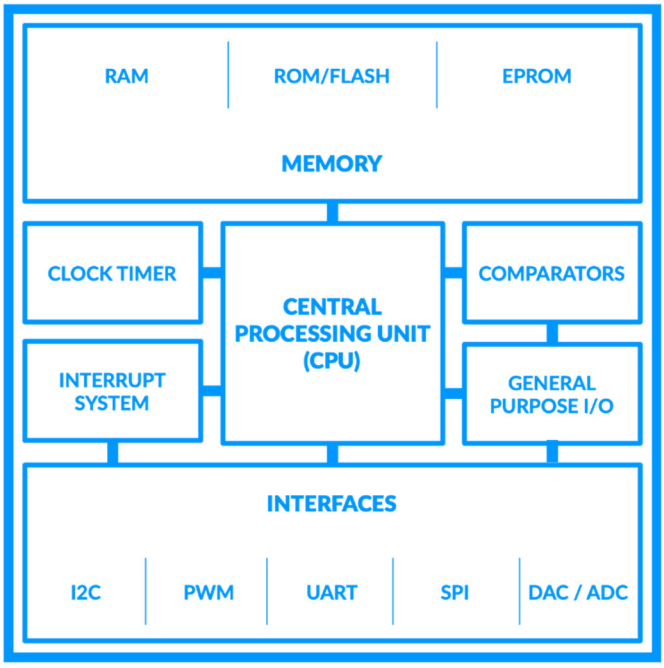
MICROCONTROLLER MASTERY

01 START

- **Microcontroller -** A small, self-contained computer that acts as the "brain" inside many electronic devices. It's a chip that can process data and control other parts of a system.
- **Central Processing Unit (CPU) -** Also known as the **Processor**, it is the component that performs calculations and makes decisions
- **Memory** - Where data and instructions are stored for later use. Different types are faster and store information longer.
- **Random Access Memory (RAM)** - Very fast and “volatile” memory, only keeping data while powered ON
- **Read Only Memory (ROM) / Flash** - Slower than RAM and used to hold program code even when the device is off. Cannot be changed without special tools or software, if at all.
- **Erasable Programmable Read-Only Memory (EPROM)** - Not in every Microcontroller, this memory is generally slower than ROM and can store data even when the device is off. An EPROM can be modified using specialized tools.
- **Clock Timer** - Provides timing to the microcontroller and allows for multiple jobs to be done at once



https://www.kevsrobots.com/resources/how it works/microcontrollers.html

- **Interrupt System** - Allows microcontroller to stop a current task to do something else
- **Comparators** - Checks different voltages
- **General Purpose Input / Output (GPIO)** - allows microcontroller to interact with the outside world using the microcontroller’s different pins
- **Interfaces -** Different ways to “talk” to devices (peripherals) using agreed upon methods. Depending on the interface, the way to communicate might take more or less wires.
- **Inter-Integrated Circuit (I^2C)** - This interface allows connecting multiple devices
- **Pulse-Width Modulation (PWM)** – An interface very commonly used with motors
- **Universal Asynchronous Receiver-Transmitter (UART)** - Used for sending data one piece at a time (serially)
- **Serial Peripheral Interface (SPI) -** Used for sending data one piece at a time (serially) using a clock signal
- **Digital-to-Analog Converter (DAC) -** Takes digital data and converts it to analog signals (like a speaker)
- **Analog-to-Digital Convertor (ADC) -** Takes analog signal and converts it to digital data (like a microphone)