101 - Arduino Introduction

SLQ Wiki Fabrication Lab 2026/01/23 20:12

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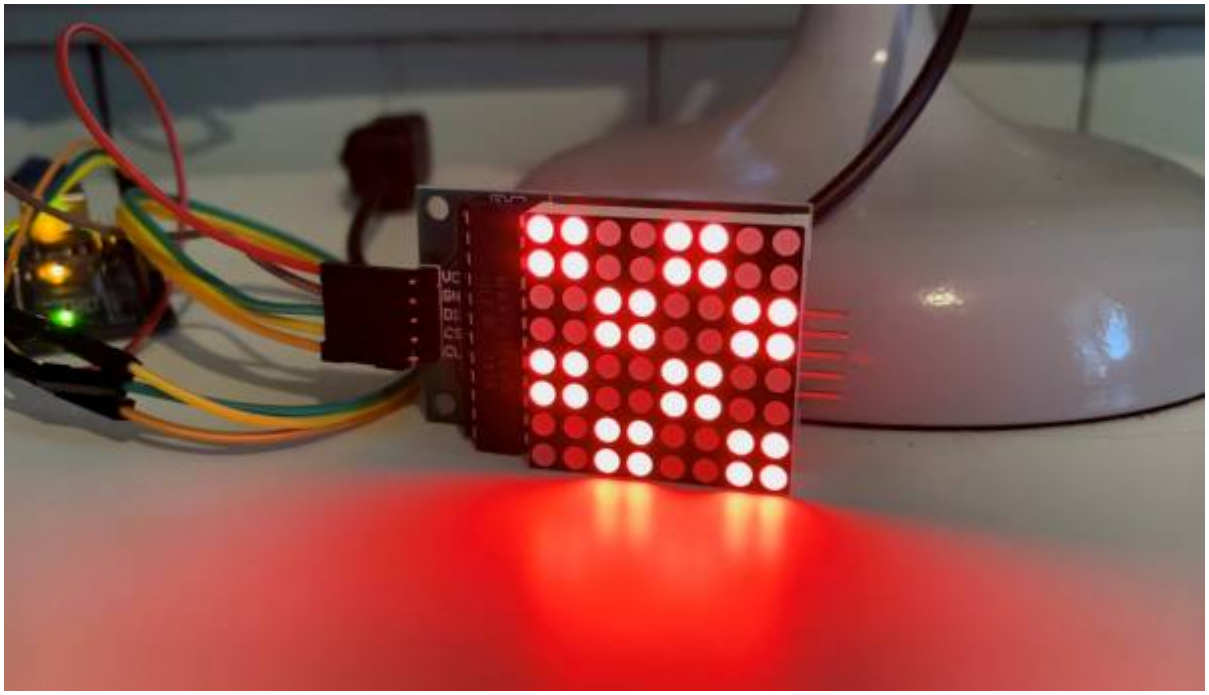


This intro to Arduino uses a LED matrix to show how to connect and use existing libraries to create fun projects without too much coding and wiring.

Redevelopment by Meg White March 2025 based around programming created by Michelle Brown and Peter Lin, September 2022.

Workshop Presentation

This workshop has been created into a slide show for presentation and documentation purposes. Please feel free to download and use the guide and files as per our CC license in the footnote.

Some pages may link to other online workshops, tutorials or guides created at The Edge, you may require internet to connect and view links.

Admin view - Slides

Public View - PDF

Arduino IDE Cheat Sheet

Acknowledgement

We acknowledge Aboriginal and Torres Strait Islander peoples and their continuing connection to land

and as custodians of stories for millennia. We respectfully acknowledge the land on which we all meet today, and pay our respects to elders past, present and emerging.

Summary

Participants will learn about the Arduino IDE program and connecting an Arduino Nano and a programmable 8×8 LED Matrix display.

Skills Introduced

- Overview of circuit and components
- Assembling components
- Using the Arduino IDE and basic coding

Materials

Material	**Quantity**	**Cost**	Notes	
Arduino Nano V3.0 Board	10	$13.48		
USB cable (included with Nano)	10	$0.00		
MAX7219 Serial Dot Matrix Display Module	10	$9.05	Link	
Small 1.2“ 8×8 Ultra Bright White LED Matrix + Backpack	Alternative	$13.50	Link	Various colours available
Solderless Breadboard	10	$4.36		
Solderless Breadboard Jumper Cable Wires (10 x 10)	50	$0.80		
	Total	$27.69		

Requirements

- Computer with USB A port or adaptor
- Arduino IDE program installed

Health & Safety

Running this workshop at The Edge?.. You should familiarise yourself and your participants with:

- DML Risk Assessment

Workshop Walk through

What is a microcontroller?

A microcontroller (or MCU for microcontroller unit) is a small computer on a single integrated circuit.

- one or more CPUs (processor cores)
- memory
- programmable input/output peripherals
- can be mixed signal devices interacting with
    - digital signals
    - analogue signals

Why use an MCU?

Microcontrollers are small, low powered and robust, making them perfect for embedded systems such as:

- medical devices
- remote controls
- office machines
- appliances
- power tools
- toys
- wearable technology

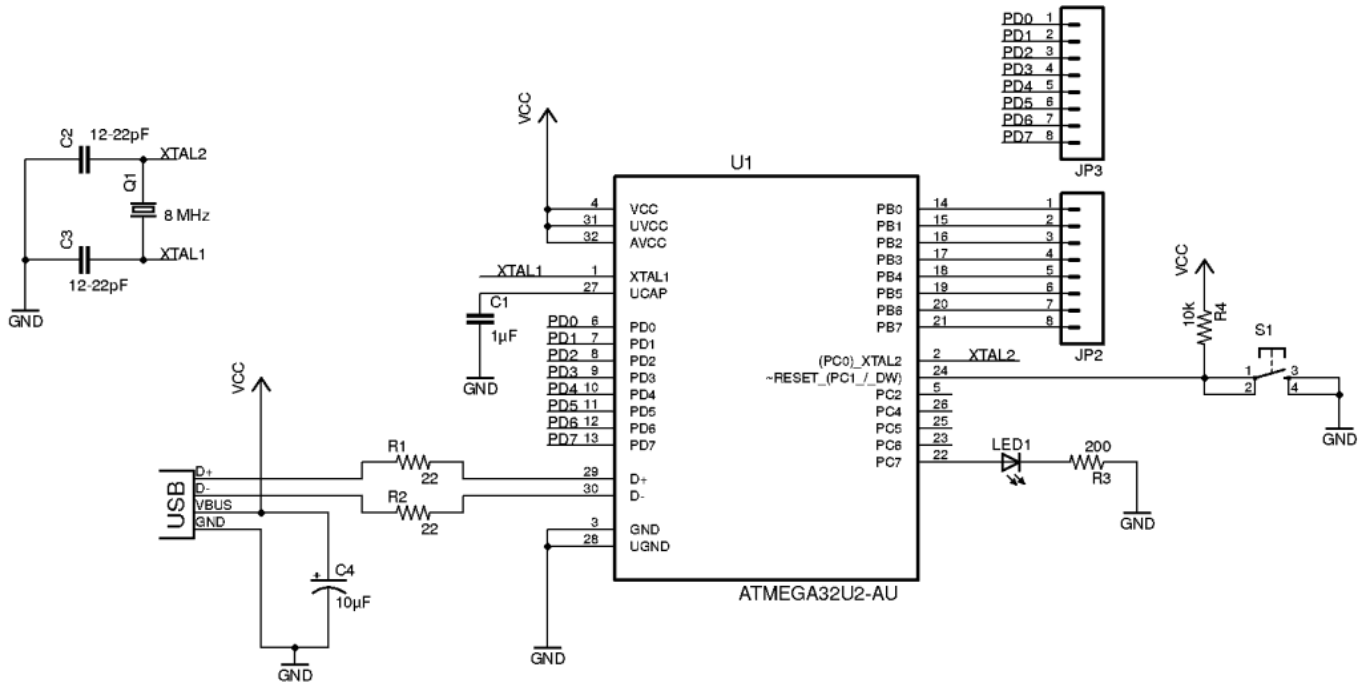
What is Arduino?

Arduino is an open source computer hardware and software organisation, project, and user community [1)]

- The hardware is based on the Amtel 8-bit AVR MCU
- The software uses the Processing IDE, with a simplified version of the Java programming language
- Open source has led to the creation of a huge range of
    - clones
    - compatible devices
    - peripherals
- A strong community means
    - “Someone, Somewhere has solved the problem”
    - we can run this workshop using and adapting existing resources.

Basic circuitry

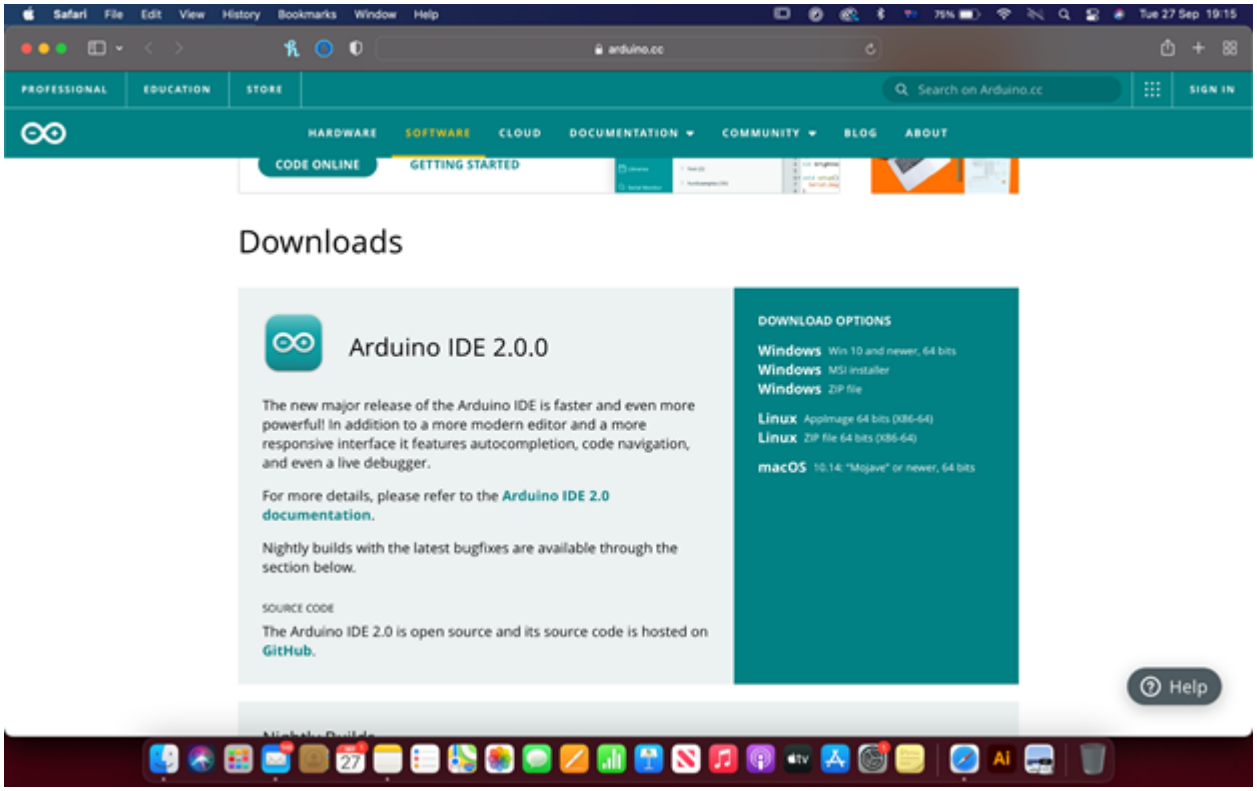
Example diagram



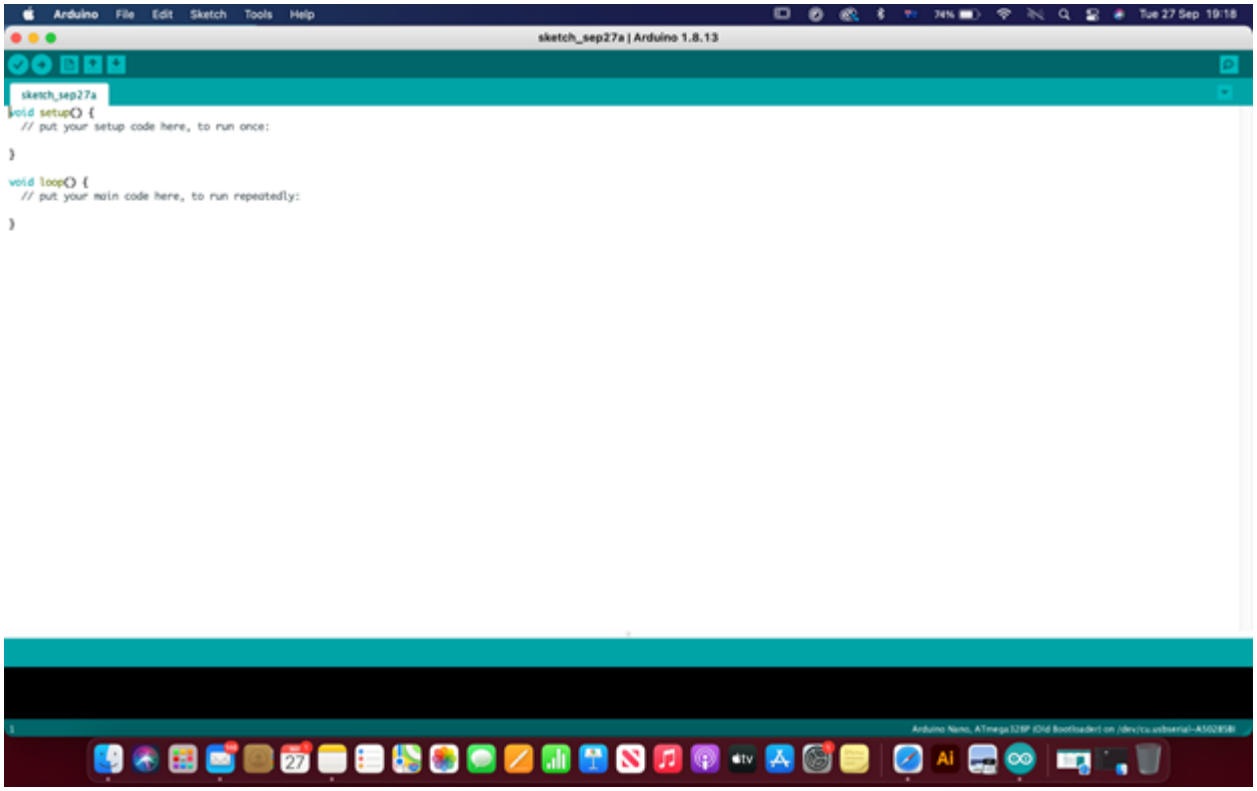
Step 1

Downloading or checking our software is installed and up to date. We an install updates to our software on the DML (Digital Media Lab) computers, it just won't save the update when the computers are restarted.

Arduino IDE

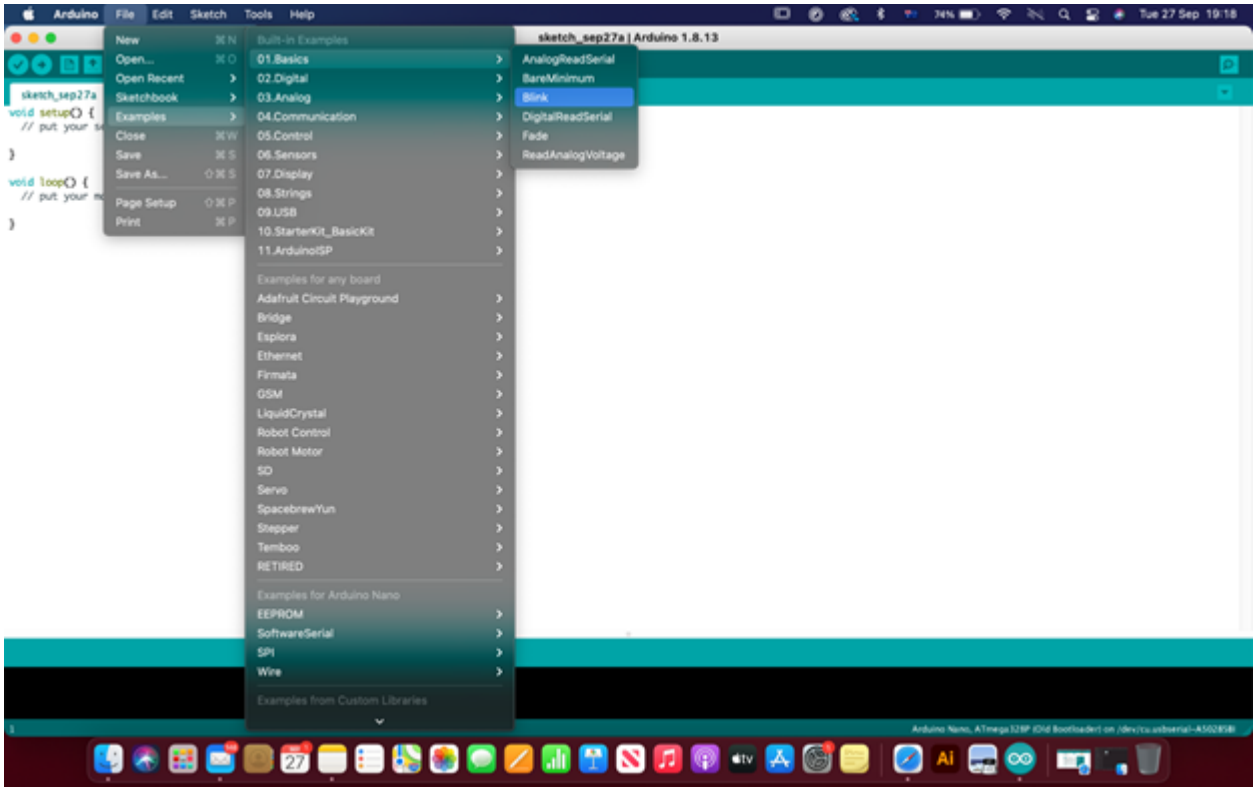


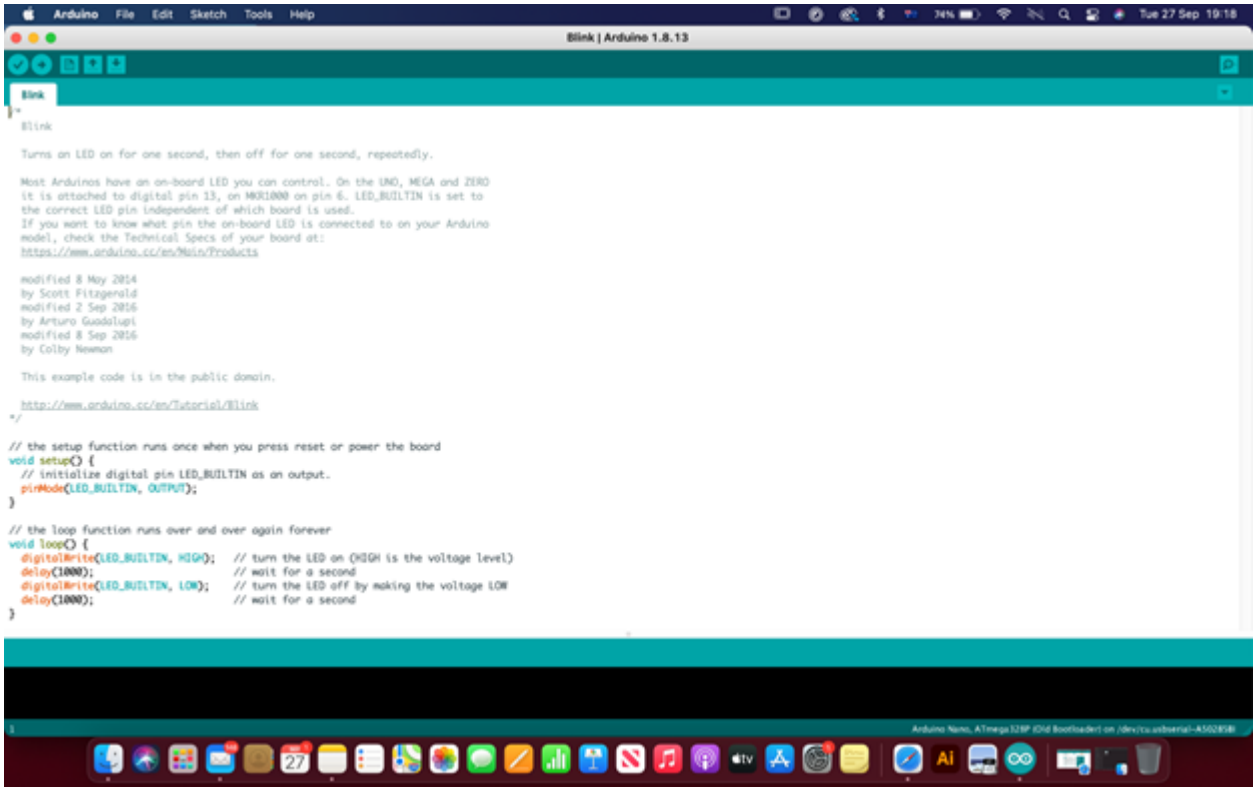
Open Arduino IDE, it will automatically open a blank code base document for you.



Connect the Arduino Nano with the blue USB cable provided.

Do a Blink test by navigating to the File menu>Examples>0.1 Basics>Blink



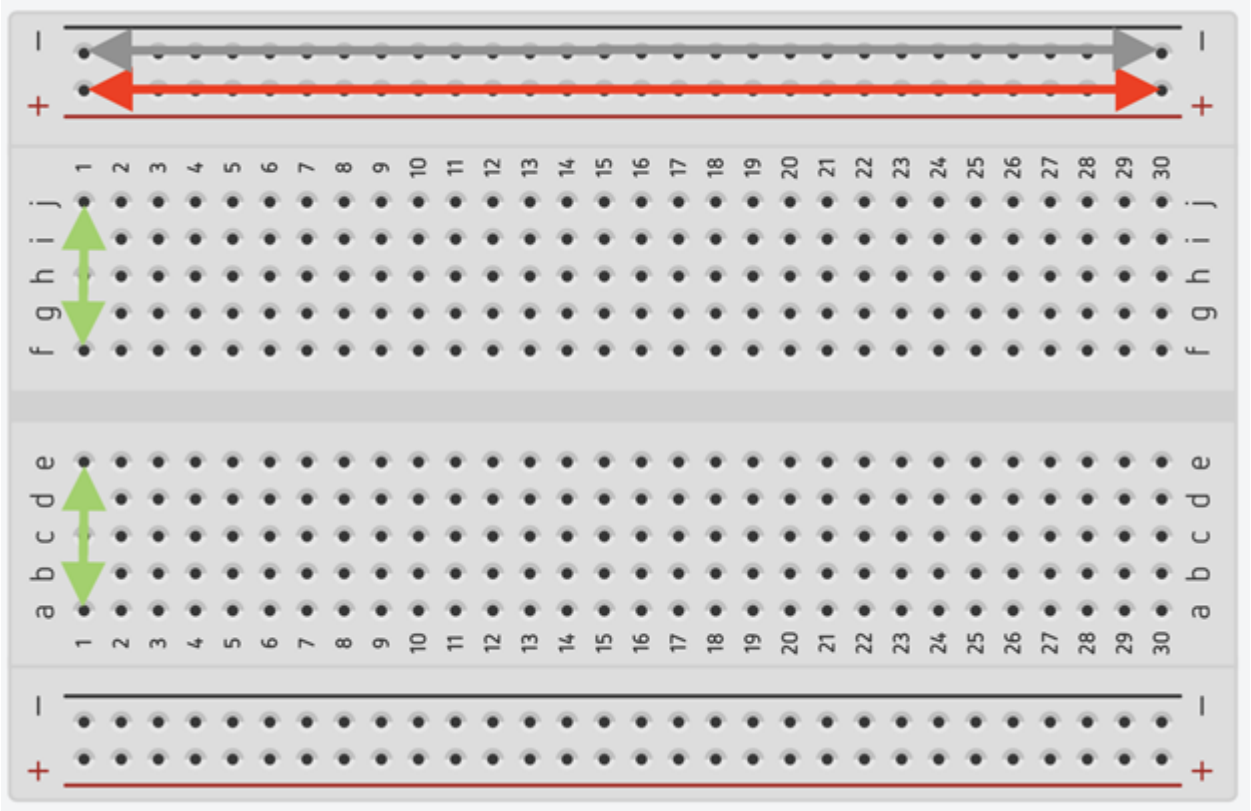


Step 2

Components

What are breadboards?

A breadboard (sometimes called a plugblock) is used for building temporary circuits. It is useful to designers because it allows components to be removed and replaced easily.

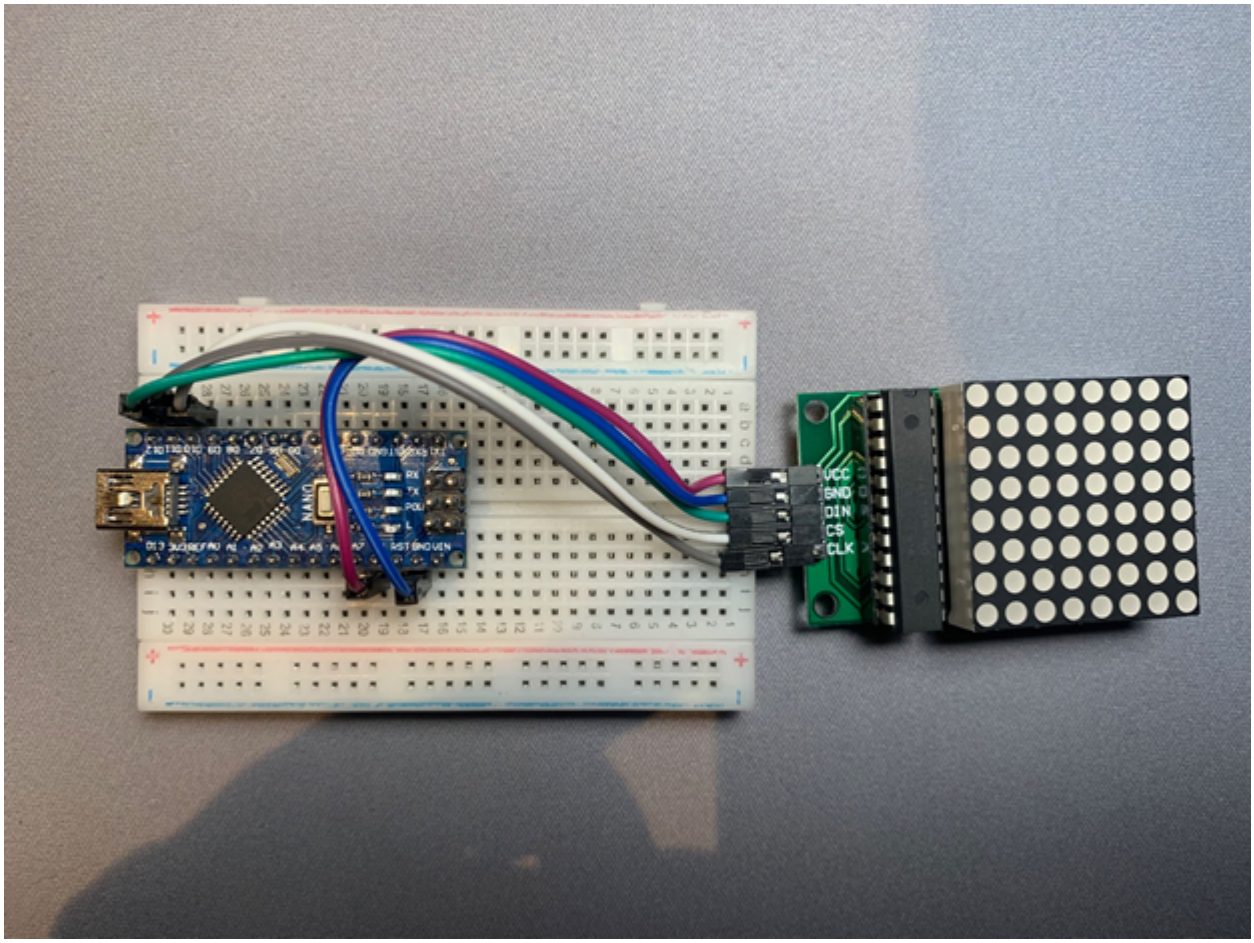


What connectors and cables do we use for basic electronics?

In this workshop we are using Solderless Breadboard Jumper Cable Wires so we don't have to do any soldering.

Connecting cables, what you need to know (pins, ground etc).

Let's put our kit together (explaining which cable goes where and why we need to know this for the programming)



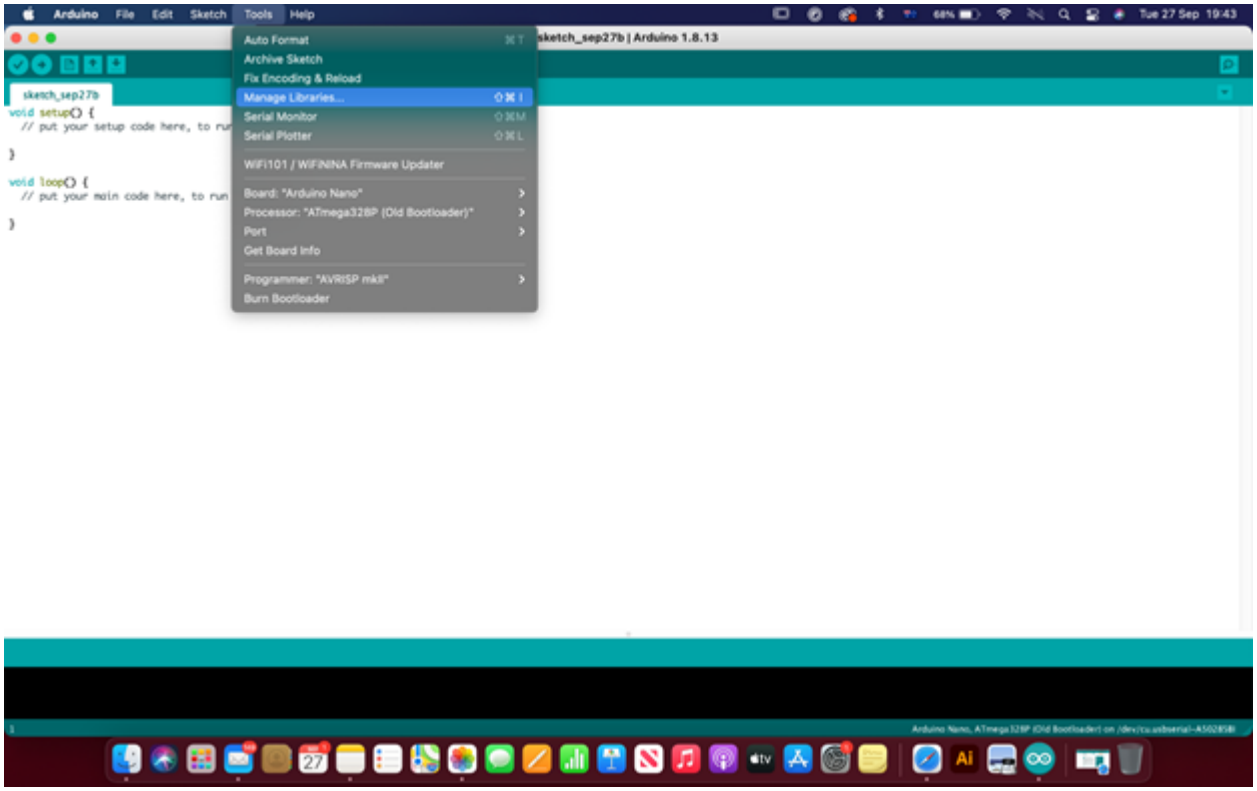
Nano Pin		
TX1.		
RX0		
RST		
GND		
D2		
D3		
D4		
D5		
D6		
D7		
D8		
D9		
D10	CS	Load
D11	CLK	
D12	DIN	Data in
-	-	-
D13		
303		
REF		
AV		

A1		
A2		
A3		
A4		
A5		
A6		
A/		
5V	VCC	5 volts
RST		
GND	GND	Ground
VIN		

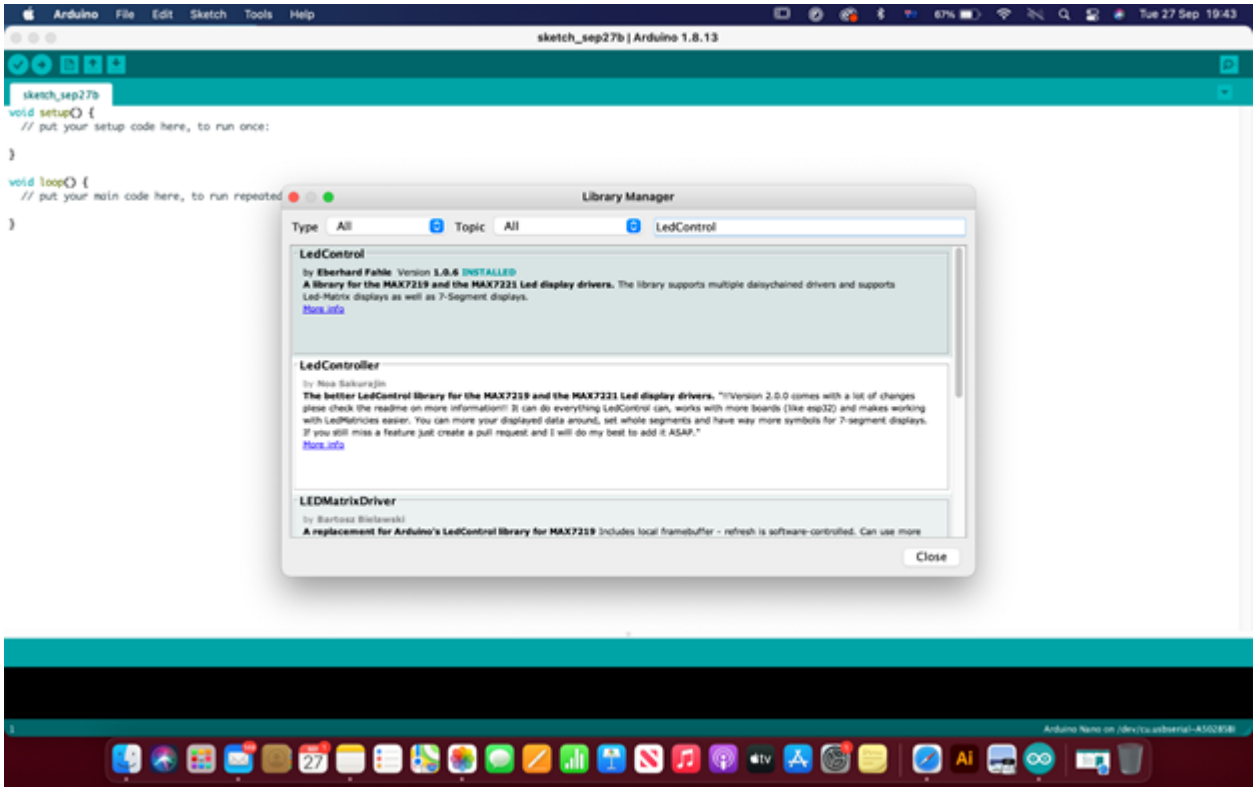
Step 3

Downloading and adding libraries

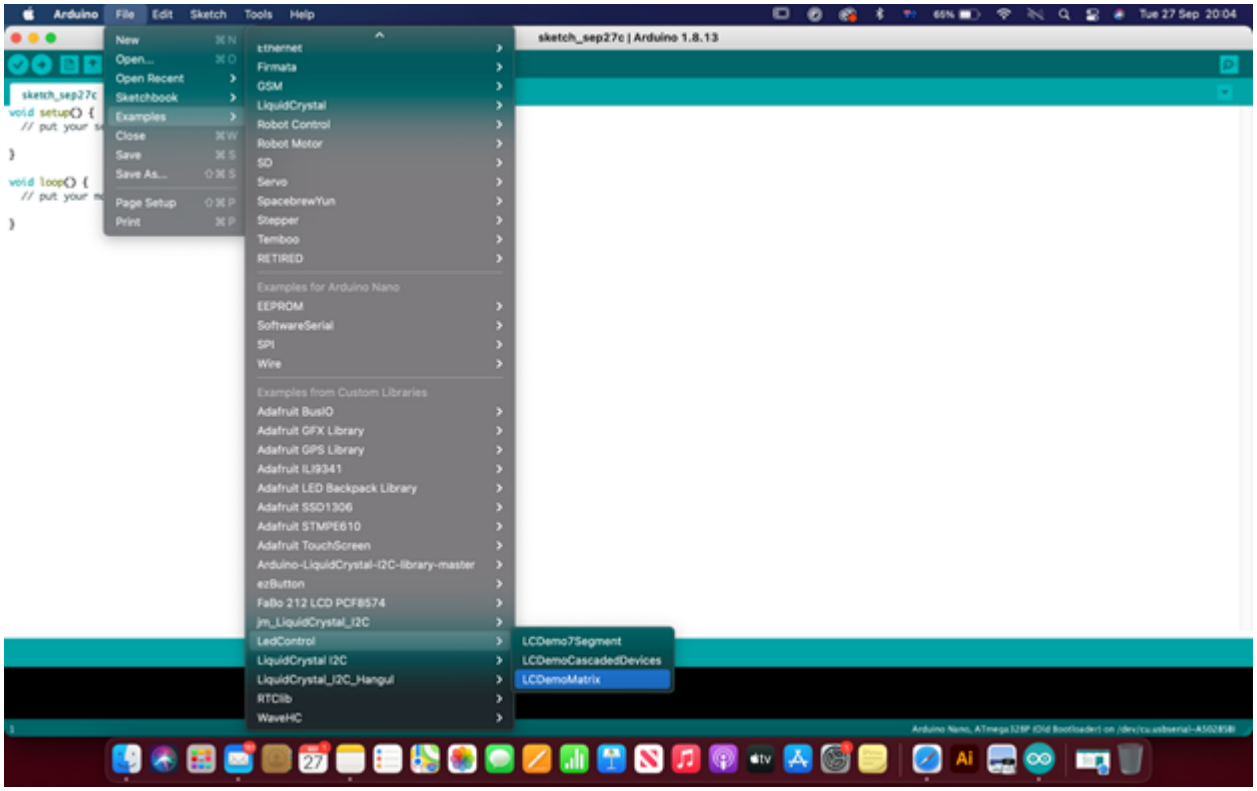
For this we need LedControl library, so let's learn how to add a library.



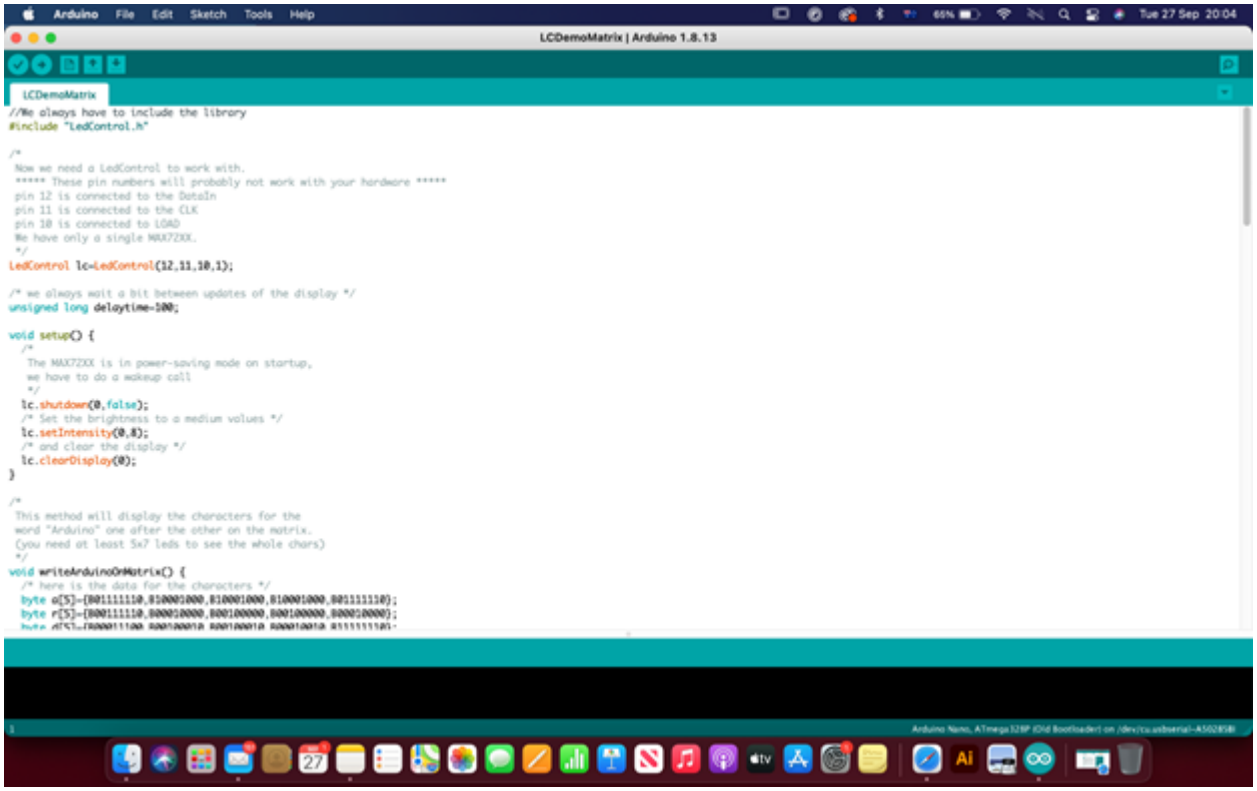
Install LedControl Library



and can use the example “LCDemoMatrix.ino” to test our devices are working



Run Example Code



This should have our matrix working! If not, let's troubleshoot.

If you did get it working, try some of the other example library code.

References

https://xantorohara.github.io/led-matrix-editor/

Downloads

https://www.arduino.cc/en/software

Additional Learning

Take a look at our Arduino 101 - Coding workshop

Or other past projects:

Deskduino Project

Badgeduino Project

1)

https://en.wikipedia.org/wiki/Arduino