



# **SNS COLLEGE OF ENGINEERING**

**Kurumbapalayam(Po), Coimbatore – 641 107**

**Accredited by NAAC-UGC with 'A' Grade**

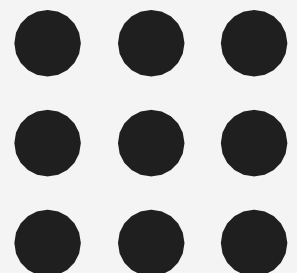
**Approved by AICTE, Recognized by UGC & Affiliated to Anna University, Chennai**

## **Department of Information Technology**

**Course Name – Internet of Things & AI**

**III Year / V Semester**

**Unit 2- DESIGN METHODOLOGY**





# ARDUINO

- Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board and the software used to program it.
- It is a designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices.
- Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board.
- Arduino IoT Cloud and its programming environments, programmers may create linked devices and objects quickly and easily.

# **Different Types Of Arduino Boards**

**Arduino Uno (R3)**

**Arduino Nano.**

**Arduino Micro.**

**Arduino Due.**

**LilyPad Arduino Board.**

**Arduino Bluetooth.**

**Arduino Diecimila.**

**RedBoard Arduino Board.**

# advantage of Arduino

- One of the main advantages of Arduino IDE is its ease of use. Arduino IDE has a simple and intuitive editor that supports syntax highlighting, auto-completion, and code formatting. You can also use the built-in serial monitor and plotter to debug and visualize your data.
- Which Arduino is mostly used?
- Arduino Uno
- Arduino Uno is the most popular and widely used development board. It is powered by an ATmega328P microcontroller.
- What coding is Arduino?
- What language is Arduino? Arduino code is written in C++ with an addition of special methods and functions,

# ARDUINO:



Open source

# Raspberry PI



series of small single-board computers

It is widely used in many areas, such as for weather monitoring because of its low cost, modularity, and open design.

- The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse
- It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python.
- C or C++ are generally one of the three languages that's most widely used on the Raspberry Pi, the other being Python

- **Why Raspberry Pi is better?**

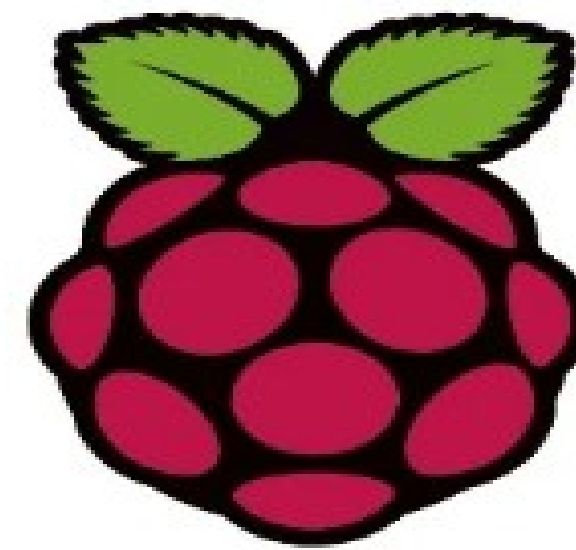
Raspberry Pi has a superb processing power – up to 1.6 GHz (depending on the board), whereas that of Arduino is up to 16 MHz (depending on the board). Arduino will come in handy for controlling motors, LEDs, or interfacing sensors, whereas Raspberry Pi is good for developing software applications.

- **How is Raspberry Pi used in IoT?**

**Raspberry Pi computers feature a set of General Purpose Input Output (GPIO) pins that provide connections to external electronic devices and therefore the development of IoT solutions. These GPIO pins can be connected to external sensors using either jumper wires or a ribbon cable.**

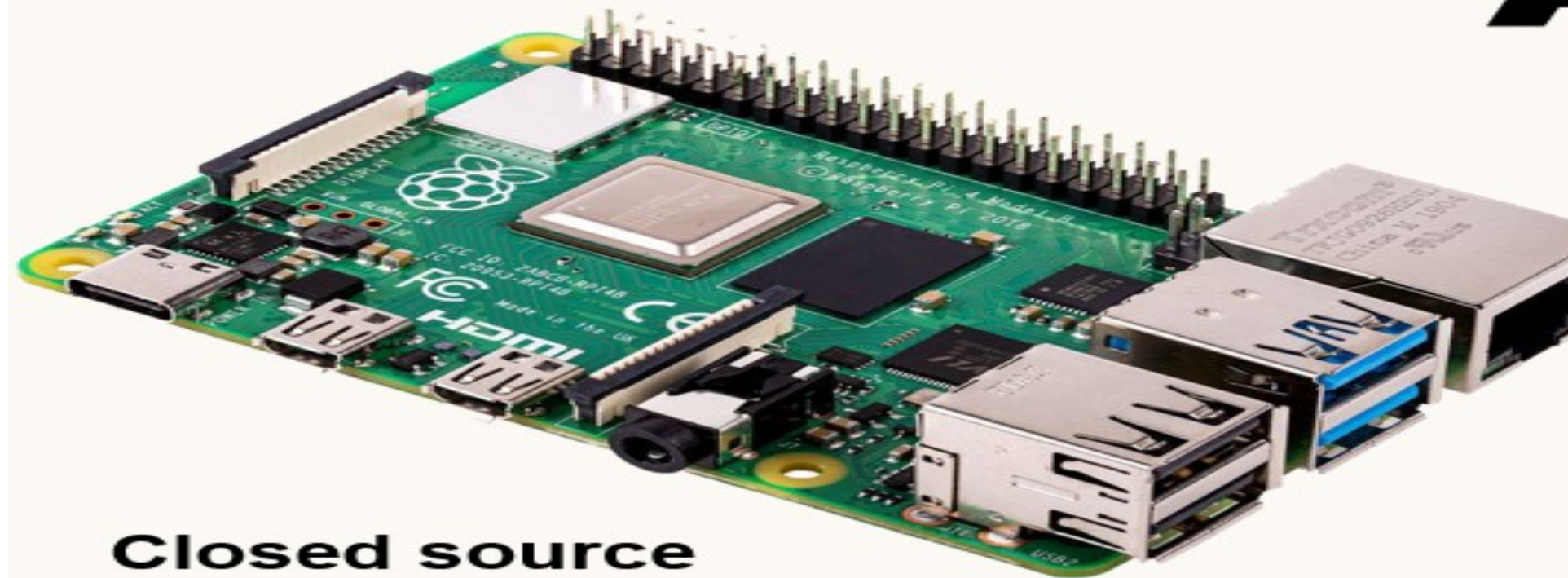
# Raspberry Pi

- ▶ A credit card sized single-board computer plugs into your TV and keyboard.
- ▶ Developed by the Raspberry Pi Foundation in UK.
- ▶ Main objective is to stimulate the teaching of basic computer science in schools.





# Raspberry pi



**Closed source**



# Raspberry Pi Specifications

- ▶ ARM 11 Single Core – 700 MHz
- ▶ Broadcom VideoCore IV, OpenGL ES 2.0, MPEG-2 and VC-1, 1080P h.264/MPEG-4 AVC.
- ▶ 512 MB Shared Memory
- ▶ Video Outputs – HDMI, Composite RCA, raw LCD Panels via DSI
- ▶ Audio Outputs – Stereo 3.5mm jack, HDMI
- ▶ Storage – SD Card
- ▶ Onboard Network – 10/100 Ethernet RJ45 via USB Hub

# THE BOARDS



Arduino Uno

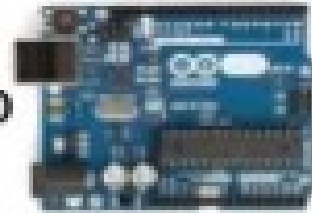


Raspberry Pi



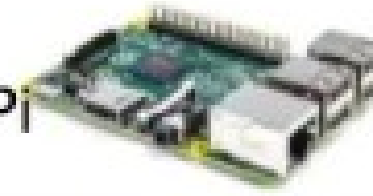
# THE COMPARISON

Arduino Uno



- Micro-controllers, not full computers.
- Does not run a full operating system, but simply execute written code as their firmware interprets it.
- Directly executing simple code is easier, and is accomplished with no operating system overhead.
- Main purpose of the Arduino board is to interface with sensors and devices
- Great for hardware projects in which you simply want things to respond to various sensor readings and manual input.
- Great for interfacing with other devices and actuators, where a full operating system would be overkill for handling simple read and response actions.

Raspberry Pi

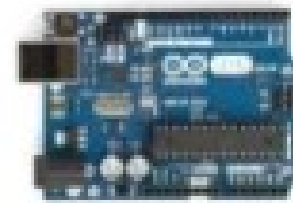


- A fully functional computer.
- Has all the trappings of a computer, with a dedicated processor, memory, and a graphics driver for output through HDMI.
- Runs a specially designed version of the Linux operating system.
- Easy to install most Linux software.
- Doesn't offer internal storage but you can use SD cards as the flash memory for the entire system.
- Independent network connectivity allows it to be set up for access via SSH, or transfer files to it using FTP.

# THE THUMB RULE

Is there a simple rule of thumb to help me decide?

Yes, there is! Think about what you want your project to do. If you can describe it with less than two 'and's, get an Arduino. If you need more than two 'and's, get a Raspberry Pi.



"I want to monitor my plants and have them Tweet me when they need water."

*That can best be done by an Arduino.*



"I want to monitor my plants and have them Tweet me when they need water and check the National Weather Service and, if the forecast is for fair weather, turn on the irrigation system and if the forecast is for rain, do nothing."

*That would best be handled by a Raspberry Pi.*



# WORKING TOGETHER

Can Arduino and Raspberry Pi work together?

"Yes, they work great together"

The Arduino is best for motor driving, sensor reading, LED driving, etc.

*while*

You can have an Internet-connected Pi drive it, storing and processing data send from the sensors.

*The possibilities are infinite –*

You could homebrew beer, with the Arduino controlling the sensors and the Pi managing the brains of the operation.



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