

# 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 ;
}
```

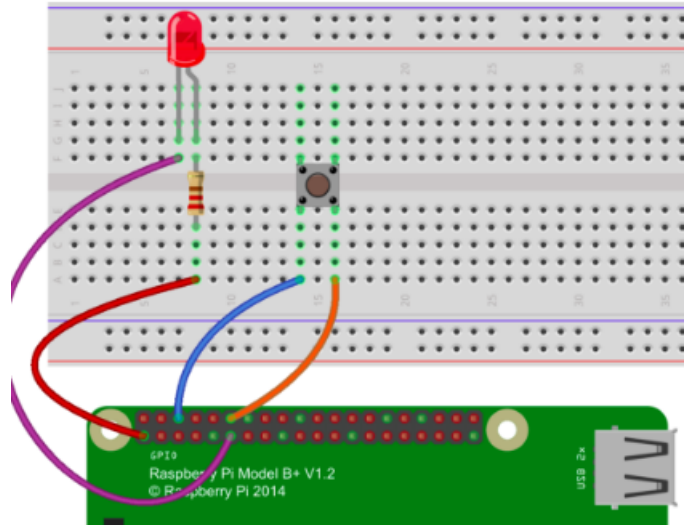


Fig. 2: Schematic diagram of push button controlled LED [2]

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
```

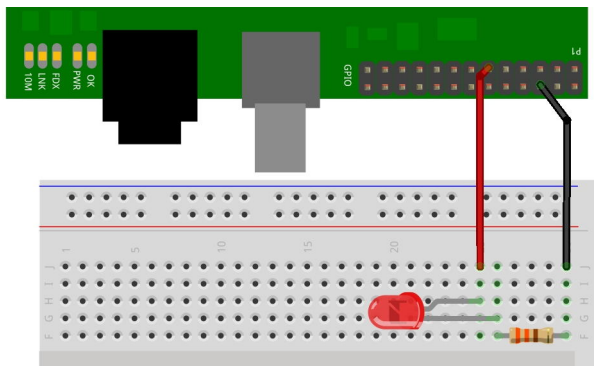


Fig. 1: Schematic of LED connected to Pi [1]

## 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
```

```
int main(void)
{
if(wiringPiSetup() == -1)
{
  //when initialize wiring failed ,
  print message to screen
  printf("setup_wiringPi_failed_!")
  );
  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](https://www.youtube.com/watch?time_continue=4&v=y3Pv7--6eik).