Hobby Circuits and Robotics

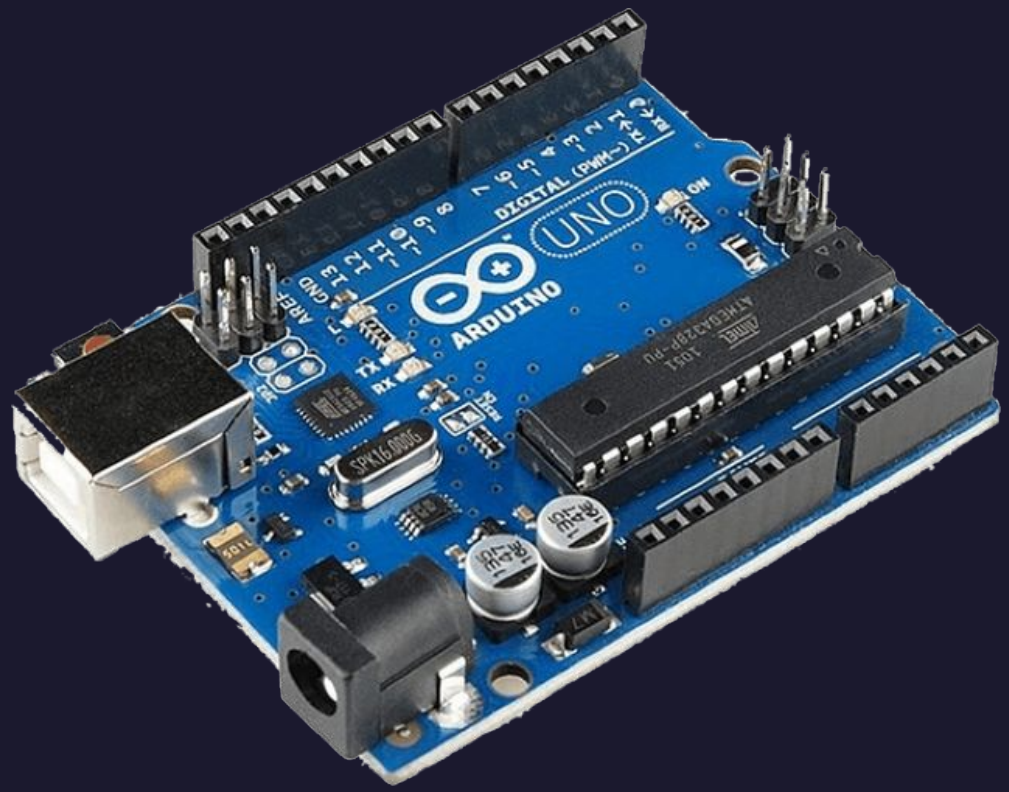
What you are going to explore....

- Introduction to Arduino
- Programming an Arduino
- Learning to control actuators with sensor data
- Building a Plant monitoring system
- Obstacle avoiding Bot

Introduction To arduino

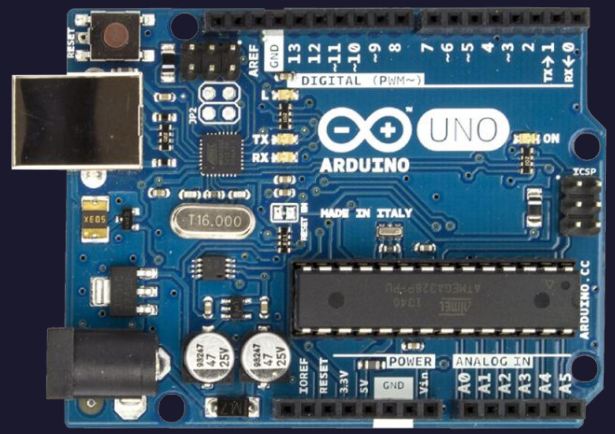
What is and Arduino?

- Arduino is an open-source electronics platform.
- It is based on easy-to-use hardware and software.
- Ideal for both beginners and advanced users in electronics and programming.



The Arduino Community

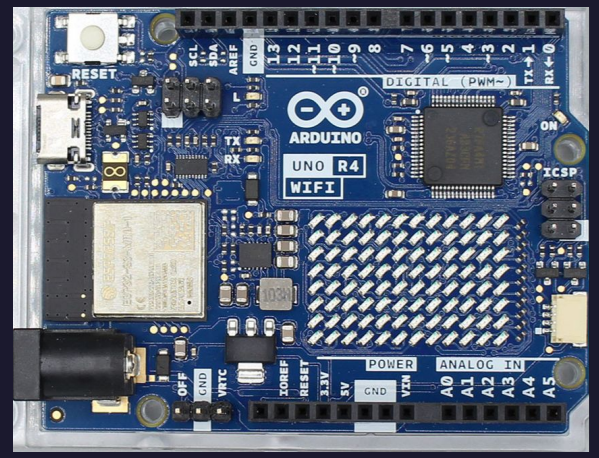
- There are different version of boards available from the side of Arduino
- Arduino Nano, Arduino UNO, Arduino MEGA are the common boards that are used
- According the projects size and requirement different boards are used



Arduino UNO

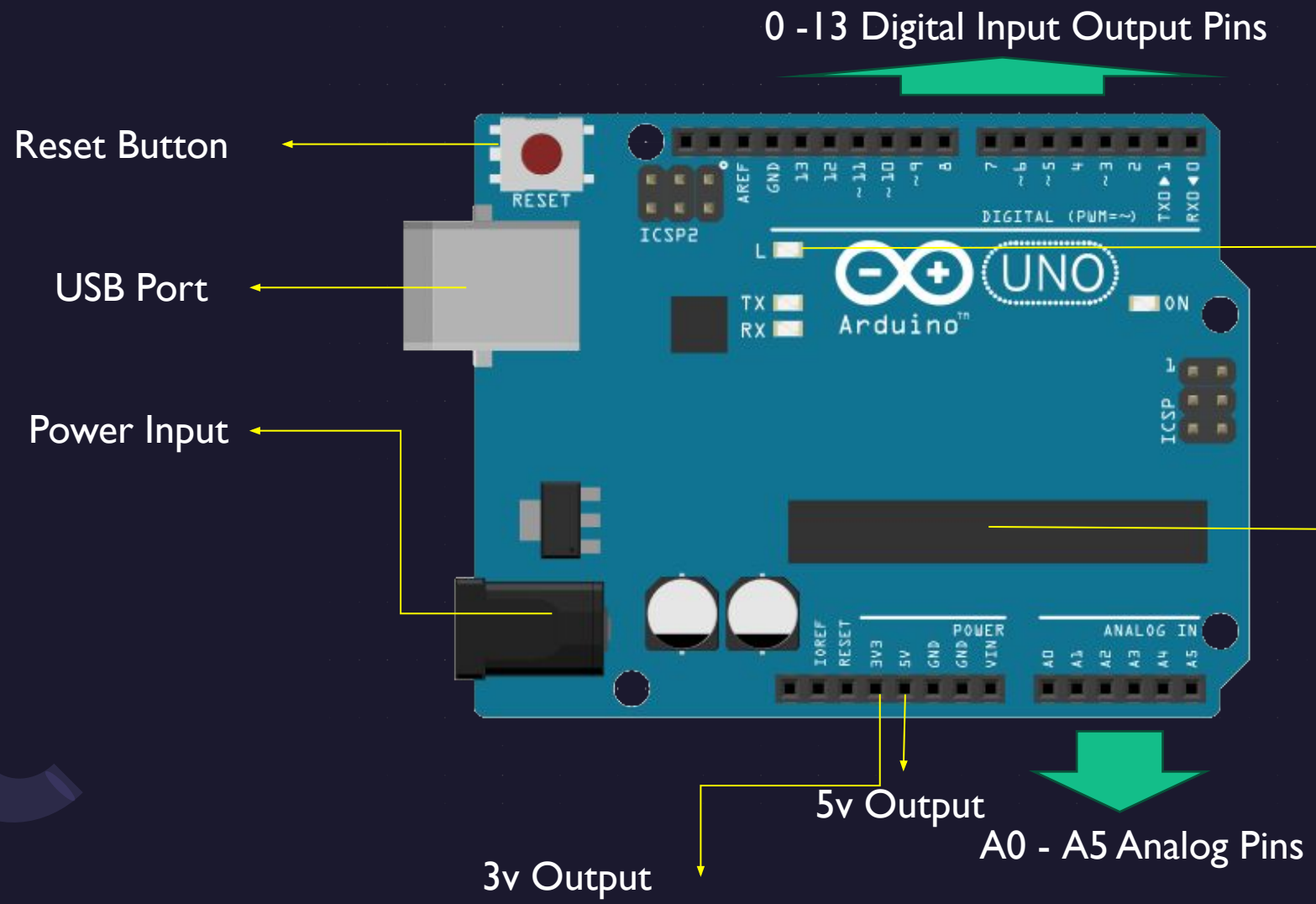
Arduino NANO

Arduino MEGA



Arduino R4 WIFI

Anatomy Of An Arduino UNO



Digital Pins

- The digital pins in Arduino can be used as both output and input pins
- This pin can read data from sensors and also send data to other devices that are used. Like LED or Buzzer or etc
- Some of the pins are able to generate PWM signals(Analog) that are marked by squiggle line (~)

Actuators	Sensors
Convert electrical signals into physical action.	Detect physical changes and convert them into electrical signals.
Perform actions or control mechanisms in a system.	Provide data or feedback to a system.
Example: Servo Motor - Converts electrical signals into precise angular movement.	Temperature Sensor: Detect temperature and makes corresponding o utput signal

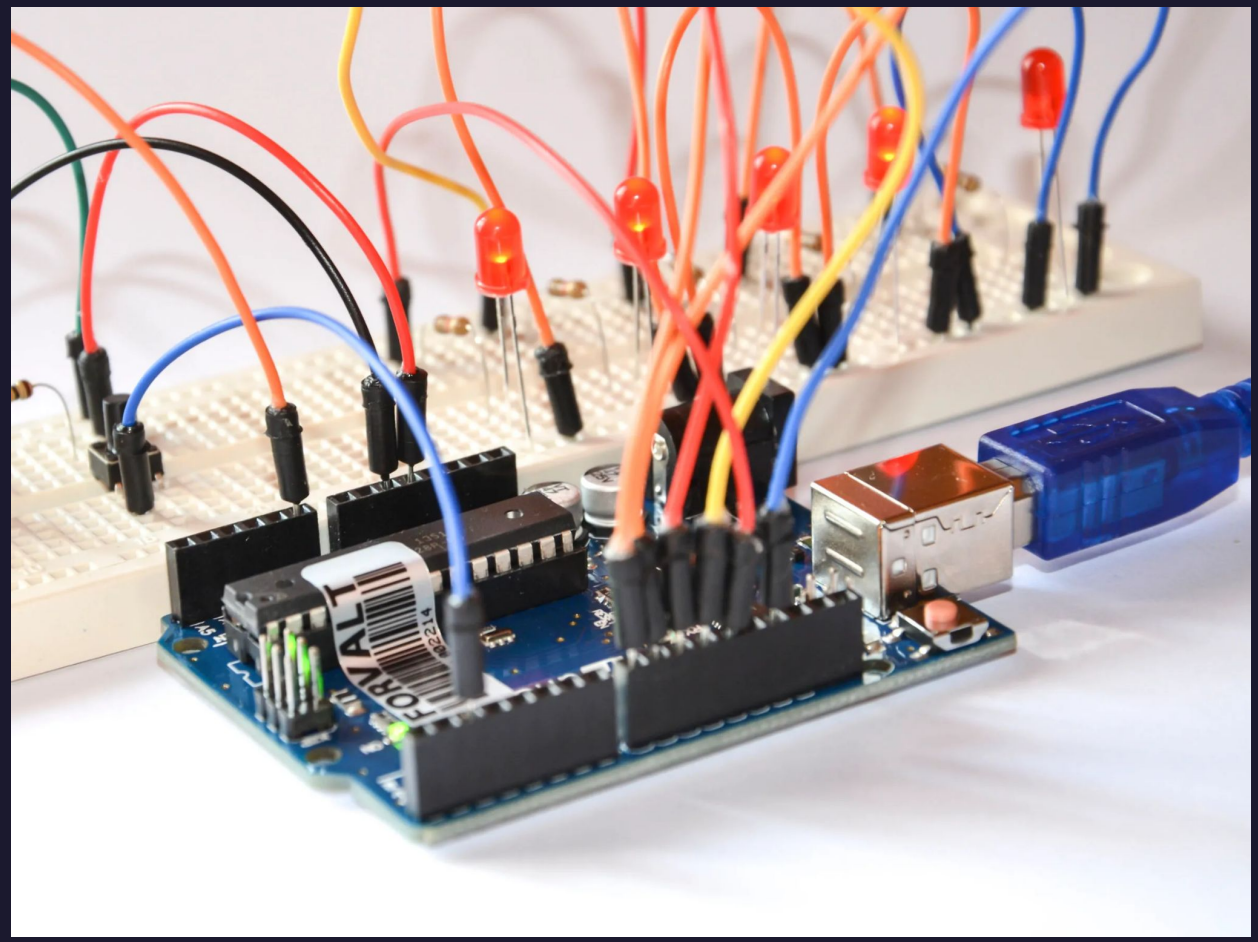
Analog Pins

- Analog pins in arduino takes up analog pins and convert them into digital readable signal by ADC(Analog to digital Conversion
- The voltage range of the analog pins are 0v to 5v or 3.3v
- Analog pins are names A0 - A5 in the board
- Analog pins can also function as digital pins
- Analog pins only take analog signals as input do not give analog output
- But can give digital output and input

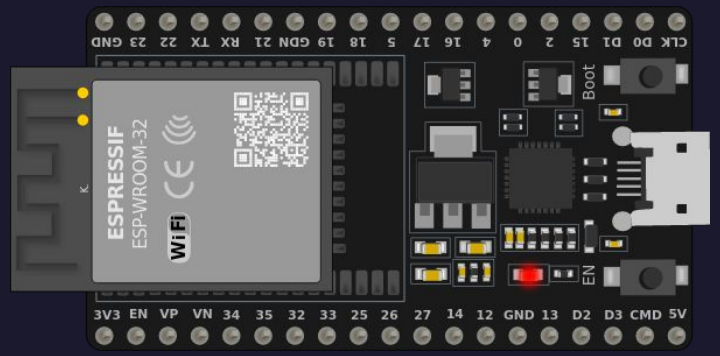
- Analog pins helps in acquiring the values which are not 1 and 0s but also gives us the intermediate value
- Analog pins help in acquiring values that are not just 1s and 0s, but also intermediate values.
- For example, an analog pin can read the varying voltage from a temperature sensor, providing a value between 0 and 1023 that corresponds to the measured temperature.

The Processor

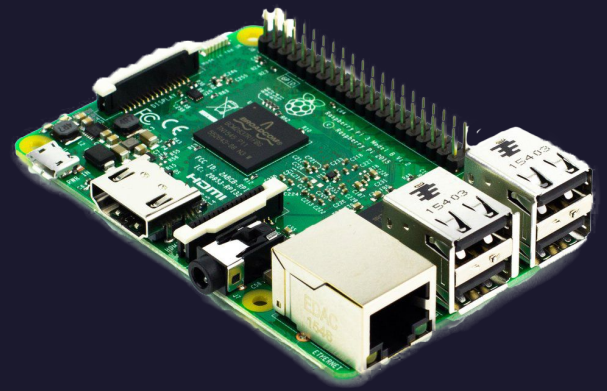
- The processor used in arduino IDE is the Atmega328P
- This is a very powerful Microcontroller which is functioning as the brain of an arduino
- according to the variants more powerful and processors in different sizes are used in arduino
- Arduino make it easy to work with atmega328P ic



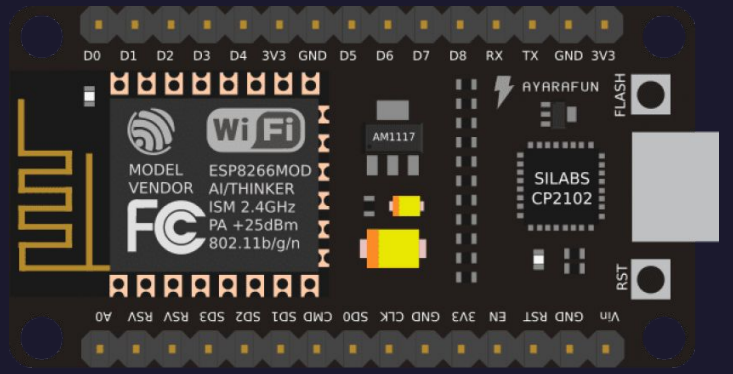
Dev boards other than arduino



ESP 32



Raspberry PI



Node MCU

These are the basic things you need to know about arduino before starting to learn how to use it.

Now we can explore how you can make arduino do things to our desire

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