SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with
'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University,
Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECT213- IoT SYSTEM ARCHITECTURE

II ECE / IV SEMESTER

UNIT 2 – MICROCONTROLLER AND INTERFACING TECHNIQUES FOR IoT

DEVICES

TOPIC 1 –Introduction to Arduino

WHAT IS ARDUINO?

- **Open-source physical computing platform which is a small microcontroller board with a USB plug**

- **Based on a simple i/o board and a development environment that implements the processing/writing language**

- **Arduino can be used to develop stand-alone interactive objects or can be connected to software on computer**

- **Easy-to-use hardware and software**

WHAT IS ARDUINO?

- It's intended for students, artists, designers, hobbyists and anyone who tinker with technology.

- It is programmed in Arduino Programming Language (APL) similar to C/C++

- More easy to program compared to other microcontroller packages

- The Arduino is a microcontroller development platform (not a microcontroller…..)

WHY ARDUINO?

- **It is open source, both in terms of Hardware and Software**

- **It is cheap**

- **USB Connectivity**

- **More powerful than a BASIC stamp**
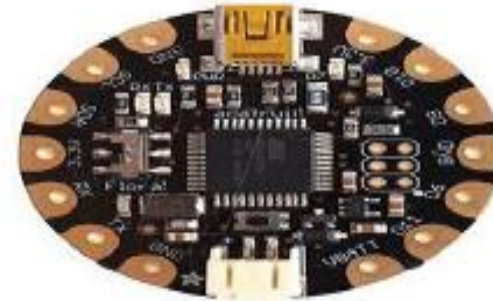
- **Simple and easy to use**
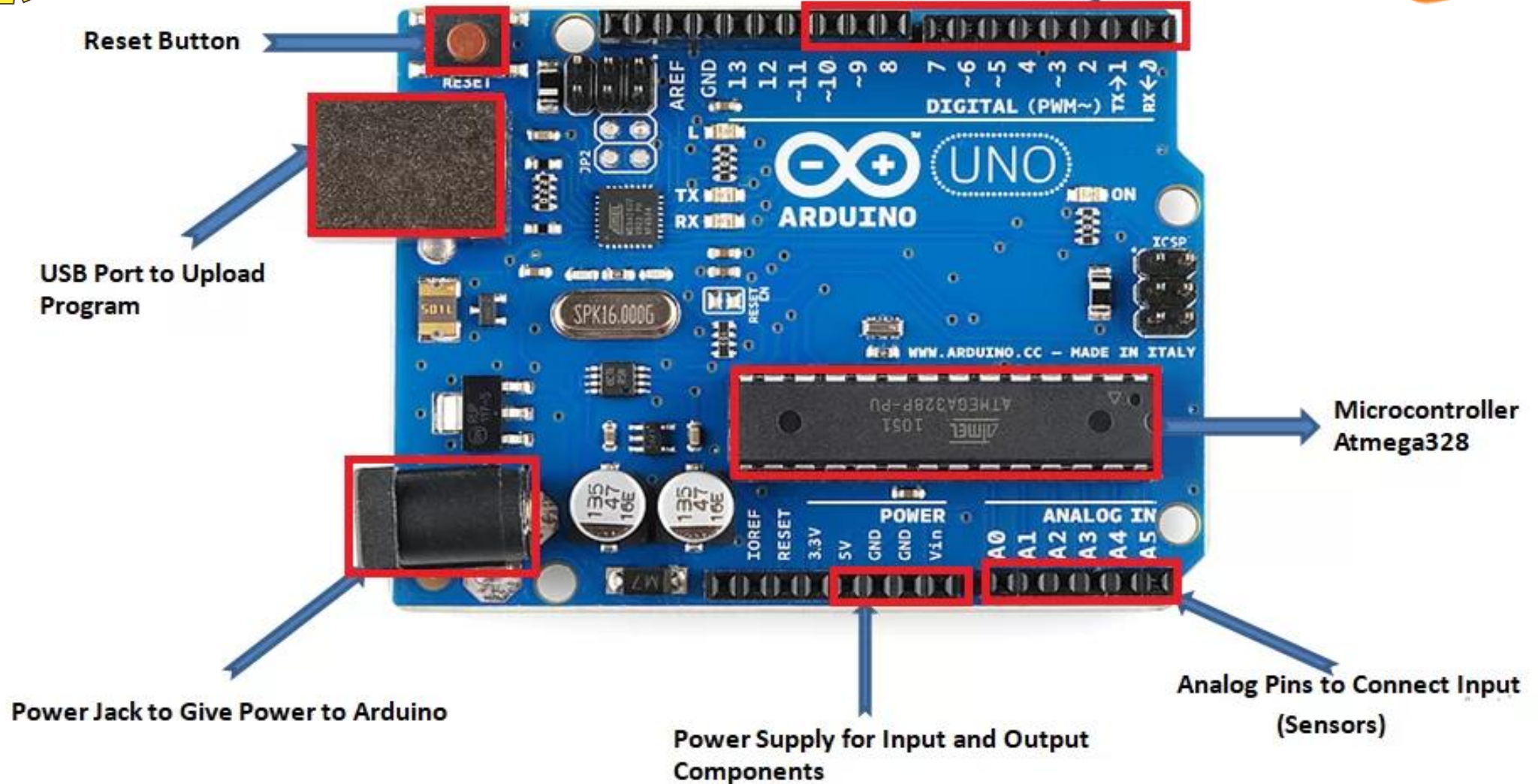
Arduino Boards

Arduino Mega

Arduino Micro
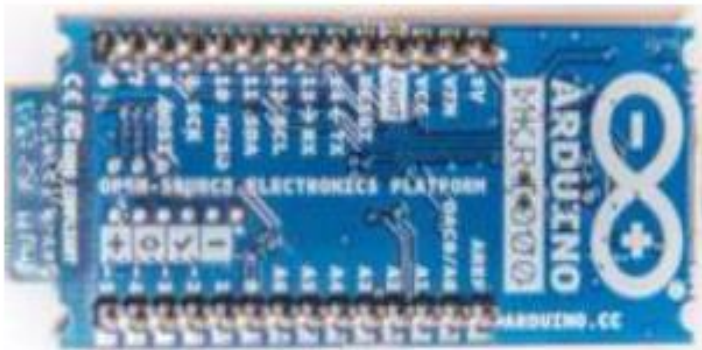
ArduinoMKR1000

Flora

Digital Pins to Connect C
(LED, LCD, Relay, etc)

Reset Button

USB Port to Upload
Program

Microcontroller
Atmega328

Power Jack to Give Power to Arduino

Power Supply for Input and Output
Components

Analog Pins to Connect Input
(Sensors)

The hardware structure of Arduino Uno

- Microcontroller

- 14 Digital Pin

- 6 Analog Pins

- Power Supply

- Power Jack

- USB Port

- Reset Button

The hardware structure of Arduino Uno

Microcontroller: Microcontroller is the central processing unit of Arduino Uno.

Digital Pins: There are 14 digital pins on Arduino Uno which can be connected to components like LED, LCD, etc.

Analog Pins: There are 6 analog pins on the Uno. These pins are generally used to connect sensors because all the sensors generally have analog values. Most of the input components are connected here.

Power Supply: The power supply pins are IOREF, GND, 3.3V, 5V, Vin are used to connecting sensors because all the sensors generally have analog values. Most of the input components are connected here.

The hardware structure of Arduino Uno

Power Jack: Uno board can be powered both by external supply and via USB cable.

USB Port: This port function is to program the board or to upload the program. The program can be uploaded to the board with the help of Arduino IDE and USB cable.

Reset Button: This is used to restart the uploaded program
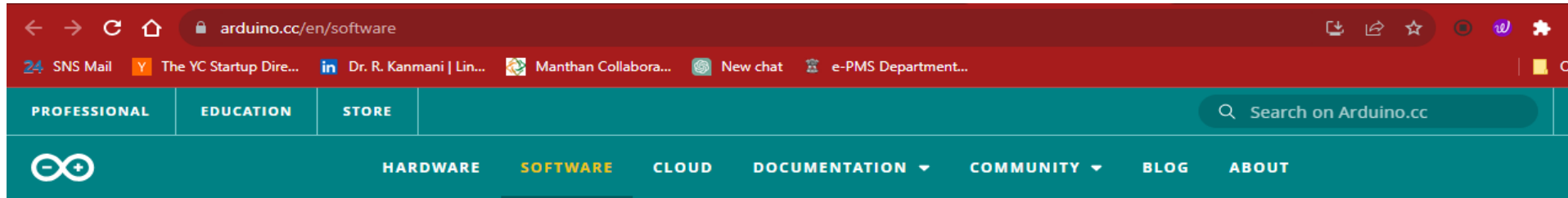
Arduino Uno

7 to 12VDC input 2.1mm x 5.5mm Male center positive

Voltage regulator

16MHz crystal

ATmega16U2 microcontroller IC/USB controller

USB-B port to computer

Reset button

ICSP for USB interface

(I2C) SCL – Serial clock

(I2C) SDA – Serial data

Pin-13 LED

(SPI) SCK – Serial clock

(SPI) MISO – Master-in, slave-out

(SPI) MOSI – Master-out, slave-in

(SPI) SS – Slave select

Not connected

I/O Reference voltage — IOREF

Reset — RESET

3.3V Output — 3.3V

5V Output — 5V

Ground — GND

Ground — GND

Input voltage — Vin

Analog pin 0 — A0

Analog pin 1 — A1

Analog pin 2 — A2

Analog pin 3 — A3

(I2C) SDA — A4

(I2C) SCL — A5

Note: Pins denoted with "~" are PWM supported

Interrupt 1

Interrupt 2

TXD

RXD

ATmega328 microcontroller IC

ICSP for ATmega328

VCC

MOSI

GND

RESET

SCK

MISO

BASICS OF IoT/19ECT213 IoT SYSTEM ARCHITECTURE / Dr.R.Kanmani/ECE/SNSCT

Arduino IDE

Download link

https://www.arduino.cc/en/software

Arduino IDE Online

Step 1 : First Click Create One

Arduino IDE Online

Step 2 : Fill your Birthday

Arduino IDE Online

Step 3 : Fill up the Sign up

Sign up to Arduino

Enter your email *

Choose a username *

Choose a password *

Minimum 8 characters long

☐ I have read the Privacy Policy and accept the Terms of Service *

☐ I would like to receive the Arduino newsletter.

☐ I agree to see personalised commercial offers from Arduino based on my browsing and purchasing behaviour.

☐ I would like to get email updates about special deals and commercial offers from Arduino.

SIGN UP

Arduino IDE Online

Step 4 : Login Page Open

Arduino IDE Online

Step 5 : Click Web editor

Arduino IDE Online

Step 6 : Click Examples -> Basic-> Blink

Blink Example Programme

```
void setup() // initialize digital pin LED_BUILTIN as an output.

{

pinMode(LED_BUILTIN, OUTPUT);

}

// the loop function runs over and over again forever

void loop()

{

 digitalWrite(LED_BUILTIN, HIGH);  // turn the LED on (HIGH is the voltage level)

 delay(1000);                      // wait for a second

digitalWrite(LED_BUILTIN, LOW);   // turn the LED off by making the voltage LOW

delay(1000);                      // wait for a second

}
```