

INTRODUCTION TO ARDUINO



What is Arduino?

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programmed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.



History of Arduino

- Arduino was born in the Italian Institute of Interaction Design Ivrea, a school where students focused their experiments on the interaction with devices, many based on microcontrollers.
- Arduino comes from a need, to have a device to use in class, it is low cost, which would work under any operating system and adapted documentation that would tell people how to start from scratch.

KEY FEATURES

- 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, connect 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.

Different types of Arduino Board

- **Arduino Diecimila** microcontroller is based on the Atmega168 chip.
- **Arduino Nano** is a microcontroller based on the Atmega328 (Arduino Nano 3.0) or Atmega168 (Arduino Nano 2.x) .
- **Arduino Mega** is a microcontroller board based Atmeg1280.



Different types of Arduino Board

- **LilyPad Arduino** microcontroller is based on the Atmega168V (version ATmega168 low consumption), or the Atmega328V.
- **Fio Arduino** microcontroller is based on the Atmega328P .
- **Arduino Mini** microcontroller is based on the ATmega168.



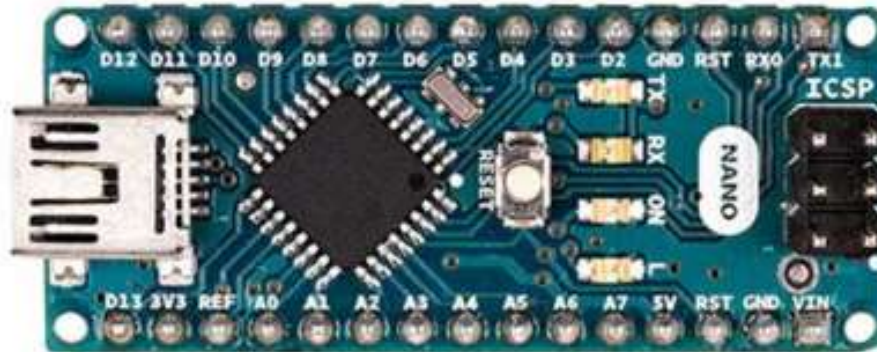
Different types of Arduino Board

- **Arduino UNO** is a microcontroller based on the Atmega328, Arduino UNO is advance version of Arduino Duemilanove.



ARDUINO NANO

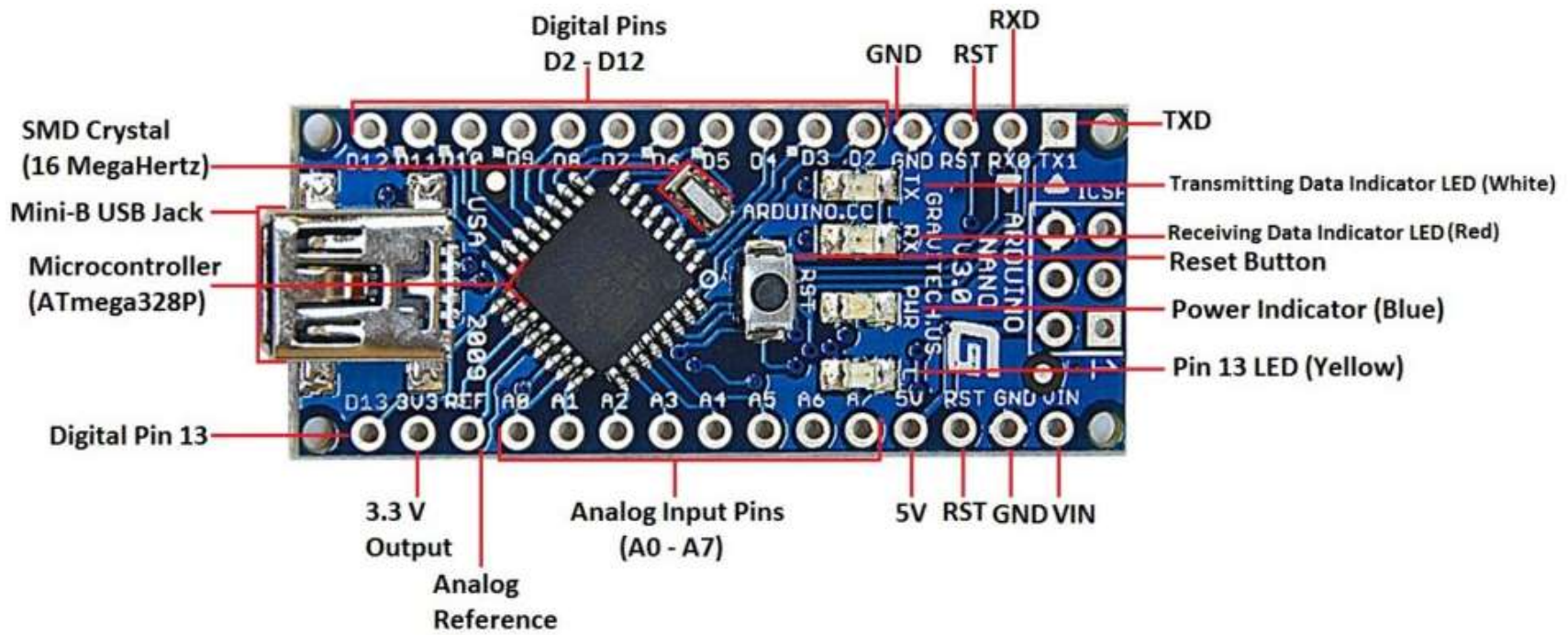
The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.



Features of Arduino Nano

Microcontroller	ATmega328
Input Voltage	7-12V
Operating Voltage	5V
Architecture	AVR
Digital I/O Pins	14 (6 of which are PWM)
Analog Input Pins	6 (A0 –A5)
DC Current per I/O Pin	40 mA (I/O pins)
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB of which 2 KB used by bootloader
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz

Pin Description of Arduino Nano

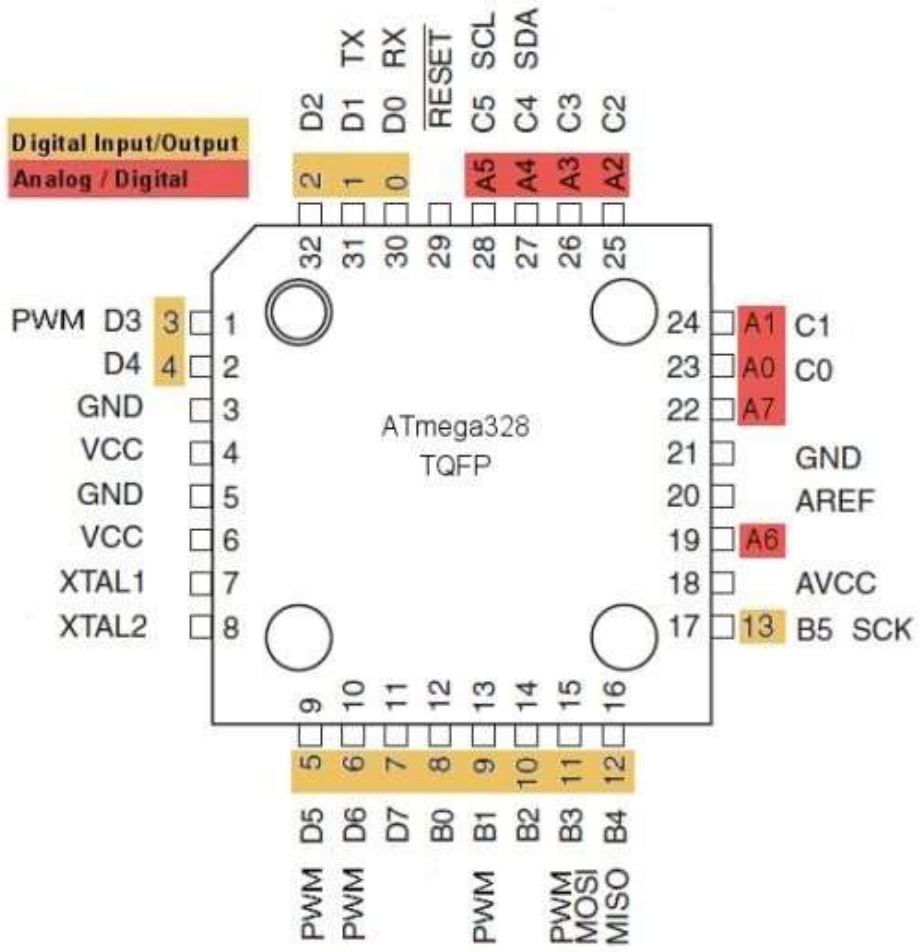


Atmega328

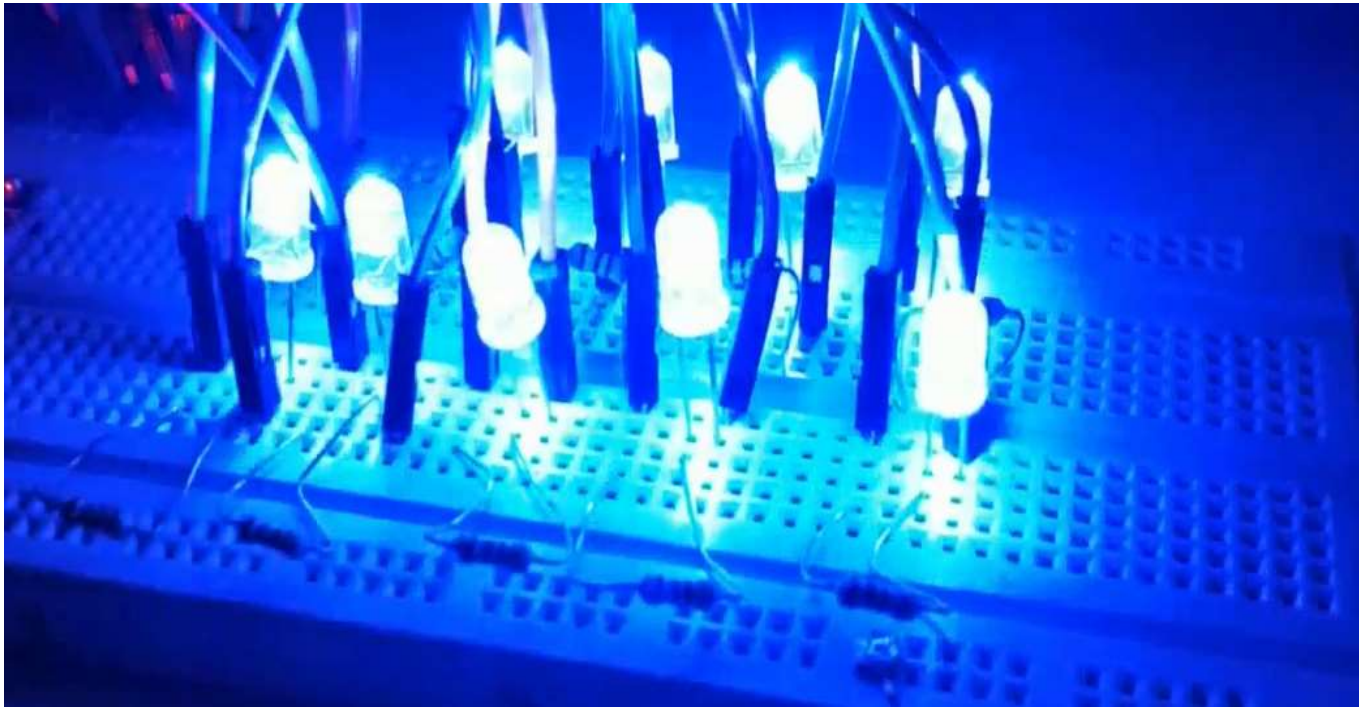
- The **ATmega328** is a single-chip **microcontroller** created by Atmel in the megaAVR family (later Microchip Technology acquired Atmel in 2016). It has a modified Harvard architecture 8-bit RISC processor core.
- The **Atmega328** is a very popular microcontroller chip produced by Atmel. It is an 8-bit microcontroller that has 32K of flash memory, 1K of EEPROM, and 2K of internal SRAM.



Atmega328 Pin-out



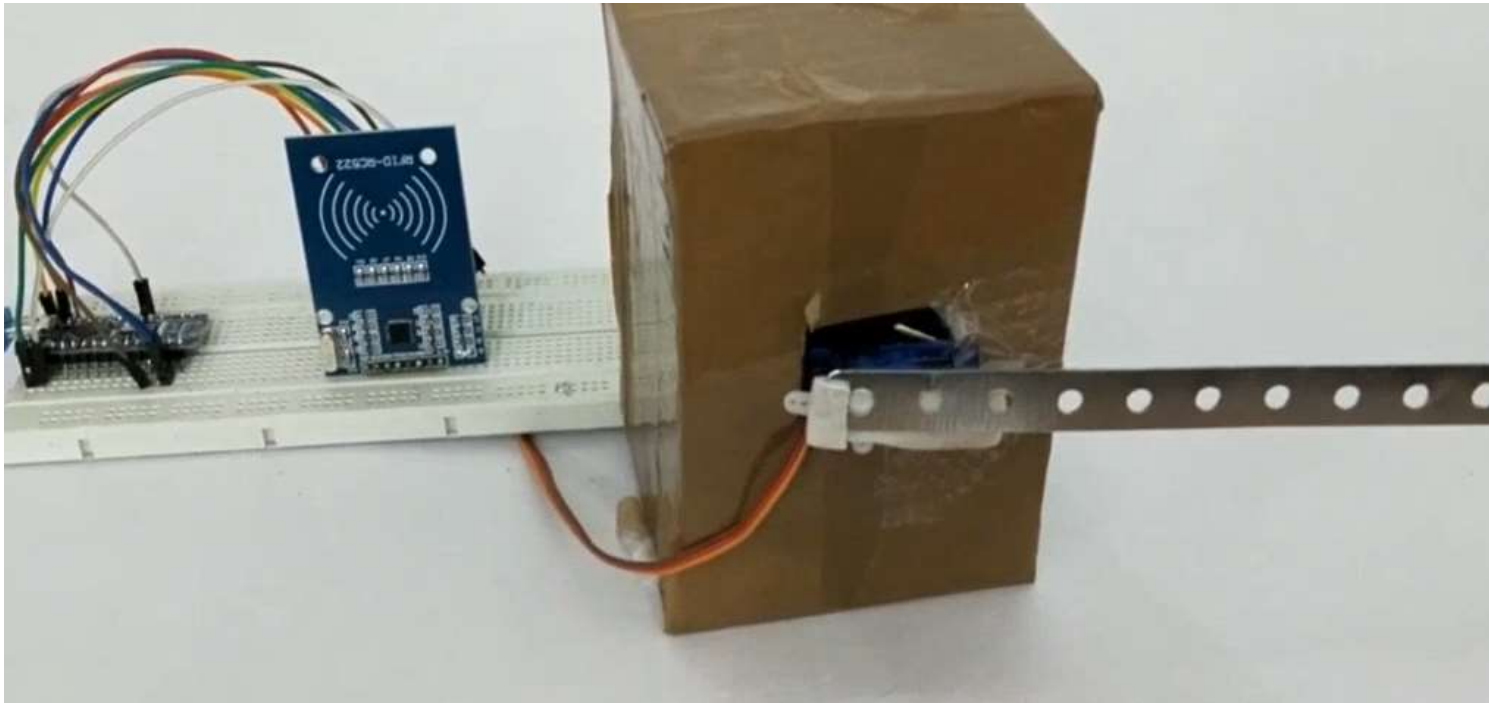
Projects developed using Arduino Nano



LED Array Project

Project video link : https://youtu.be/039n_HlRxic

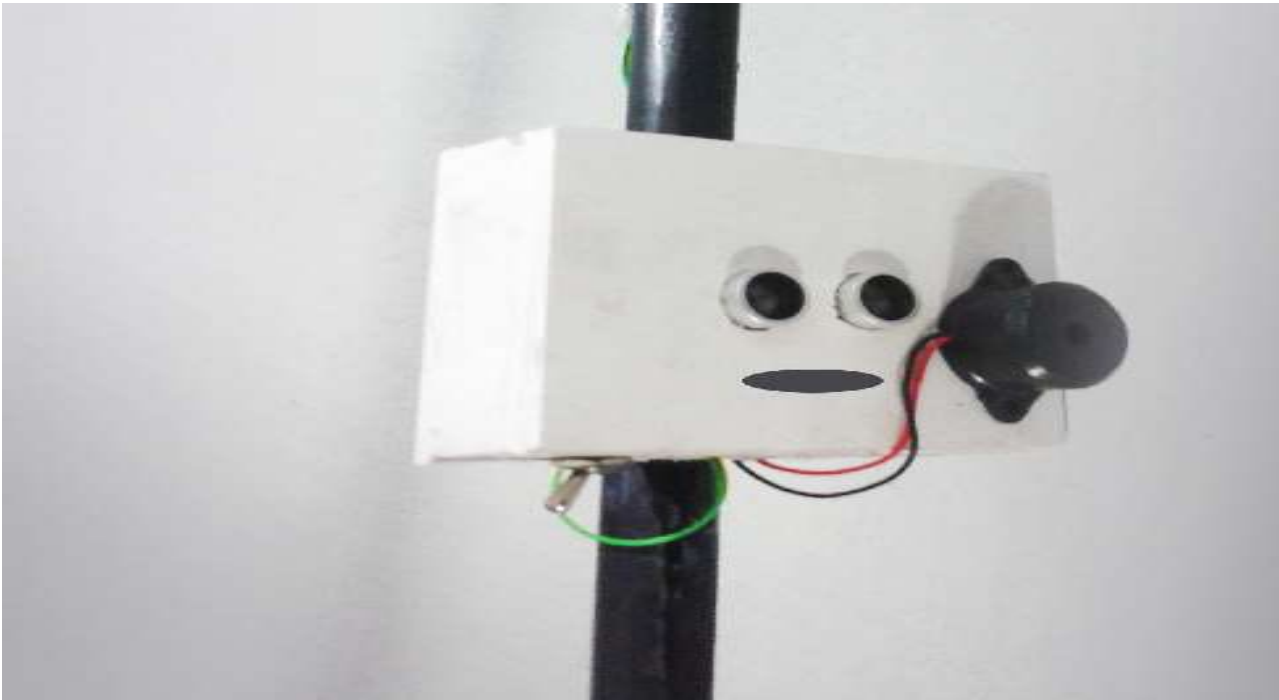
Projects developed using Arduino Nano



Automatic door lock using RFID

Project video link : <https://youtu.be/vK8rfozAaXw>

Projects developed using Arduino Nano



Blind Stick Project

Project video link : <https://youtu.be/bItI44lYJBI>