

Raspberry Pi Traffic Lights...

1) *HARDWARE.*

Get your breadboard and check its numbering. You'll see little letters across the short side, and tiny numbers running down the long side.

1.1) LEDs

Check your three LEDs. They have a long leg – the Anode (+) and a short leg – the Cathode (-). Bend the legs gently, so you can fit them into the following breadboard holes:

LED Colour	Cathode (-)	Anode (+)
Red	E4	I4
Yellow	E6	I6
Green	E8	I8

1.2) Resistors

Resistors are all the same, and it doesn't matter which way around you connect them. Gently bend the legs to connect these pairs of breadboard holes:

Resistor 1	D1 ↔ D4
Resistor 2	C1 ↔ C6
Resistor 3	B1 ↔ B8

1.3) Wires

With your Pi switched off, you're going to need to use wires to connect the breadboard to your Pi. It doesn't really matter which colour of wire you use with which connection, but remember which wire does which thing. If you can match some or all of your wire colours to LED colours, then go for it. If you can't, then institute your own system.

Connection	Hole on the Breadboard	Pin on the Pi
Red LED	J4	Pin 3
Yellow LED	J6	Pin 5
Green LED	J8	Pin 7
Earth	A1	Pin 25

2) *SOFTWARE*

2.1) Log in to your Raspberry Pi

username: pi
password: raspberry

2.2) Install software

Make sure your Raspberry pi is connected to the network. A good test is to “ping” a server online. You can do this by number, or by name. Let's try number first...

```
ping 8.8.8.8
```

This number just happens to be one of Google's nameservers. Press **Ctrl-C** once you're satisfied you're connected. Now try with a name:

```
ping google.com
```

If that works too, we're in business. Press **Ctrl-C** to stop it.

```
wget -O TrafficLED.py -r tinyurl.com/pittraffic
```

This command will download the software we need, and save it in a file called `TrafficLED.py`. If you like, you can see the source code with `cat TrafficLED.py`

```
import time
import RPi.GPIO as GPIO

GPIO.cleanup()
GPIO.setmode(GPIO.BOARD)

GPIO.setup(3,GPIO.OUT)
GPIO.setup(5,GPIO.OUT)
GPIO.setup(7,GPIO.OUT)

while True:
    GPIO.output(5,GPIO.LOW)
    GPIO.output(3,GPIO.HIGH)
    time.sleep(2)

    GPIO.output(5,GPIO.HIGH)
    time.sleep(2)

    GPIO.output(5,GPIO.LOW)
    GPIO.output(3,GPIO.LOW)
    GPIO.output(7,GPIO.HIGH)
    time.sleep(2)

    GPIO.output(7,GPIO.LOW)
    GPIO.output(5,GPIO.HIGH)
    time.sleep(2)
```

2.3) Run Software

```
sudo python TrafficLED.py
```

3) DEBUGGING & Improvements

Running the software is just the start. Does it work correctly? Can we make any improvements? We can edit the source code with:

```
nano TrafficLED.py
```