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What are the Differences between Arduino and Raspberry Pi

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Arduino and [Raspberry Pi](#) are the most popular devices among the engineering students, hobbyists and professionals. Experienced and professionals know the differences and utility between the Arduino and Raspberry Pi. But both beginners and students are just confused between them, like which board is easy to learn or which board to use for their project or why should they use Arduino over Raspberry Pi and vice versa. So, mostly this article discusses all the features that can make you easy to choose the decision over Arduino and Raspberry Pi.

Differences between Arduino and Raspberry Pi

The differences between Arduino and Raspberry Pi mainly include what is Raspberry Pi, Arduino, advantages, disadvantages and differences between them.



Arduino and Raspberry Pi

What is a Raspberry Pi?

Raspberry Pi board is a fully functional computer or full-fledged credit card sized. It has all the trappings of a computer, with a dedicated memory, processor, and a graphics card for output through HDMI. It even runs a specially designed version of the Linux operating system and it is easy to install in most Linux software, and used the Raspberry Pi as a functioning video game emulator or media streamer with a bit of effort.



Raspberry Pi

Though the Raspberry Pi doesn't offer internal storage, we can use SD cards as the flash memory in the total system, allowing you to quickly swap out different versions of the operating system or software updates to debug. Because of this device is independent network connectivity, you can also set it up to access via SSH, or transfer files to it

using FTP. It is having 512 MB RAM, 700 MHz microprocessor and hardware support for SPI, I2C and Serial.

Advantages (Pros)

Following are some of the main advantages of Raspberry Pi

- It is very easy to connect to the internet
- Entire [Linux software](#) stack is available
- Can be programmed using a variety of programming languages

Disadvantages (Cons)

Following are some of the main limitations of Raspberry Pi

- Accessing hardware is not a real-time. If the CPU is busy, then interfacing with the hardware can be delayed
- Does not have enough power to drive inductive loads
- There is no inbuilt Analog to Digital converter available
- The hardware design is not open source. Even though it is not a big deal, for some people it might a deal breaker

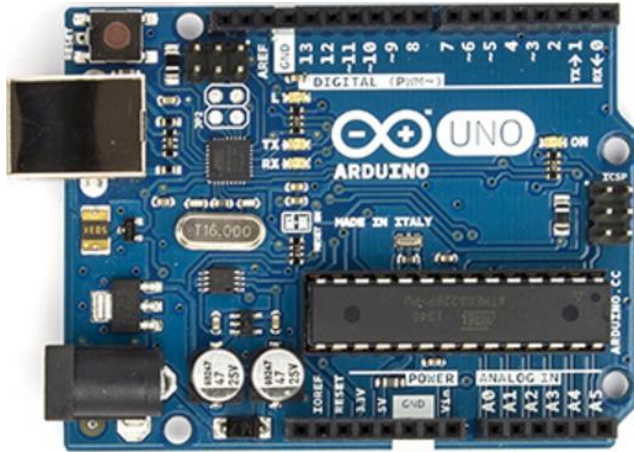
When to Use & Not Use Raspberry Pi

If your project is very limited hardware interaction, but is slightly complex on the software side or need to be connected to the internet then you should just [go with Raspberry Pi](#). Also, if you want to program using a variety of programming languages, then you should choose Raspberry Pi.

On the other hand, if your project requires a lot of hardware interfaces and need to read data from a lot of sensors or need to control lot of devices, then Raspberry Pi may not be the best choice.

What is an Arduino?

Arduino is a collection of three things. There are Hardware prototype platform, Arduino language and IDE & libraries. [The Arduino boards are micro-controllers](#), not a full-fledged computer. They don't run a full operating system, but simply write the code and execute as their firmware interprets it.



Arduino Board

The main purpose of the Arduino board is to interface with the devices and sensors, so it's great for hardware projects in which you simply want things to respond various sensor readings and manual input. This may not seem to be a lot, but it is actually a very sophisticated system that allows you to better manage your devices. It is great for interfacing with other devices and actuators, where a full operating system would be overload for handling simple read and response actions. It has 8-bit [AVR microcontroller](#) and hardware support for SPI, I2C and Serial.

Advantages (Pros)

Following are some of the main advantages of Arduino.

- Very easy to get started.
- Can be used for real-time applications for both hardware, software and IDE is open source.
- Not much programming knowledge needed to do basic stuff.
- It is very easy to extend and has tons of user contributed shields and libraries. Shields are available to do attractive much anything.

Disadvantages (Cons)

Following are some of the main limitations of Arduino.

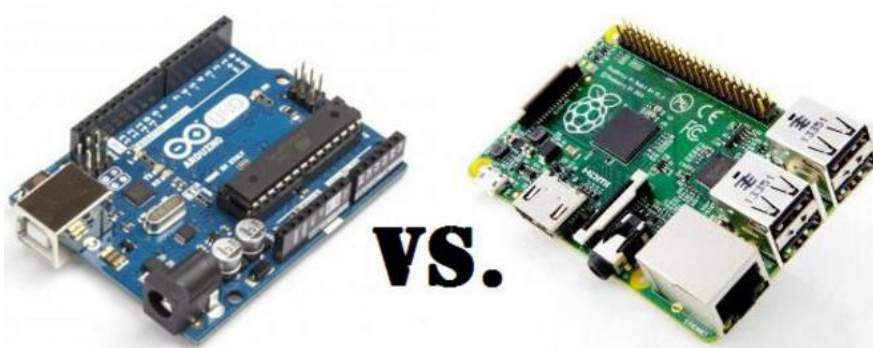
- It is not very powerful when compared with Raspberry Pi
- You need to program using either Arduino or C/C++
- Connecting to the internet is slightly difficult, but not impossible. Parsing of Arduino with YQL and JSON is possible.

When to Use & Not Use Arduino

- If your project requires you to interact with a lot of external hardware requirements, then you should consider using Arduino.
- On the other hand, if your project requires a lot, so you have to write a complex software entire software stack or protocols, then Arduino may not be the best options.

Arduino Vs Raspberry Pi

Choosing which board you want depends on the type of project you want to make, and your experience in programming. If you have no experience in programming or electronics, you will find the Arduino a steeper learning curve than the Raspberry Pi as you will have to learn them both at the same time. The Arduino has been around for a while though, and there are tons of useful tutorials around to get you started. If you have experience in programming, you won't be having problem in getting to grips with the Arduino straight away.



Arduino Vs Raspberry Pi

The Arduino is based on hardware, which means you won't get far without some components: LCDs, LEDs, resistors, motors etc. Depending upon what project you want to do. You need no experience or components to get the Raspberry Pi to do something. Just plug and play.

If you want to make a hardware project, then the [Arduino is the best choice](#). The input is given analog and get output is PWM and a whole spectrum of compatibility the Raspberry Pi cannot do natively. Plus the large I/O pins let you to connect the multiple sensors and feedback components. The Arduino however, is not as powerful as the Raspberry Pi, so there's no proper video, audio, or internet out of the box. The Arduino can send data to your PC or Raspberry Pi, over serial, and you can then create a program to read this data and do something.

If you want to make a software project, then the Raspberry Pi is the way to go. The video, audio, and internet capabilities make it the winner in this aspect. There's no need to attach external components, so there's no real need to learn electronics.

Feature	Raspberry Pi	Arduino
Programming Language	No limit	Arduini, C/C++
Processor Speed	700 MHz,	16MHz
Internet connection very easy	Not easy	Doable
Hardware design	Closed source	Open source
Real time	Hardware realtime	In real time
Analog to Digital	No	Yes

Thus, this is all about the differences between Arduino and Raspberry Pi. We hope that you have got a better understanding of this concept. Furthermore, any queries regarding [this topic or electrical and electronics projects](#) Please give your feedback by commenting in the comment section below. Here is a question for you, what are the applications of an Arduino and Raspberry pi?