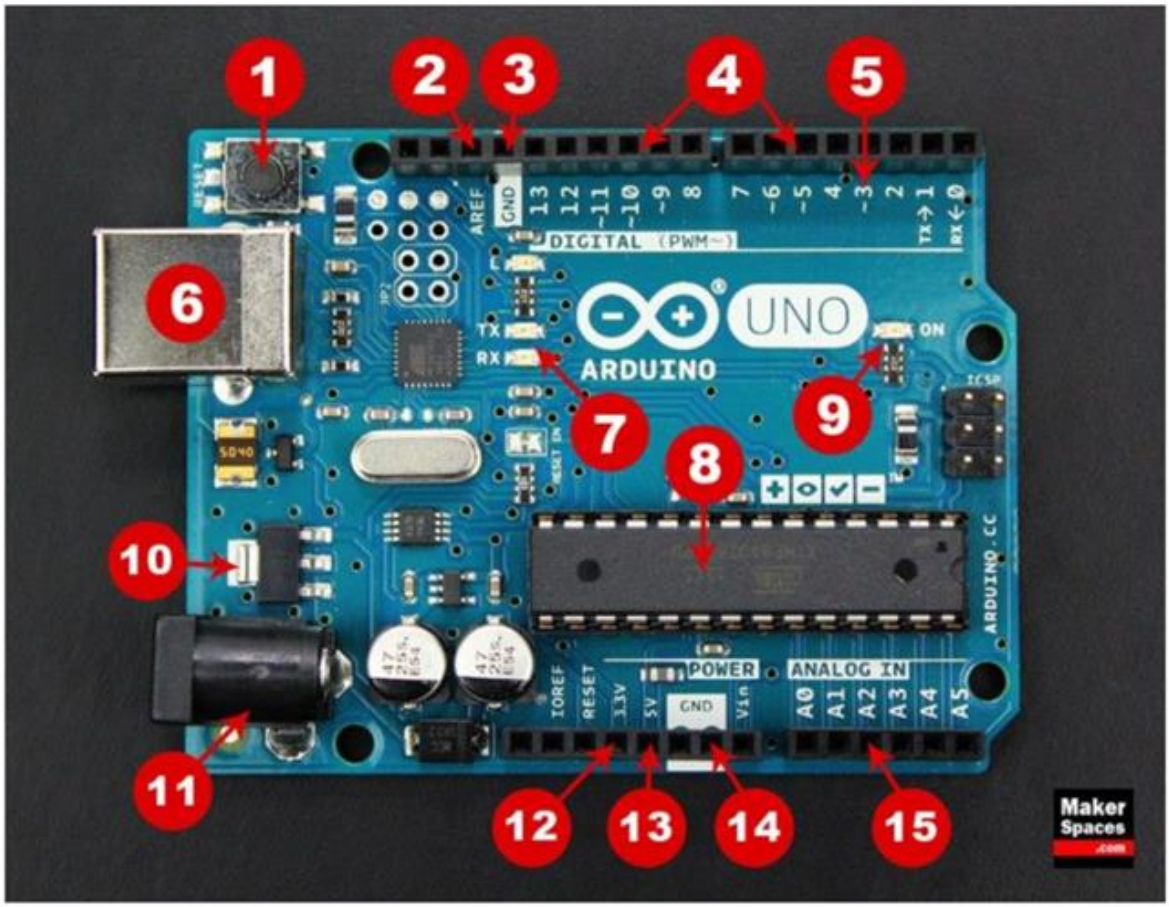
ARDUINO

- Arduino is the go-to gear for artists, hobbyists, students, and anyone with a gadgetry dream.
- Arduino is an open source programmable circuit board that can be integrated into a wide variety of makerspace projects both simple and complex.
- This board contains a microcontroller which is able to be programmed to sense and control objects in the physical world.
- By responding to sensors and inputs, the Arduino is able to interact with a large array of outputs such as LEDs, motors and displays.

A Tour of an Arduino Board



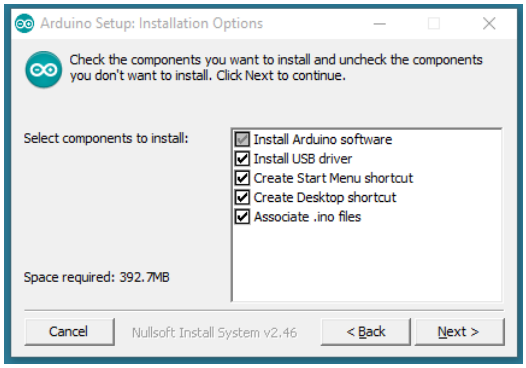
1.Reset Button – This will restart any code that is loaded to the Arduino board
2.AREF – Stands for “Analog Reference” and is used to set an external reference voltage
3.Ground Pin – There are a few ground pins on the Arduino and they all work the same
4.Digital Input/Output – Pins 0-13 can be used for digital input or output
5.PWM – The pins marked with the (~) symbol can simulate analog output
6.USB Connection – Used for powering up your Arduino and uploading sketches
7.TX/RX – Transmit and receive data indication LEDs
8.ATmega Microcontroller – This is the brains and is where the programs are stored
9.Power LED Indicator – This LED lights up anytime the board is plugged in a power source
10.Voltage Regulator – This controls the amount of voltage going into the Arduino board
11.DC Power Barrel Jack – This is used for powering your Arduino with a power supply
12.3.3V Pin – This pin supplies 3.3 volts of power to your projects
13.5V Pin – This pin supplies 5 volts of power to your projects
14.Ground Pins – There are a few ground pins on the Arduino and they all work the same
15.Analog Pins – These pins can read the signal from an analog sensor and convert it to digital

The Arduino IDE

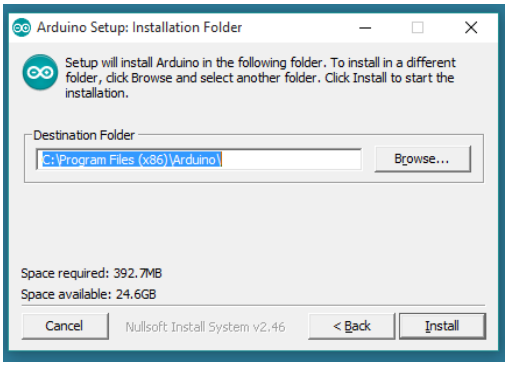
•Once the circuit has been created on the breadboard, you’ll need to upload the program (known as a sketch) to the Arduino.
•The sketch is a set of instructions that tells the board what functions it needs to perform.
•An Arduino board can only hold and perform *one sketch at a time.*
•The software used to create Arduino sketches is called the *IDE* which stands for *Integrated Development Environment.*

Installing

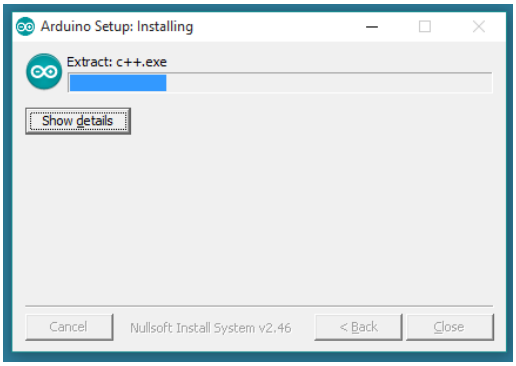
1. Choose the components to **install**.



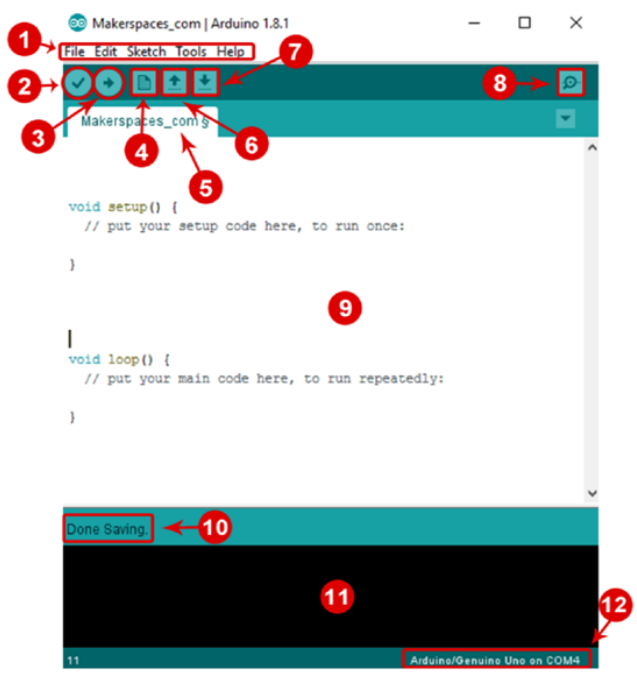
2. Choose the **installation** directory. (we suggest to keep the default one)



3. The **process** will extract and **install** all the required files to execute properly the **Arduino** Software (**IDE**) Proceed with board specific **instructions**.

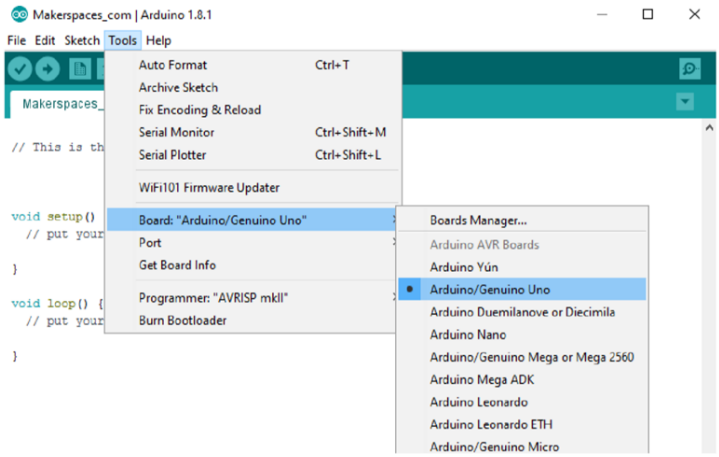


Parts of the IDE

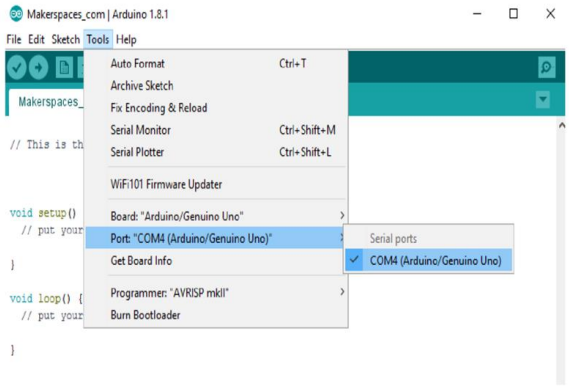


1.**Menu Bar:** Gives you access to the tools needed for creating and saving Arduino sketches.
2.**Verify Button:** Compiles your code and checks for errors in spelling or syntax.
3.**Upload Button:** Sends the code to the board that's connected such as Arduino Uno in this case. Lights on the board will blink rapidly when uploading.
4.**New Sketch:** Opens up a new window containing a blank sketch.
5.**Sketch Name:** When the sketch is saved, the name of the sketch is displayed here.
6.**Open Existing Sketch:** Allows you to open a saved sketch or one from the stored examples.
7.**Save Sketch:** This saves the sketch you currently have open.
8.**Serial Monitor:** When the board is connected, this will display the serial information of your Arduino.
9.**Code Area:** This area is where you compose the code of the sketch that tells the board what to do.
10.**Message Area:** This area tells you the status on saving, code compiling, errors and more.
11.**Text Console:** Shows the details of an error message, size of the program that was compiled and additional info.
12.**Board and Serial Port:** Tells you what board is being used and what serial port it's connected to.

Setting up Arduino IDE with Arduino Board



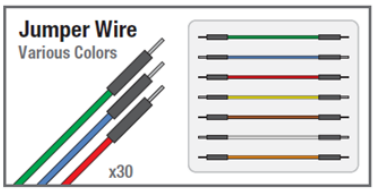
Once the board is connected, you will need to go to Tools then Board then finally select Arduino Uno.

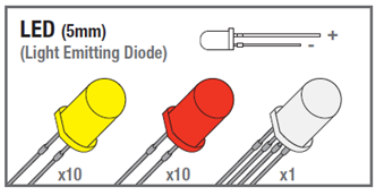


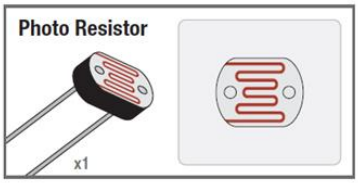
Next, you have to tell the Arduino which port you are using on your computer.

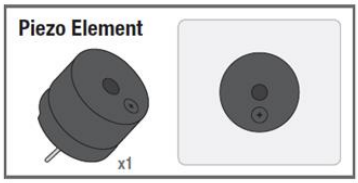
To select the port, go to **Tools** then **Port** then select the port that says **Arduino**.
Arduino Components

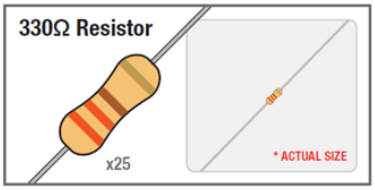
Name	Image	Type	Function	Notes
Push Button		Digital Input	Switch - Closes or opens circuit	Polarized, needs resistor
Trim potentiometer		Analog Input	Variable resistor	Also called a Trimpot.
Photoresistor		Analog Input	Light Dependent Resistor (LDR)	Resistance varies with light.
Relay		Digital Output	Switch driven by a small signal	Used to control larger voltages
Temp Sensor		Analog Input	Temp Dependent Resistor	
Flex Sensor		Analog Input	Variable resistor	
Soft Trimpot		Analog Input	Variable resistor	Careful of shorts
RGB LED		Dig & Analog Output	16,777,216 different colors	Ooh... So pretty.

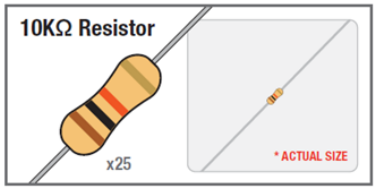


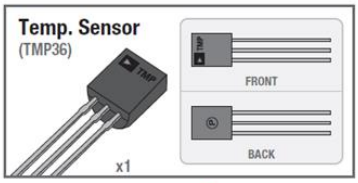


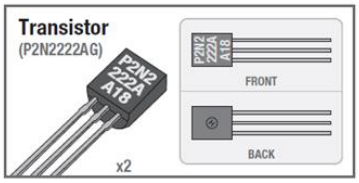


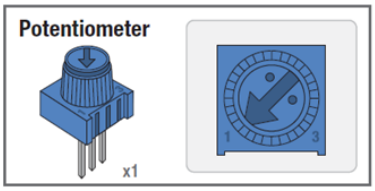


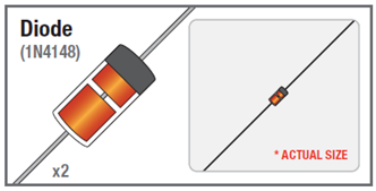


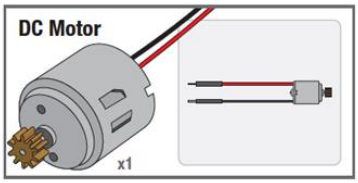


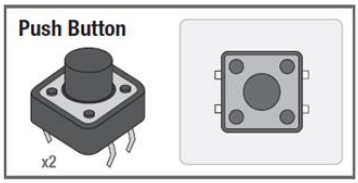




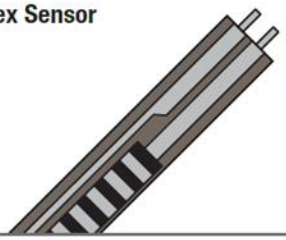








Flex Sensor



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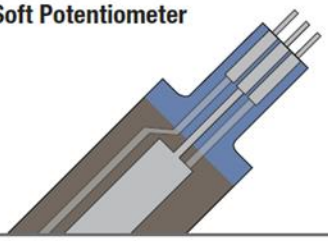
Soft Potentiometer



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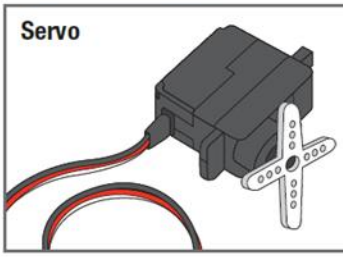
Servo



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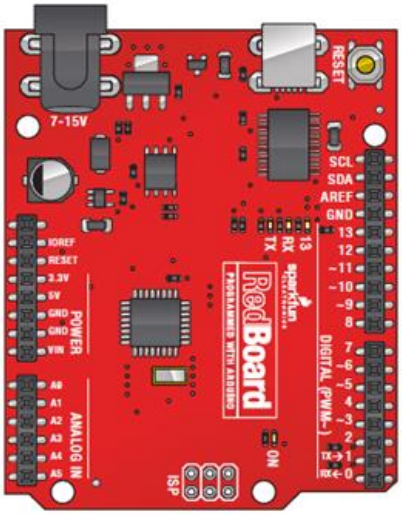
SparkFun RedBoard



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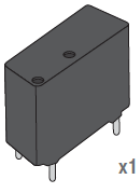
Relay



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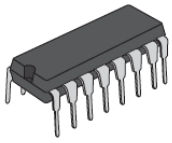
Integrated Circuit
(IC)



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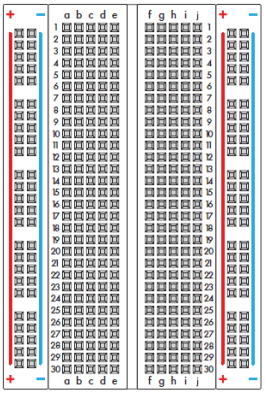
Breadboard
Standard Solderless (Color may vary)



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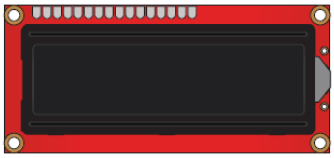
LCD



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