# Conclusion

1. Raspberry pi Architecture

Raspberry Pi is a small single-board computer (SBC). It is a credit card-sized computer that can be plugged into a monitor. It acts as a minicomputer by connecting the keyboard, mouse, and display. Raspberry Pi has an ARM processor and 512MB of RAM. The architecture of Raspberry Pi is discussed in this article.

The following diagram shows the architecture of Raspberry Pi:
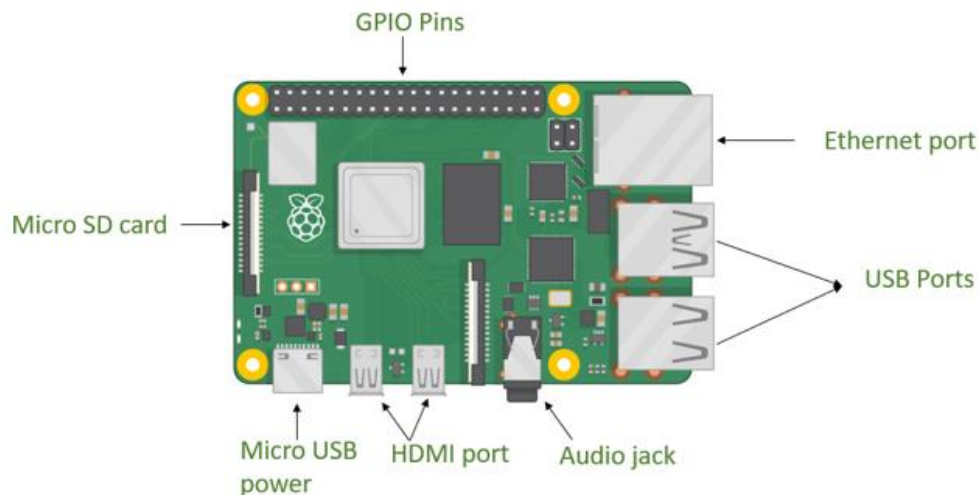
The following diagram shows some main blocks of Raspberry Pi:
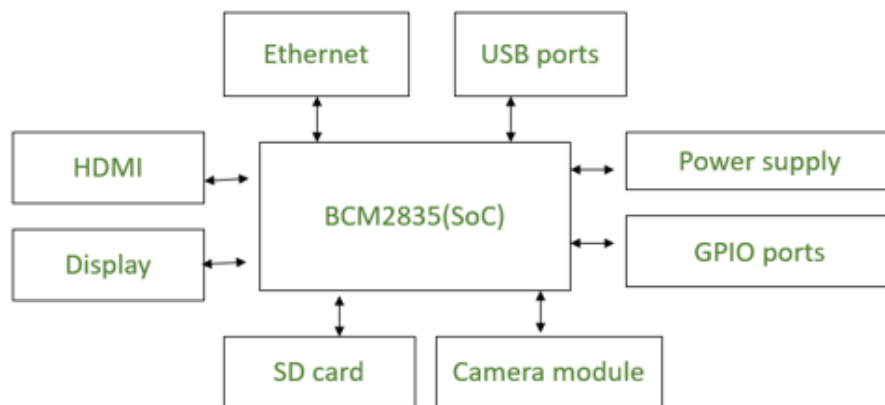
Raspberry Pi mainly consists of the following blocks:
- **Processor:** Raspberry Pi uses Broadcom BCM2835 system on chip which is an ARM processor and Video core Graphics Processing Unit (GPU). It is the heart of the Raspberry Pi which controls the operations of all the connected devices and handles all the required computations.
- **HDMI:** High Definition Multimedia Interface is used for transmitting video or digital audio data to a computer monitor or to digital TV. This HDMI port helps Raspberry Pi to connect its signals to any digital device such as a monitor digital TV or display through an HDMI cable.
- **GPIO ports:** General Purpose Input Output ports are available on Raspberry Pi which allows the user to interface various I/P devices.

- **Audio output**: An audio connector is available for connecting audio output devices such as headphones and speakers.
- **USB ports:** This is a common port available for various peripherals such as a mouse, keyboard, or any other I/P device. With the help of a USB port, the system can be expanded by connecting more peripherals.
- **SD card: The** SD card slot is available on Raspberry Pi. An SD card with an operating system installed is required for booting the device.
- **Ethernet**: The ethernet connector allows access to the wired network, it is available only on the model B of Raspberry Pi.
- **Power supply:** A micro USB power connector is available onto which a 5V power supply can be connected.
- **Camera module:** Camera Serial Interface (CSI) connects the Broadcom processor to the Pi camera.
- **Display:** Display Serial Interface (DSI) is used for connecting LCD to Raspberry Pi using 15 15-pin ribbon cables. DSI provides a high-resolution display interface that is specifically used for sending video data.

2. Installation of Raspbian and NOOBS Operating systems

Raspbian Installation:

1. Download Raspbian: Obtain the Raspbian image from the Raspberry Pi Foundation's website.

2. Prepare SD Card: Use Etcher or Raspberry Pi Imager to flash the Raspbian image onto an SD card.

3. Insert SD Card: Insert the SD card into the Raspberry Pi.

4. Power Up: Connect peripherals (keyboard, mouse, display), then power up the Raspberry Pi.

5. Configuration: Follow the on-screen setup wizard to configure your Raspbian system.

NOOBS Installation:

1.Download NOOBS: Get the NOOBS files from the Raspberry Pi Foundation's website.

2.Extract to SD Card: Extract the contents of the NOOBS zip file onto an SD card.

3. Insert SD Card: Insert the SD card into the Raspberry Pi.

4.Power Up: Connect peripherals (keyboard, mouse, display), then power up the Raspberry Pi.

5.Operating System Selection: NOOBS will display a list of available operating systems. Select Raspbian and follow the on-screen instructions to install it.

Both methods are straightforward, allowing for an easy setup of your Raspberry Pi with Raspbian.

3. list of components (other devices and connector)

Here are the items required to install Raspbian OS on Raspberry Pi:

1. SD Card: Used as the primary boot media for the Raspberry Pi.
2. SD Card Formatter: Software tool for formatting microSD cards.
3. Win32 Disk Imager: Software tool for writing Raspbian operating system images to microSD cards.
4. PC: Must download the Raspbian OS image and write it to the microSD card.
5. SD Card Reader: A device used to connect a microSD card to a computer.
6. Power: Provides power to the Raspberry Pi.
7. Display: Connect to Raspberry Pi to display the Raspbian OS interface.
8. Keyboard and mouse: Input devices used to interact with the Raspbian OS interface.

These parts and accessories are required to install and use the Raspbian operating system on the Raspberry Pi .

4. Difference between BCM and BOARD mode

- ➢ BCM and BOARD are two different types of code used in Raspberry Pi.
- ➢ BCM refers to the Broadcom SOC channel number, which is the internal number of the chip used in the Raspberry Pi.
- ➢ This number may differ from the BOARD number as it may vary between cards. The BOARD number refers to the serial number of the plug written on the board, which is similar to the numbering of pins. When using the RPi.
- ➢ GPIO library in Python, you need to call import RPi.GPIO as GPIO and then call GPIO.setmode(GPIO.BOARD) or GPIO.setmode(GPIO.BCM) to specify the mode used. If you are using more than one Raspberry Pis in your project, it is recommended to use the BOARD code as the BCM code may vary depending on the board version.