ESIOT

1] VARIOUS PINS USED IN ARDUINO BOARD WITH IT'S FUNCTION :

* The Arduino board is an open-source electronic platform based on simple microcontroller boards.

* It consists of various types of pins used for interfacing sensors, actuators, and other modules.

* The most commonly used board is Arduino Uno, which is based on the ATmega328P microcontroller.

Classification of pins in Arduino Uno :-

1. Power pins.
2. Digital Input/Output pins.
3. PWM pins.
4. Analog input pins.
5. Communication pins.
6. Other special pins.

1. Power Pins :-

* Vin : Voltage input. Used to supply external voltage (7-12V) to the Arduino.

* 5V : Outputs regulated 5V power. Used to power external components like Sensors.

* 3.3V : Outputs regulated 3.3V power for low voltage devices.

* GND (Ground) : Common ground.. All circuits need a return path to ground.

*RESET: Resets the microcontroller. You can connect it to a push button to reset the board.

2. Digital Pins (0-13) :-

* Used to read or write digital signals (either HIGH or LOW).

* Pins 0 and 1 : Also used for Serial communication (RX and TX).

* Can be Configured as INPUT or OUTPUT using pinMode() in code.

* Some pins have Special functions:

→ pin 3, 5, 6, 9, 10, 11 : provide PWM output (~ symbol on board).

3. PWM pins :-

* Digital pins with PWM Capability : 3, 5, 6, 9, 10, 11.

* PWM (Pulse Width Modulation) is used to simulate analog output using digital signals.

4. Analog pins (A0-A5) :-

* Used to read analog values (like from sensors).

* Inputs voltage from 0 to 5V and converts it to a digital value to (0 to 1023)

* Can also be used as digital pins if needed.

5. Communication pins :-

(i) Serial Communication:

* pin 0 (RX): Receives data from another device.

* pin 1 (TX): Transmit – Sends data to another device.

* Used for communication with a computer or other serial devices.

(ii) I2C Communication:

* A4 (SDA): Serial Data Line – Used to send and receive data.

* A5 (SCL): Serial Clock Line – Used to synchronize data transfer.

* Used to communicate with multiple devices using only two wires.

* You need to include the library: #include <wire.h>

(iii) SPI communication:

* pins used :-

-> pin 10 (SS): Slave select

-> pin 11 (MOSI): Master Out Slave in

-> pin 12 (MISO): Master In Slave Out

-> pin 13 (SCK): Serial Clock.

* Used for fast communication between Arduino and devices like SD cards, sensors, etc.

* you need to include the library : #include<SPI.h>

6. Other Special pins :-

* AREF (Analog Reference): Used to set an external reference voltage (0 to 5V) for the analog inputs.

* ICSP (In-Circuit serial programming):
  used for programming the Arduino using external programmer.