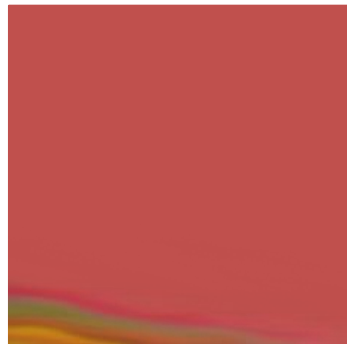
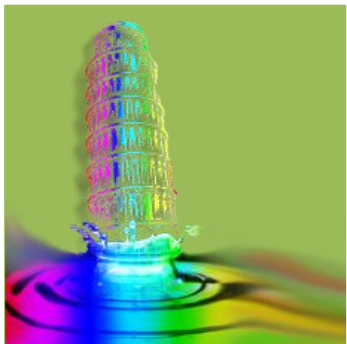
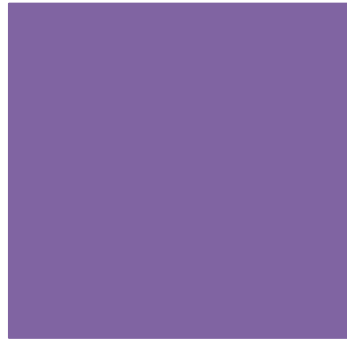




CENTRO E. PIAGGIO

Bioengineering and Robotics Research Center

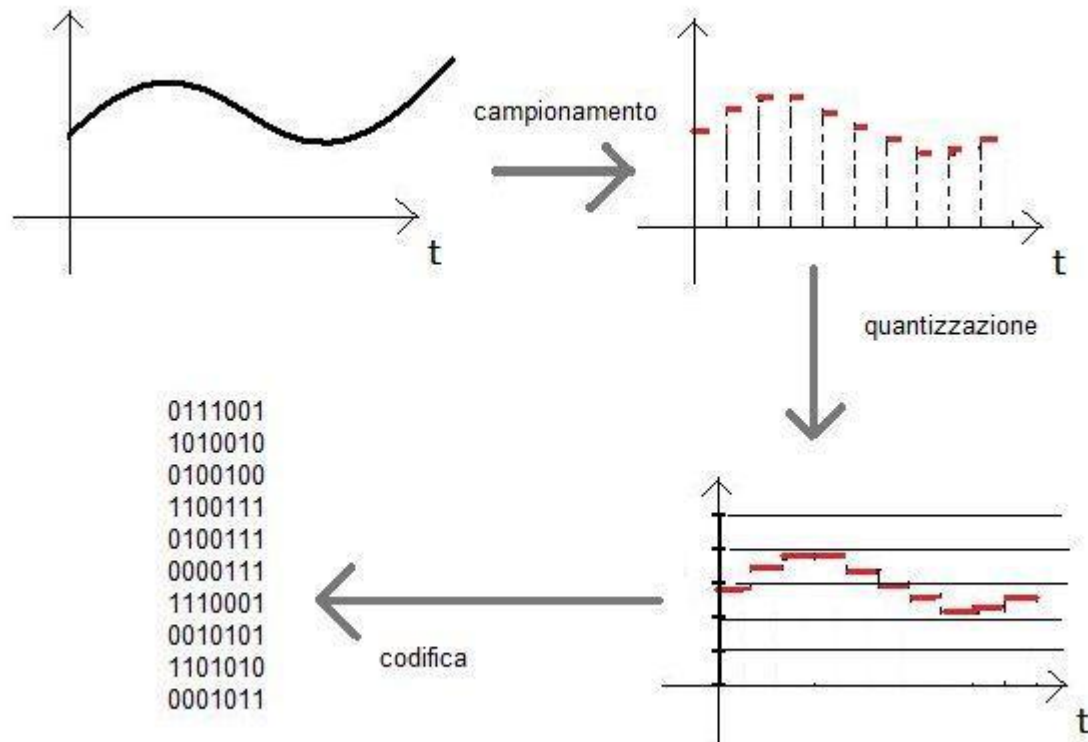


# Esercitazione protesi visive

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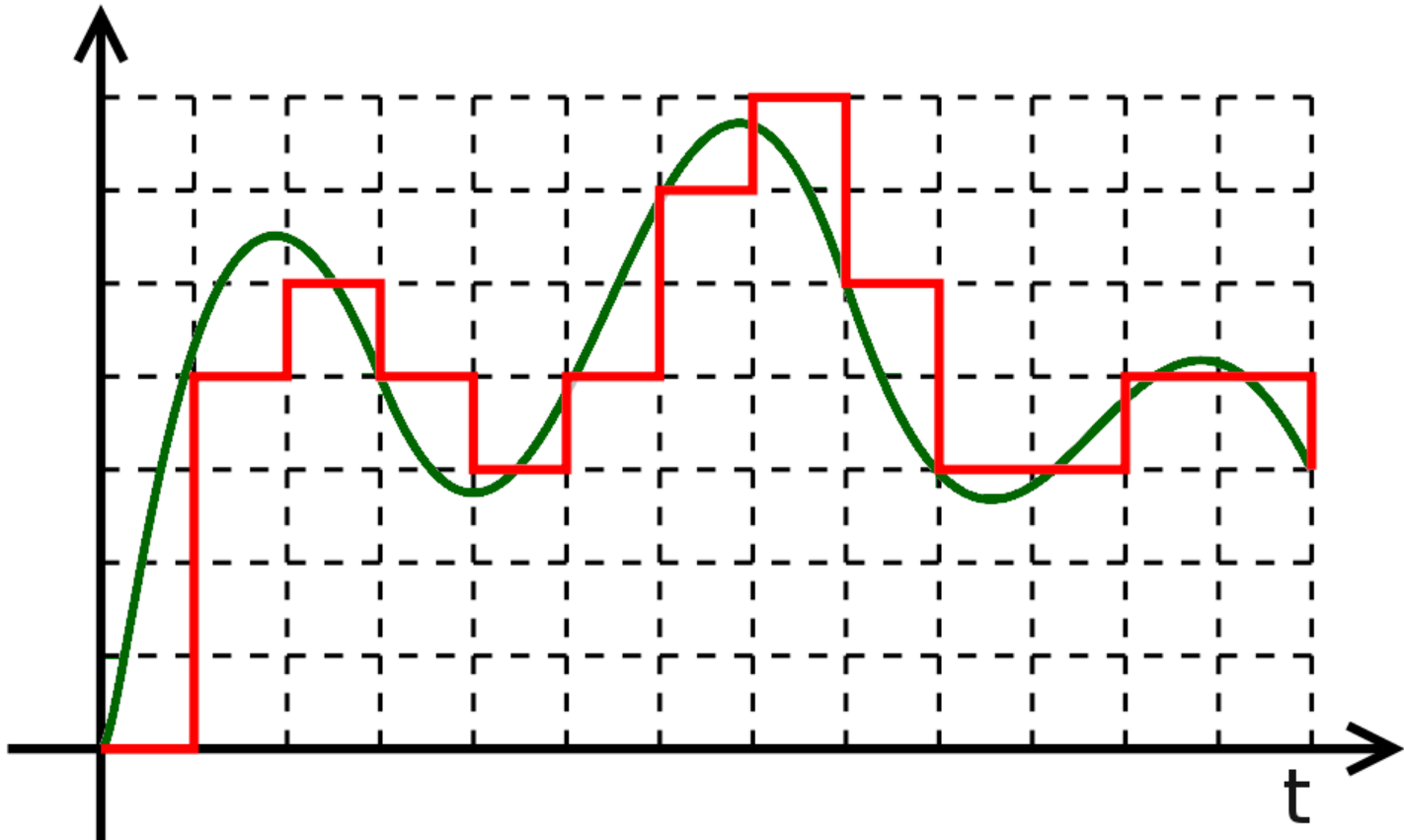
# + Segnali

- Campionamento e quantizzazione

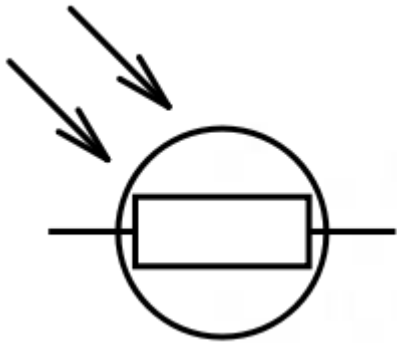


# + Segnali

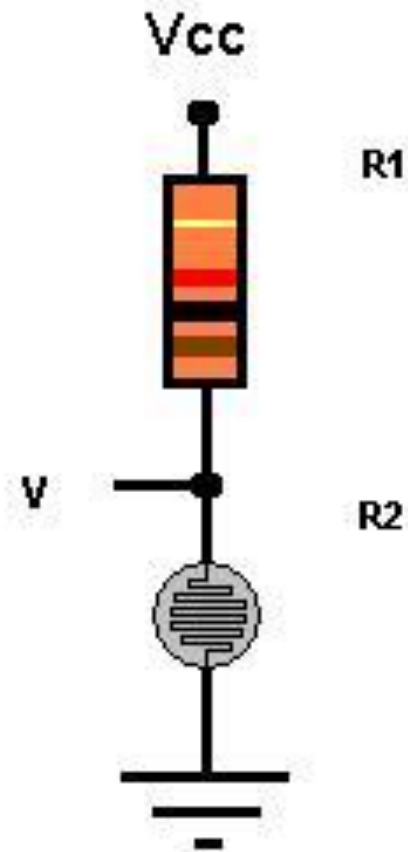
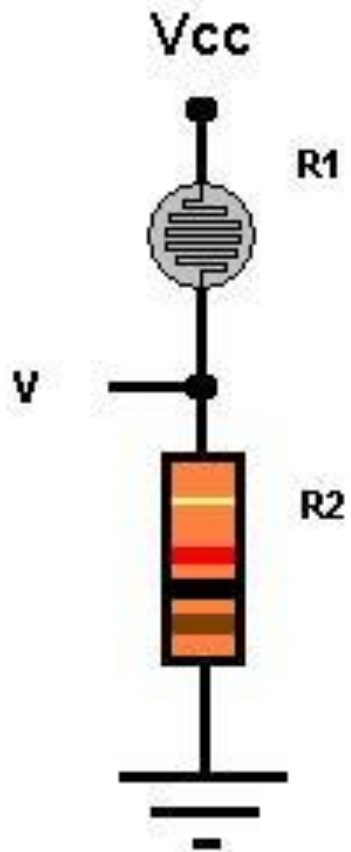
- Campionamento e quantizzazione



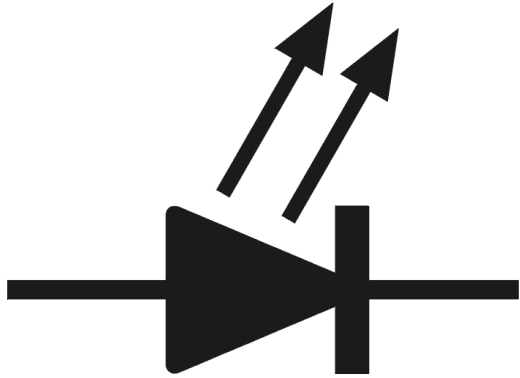
# + Fotoresistenza



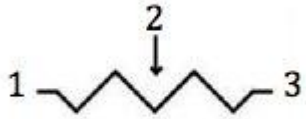
# + Partitore



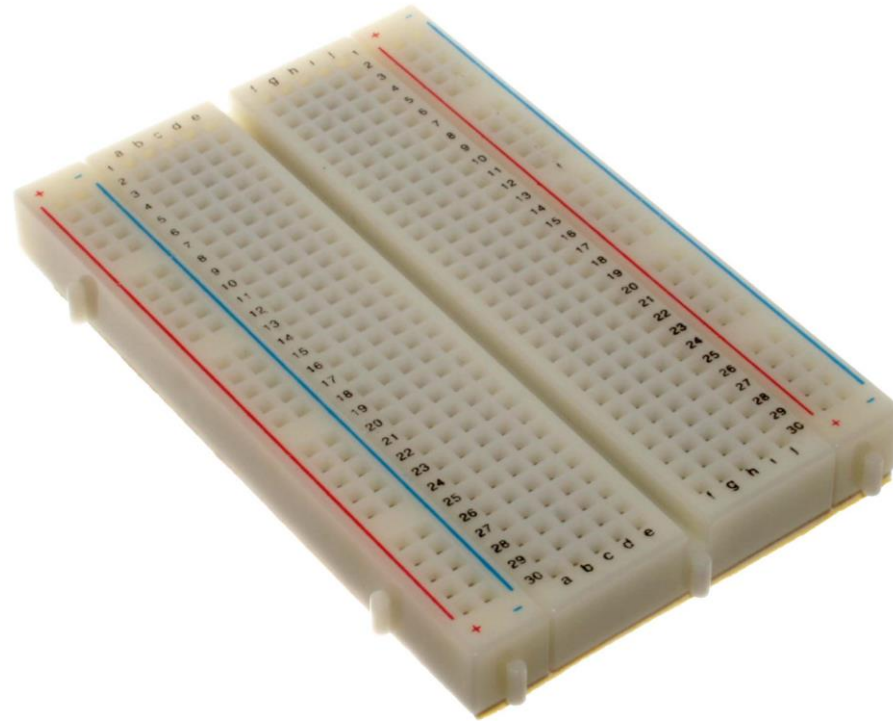
+ LED



# + Trimmer



# + Breadboard



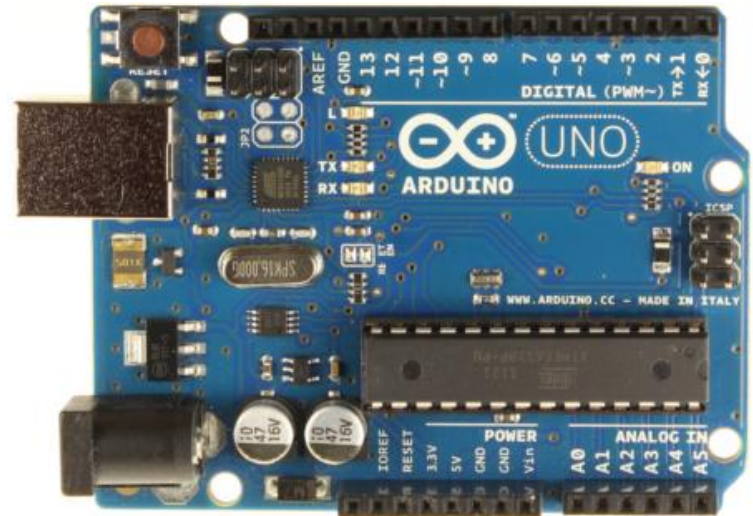


# + Arduino



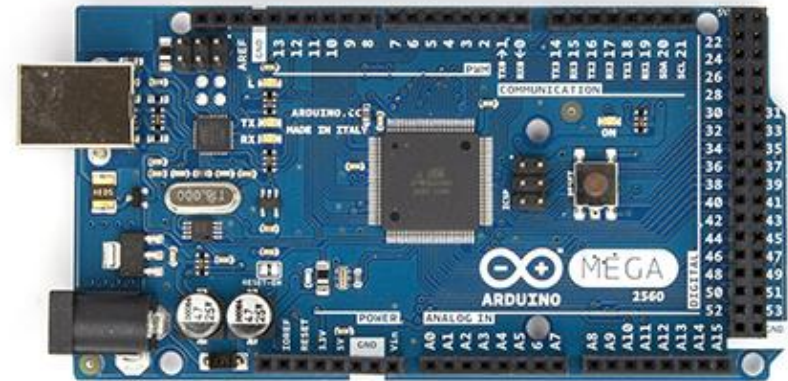
# + Arduino UNO

- The Arduino Uno is a microcontroller board based on the ATmega328.
  - 14 digital input/output pins
  - 6 PWM outputs (8 bit resolution)
  - 6 analog inputs (10 bit resolution)
  - 32 KB Flash Memory (of which 0.5 KB used by bootloader)
  - 2 KB SRAM
  - 1 KB EEPROM
  - 16 MHz ceramic resonator
  - USB connection - ICSP header
  - Power jack - reset button
- It contains everything needed to support the microcontroller
- simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

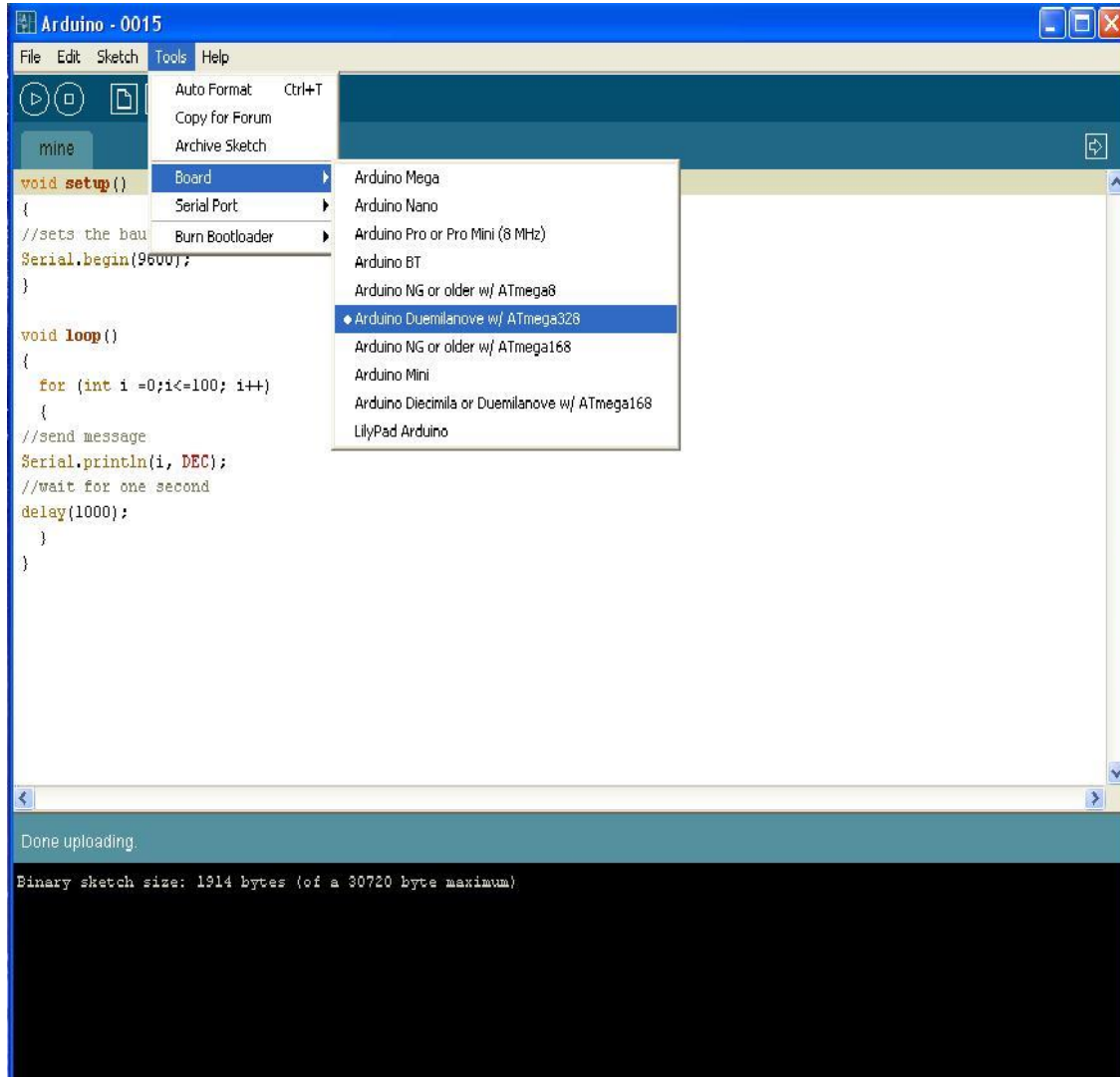


# + Arduino Mega

- The Arduino MEGA is a microcontroller board based on the ATmega2560.
  - 54 digital input/output pins
  - 15 PWM outputs (8 bit resolution)
  - 16 analog inputs (10 bit resolution)
  - 256 KB Flash Memory (of which 8 KB used by bootloader)
  - 8 KB SRAM
  - 4 KB EEPROM
  - 16 MHz ceramic resonator
  - USB connection - ICSP header
  - Power jack - reset button

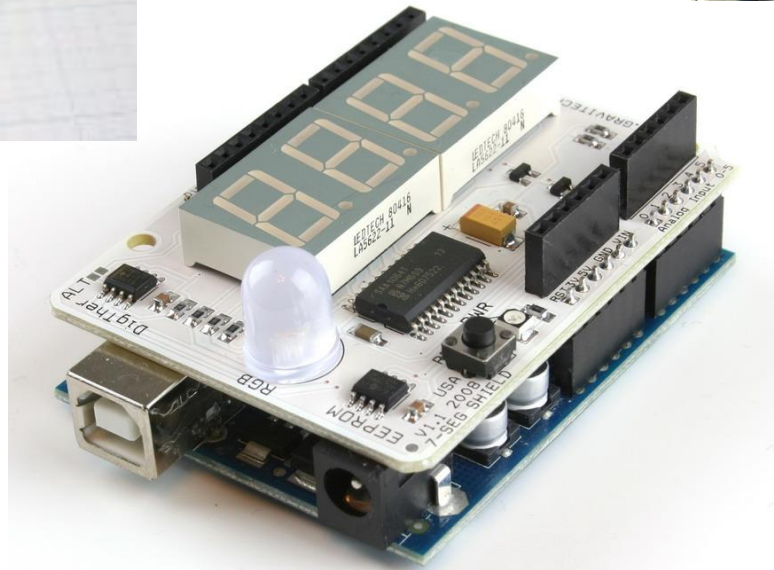
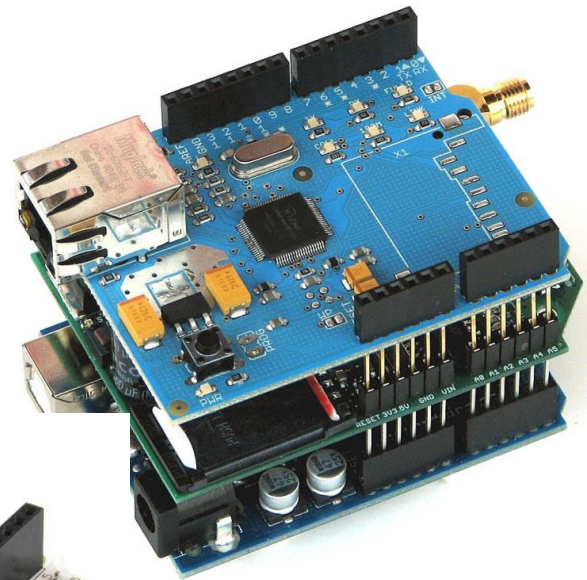
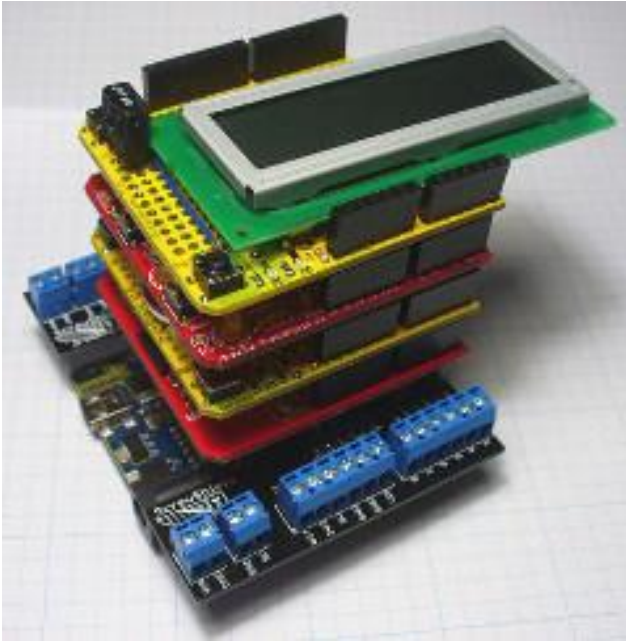


# + Arduino: IDE





# + Arduino: shields



# + Difference between microprocessor and microcontroller

- Microprocessor is an IC which has only the CPU inside them. It doesn't have RAM, ROM, and other peripheral on the chip. Application of microprocessor includes Desktop PC's, Laptops, notepads etc.
- Microcontroller has a CPU, in addition with a fixed amount of RAM, ROM and other peripherals all embedded on a single chip.
- Microcontrollers perform specific tasks where the relationship of input and output is defined.
- Microprocessors find applications where tasks are unspecific like software, games, websites, photo editing
- Microcontroller doesn't have video output.
- Microcontroller are programmed with firmware
- Microprocessors run operating systems on which software applications run.

