ISTITUTO DI ISTRUZIONE SUPERIORE
Palazzolo Acreide
www.polivalentepalazzolo.com
sris003005@istruzione.it
sris003005@pec.istruzione.it

ERASMUS K2 « PASSPORT TO THE FUTURE »

How the traffic lights work

SILALE 24-30 APRIL 2022

Co-funded by the
Erasmus+ Programme
of the European Union

WHAT IS A SOFTWARE PROGRAM?

- It is a set of instructions written in various computer languages by programmers
- A program contains sequences of operations that the computer will follow to execute a specific task
- The sequences of the operations are called **algorithms**



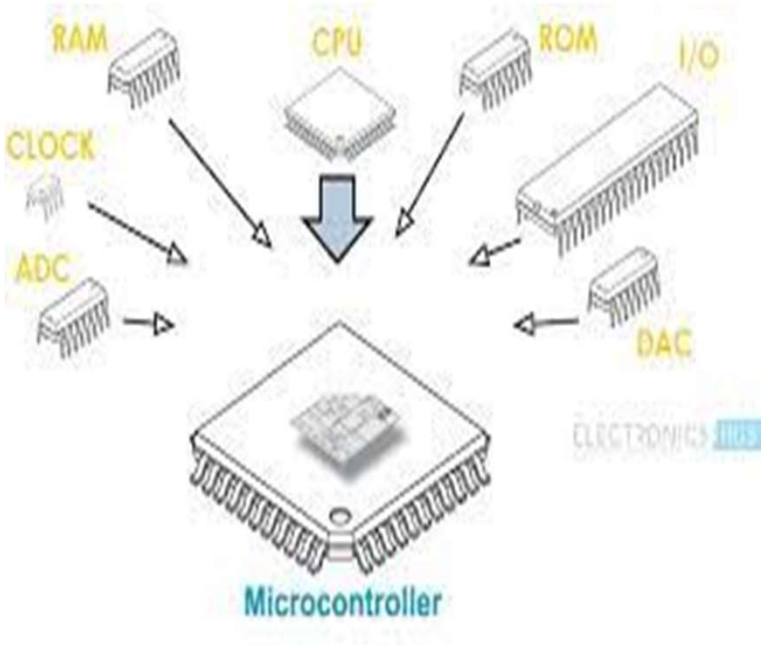
PROGRAMMING LANGUAGES

- they are used to write the sequences of operations
- They are divided in low – level languages (based on the binary code) and high-level languages (similar to spoken and mathematical languages)
- The most common high- level languages are:



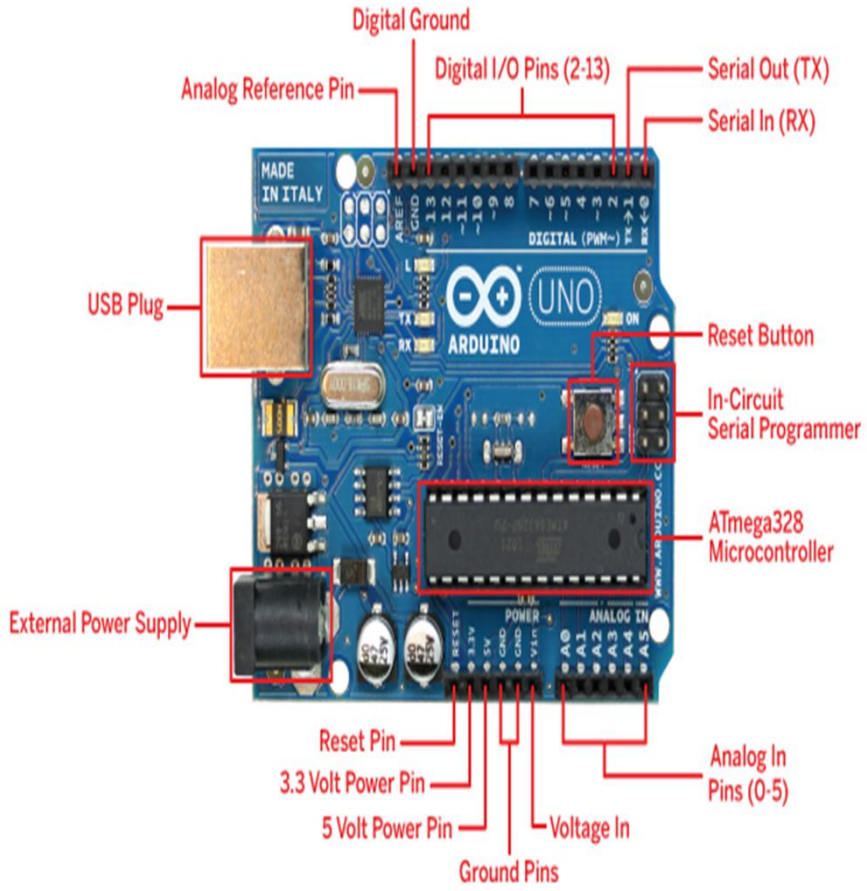
A MICROCONTROLLER

- A **microcontroller** is a small computer on a single integrated circuit (IC)or chip. A microcontroller contains one or more Central Processing Units along with memory and programmable input/output peri pherals.
- Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, remote controls, office machines, appliances, power tools, toys and other embedded systems.



THE ARDUINO PLATFORM: Hardware

- An easy but complete hardware and software system even for non-experts
- On the hardware side, Arduino is a single-board microcontroller system usually equipped with 8 –bit AVR microcontroller
- The pins of Arduino boards are exposed in the same fashion, which means it is very easy to plug in extensions, called shields, directly into the boards
- These shields can add variuos functionalities to the board, like the ability to connect wirelessly to your phone via Bluetooth



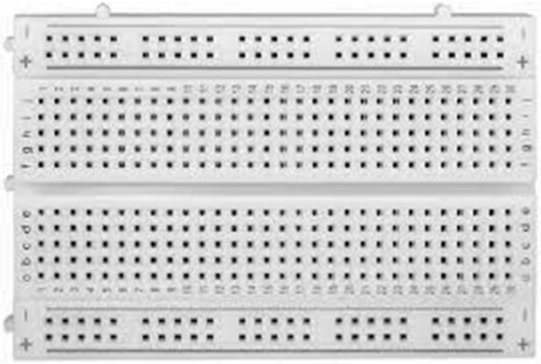
THE ARDUINO PLATFORM: Software

- It is the software part which makes Arduino platform so powerful
- You can make it do what you want by using the free official Arduino software and a language similar to C++ to write the code, that is a series of instructions to do some tasks
- This code is uploaded to the board
- For example making a LED light up only takes a single line of code with an Arduino board, while it would take many lines with other microntrollers



What You Need

- A Breadboard
- A Red Diffused LED
- A Yellow Diffused LED
- A Green Diffused LED
- 3 x 220Ω Resistor
- Jumper Wires





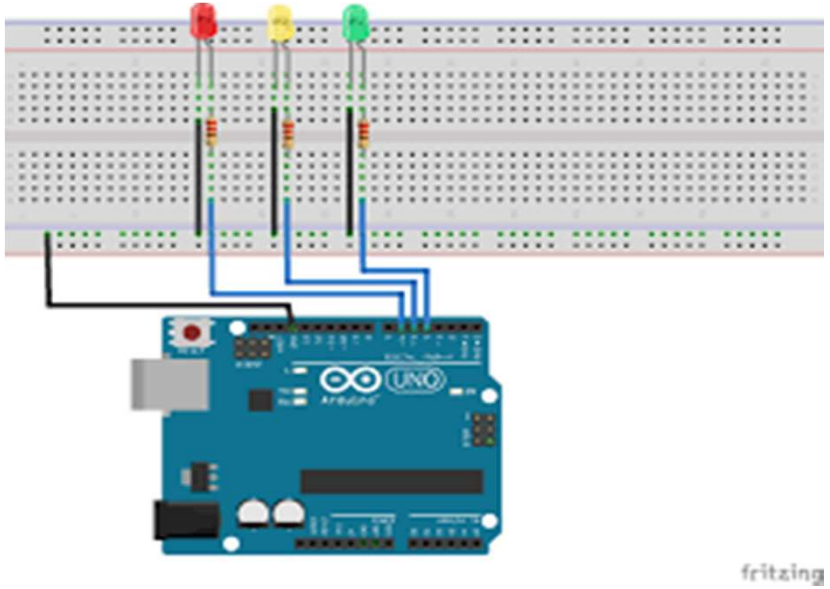




Write the Code

Project 3 - Traffic Lights

```
int ledDelay = 10000; // delay in between changes
int redPin = 10;
int yellowPin = 9;
int greenPin = 8;
void setup() {
pinMode(redPin, OUTPUT);
pinMode(yellowPin, OUTPUT);
pinMode(greenPin, OUTPUT);
}
void loop() {
// turn the red light on
digitalWrite(redPin, HIGH);
delay(ledDelay); // wait 5 seconds
digitalWrite(yellowPin, HIGH); // turn on yellow
delay(2000); // wait 2 seconds
digitalWrite(greenPin, HIGH); // turn green on
digitalWrite(redPin, LOW); // turn red off
digitalWrite(yellowPin, LOW); // turn yellow off
delay(ledDelay); // wait ledDelay milliseconds
digitalWrite(yellowPin, HIGH); // turn yellow on
digitalWrite(greenPin, LOW); // turn green off
delay(2000); // wait 2 seconds
digitalWrite(yellowPin, LOW); // turn yellow off
// now our loop repeats
```



The Traffic Lights

- When you enter the following code the traffic lights will change from green to red, via amber, and back again, after a set length of time using the 4-state system.
- You can add extra functions to this project by including a set of pedestrian lights and adding a push button to make the lights interactive.

Video

Mobile Robots

- First Lego Video
- The Hanoi Tower video

THANK YOU
FOR YOUR ATTENTION

