Name- Rutuja Manoj Kasar
class- TE - Div- A
Roll no.- 65

Assignment - 3.

Aim- Study of connectivity and configuration of Raspberry- Pi/ Beagle board circuit with basic peripherals, LEDs understanding and its use in program.

Theory — Connectivity and configuration of Raspberry Pi guides Raspberry Pi.

1. raspi-Config →
The Raspberry Pi configuration tool in Rasbion, allowing you to easily enable features such as the camera, and to change your specific settings can be keyboard.

2. Wireless access point →
Configuration of your Pi as a wireless access point using the Raspberry Pi3 and Pi Zero Ws. In built wirkless connectivity or a USB wireless dongle.

6 Camera config
Installing and setting up the Raspberry Pi camera board

7 External Storage config
Mounting and setting up external storage on Raspberry Pi

8 Localisation
Setting up your Pi to work in your local language / time zone

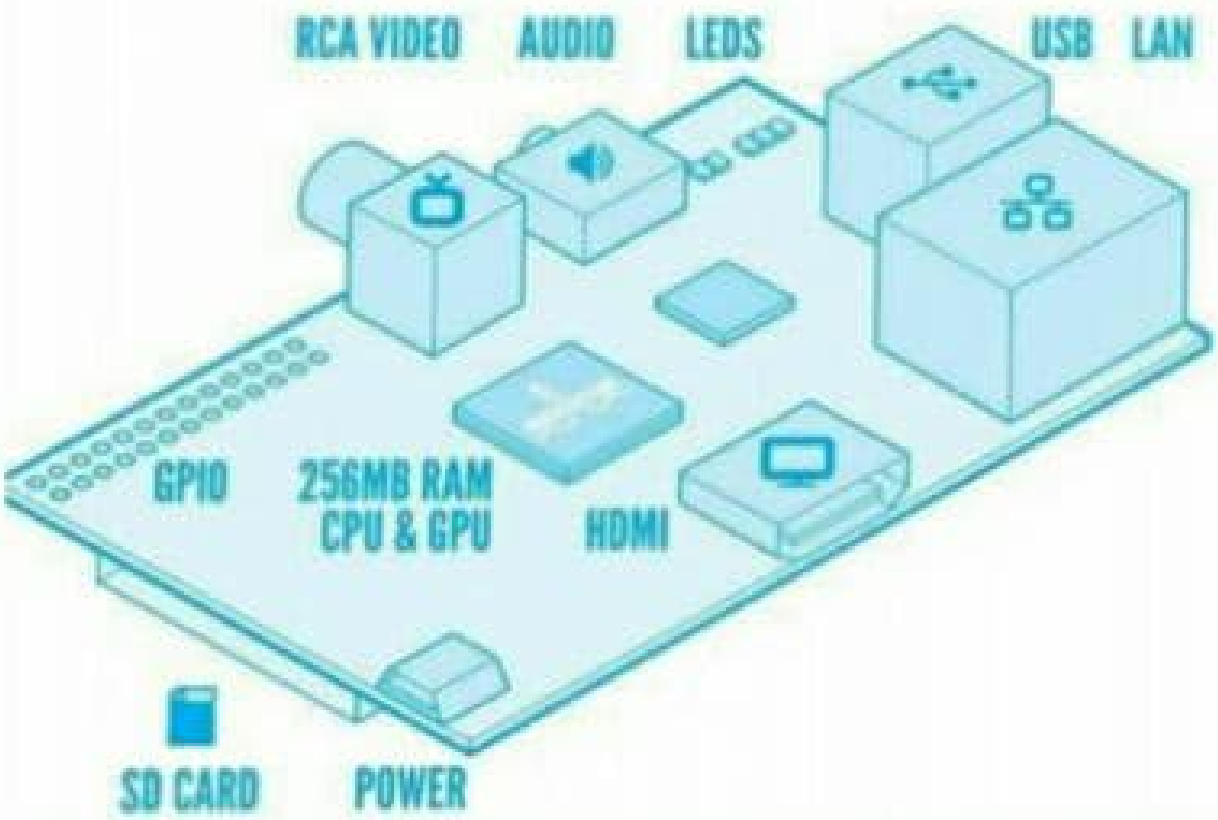
9. Default Pin configuration
changing the default Pin states

10 Device Trees config
Device Trees, overlays and parameters

11. Kernel command line
The linux kernel accepts a command line of parameters during boot. This is a simple text file can be edited using any text editor

12. UART Configuration
The SoCs used on the Raspberry Pis have two built-in UARTs a Pl011 and a mini UART

13. Screensaver
If you are using the Raspberry Pi solely on the console (no desktop GUI), you need to set the console blanking.
Add consoleblank=0 turn screen blanking off completely or edit it to set the no of seconds of inactivity before console will blank



[illegible] making the Raspberry Pi compatible with

Connectivity of Raspberry Pi

Connectivity is truly superb for such a tiny device, especially on the B version of Raspberry Pi. There are two USB 2.0 ports that can be used to hook up peripherals or adapters, and this can be further expanded with a power hub

For video, there's a full-size HDMI port making the Raspberry Pi compatible with practically every monitor, TV and other display out there. Stereo audio can be output a 3.5 mm jack, or you can get the full 5.1 surround sound package through the HDMI.

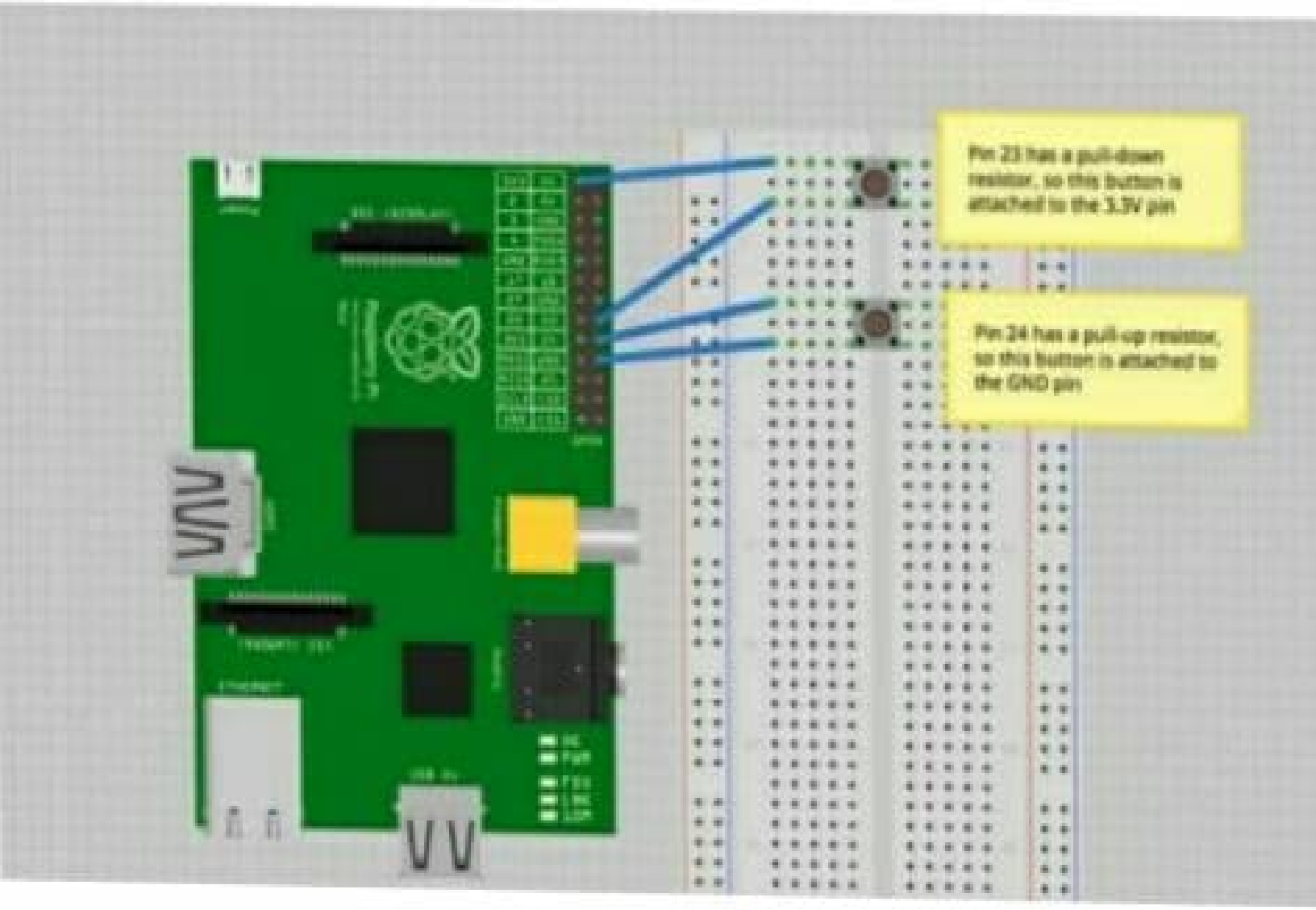
GPIO Mode

The GPIO.BOARD option specifies that you are referring to pins by the number of the pin the plug - i.e the numbers printed on the board (eg P1) and in middle of the diagrams below.

Unfortunately BCM numbers changed between versions of the Pi 2 Model B

The Model B+ uses the same numbering as the model B+ 1.0, and new pins (board numbers 27-40)

The Raspberry Pi Zero, Pi 2B and Pi 3B use the same numbering as B+.


Pin 23 has a pull-down resistor, so this button is attached to the 3.3V pin
Pin 24 has a pull-up resistor, so this button is attached to the GND pin

Building Circuit -

In the circuit shown below, two momentary Switches are wired to GPIO pins 23 and 24 (Pins 16 & 18 on board). The switch on Pin 23 is tied to 3.3 V, while switch on Pin 24 is tied to ground

To set up these pins, write

```
GPIO.setup (23 GPIO.IN, pull_up_down = GPIO.PUD)
GPIO.setup (24, GPIO.IN, Pull_up_down = GPIO.PUD
```

This will enable a pull-down resistor on Pin 23, and a Pull-up resistor on Pin 24. Now let's check to see if we can read them The code so far look like this -

```
import RPi.GPIO as GPIO
GPIO.setmode (GPIO.BCM)
GPIO.setup (23, GPIO.IN, Pull_up_down = GPIO.PUD_D
GPIO.setup (24, GPIO.IN, Pull_up_down = GPIO.PUD_UP)

While True:
if (GPIO.input (23) == 1)
print (" Button 1 Pressed")
if (GPIO.input (24) == 0):
print (" Button 2 pressed")
GPIO.cleanup()
```

The indents in Python are important when using loops. So be sure to include them. If you don't use this, then the GPIO pins will remain at whenever state they were last set to.

Register

You must ALWAYS use resistors to connect LEDs up to the GPIO Pins of the Raspberry Pi The Raspberry Pi can only supply a small current. The LEDs will want to draw more, and if allowed to they will burn out Raspberry Pi.

Resistors are a way of limiting the amount of electricity going through a circuit Specifically, they limit the amount of current that is allowed to flow The value of a resistors is marked with colored band along the length of the resistor body.

Jumper wires

Jumper wires are used on breadboards to 'jump' from one connection to another

- The ones you will be using in this circu have different connectors on each end
- The end with 'Pin' will go into the Breadboard
- The end with the project piece of plasti with a hole in it will go onto the Raspberry Pi's GPIO Pins

Conclusion -

Thus we have studied connectivity and configuration of Raspberry Pi and also use of GPIO.

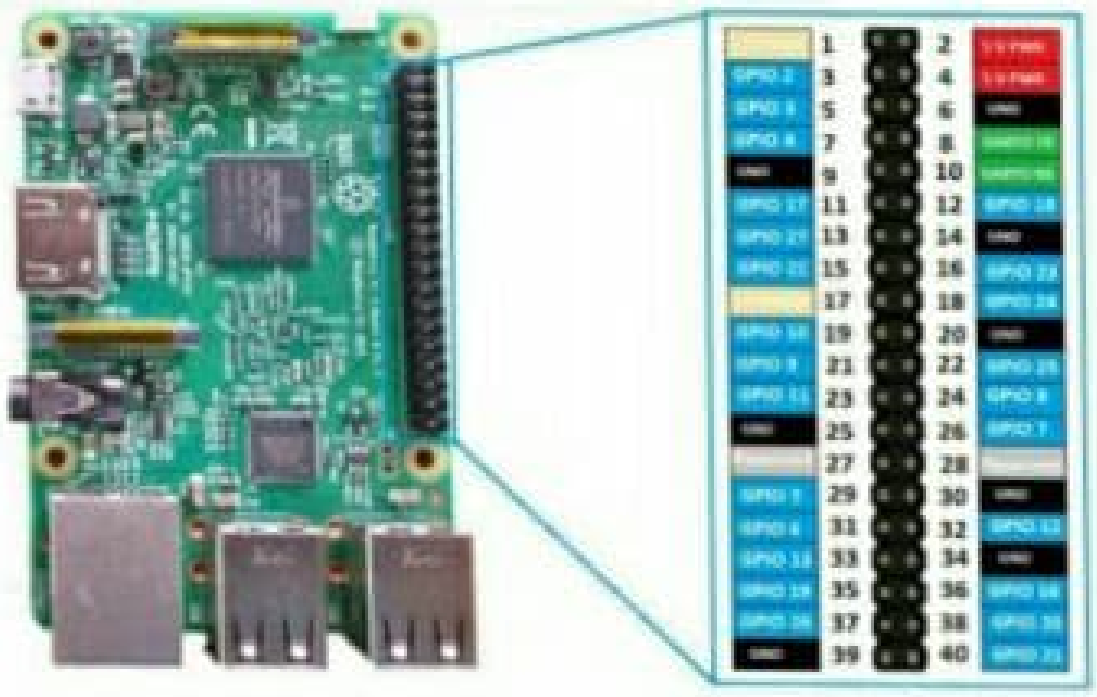
Understanding GPIO pins on Raspberry Pi board and its use in program

Aim objectives -

1. To understand the GPIO pins of Raspberry Pi 3.
2. To program the GPIO pins of Raspberry Pi 3 using Python

Introduction -

1. Raspberry Pi 3 Model B is the last version of Raspberry Pi board
2. It is released on 29 Feb
3. The above fig shows the Raspberry Pi3 Model B and its GPIO pins
5. There are 40 pins available on board of Raspberry Pi3 Model B
6. The pins are arranged in a 2x20 fashion as shown in fig above out of these, 26 Pins are GPIO Pins. As you can observe, the no to the pins are given in zigzag manner
7. The first row starts with number '1', so the pins in this row have odd numbers from 1 to 39
8. The 2nd (top) row starts with number '2' So the pins in this row have even number i.e 2 to 40




pi@raspberrypi: ~
Programming
Office
Internet
Games
Accessories
Graphics
Sound & Video
Help
Preferences
Run...
Shutdown...
BlueJ Java IDE
Geany Programmer's Editor
Greenfoot Java IDE
Mathematica
Node-RED
Python 2 (IDLE)
Python 3 (IDLE)
Scratch
Sense HAT Emulator
Sonic Pi
Wolfram
Integrated development environment for Python 3

10. 26 Pins are GPIO Pins
8 Pins are Ground (GND) Pins.
2 Pins are 5v Power Supply Pins
2 Pins are not used
12 In Raspberry Pi there are two different Schemes for referencing pi pin

Open Python 3 from the main menu:

- or open terminal window and and type the command sudo idle 3.5 and press enter
- Install all libraries required for Buzzer as given above

Raspberry Pi GPIO programming using Python

1. The Raspberry Pi is often used in conjuctio with other hardware to create
2. The Pi3 comes with 40 GPIO pins that you can use to interface with various for both receiving data from them or for writing data to them
3. To do this, we have to program, the command used is 'import'
4. This way, we can write application to both led and also to control device
5. The default operating System used in Raspberry-Pi is Raspian