**UNIT 4**

**Arduino platform boards & anatomy Arduino IDE**

[Programming the Arduino for IoT](https://bcalabs.org/subject/arduino-platform-boards-anatomy-arduino-ide#Programming%20the%20Arduino%20for%20IoT)

* Arduino is a popular open-source platform widely used for developing IoT applications.
* It provides a simple and accessible way to program microcontrollers and create interactive projects.

[Arduino Platform Boards Anatomy](https://bcalabs.org/subject/arduino-platform-boards-anatomy-arduino-ide#Arduino%20Platform%20Boards%20Anatomy)

Arduino boards come in various forms and configurations, but they share some common components:

[Microcontroller](https://bcalabs.org/subject/arduino-platform-boards-anatomy-arduino-ide#Microcontroller)

* The central component of an Arduino board is its microcontroller, an integrated circuit that can be programmed.
* It executes the code and controls the board's functionality.
* Common microcontrollers used in Arduino boards include ATmega328P, ATmega2560, and ARM Cortex-M.

[Digital I/O Pins](https://bcalabs.org/subject/arduino-platform-boards-anatomy-arduino-ide#Digital%20I/O%20Pins)

* Arduino boards have digital input/output (I/O) pins that can be used to connect sensors, actuators, and other devices.
* These pins can be configured as either inputs or outputs and can read or write digital values (HIGH or LOW).

[Analog Input Pins](https://bcalabs.org/subject/arduino-platform-boards-anatomy-arduino-ide#Analog%20Input%20Pins)

* Analog input pins allow Arduino boards to read analog voltages from sensors such as temperature sensors, light sensors, or potentiometers.
* These pins have an analog-to-digital converter (ADC) that converts the analog signal into a digital value.

[Power Pins](https://bcalabs.org/subject/arduino-platform-boards-anatomy-arduino-ide#Power%20Pins)

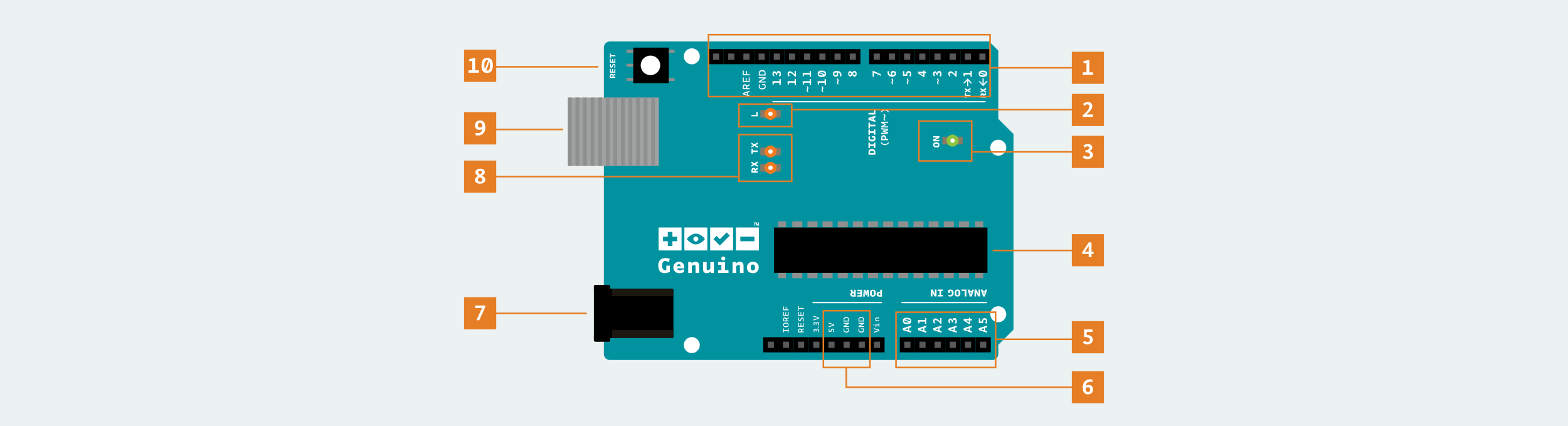
* Arduino boards have power pins that provide regulated voltage to power the microcontroller and connected components.
* The common power pins are VCC (positive voltage) and GND (ground).

[Communication Interfaces](https://bcalabs.org/subject/arduino-platform-boards-anatomy-arduino-ide#Communication%20Interfaces)

* Arduino boards often include communication interfaces such as
* UART (Universal Asynchronous Receiver/Transmitter) and I2C (Inter-Integrated
* Circuit) are all communication protocols commonly used in embedded systems and microcontroller-based devices.
* These interfaces allow the Arduino to communicate with other devices, sensors, or modules.
* **Example**: The Arduino Uno is a popular board that features an ATmega328P microcontroller, 14 digital I/O pins,
* 6 analog input pins, and a USB connection for programming and power.

**Arduino UNO Board Anatomy**

Arduino boards senses the environment by receiving inputs from many sensors, and affects their surroundings by controlling lights, motors, and other actuators. Arduino boards are the microcontroller development platform that will be at the heart of your projects. When making something you will be building the circuits and interfaces for interaction, and telling the microcontroller how to interface with other components. Here the anatomy of Arduino UNO.



1. **Digital pins** Use these pins with digitalRead(), digitalWrite(), and analogWrite(). analogWrite() works only on the pins with the PWM symbol.
2. **Pin 13 LED** The only actuator built-in to your board. Besides being a handy target for your first blink sketch, this LED is very useful for debugging.
3. **Power LED** Indicates that your Arduino is receiving power. Useful for debugging.
4. **ATmega microcontroller** The heart of your board.
5. **Analog in** Use these pins with analogRead().
6. **GND and 5V pins** Use these pins to provide +5V power and ground to your circuits.
7. **Power connector** This is how you power your Arduino when it's not plugged into a USB port for power. Can accept voltages between 7-12V.
8. **TX and RX LEDs** These LEDs indicate communication between your Arduino and your computer. Expect them to flicker rapidly during sketch upload as well as during serial communication. Useful for debugging.
9. **USB port** Used for powering your Arduino UNO, uploading your sketches to your Arduino, and for communicating with your Arduino sketch (via Serial. println() etc
10. **Reset button** Resets the ATmega microcontroller.

