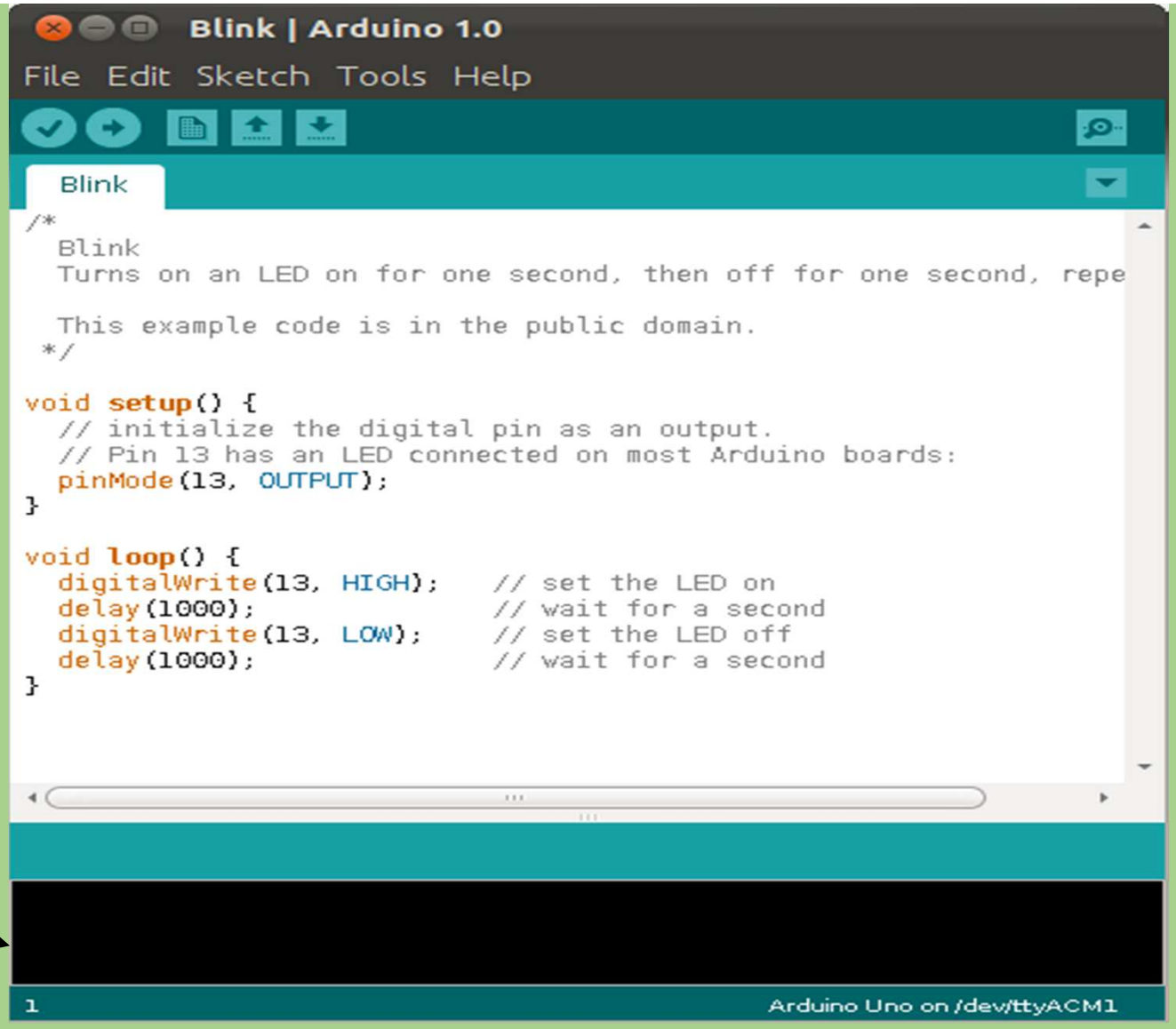
The programming language is basically C++

- **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

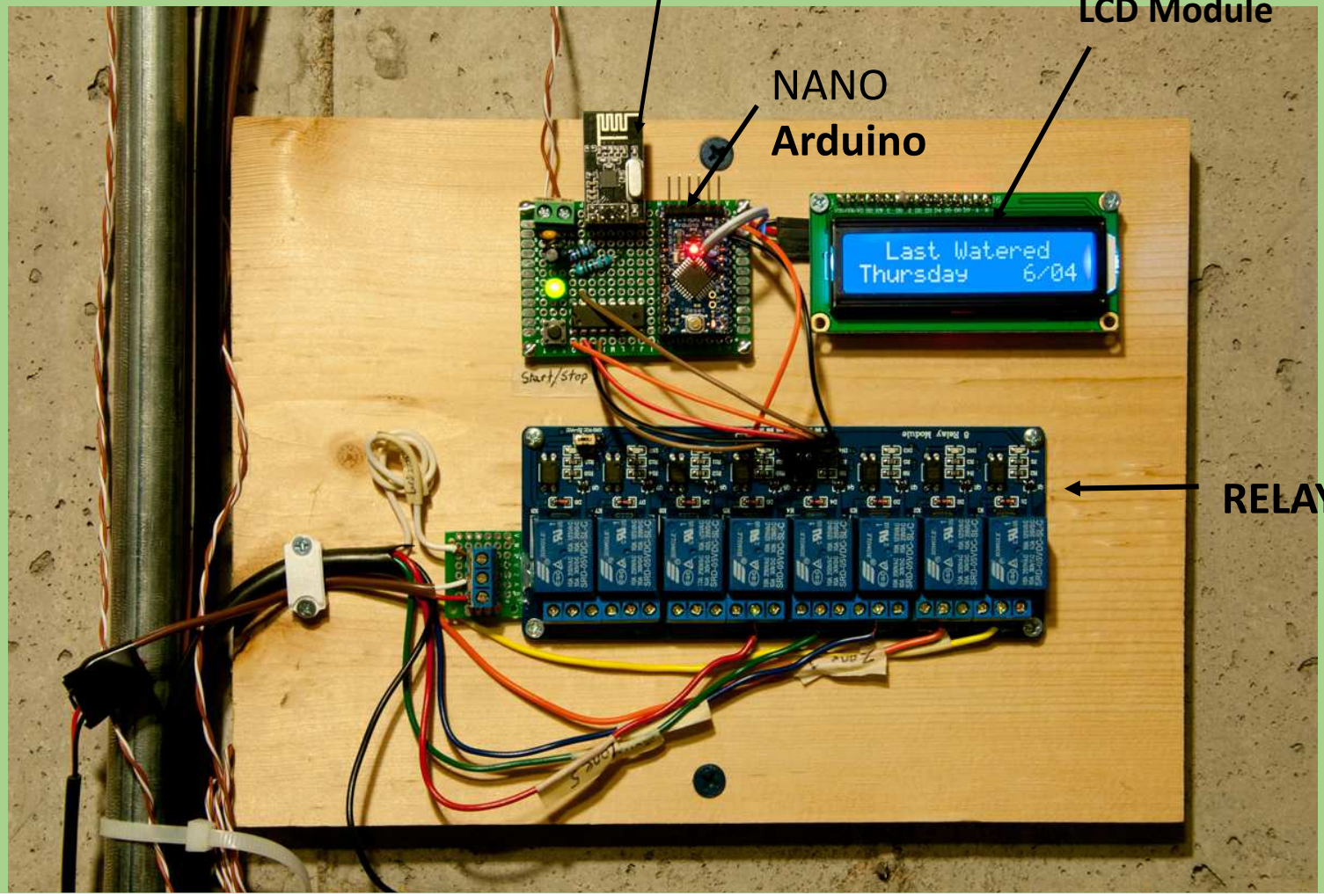
The IDE program

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

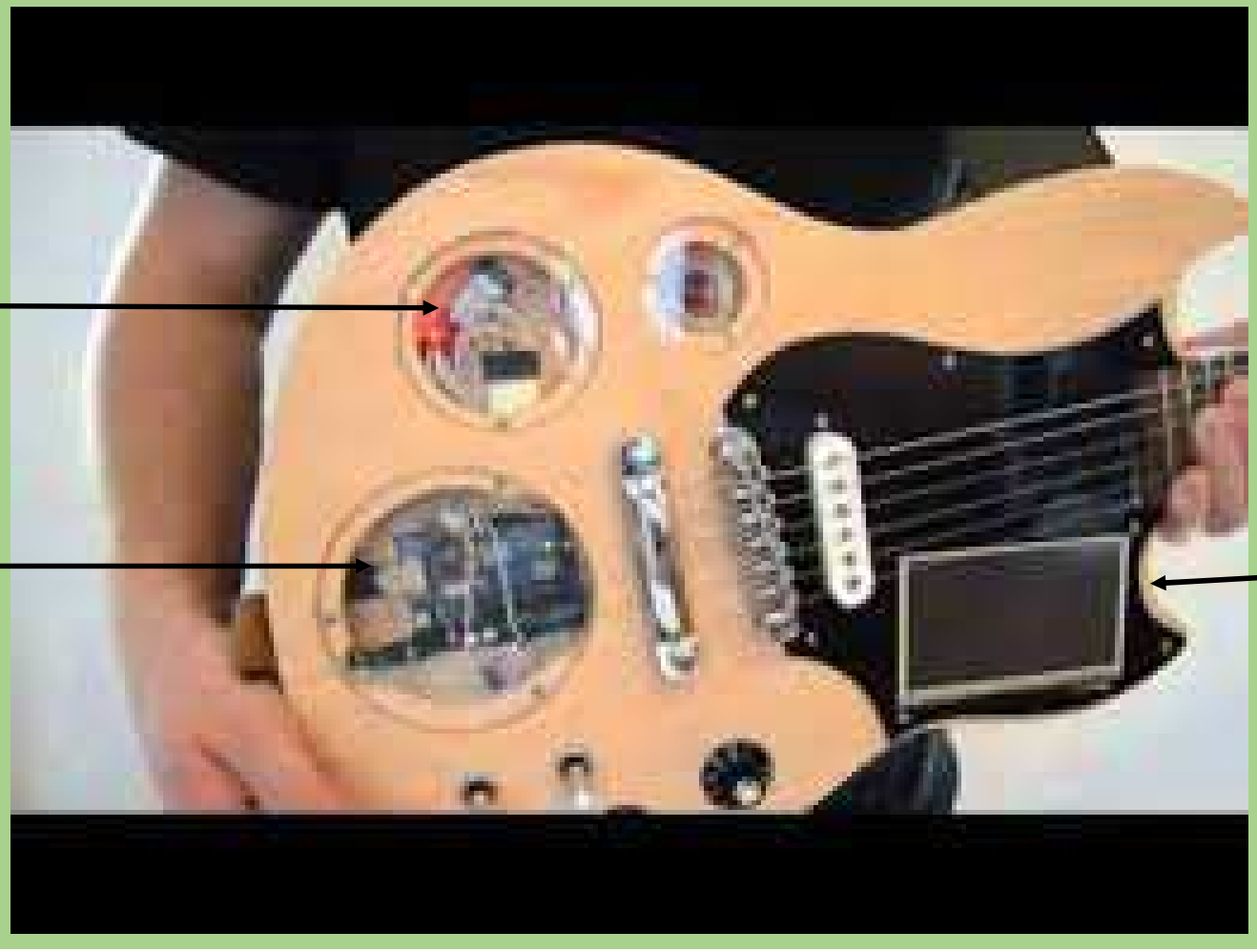


Debugging window

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