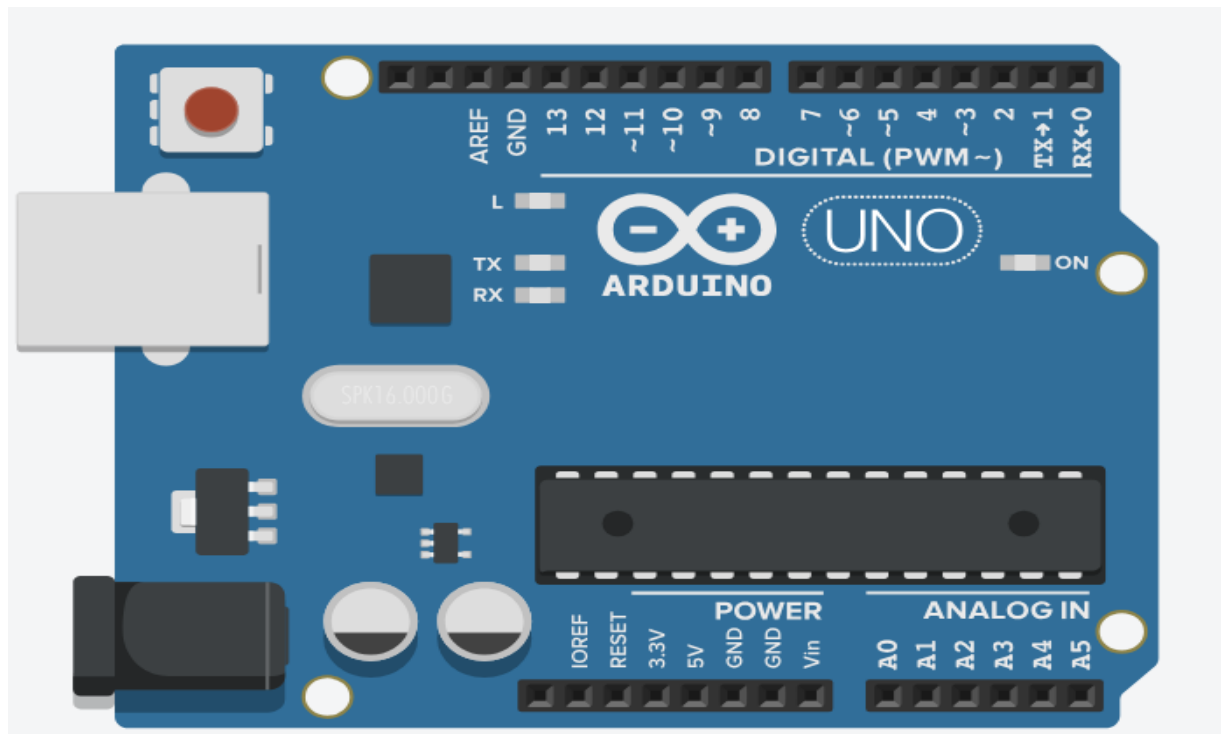


Arduino UNO



The **Arduino Uno** board is built around the **ATmega328P microcontroller** and comes with a number of input/output pins to interface with different sensors, modules, and devices. Here is a breakdown of the **Arduino Uno pin configuration**:

1. Digital Pins (0-13)

- **Total:** 14 Digital Pins (Pins 0 to 13)
- **Function:** Can be used as inputs or outputs. Each pin can supply a voltage of 5V (HIGH) or 0V (LOW).
- **PWM Pins:** Pins 3, 5, 6, 9, 10, and 11 can also be used for PWM (Pulse Width Modulation) output using the `analogWrite()` function.
- **Special Functions:**
 - **Pin 0 (RX):** Used for receiving serial data.
 - **Pin 1 (TX):** Used for transmitting serial data.

2. Analog Input Pins (A0-A5)

- **Total:** 6 Analog Pins (Pins A0 to A5)
- **Function:** These pins can be used to read analog values using the `analogRead()` function.
- **Input Voltage Range:** 0V to 5V.
- **Resolution:** 10-bit resolution, which means they can provide values between 0 and 1023.
- **Pin A4 (SDA) and Pin A5 (SCL):** These are used for **I2C communication**.

3. Power Pins

- **Vin:** The input voltage to the Arduino board when using an external power source (6V-12V).
- **5V:** Provides a regulated 5V output from the board.
- **3.3V:** Provides 3.3V for low-voltage components (maximum current draw of 50mA).
- **GND:** Ground pins (there are three GND pins).
- **RESET:** Can be used to reset the microcontroller when connected to ground.
- **IOREF:** This pin provides the reference voltage for the microcontroller. On the Arduino Uno, it is typically 5V.

4. PWM Pins

- Pins 3, 5, 6, 9, 10, 11 are capable of **PWM output**.
- These pins output a pulsed signal that simulates an analog output using the `analogWrite()` function.

5. Communication Pins

- **UART (Serial Communication):**
 - **TX (Pin 1):** Transmits data.
 - **RX (Pin 0):** Receives data.

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- **I2C Communication:**
 - **SDA (Pin A4):** Serial Data Line for I2C.
 - **SCL (Pin A5):** Serial Clock Line for I2C.
- **SPI Communication** (Serial Peripheral Interface):
 - **MOSI (Pin 11):** Master Out Slave In.
 - **MISO (Pin 12):** Master In Slave Out.
 - **SCK (Pin 13):** Serial Clock.

6. External Interrupt Pins

- **Pins 2 and 3** can be used for external interrupts. These are triggered by changes in the pin state (rising, falling, or change in signal). Use the `attachInterrupt()` function to handle interrupts.

7. AREF (Analog Reference)

- **AREF Pin:** Used to set an external reference voltage for the analog inputs (if required). By default, the analog reference is 5V, but you can use the `analogReference()` function to change this.

Pin Mapping Summary

Pin	Description
Digital Pins 0-13	General-purpose input/output pins.
PWM Pins	Pins 3, 5, 6, 9, 10, 11 (PWM capable).
Analog Pins A0-A5	Read analog values (10-bit resolution).
Vin	External power input.
5V	5V output for external components.
3.3V	3.3V output for low-power devices.
GND	Ground.
TX (Pin 1)	Serial transmit pin.
RX (Pin 0)	Serial receive pin.
SCL (Pin A5)	I2C clock.
SDA (Pin A4)	I2C data.
AREF	Analog reference voltage input.

This layout allows the Arduino Uno to interface with a wide range of devices and sensors, enabling the development of various IoT and embedded systems projects.