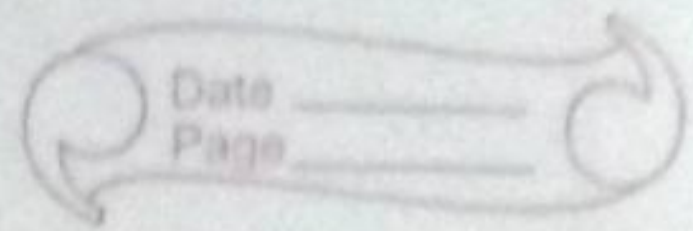


Name :- Sakshi Anil Fokane

Class :- TE - A Roll No :- 42

Assignment No :- 3



①

* Aim :- Study of Connectivity and Configuration of Raspberry - Pi / Beagle board Circuit with basic peripherals, LEDs. Understanding GPIO and its use in program.

* Theory :-

Connectivity and Configuration of Raspberry - Pi
Guides to configure Raspberry Pi.

• 1. raspi-config :

The Raspberry Pi Configuration tool in Raspbian, allowing you to easily enable features such as the Camera, and to change your specific settings such as keyboard layout.

• 2. Config.txt :

The Raspberry Pi configuration file.

• 3. Wireless :

Configuring your Pi to connect to a wireless net^{rk} using the Raspberry Pi 3 & Pi Zero W's in the built wireless connectivity or a USB wireless dongle.

• 4. Wireless Access Point :

Configuring your Pi as a wireless access point using the Raspberry Pi 3 and Pi Zero W's in built wireless connectivity, or a USB wireless dongle.

• 5. Audio Config :-

Switch your audio output between HDMI and the

3.5 mm jack.

- 6. Camera Config :

Installing and setting up the Raspberry Pi Camera board.

- 7. External Storage Config :

Mounting and setting up external storage on a 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. On the Raspberry Pi, this command line is defined in a file in the boot partition, called `cmdline.txt`. This is a simple text file that can be edited using any text editor, eg. nano.

- 12. UART Configuration :

The SOCs used on the Raspberry Pis have two built-in UARTs, a PL011 and a mini UART. They are implemented using different hardware blocks, so they have slightly different characteristics.

However, both are 3.3V devices, which means extra care must be taken when connecting up to an RS232 or other system that utilizes different voltage levels.

• 13. Screensaver :-

If you are using the Raspberry Pi solely on the console (no desktop GUI) you need to set the console blanking.

* Connectivity of Raspberry Pi:

Connectivity is truly superb for such a tiny device, especially on the B version of the 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 powered hub.

* GPO Mode :-

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

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

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

* Building a Circuit :-

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

is tied to ground. The reason for this is that the Raspberry Pi has internal pull-up and pull-down resistors that can be specified when the pin declarations are made.

To set up these pins, write :

```
GPIO.setup(23, GPIO.IN, pull-up-down=GPIO.PUD_DOWN)
GPIO.setup(24, GPIO.IN, pull-up-down=GPIO.PUD_UP)
```

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 Pi is looking for a high voltage on Pin 23 and a low voltage on Pin 24. We'll also need to put these inside of a loop, so that it is constantly checking the pin voltage.

The code so far looks like this :

```
import RPi.GPIO as GPIO
GPIO.setmode(GPIO.BCM)
GPIO.setup(23, GPIO.IN, pull-up-down=GPIO.PUD_DOWN)
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()
```

* Resistor :

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 the Raspberry Pi. Therefore putting the resistors in the circuit will ensure that only this small current will flow and the Pi will not be damaged.

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 measure of resistance is called the ohm (Ω), and the larger the resistance, the more it limits the current. The value of a resistor is marked with colored bands 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 circuit have different connectors on each end.
- The end with the 'Pin' will go into the breadboard.
- The end with the piece of plastic 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.