Introduction to Arduino

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board -- you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

History of an arduino

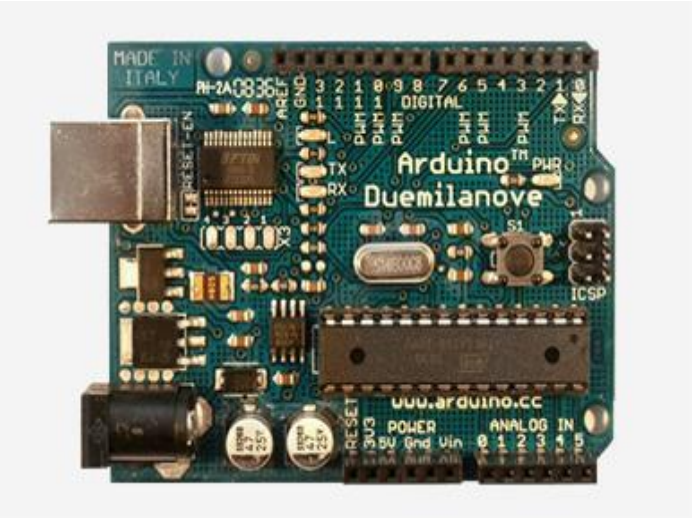
The Arduino project was started at the Interaction Design Institute Ivrea (IDII) in Ivrea, Italy. At that time, the students used a BASIC Stamp microcontroller at a cost of $50, a considerable expense for many students. In 2003 Hernando Barragán created the development platform Wiring as a Master's thesis project at IDII, under the supervision of Massimo Banzi and Casey Reas. Casey Reas is known for co-creating, with Ben Fry, the Processing development platform. The project goal was to create simple, low cost tools for creating digital projects by non-engineers. The Wiring platform consisted of a printed circuit board (PCB) with an ATmega168 microcontroller, an IDE based on Processing and library functions to easily program the microcontroller. In 2005, Massimo Banzi, with David Mellis, another IDII student, and David Cuartielles, extended Wiring by adding support for the cheaper ATmega8 microcontroller. The new project, forked from Wiring, was called Arduino.The initial Arduino core team consisted of Massimo Banzi, David Cuartielles, Tom Igoe, Gianluca Martino, and David Mellis.

Different types of Arduino Boards

Arduino UNO

This is the latest revision of the basic Arduino USB board. It connects to the computer with a standard USB cable and contains everything else you need to program and use the board. It can be extended with a variety of shields: custom daughter-boards

with specific features. It is similar to the Duemilanove, but has a different USB-to-serial chip, the ATMega8U2, and newly designed labeling to make inputs and outputs easier to identify.



3.1.2.2 ARDUINO DUEMILANOVE:-

The Duemilanove automatically selects the appropriate power supply (USB or external power), eliminating the need for the power selection jumper found on previous boards. It also adds an easiest to cut trace for disabling the auto-reset, along with a solder jumper for re-enabling it. Note: around March 1st, 2009, the Duemilanove started to ship with the ATmega328p instead of the ATmega168.

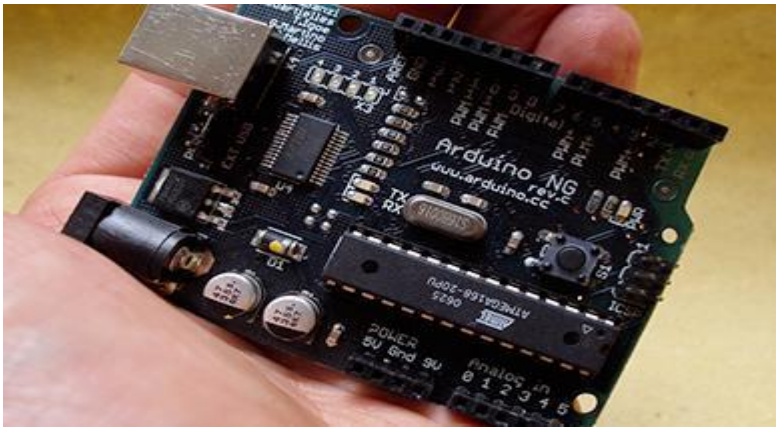
3.1.2.3 ARDUINO DIECIMILA

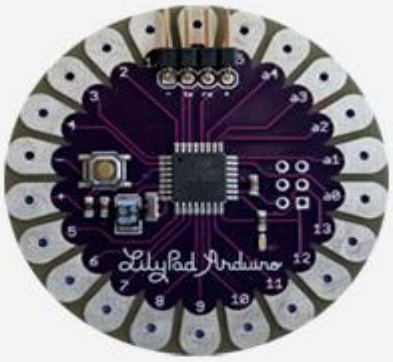
The main change in the Arduino Diecimila is that it can be reset from the computer, without the need to physically press the reset button on the board. The Diecimila uses a low dropout voltage regulator which lowers the board's power consumption when powered by an external supply (AC/DC adapter or battery).A resettable polyfuse protects your computer's USB ports

from shorts and surges. It also provides pin headers for the reset line and for 3.3V. There is a built-in LED on pin 13. Some blue Diecimila boards say "Prototype - Limited Edition" but are in fact fully-tested production boards (the actual prototypes are red).

3.1.2.4 ARDUINO NG REV. C

Revision C of the Arduino NG does not have a built-in LED on pin 13 - instead you'll see two small unused solder pads near the labels "GND" and "13". There is, however, about 1000 ohms of resistance on pin 13, so you can connect an LED without an external resistor.



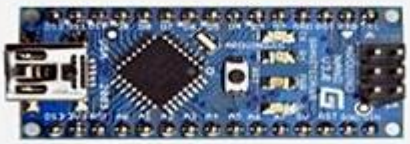


3.1.2.5 ARDUINO LILLYPAD 02

The second revision includes an external 8mhz oscillator. The bootloader has also been updated to Limor Fried's "no wait" bootloader. When the LilyPad is supplied with power, the sketch starts immediately. The bootloader is triggered only when the reset switch is pressed.

3.1.2.6 ARDUINO NANO 2.X

The Arduino Nano 2.x boards have an ATmega168 and a four-layer PCB.



3.1.2.7 Arduino Mini

On this version of the Arduino Mini, two of the pins changed. The third pin became reset (instead of ground) and the fourth pin became ground (instead of being unconnected). These boards are labelled "Mini 04".

3.1.3 Features of Arduino

Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connecting to the cloud and many other actions.

- You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software).
- Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board. You can simply use a USB cable.
- Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.
- Finally, Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.