



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*



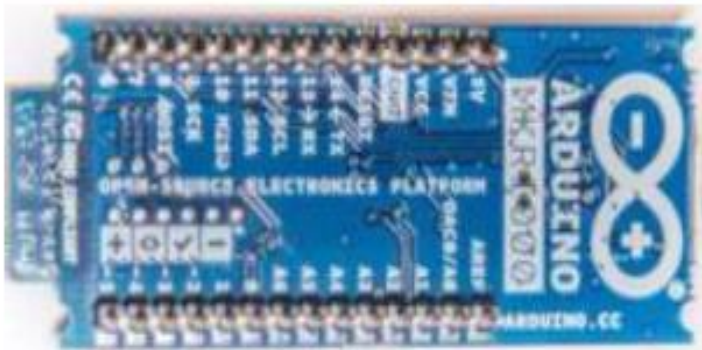
Arduino Boards



Arduino Mega



Arduino Micro



ArduinoMKR1000



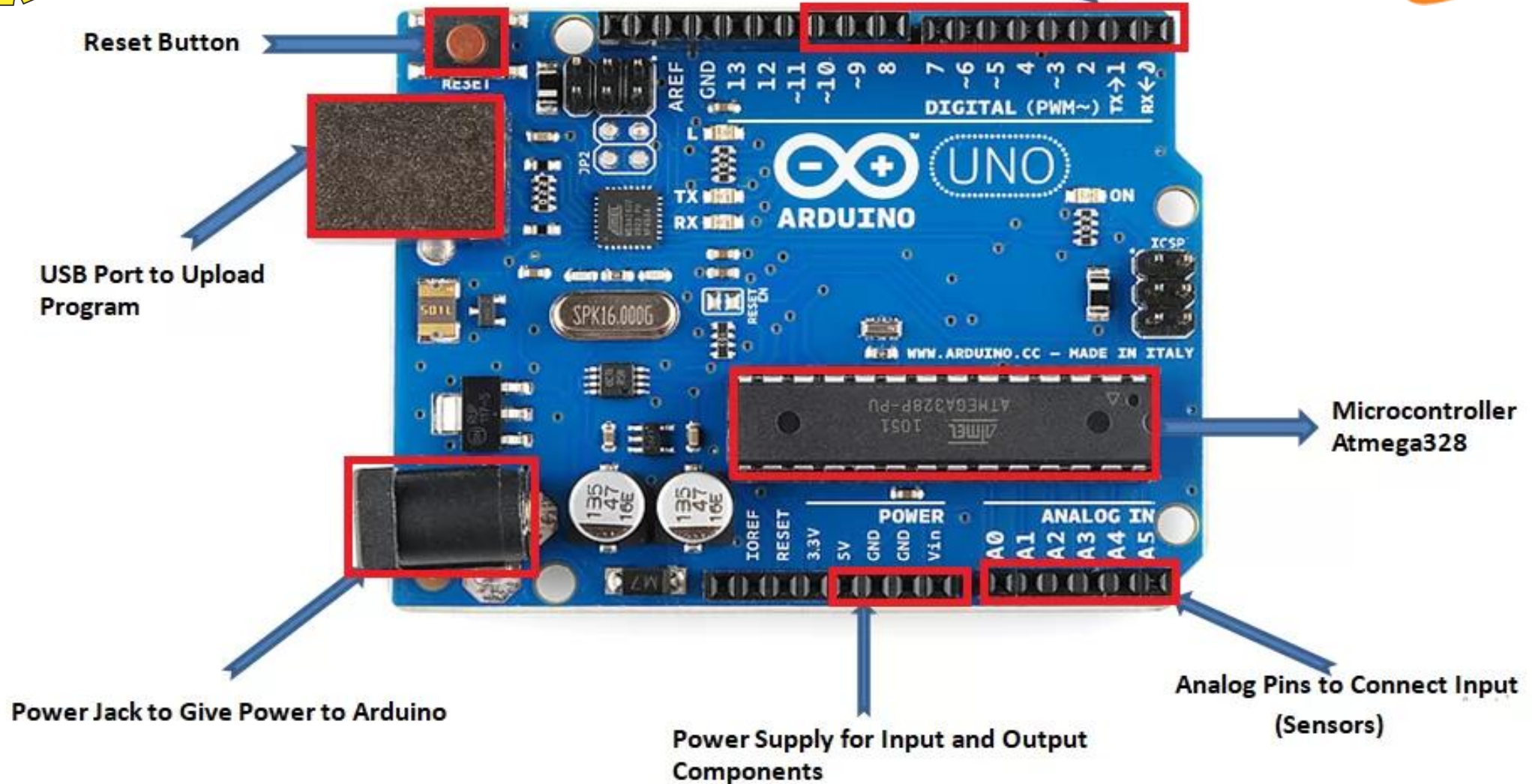
Flora



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



Arduino Uno





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



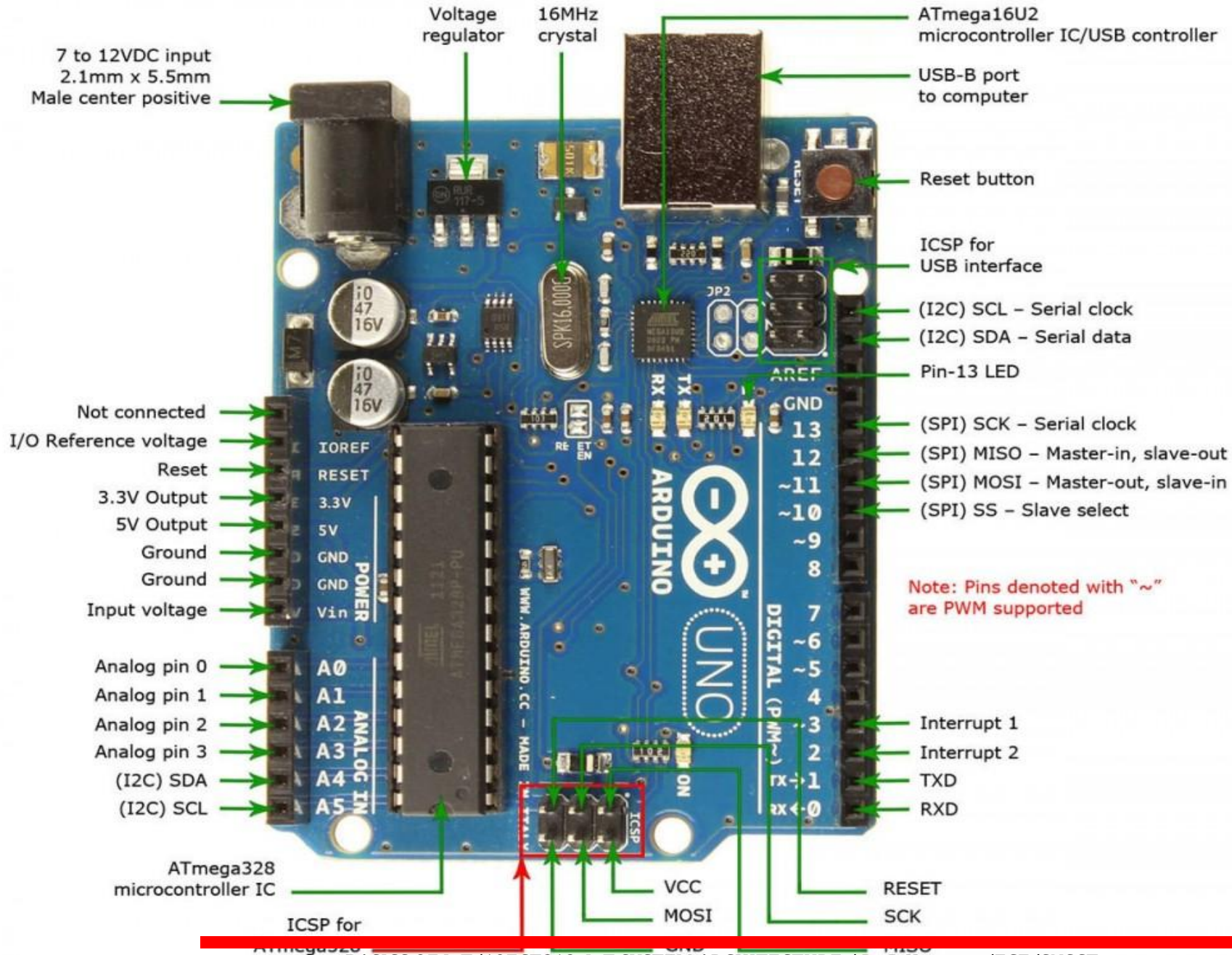
Power Jack: Uno board can be powered both by external supply and via USB cable.

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



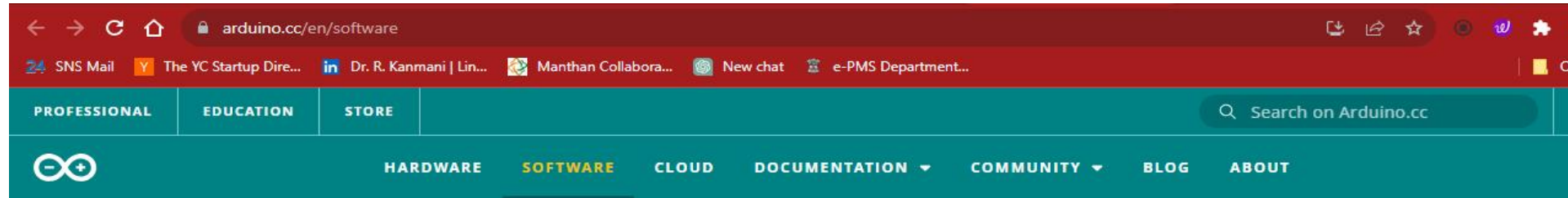


Arduino IDE



Download link

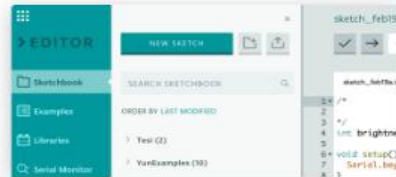
<https://www.arduino.cc/en/software>



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** AppImage 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 is a navigation bar with a 'CLOUD' logo, an 'UPGRADE PLAN' button, and a 'My Cloud' dropdown menu. The main content area is divided into several sections: a 'Welcome, kanmani0808' message, a 'Cloud apps' section with 'IoT Cloud' and 'Web Editor' tiles, and a 'Quick Start' section with 'New sketch' and 'My IoT Dashboards' options. A notification box at the bottom right contains the text 'Thanks for using Arduino Cloud! Please help us improve it by answering these 6 questions' and a 'Next' button. The left sidebar contains navigation options like 'Home', 'Courses', 'Resources', 'CLOUD APPS', and 'INTEGRATIONS'.



Arduino IDE Online



Step 5 : Click Web editor

sketch_jul30a

UPGRADE PLAN

NEW SKETCH

Sketchbook

SEARCH SKETCHBOOK

ORDERING BY LAST MODIFIED

sketch_jul30a

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

Please follow the instructions on the email we sent you to activate your account. Resend email



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, which is displayed in a text editor. The code includes comments about its origin and a C++ program structure with a setup function and a loop function. The board is set to 'Arduino Uno'.

```
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
}
```