Intro to Raspberry Pi

Workshop with Shawn Hymel

Name:_____
Date:_____

Pre-Flight Checklist

- Download latest Raspbian image: https://www.raspberrypi.org/downloads/
- Download Etcher: https://www.balena.io/etcher/
- Use Etcher to burn the Raspbian image onto the SD card

1 Connect hardware

- HDMI Mini adapter > HDMI cable > monitor
- USB micro B adapter > USB hub > keyboard and mouse
- SD card
- Power cable, turn switch on

2 Configure

```
sudo raspi-config
```

- Network options > Wi-Fi
  - SSID: RHIT-OPEN
  - Password: <leave blank>
- Localisation options
  - Change local: en_US.UTF-8 UTF-8
  - Change keyboard layout: US (generic)
- Advanced Options > Expand Filesystem
- Reboot
- Open browser to example.com

If you're asked for credentials:

Username: **pi**

Password: **raspberry**

3 Command Line

```
$ pwd
$ mkdir Projects
$ cd Projects
$ touch hello.py
$ leafpad hello.py
```

Common Commands

`ls`	List files	`clear`	Clear terminal
`cd`	Change directory	`mkdir`	Make directory
`pwd`	Print working directory	`rmdir`	Remove directory
`mv`	Move file	`man`	Show manual
`cp`	Copy file	`locate`	Find file
`touch`	Create file	`ifconfig`	View network info
`rm`	Remove file	`sudo`	Run as superuser
`cat`	Print file contents	`ping`	Ping remote host

4 Hello, World

In Leafpad, enter the following code:

```
print("Hello, World!")
```

Save the file in /home/pi/Projects as *hello.py*

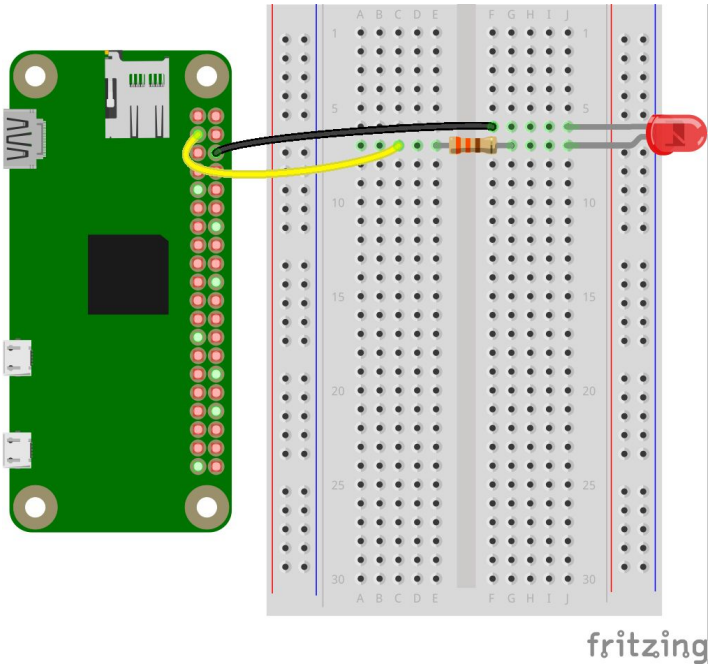
In a terminal, enter the following:

```
cd /home/pi/Projects
python hello.py
```

5 Blinky

Raspberry Pi 3 GPIO Pinout

GPIO_GEN	Functions	GPIO	Pin		Pin	GPIO	Functions	GPIO_GEN
		3.3V	1		2	5V		
	SDA1 (I²C)	GPIO2	3		4	5V		
	SCL1 (I²C)	GPIO3	5		6	GND		
GCLK		GPIO4	7		8	GPIO14	TXD0 (UART)	
		GND	9		10	GPIO15	RXD0 (UART)	
GEN0		GPIO17	11		12	GPIO18	PWM0, CLK (PCM)	GEN1
GEN2		GPIO27	13		14	GND		
GEN3		GPIO22	15		16	GPIO23		GEN4
		3.3V	17		18	GPIO24		GEN5
	MOSI (SPI)	GPIO10	19		20	GND		
	MISO (SPI)	GPIO9	21		22	GPIO25		GEN6
	SCLK (SPI)	GPIO11	23		24	GPIO8	CE0 (SPI)	
		GND	25		26	GPIO7	CE1 (SPI)	
		ID_SD	27		28	ID_SC		
		GPIO5	29		30	GND		
		GPIO6	31		32	GPIO12	PWM0	
	PWM1	GPIO13	33		34	GND		
	FS (PCM), PWM1	GPIO19	35		36	GPIO16		
		GPIO26	37		38	GPIO20	DIN (PCM)	
		GND	39		40	GPIO21	DOUT (PCM)	




```
import time
import RPi.GPIO as GPIO

LED = 2
GPIO.setmode(GPIO.BCM)
GPIO.setup(LED, GPIO.OUT)

try:
    while True:
        GPIO.output(LED, GPIO.HIGH)
        time.sleep(0.5)
        GPIO.output(LED, GPIO.LOW)
        time.sleep(0.5)
finally:
    GPIO.cleanup()
```

Save the following code in */home/pi/Projects* as *blink.py*

Run it with `python blink.py` in the terminal

6 Web Server

Save as */home/pi/Projects/webserver/server.py*

```
import SimpleHTTPServer
import SocketServer

PORT = 80

Handler = SimpleHTTPServer.SimpleHTTPRequestHandler
httpd = SocketServer.TCPServer(("", PORT), Handler)

print("Serving at port", PORT)
httpd.serve_forever()
```

Save as */home/pi/Projects/webserver/index.html*

```
<html>
    <head>
        <title>Yay Python!</title>
    </head>
    <body>
        <h1>My Page</h1>
        <p>This is my page.</p>
    </body>
</html>
```

Run it with `sudo python server.py` in the terminal.
Open a browser and navigate to *localhost:80*

Challenge: Expert Mode!

Add a button to your webpage (index.html).
Modify the server code so that when the button is pressed, the LED toggles on or off.

Hint: You'll need BaseHTTPServer
Solution: `https://bit.ly/2O4ZdfT`