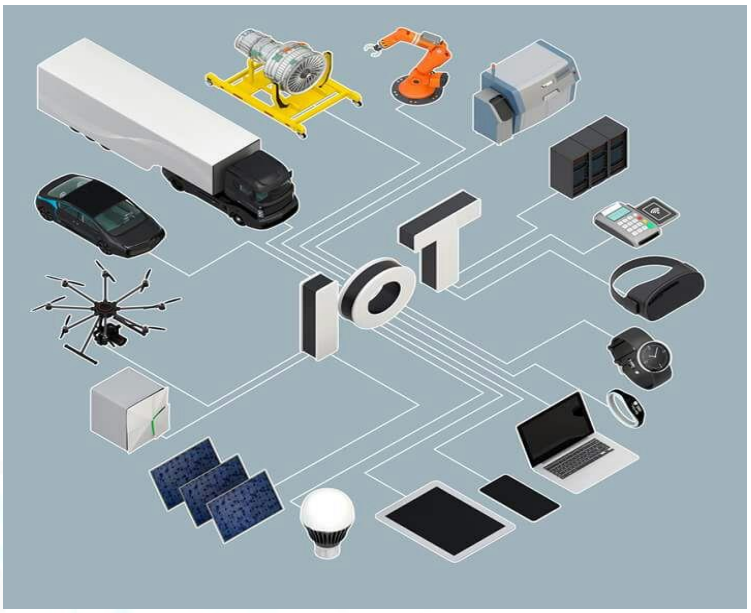

IOT WORKSHOP BASED ON RASPBERRY PI AND PYTHON

Manual

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Installing Operating System:

- First, download the Raspberry pi official image file of the Raspbian Operating system.
- Download the image file from following link:

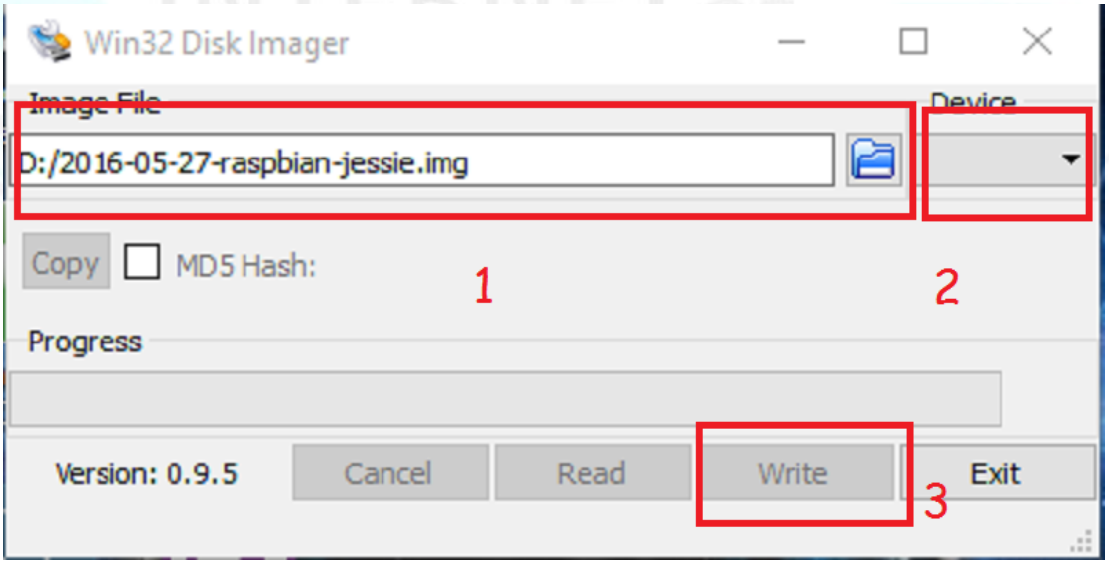
  https://www.raspberrypi.org/downloads/raspbian/

- For online tutorial for complete installation visit the following link:

  http://raspberrypihq.com/booting-the-raspberry-pi-for-the-first-time/

- For writing image file to SD card download the Win32DiskImager from this link:
  https://sourceforge.net/projects/win32diskimager/

- Select the downloaded image file(1) and the right device(2).
  (NOTE: Select the device drive with caution or you would end up deleting your computer HDD!)



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PROJECT 1: LED control using Raspberry pi and mobile phone

Components Required:

1. Raspberry Pi
2. LEDs
3. Jumper Wires(Female to Male)
4. Resistors
5. Wifi adapter(in case of rpi 2 and below)

Softwares Required:

1. WiringPi
2. PHP5.5+
3. Apache Server

Steps to Follow:

1. For installing WiringPi:

   Type these commands one after another in Rpi terminal

   (a) pi@raspberrypi: ~ $sudo apt-get install git-core
   (b) pi@raspberrypi: ~ $sudo apt-get update
   (c) pi@raspberrypi: ~ $sudo apt-get upgrade (optional)
   (d) pi@raspberrypi: ~ $sudo git clone git://git.drogon.net/wiringPi
   (e) pi@raspberrypi: ~ $cd wiringPi
   (f) pi@raspberrypi: ~ $sudo git pull origin
   (g) pi@raspberrypi: ~ $cd wiringPi
   (h) pi@raspberrypi: ~ $./build

2. For installing Apache type the following command in Rpi terminal:

   sudo apt-get install apache2 apache2-utils

3. For installing PHP type the following command in Rpi terminal:

   sudo apt-get install libapache2-mod-php5 php5 php-pear php5-xcache php5-mysql

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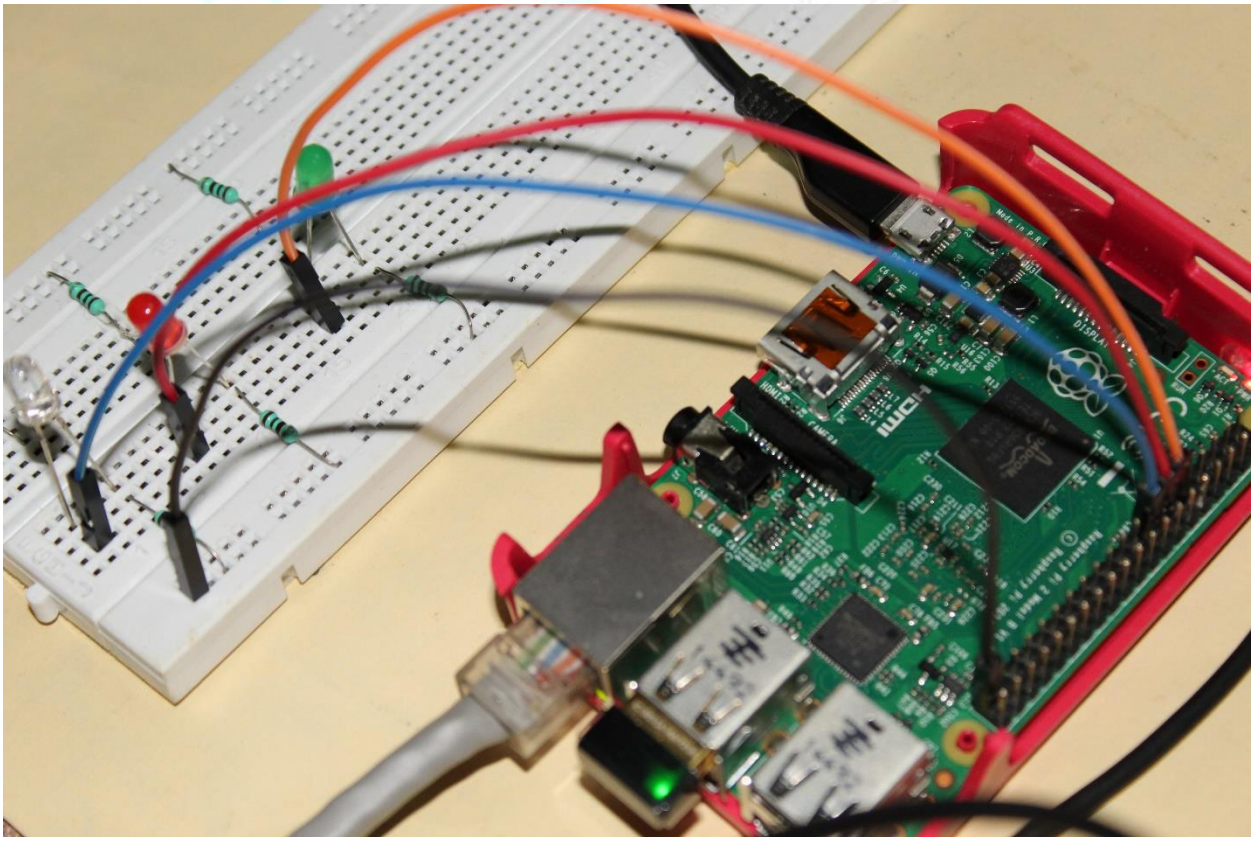
4. For reference in installing visit the link:

https://www.stewright.me/2015/08/tutorial-install-apache-php-and-mysql-on-a-raspberry-pi-2/

5. Once all the soft wares are installed without any error, navigate to /var/www/html directory make a new file name led.php and make the following connections:
    I. Connect Pin 11(GPIO PIN 17) of Rpi to +ve of 1st LED.
    II. Connect Pin 13(GPIO PIN 27) of Rpi to +ve of 2nd LED.
    III. Connect Pin 15(GPIO PIN 22) of Rpi to +ve of 3rd LED.
    IV. Connect –ve of LED to a resistor and GND (PIN 39).



6. **PROGRAM:**

```
<html>
<head>
<meta name="viewport" content="width=device-width" />
<title>LED Control</title>
</head>
    <body>
    LED Control:
    <form method="get" action="gpio.php">
        <input type="submit" value="ON" name="on">
        <input type="submit" value="OFF" name="off">
    </form>
    <?php
      $setmode17 = shell_exec("/usr/local/bin/gpio -g mode 17  out");
      if(isset($_GET['on'])){
        $gpio_on = shell_exec("/usr/local/bin/gpio -g write 17  1");
        echo "LED is on";
    }
    else if(isset($_GET['off'])){
                $gpio_off = shell_exec("/usr/local/bin/gpio -g write 17  0");
                echo "LED is off";
    }
    ?>
    </body>
</html>
```

7. After typing the program save it. Now, we have to access it through our mobile phone. For that, both, our computer and our mobile **must** be in the same network.
8. Get the Rpi's IP by typing the command
   (a) pi@raspberrypi: ~ $ifconfig

   and note the 'inet' address in front of wlan0(Wifi Interface).

9. Next, type this IP on your mobile phone along with the file name. For example, if my IP is 192.168.1.4 then I will type **192.168.1.4/led.php** in my mobile phone browser.
10. Now you can control the LED which you have programmed through your mobile phone.

PROJECT 2: Motion Detection system

Components Required:

1. Raspberry Pi
2. Jumper Wires (Female to Female)
3. PIR Motion Sensor
4. Pushetta Application on android phones

Steps to Follow:

1. Make the following connections for interfacing Rpi and PIR motion sensor
   VCC - PIN 2(5V PWR)
   OUT - PIN 40(GPIO PIN 21)
   GND - PIN 39(GND)

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PROGRAM:

```
import urllib2                          #Lib for surfing internet
import json                             #Transferring JSON data
import RPi.GPIO as GPIO                 #Rpi GPIO Lib
import time                             #For sleep function
from gpiozero import MotionSensor #Lib for controlling components

#Function for sending notification
def sendNotification(token, channel, message):
        data = {
                "body" : message,
                "message_type" : "text/plain"
        }

        req = urllib2.Request('http://api.pushetta.com/api/pushes/{0}/'.format(channel))
        req.add_header('Content-Type', 'application/json')
        req.add_header('Authorization', 'Token {0}'.format(token))

        response = urllib2.urlopen(req, json.dumps(data))


GPIO.setmode(GPIO.BCM)          #Set GPIO pin set to BCM

# In BCM mode pin 40 is identified by id 21
GPIO.setup(21, GPIO.IN)
pir = MotionSensor(21)
try:
      print "Reading PIR status"

      while True:
                pir.wait_for_motion() #Detect Motion
           if pir.motion_detected:
                sendNotification("d62d3def7120e0fe4891045888c999c6c5889e99", "SlowBros",
"Motion detected")
               print "Motion detected!"
                        pir.wait_for_no_motion
                        time.sleep(2)

except KeyboardInterrupt:
      print "Exit"
      GPIO.cleanup()
```

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