



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**



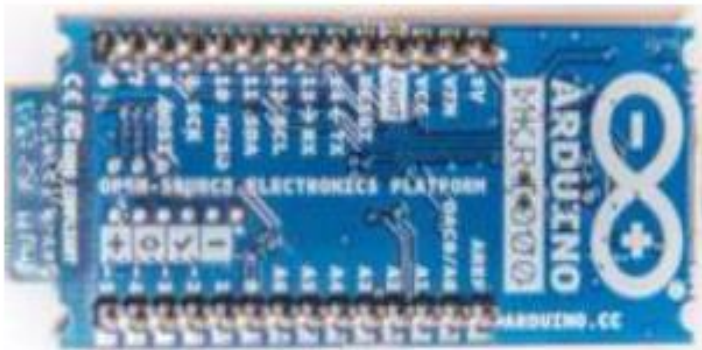
Arduino Boards



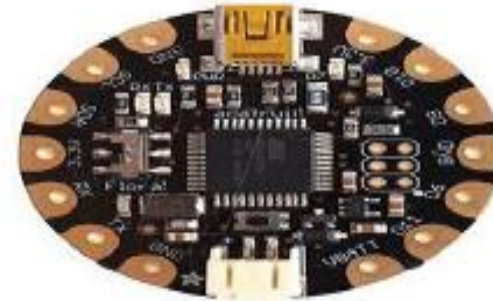
Arduino Mega



Arduino Micro



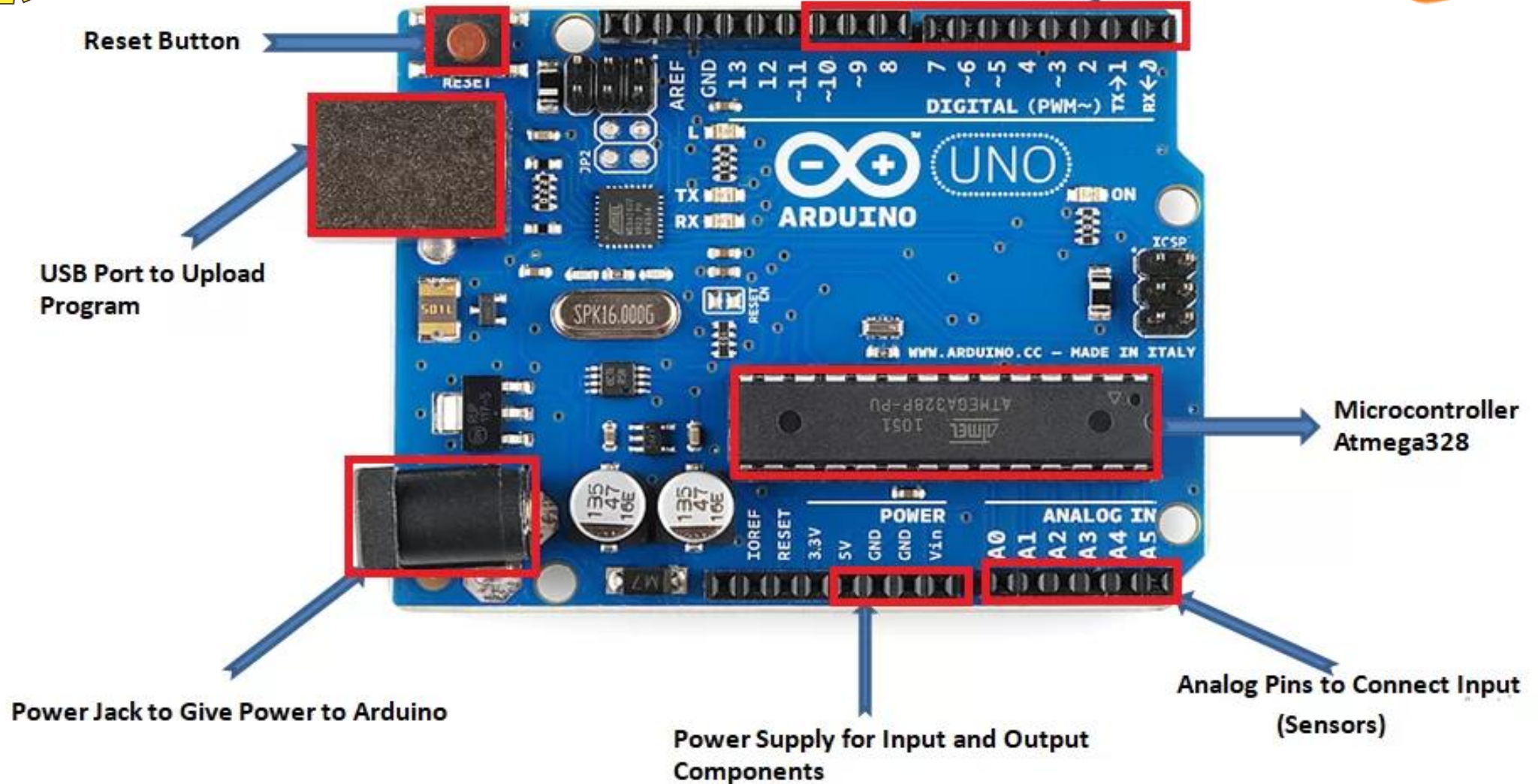
ArduinoMKR1000



Flora



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





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

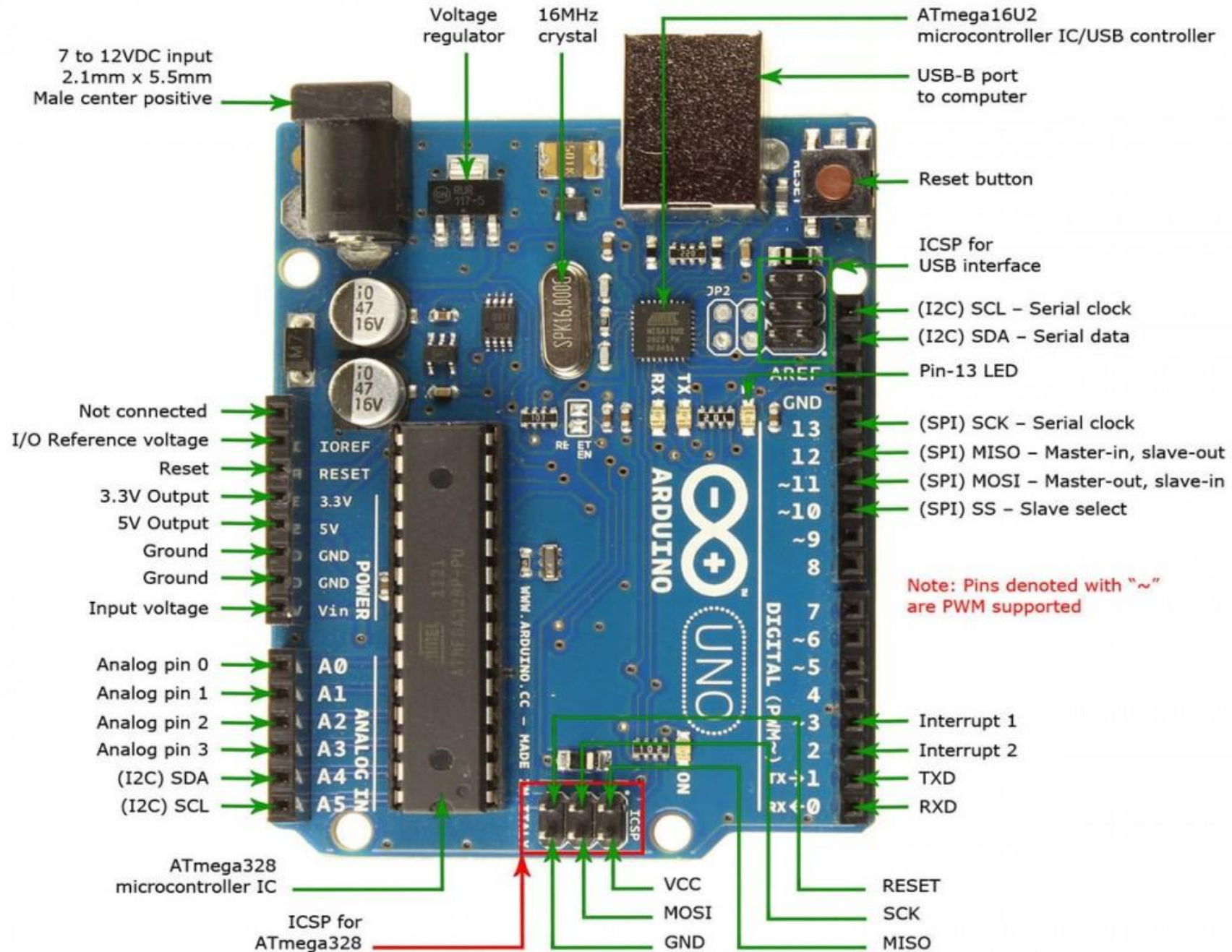


Power Jack: Uno board can be powered both by external supply and via USB cable.

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



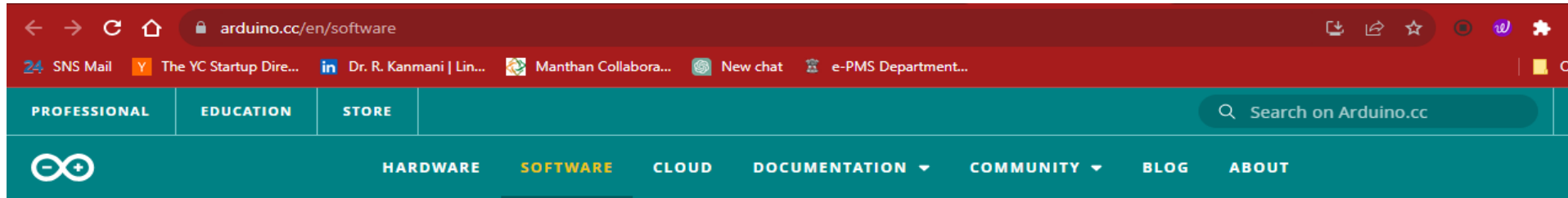


Arduino IDE



Download link

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



Arduino Web Editor


Start coding online and save your sketches in the cloud. The most up-to-date version of the IDE includes all libraries and also supports new Arduino boards.

CODE ONLINE GETTING STARTED

Over-the-Air Updates

DISCOVER MORE

Downloads

 **Arduino IDE 2.1.1**

The new major release of the Arduino IDE is faster and even more powerful! In addition to a more modern editor and a more responsive interface it features autocompletion, code navigation, and even a live debugger.

DOWNLOAD OPTIONS

- Windows** Win 10 and newer, 64 bits
- Windows** MSI installer
- Windows** ZIP file
- Linux** Applmage 64 bits (X86-64)
- Linux** ZIP file 64 bits (X86-64)



Arduino IDE Online



Step 1 : First Click Create One

Welcome to Arduino
Learn and create, with the ever-growing platform

[SIGN IN](#)

Don't have an account yet? [Create one.](#)

Hey Kids!
To sign in, click here if you are under 14

Create beautiful dashboards with Arduino Cloud

Mix and match customizable widgets to visualize real time or historical data, or control your devices.

[DISCOVER MORE](#)




Arduino IDE Online



Step 2 : Fill your Birthday

←



Sign up to Arduino

Enter your birth date below to continue and ensure the data is correct: it will determine the type of account created for you.

Birthday
DD / MM / YYYY


NEXT



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

The screenshot displays the Arduino Cloud interface. At the top, there's a navigation bar with a 'CLOUD' logo, an 'UPGRADE PLAN' button, and a user profile dropdown labeled 'My Cloud'. The main content area is divided into several sections:

- Welcome, kanmani0808**: A personalized greeting at the top.
- Cloud apps**: A section with two cards: 'IoT Cloud' (with a gear and plug icon) and 'Web Editor' (with a code editor icon).
- Quick Start**: A section with two options: 'New sketch' (with a document icon) and 'My IoT Dashboards' (with a dashboard icon).
- Integrations**: A section at the bottom with a 'FEATURES USAGE' dropdown and a 'All Systems' status indicator.

A notification box in the bottom right corner contains the text: "Thanks for using Arduino Cloud! Please help us improve it by answering these 6 questions" and a "Next" button.



Arduino IDE Online



Step 5 : Click Web editor

The screenshot shows the Arduino IDE Online web editor interface. The left sidebar contains navigation options: EDITOR, Sketchbook, Examples, Libraries, Monitor, Reference, Help, Preferences, and Features usage. The main editor area displays a sketch named 'sketch_jul30a' with the following code:

```
1 /*
2
3 */
4
5 void setup() {
6
7 }
8
9 void loop() {
10
11 }
12
```

A notification banner at the bottom of the editor area reads: "Please follow the instructions on the email we sent you to activate your account. Resend email x".



Arduino IDE Online



Step 6 : Click Examples -> Basic-> Blink

The screenshot displays the Arduino IDE Online interface. On the left, a teal sidebar contains navigation options: EDITOR, Sketchbook, Examples (selected), Libraries, Monitor, Reference, Help, Preferences, and Features usage. Below the sidebar is a 'CLOUD' button. The main area is divided into two panes. The left pane shows a search bar for examples and a list of categories: 01.BASICS (6), 02.DIGITAL (9), and 03.ANALOG (6). Under '01.BASICS (6)', several examples are listed, with 'Blink' selected and highlighted. The right pane shows the code for the 'Blink' example, with the board set to 'Arduino Uno'. The code is as follows:

```
14 by Scott Fitzgerald
15 modified 2 Sep 2016
16 by Arturo Guadalupi
17 modified 8 Sep 2016
18 by Colby Newman
19
20 This example code is in the public domain.
21
22 https://www.arduino.cc/en/Tutorial/BuiltInExamples/Blink
23 */
24
25 // the setup function runs once when you press reset or power the board
26 void setup() {
27   // initialize digital pin LED_BUILTIN as an output.
28   pinMode(LED_BUILTIN, OUTPUT);
29 }
30
31 // the loop function runs over and over again forever
32 void loop() {
```



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
}
```