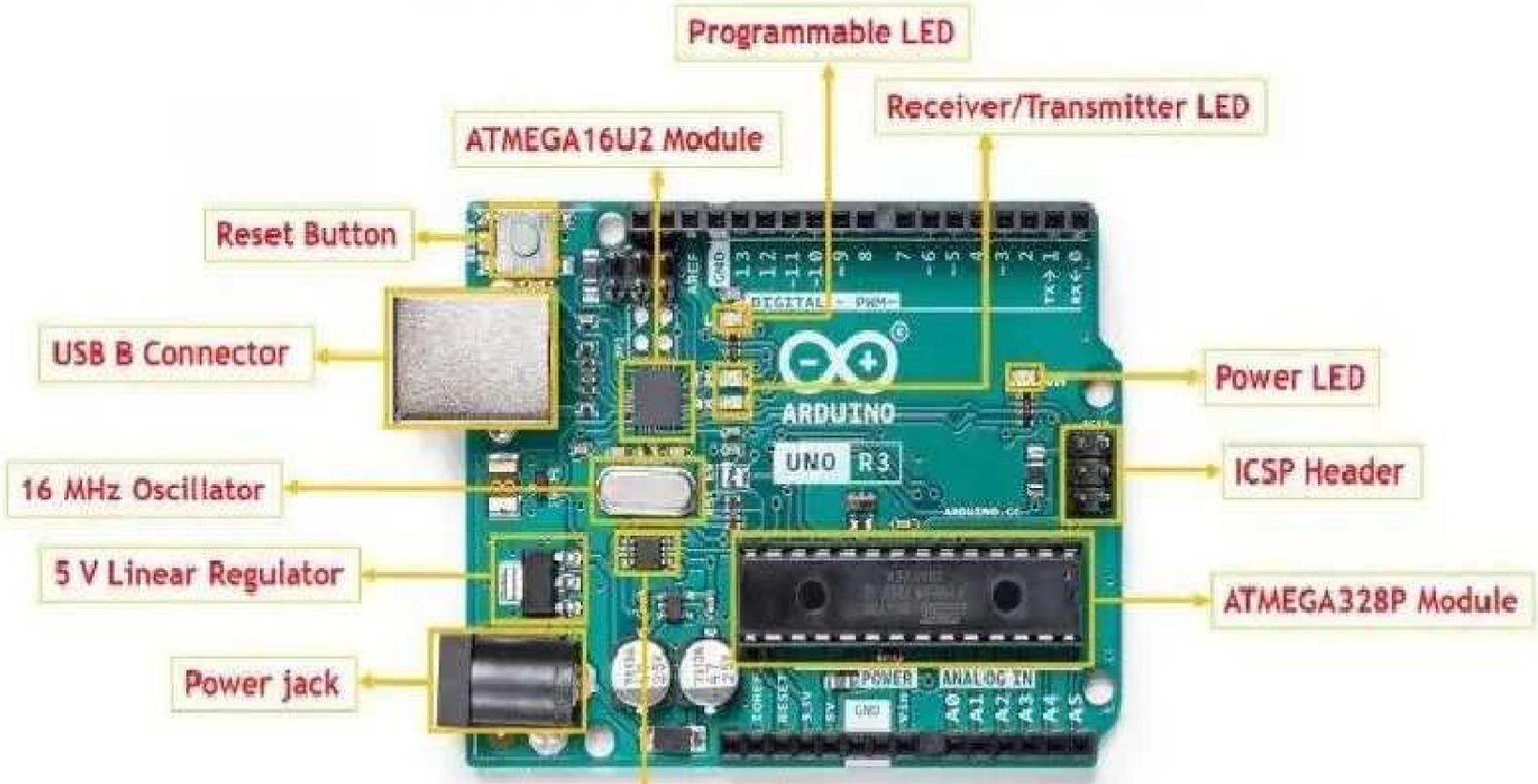
UNIT III IOT PHYSICAL DEVICES AND ENDPOINTS

Introduction to Arduino and Raspberry Pi- Installation, Interfaces (serial, SPI, I2C), Programming – Python program with Raspberry PI with focus on interfacing external gadgets, controlling output, and reading input from pins.

ARDUINO

- Arduino is a open-source hardware, and software platform used to design and build electronic devices.
- It designs and manufactures microcontroller kits and single-board interfaces for building electronics projects.
- Arduino UNO is a microcontroller version of ATmega328p, it has 14 digital io pins, 6 of which can be used for PWM output, 6 analog input pins, 32 kb flash memory, 2 kb static memory, 1 kb live edge socket RAM, type b USB connection, ICSP connector and reset button.
- Only through the USB data connection, you can power the computer, download the program and control the hardware by the data communication software.
- Arduino has its own language based on classic C style, and the hardware Layer is written in high level languages. So in terms of programming Arduino seems to be very simple, just needs to know one language like java or C
- When processing analog signals and digital signals, it is often necessary to perform the proportional conversion, such as the conversion of angle to the digital sensor.

Arduino UNO Rev 3 Board Layout




DIGITAL (PWM~)
UNO
ARDUINO
ON
TX
RX
ICSP
WWW.ARDUINO.CC – MADE IN ITALY
POWER
ANALOG IN
IOREF
RESET
3.3V
5V
GND
GND
Vin
A0
A1
A2
A3
A4
A5

ARDUINO UNO PINOUT DESCRIPTION

The Arduino UNO board is divided into digital pins, analog pins and power pins.

There are pins with secondary functions as listed below. Secondary pins are mostly communications pins such as I2C and SPI.

Pin Name	Description	Secondary Function	Description
D0	Digital Pin 0	RX	Receive pin for Serial UART
D1	Digital Pin 1	TX	Transmit pin for Serial UART
D2	Digital Pin 2	INT0	Interrupt Pin 0
D3	Digital Pin 3	INT1	Interrupt Pin 1
D4	Digital Pin 4		
D5	Digital Pin 5		
D6	Digital Pin 6		
D7	Digital Pin 7		
D8	Digital Pin 8		
D9			
D10	Digital Pin 10	SS	SPI Slave Select Pin
D11	Digital Pin 11	MOSI	SPI Master Out-Slave In
D12	Digital Pin 12	MISO	SPI Master In-Slave Out
D13	Digital Pin 13	SCK	SPI Clock

Digital Pins

Digital Pin 9

Analog Pins

Pin Name	Description	Secondary Function	Description
A0	Analog Pin 0		
A1	Analog Pin 1		
A2	Analog Pin 2		
A3	Analog Pin 3		
A4	Analog Pin 4	SDA	I2C Data Out
A5	Analog Pin 5	SCL	I2C Clock

Power Pins

Pin Name	Description
5V	5V (Regulated) Source
3.3V	3.3V Source
GND	Ground
RESET	Reset
Vin	DC Jack Input Voltage
IOREF	I/O Reference Voltage. This pin is connected to 5V for the UNO
AREF	ADC Reference Voltage. Insert other voltage (0-5V only) to use as reference for analog conversion

ARDUINO PROGRAMMING STRUCTURE

The Arduino software is open-source. The source code for the Java environment is released under the GPL and the C/C++ microcontroller libraries are under the LGPL.

TYPES OF ARDUINO:

- Arduino Uno (R3)
- Arduino Nano
- Arduino Micro
- Arduino Due
- LilyPad Arduino Board
- Arduino Bluetooth
- RedBoard Arduino Board
- Arduino Mega (R3) Board
- Arduino Leonardo Board
- Arduino Robot
- Arduino Pro Mic
- Arduino Ethernet