

C Programming through Wiring Pi

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Abstract—This manual shows how to install Wiring Pi library in Raspberry Pi and control GPIO pins using C program. It helps us to analyze how C programing is used to interact with hardware.

1 INSTALLATION OF WIRING PI

In this section the installation of wiring pi library in R Pi from git hub in Raspbian OS is explained.

If you do not GIT installed use the following command.

```
sudo apt-get install git-core
```

Download or clone wiring pi from GIT

```
sudo apt-get update
sudo apt-get upgrade
cd
git clone git://git.drogon.net/
wiringPi
```

Web link (i.e. url) to download wiringpi from GIT
<https://github.com/WiringPi/WiringPi>

Steps to install wiringpi if it is cloned

```
cd ~/wiringPi
./build
```

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Steps to install wiringpi if it is downloaded from web link. Downloaded file will be in zip formate, extract it in the home directory.

```
cd file_name
./build
```

Type the following manual command to know how to use the gipo utility

```
man gpio
```

Run the gpio command to check the installation

```
gpio -v
gpio readall
```

2 BASIC PROGRAMMING USING WIRING PI

Before execution of any programing initialize BCM-GPIO pin numbering by using following command

```
gpio -g mode 17 output
```

in the above command '-g' indicates the BCM (Broadcom) pin numbering, 'mode' indicates the mode of operation of pin i.e. *Input/output*. If the BCM pin numbers are not assigned then Pi will take default pin numbering.

2.1 Control LED blink

Here is an example experiment of LED blink using broadcom pin number 17.

```
#include <stdio.h>
#include <wiringPi.h>
```

```
#define LED 0
// The above command tell that
// LED Pin - wiringPi pin 0 is
// BCM_GPIO pin 17.
```

```
int main (void)
{
    printf ("Raspberry_Pi_blink\n")
    ;
}
```

```

wiringPiSetup () ;
// setup function due Broadcom
// numbering.
pinMode (LED, OUTPUT) ;

for (;;)
{
    digitalWrite (LED, HIGH) ; //
    On
    delay (500) ; //
    mS
    digitalWrite (LED, LOW) ; //
    Off
    delay (500) ;
}
return 0 ;
}

```

The above program should be saved as .c file. Now compile & run the program

```

gcc filename.c -o output_filename
-l wiringPi
sudo ./output_filename

```

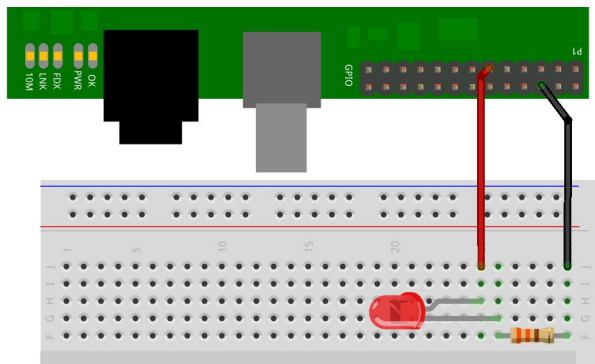


Fig. 1: Schematic of LED connected to Pi [1]

2.2 Control LED using Push button

Here LEDs are controlled using push button. Connect the circuit as per the schematic diagram.

```

#include <stdio.h>
#include <wiringPi.h>

#define LedPin 0
#define ButtonPin 1

```

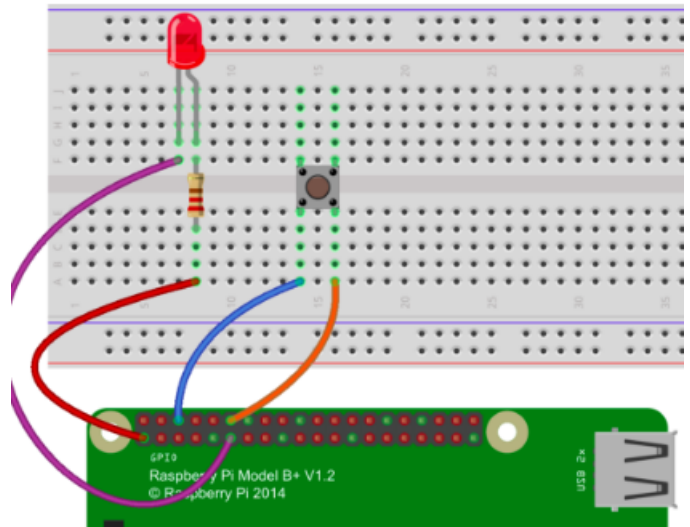


Fig. 2: Schematic diagram of push button controlled LED [2]

```

int main(void)
{
    if(wiringPiSetup() == -1)
    {
        //when initialize wiring failed ,
        print message to screen
        printf("setup_wiringPi_failed_!\n");
        return 1;
    }

    pinMode(LedPin, OUTPUT);
    pinMode(ButtonPin, INPUT);

    pullUpDnControl(ButtonPin, PUD_UP);
    ;
    // pull up to 3.3V, make GPIO1 a
    // stable level

    while(1)
    {
        digitalWrite(LedPin, HIGH);
        if(digitalRead(ButtonPin) == 0)
        {
            // indicate that button has
            // pressed down
            digitalWrite(LedPin,
                LOW);
            // led on
        }
    }
}

```

```

    }
}

    return 0;
}

```

Save the program file as .c file. Run & compile the the program as above.

3 CONCLUSION

By this we can understand that how a basic C programing will help us to talk with the real world hardware. WiringPi is released under the GNU Lesser Public License version 3. For more information visit <http://www.wiringpi.com/>.

REFERENCES

- [1] Wiring Pi- GPIO Interface library for the Raspberry Pi, url-
<http://www.wiringpi.com/>.
- [2] Sunfounder, Raspberry pi tutorial - 'Lesson 2 Controlling
an LED by a Button' <https://www.sunfounder.com/>. Demo
video link https://www.youtube.com/watch?time_continue=4&v=y3Pv7--6eik.