

$$\text{Microcontroller} = \text{Microprocessor} + \text{RAM} + \text{ROM} + \text{I/O} + \text{Peripherals} \quad (1)$$

where:

- **Microprocessor** refers to the central processing unit (CPU) that performs arithmetic and logic operations, control functions, and processing tasks.
- **RAM** (Random Access Memory) is the memory used by the microcontroller to temporarily store data while it is operating.
- **ROM** (Read-Only Memory) is the memory that permanently stores the firmware or software program that the microcontroller runs.
- **I/O** (Input/Output) are the connection points that allow the microcontroller to interact with the outside world. Think of these as the microcontroller's "senses" - they let it receive information (input) from sensors or buttons, and send signals (output) to control things like lights or motors.
- **Peripherals** are built-in features that give the microcontroller extra capabilities without needing separate chips. These can include things like timers (for keeping track of time), communication systems (for "talking" to other devices), and converters (for changing digital signals to analog and vice versa). They're like Swiss Army knife tools that make the microcontroller more versatile and powerful.

**Note:** All these components are integrated on a single chip, which is the microcontroller itself.