What is Arduino?

Arduino is an open-source microcontroller board used to build electronic and robotics projects easily.

What does “open-source” mean?

Its circuit design, hardware, and software are publicly available — anyone can use, modify, and improve it.

What language does Arduino use?

Arduino uses a programming language based on C/C++, called Arduino Language.

What is Arduino IDE?

It’s the software where you write code and upload it to the Arduino board through a USB cable.

What components exist on an Arduino board?

Microcontroller
Digital pins
Analog pins
PWM pins
5V & 3.3V output
GND pins
USB port
Power jack
Reset button

What can Arduino do?

Read sensor data
Control motors
Turn LEDs/Buzzers on/off
Display output on LCD
Build robots (line follower, obstacle avoider, human follower)
Make automation systems
Create IoT devices
Control home appliances

Why is Arduino so popular?

Because it is easy, cheap, and beginner-friendly. Anyone can start within minutes.

Microcontroller (The Brain)

This is the main chip (example: ATmega328P on Arduino UNO).
It processes instructions and controls everything.
Works like a tiny computer.

Digital Pins

Labeled as 0 to 13 on Arduino UNO.
Used to read or send HIGH/LOW (1 or 0) signals.
Can turn LEDs, buzzers, motors ON/OFF.

Analog Pins

Labeled A0 to A5.
Used to read sensor values (0–1023 range).
Needed for sensors like LDR, temperature, POT, etc.

PWM Pins

Some digital pins have ~ symbol (like 3, 5, 6, 9, 10, 11).
PWM = Pulse Width Modulation.
Used for:
motor speed control
LED brightness control
servo motor movement

Power Pins

These provide voltage to sensors/ modules.
➡ 5V Pin
Supplies 5 volts.
➡ 3.3V Pin
Supplies 3.3 volts.
➡ GND Pins
Ground pins — needed in every circuit.
➡ Vin Pin
Used when powering Arduino using external battery (7–12V input).

Reset Button

Resets (restarts) the Arduino program.
Useful while debugging.

Power Jack (Barrel Jack)

Used to power Arduino using adapter (7–12V).
External power source.

USB Port

Used to:
Upload code
Give power (5V)
Serial communication with PC

Crystal Oscillator

A small silver component (16 MHz).
Controls the timing/speed of the microcontroller.
Works like a clock.

Voltage Regulator

Makes sure Arduino gets safe voltage (5V or 3.3V).
Protects board from overvoltage.

LEDs on the Board

➡ Power LED (ON)
Lights when Arduino has power.
➡ Pin 13 LED (L)
Built-in LED connected to pin 13.
➡ RX & TX LEDs
Blink when data is being:
received (RX)
transmitted (TX)

ICSP Header

A small 6-pin connector.
Used for low-level programming of the microcontroller.
Mainly used by advanced users.

Reset Pin

Allows resetting Arduino through external wire/module.

EEPROM (Inside microcontroller)

Small storage memory.
Stores data even when power is off.

Regulated 5V/3.3V Circuits

Internal circuits that create stable voltage for sensors and modules.