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<b>PROBLEM STATEMENT</b>	A Survey on Arduino and Raspberry PI boards.

# ARDUINO

Arduino is an open-source hardware and software platform designed for computer programmers, industrial artists, professionals and those interested in developing interactive devices and applications specific to an interactive development environment.

Arduino can receive input signals from various sensors and inputs. By controlling light sources, motors, or other actuators, Arduino can change the surrounding environment. Programs for the



microcontroller on the Arduino board are written in Arduino's programming language (based on "Wiring" - an open source framework for microcontrollers) and run in the Arduino development environment (based on "Processing" - an open source programming language and integrated development environment).

Arduino is able to run independently or communicate with software running on a computer (for instance, Flash, Processing and MaxMSP). The open-source Arduino IDE, which is free to download, makes it easy for you to write code, upload it to the board and come up with your own interactive devices.

What can we do with Arduino?

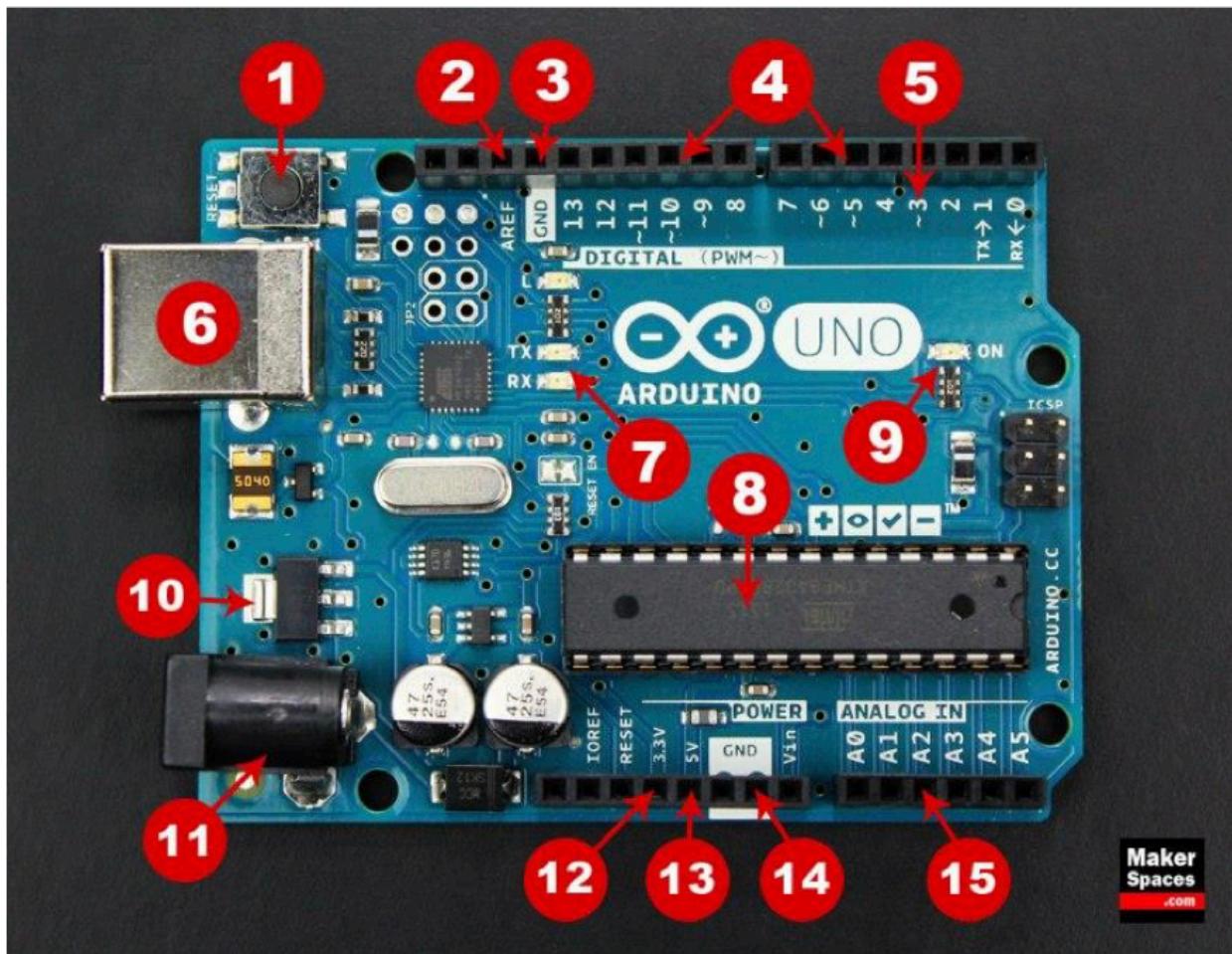
- ◆ Make a line-following robot
- ◆ Make a fluffy toy that lights up
- ◆ Make your phone ring when you receive an e-mail
- ◆ Make a Metroid-style arm cannon
- ◆ Make a coffee maker that sounds an alarm when your coffee is ready
- ◆ Make device that can record your heart rate when you ride your bike

ARDUINO UNO	
Feature	Value
OperatingVoltage	5V
ClockSpeed	16MHz
Digital I/O	14
AnalogInput	6
PWM	6
UART	1
Interface	USB via ATMega16U2

# Board Breakdown

Here are the components that make up an Arduino board and what each of their functions are.

1. Reset Button – This will restart any code that is loaded to the Arduino board
2. AREF – Stands for “Analog Reference” and is used to set an external reference voltage
3. Ground Pin – There are a few ground pins on the Arduino and they all work the same
4. Digital Input/Output – Pins 0-13 can be used for digital input or output
5. PWM – The pins marked with the (~) symbol can simulate analog output



6. USB Connection – Used for powering up your Arduino and uploading sketches
7. TX/RX – Transmit and receive data indication LEDs
8. ATmega Microcontroller – This is the brains and is where the programs are stored
9. Power LED Indicator – This LED lights up anytime the board is plugged in a power source
10. Voltage Regulator – This controls the amount of voltage going into the Arduino board

11. DC Power Barrel Jack – This is used for powering your Arduino with a power supply
12. 3.3V Pin – This pin supplies 3.3 volts of power to your projects
13. 5V Pin – This pin supplies 5 volts of power to your projects
14. Ground Pins – There are a few ground pins on the Arduino and they all work the same
15. Analog Pins – These pins can read the signal from an analog sensor and convert it to digital

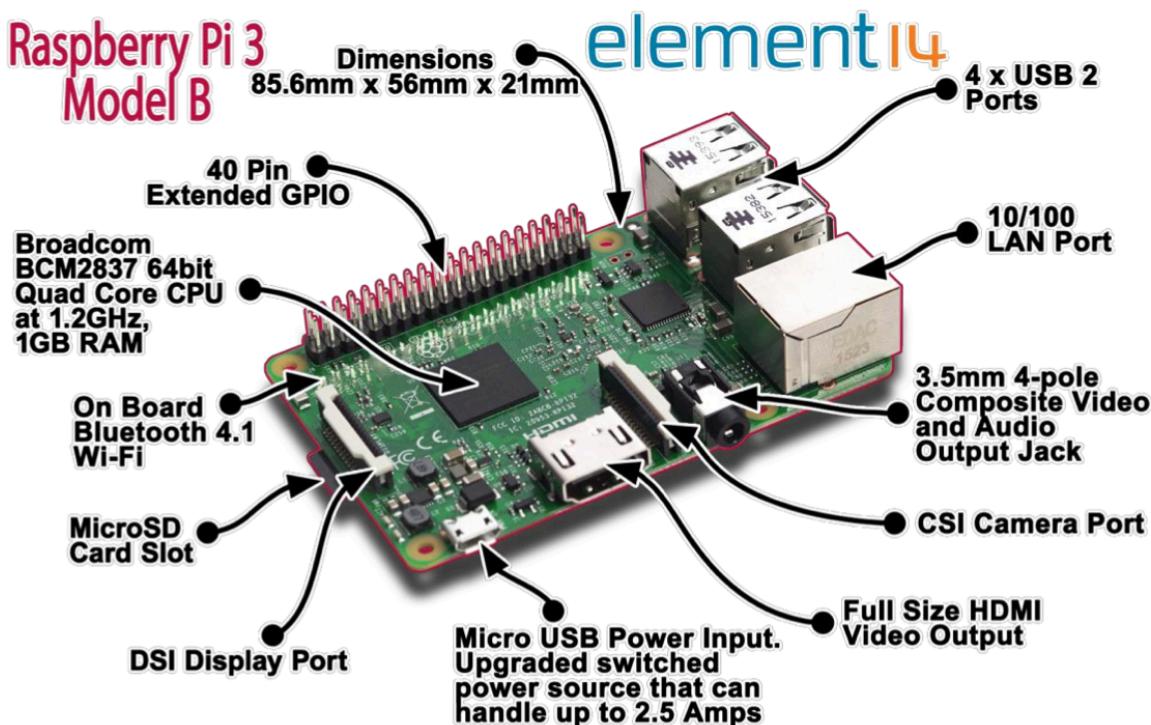
## Types of Arduinos

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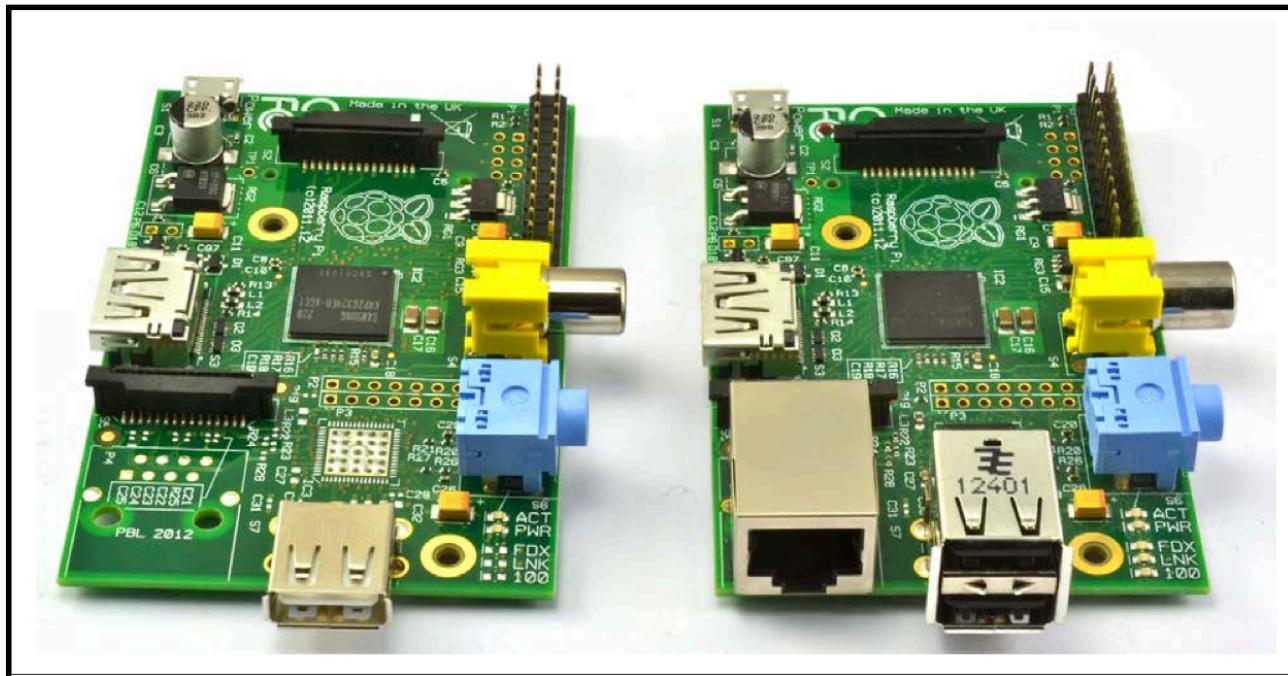
# RASPBERRY PI

Raspberry Pi is a credit card sized micro processor available in different models with different processing speed starting from 700 MHz. Whether you have a model B or model B+, or the very old version, the installation process remains the same. People who have checked out the official Raspberry Pi website, But using the Pi is very easy and from being a beginner, one will turn pro in no time. So, it's better to go with the more powerful and more efficient OS, the Raspbian. The main reason why Raspbian is extremely popular is that it has thousands of pre built libraries to perform many tasks and optimize the OS. This forms a huge advantage while building applications.



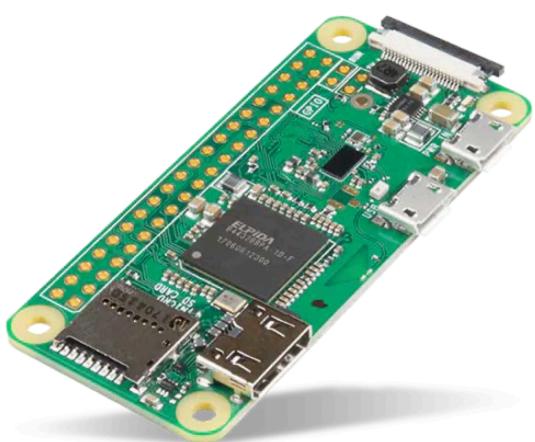
As for the specifications, the Raspberry Pi is a credit card-sized computer powered by the Broadcom BCM2835 system-on-a-chip (SoC). This SoC includes a 32-bit ARM1176JZFS processor, clocked at 700MHz, and a Videocore IV GPU. It also has 256MB of RAM in a POP package above the SoC. The Raspberry Pi is powered by a 5V micro USB AC charger or at least 4 AA batteries (with a bit of hacking). While the ARM CPU delivers real-world performance similar to that of a 300MHz Pentium 2, the Broadcom GPU is a very capable

graphics core capable of hardware decoding several high definition video formats. The Raspberry Pi model available for purchase at the time of writing — the Model B — features HDMI and composite video outputs, two USB 2.0 ports, a 10/100 Ethernet port, SD card slot, GPIO (General Purpose I/O Expansion Board) connector, and analog audio output (3.5mm headphone jack). The less expensive Model A strips out the Ethernet port and one of the USB ports but otherwise has the same hardware. Raspberry Pi Basics: installing Raspbian and getting it up and running.



## SPECIFICATIONS - PI Specs – Zero W :

- Single core ARM11 processor unning at 1GHz
- 512mb RAM
- Mini-HDMI output
- 1 Micro-USB port
- 2.4GHz Wireless
- Bluetooth
- Board costs only \$10



## SPECIFICATIONS - PI Specs - 3B+ :

- Quad core ARMv8 processor running at 1.4GHz
- 1GB RAM
- HDMI output
- 3.5mm audio jack output
- 4 USB 2.0 ports
- 1 Gigabit Ethernet port
- 2.4GHz/5GHz Wireless
- Bluetooth
- Board costs \$35



## SPECIFICATIONS - PI Specs – Model 4 :

- Quad core ARMv8-A processor running at 1.6GHz
- 1,2,4, or 8 GB RAM
- 2 MicroHDMI outputs
- 3.5mm audio jack output
- 2 USB 2.0 ports
- 2 USB 3.0 ports
- 1 Gigabit Ethernet port
- 2.4GHz/5GHz Wireless bluetooth



## Pi vs Arduinos



- Runs a full Linux operating system, running at 1+GHz
- Is a complete computer reduced to a single tiny board



- Doesn't run an operating system, and runs at 10-100MHz
- Can be programmed by a computer, and set to autonomously perform a task until powered off
- Due to lack of overhead the Arduino is fantastic at performing repetitive tasks with excellent timing