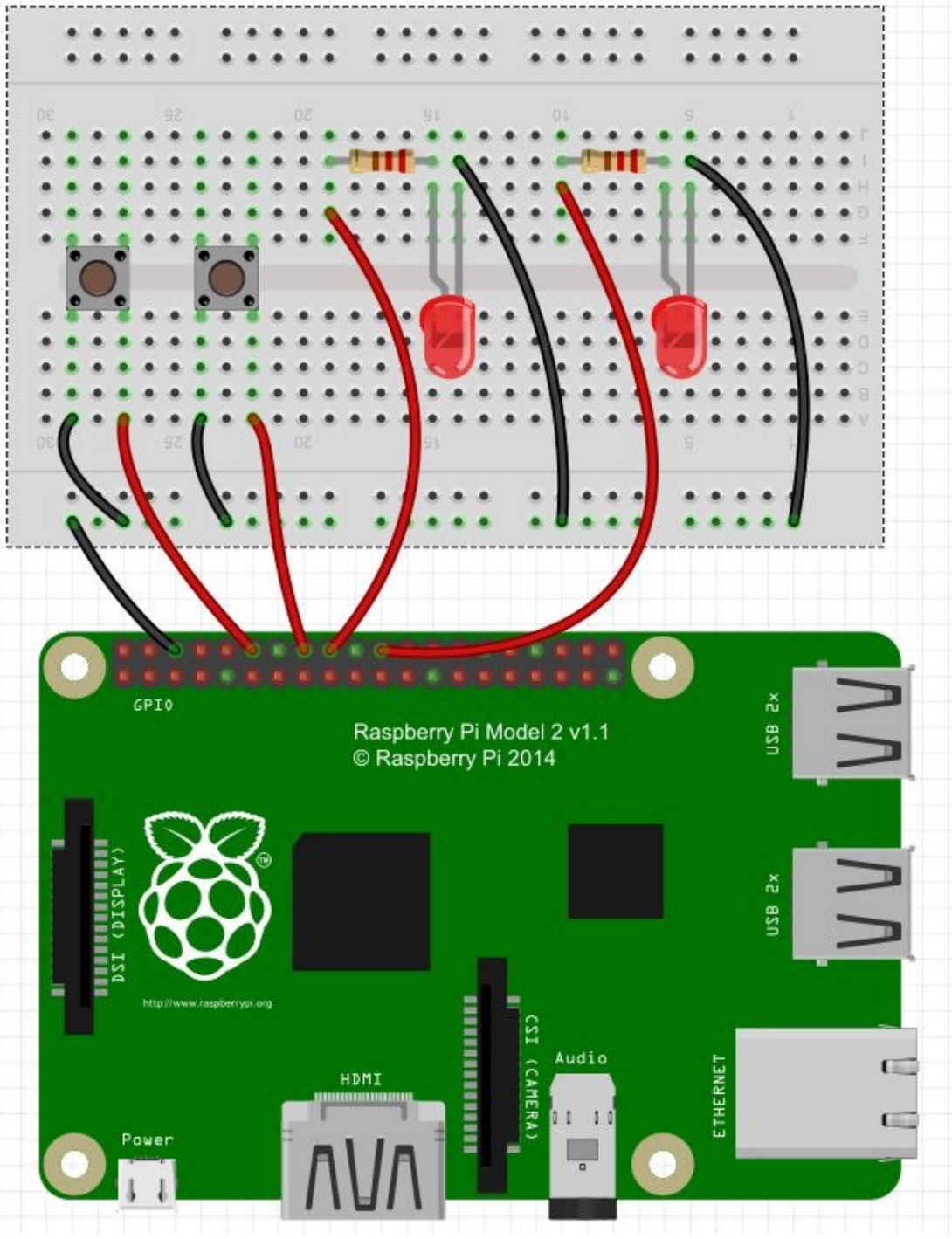
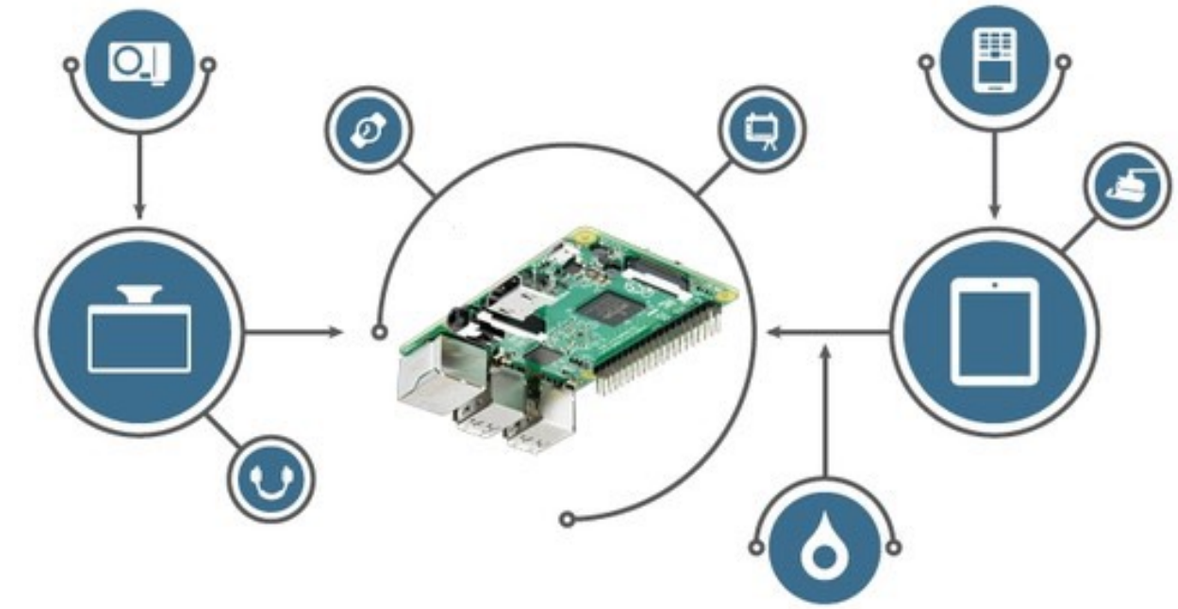
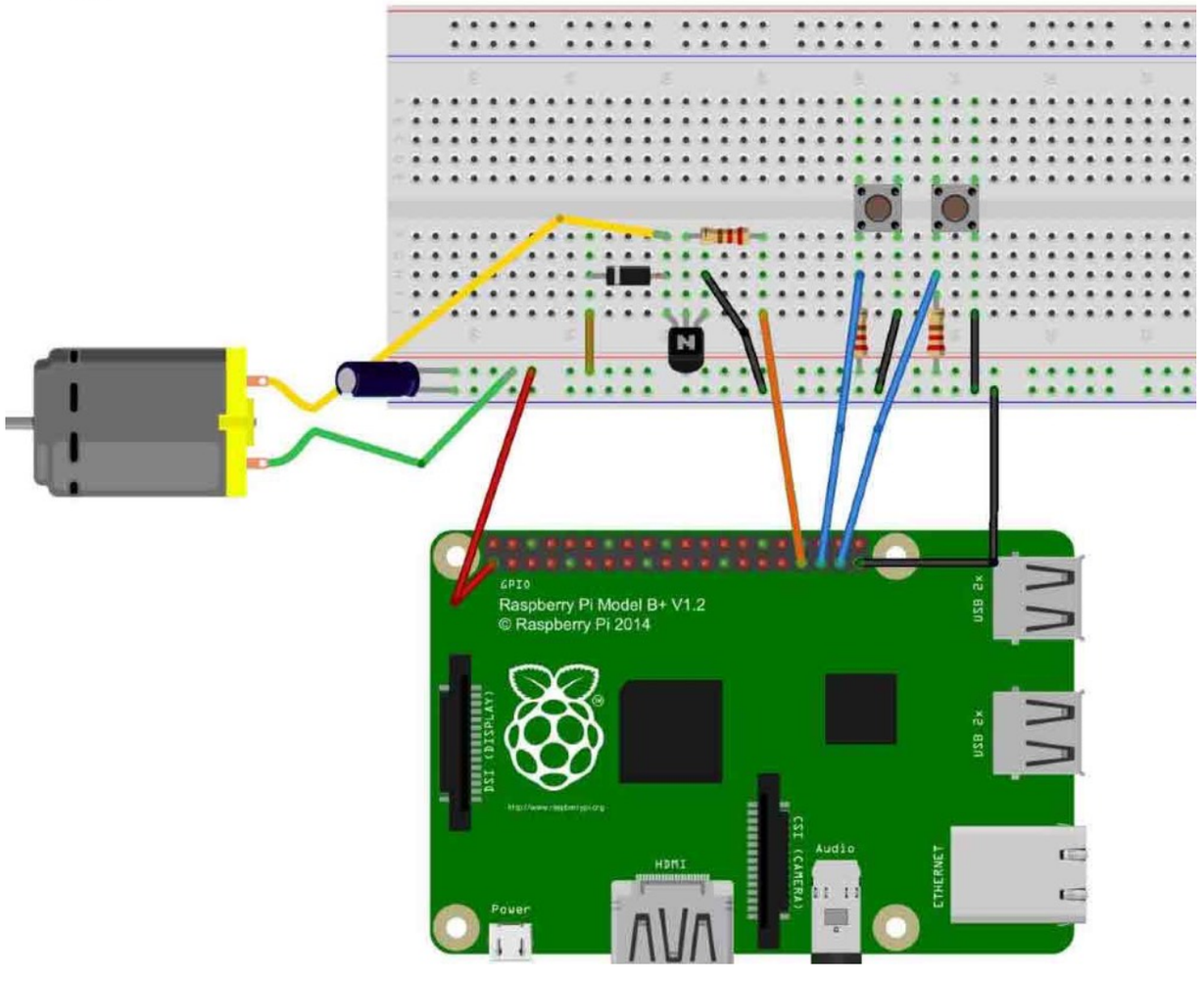
Raspberry Pi

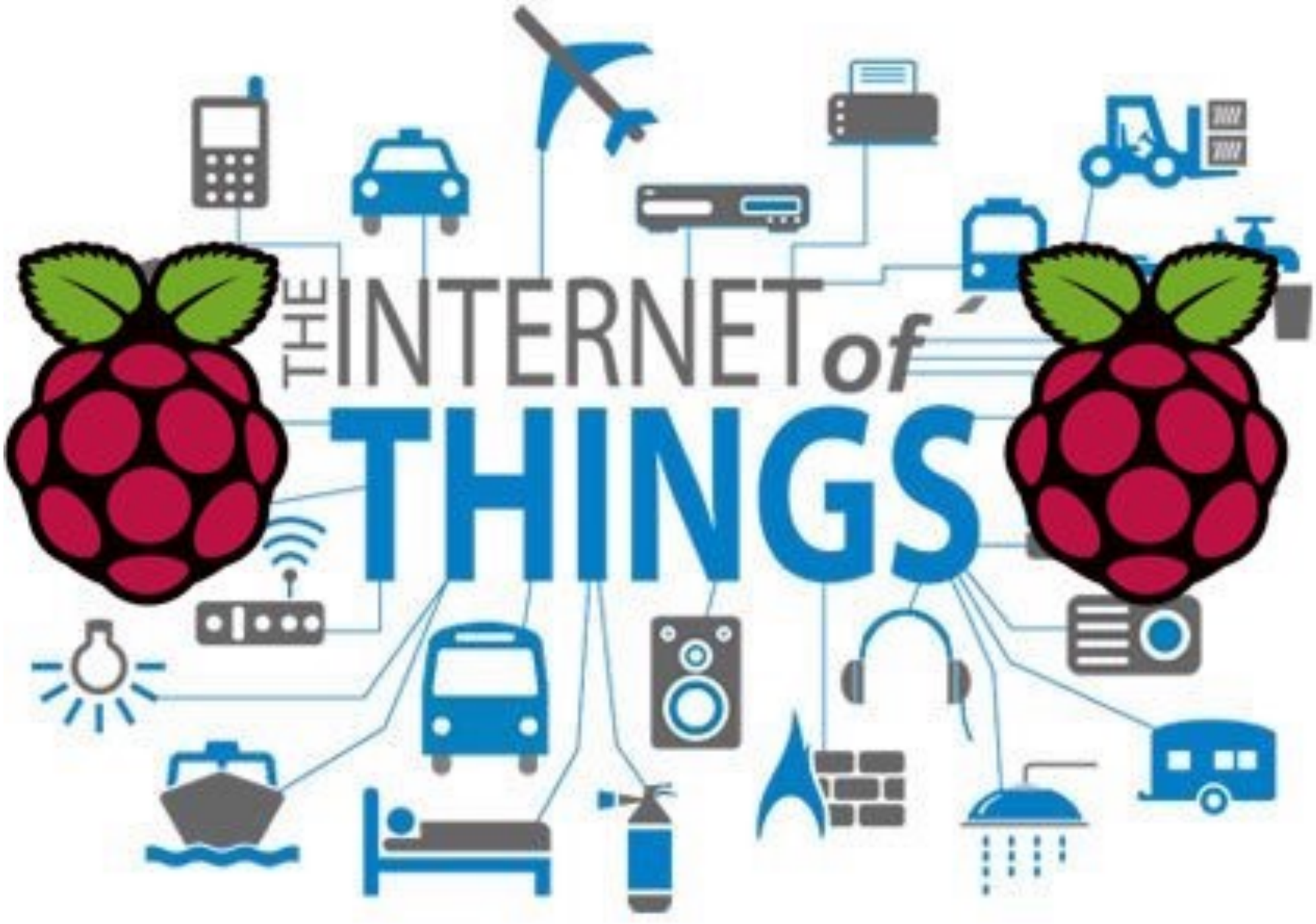
Working with GPIO Pins

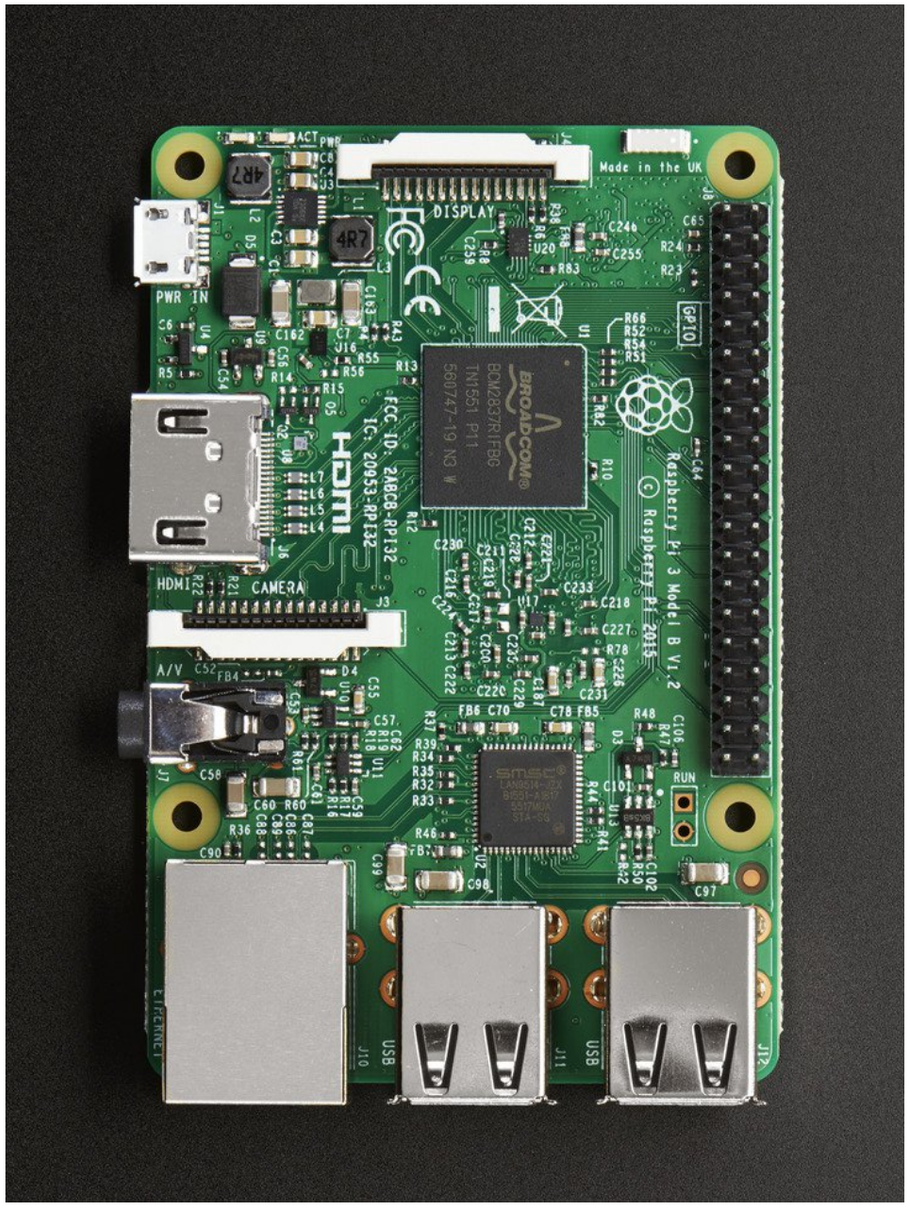

GPIO
Raspberry Pi Model 2 v1.1
© Raspberry Pi 2014
USB 2x
USB 2x
DSI (DISPLAY)
http://www.raspberrypi.org
CSI (CAMERA)
Audio
HDMI
ETHERNET
Power



fritzing


GPIO
Raspberry Pi Model B+ V1.2
© Raspberry Pi 2014
USB 2x
USB 2x
DSI (DISPLAY)
CSI (CAMERA)
Audio
HDMI
ETHERNET
Power


THE INTERNET of
THINGS



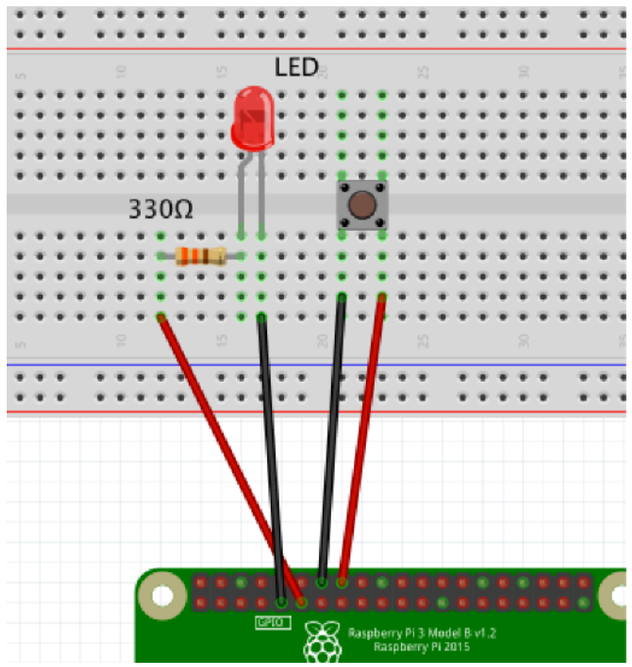
Raspberry Pi 3 GPIO Header

Pin#	NAME		NAME	Pin#
01	3.3v DC Power		DC Power 5v	02
03	GPIO02 (SDA1 , I²C)		DC Power 5v	04
05	GPIO03 (SCL1 , I²C)		Ground	06
07	GPIO04 (GPIO_GCLK)		(TXD0) GPIO14	08
09	Ground		(RXD0) GPIO15	10
11	GPIO17 (GPIO_GEN0)		(GPIO_GEN1) GPIO18	12
13	GPIO27 (GPIO_GEN2)		Ground	14
15	GPIO22 (GPIO_GEN3)		(GPIO_GEN4) GPIO23	16
17	3.3v DC Power		(GPIO_GEN5) GPIO24	18
19	GPIO10 (SPI_MOSI)		Ground	20
21	GPIO09 (SPI_MISO)		(GPIO_GEN6) GPIO25	22
23	GPIO11 (SPI_CLK)		(SPI_CE0_N) GPIO08	24
25	Ground		(SPI_CE1_N) GPIO07	26
27	ID_SD (I²C ID EEPROM)		(I²C ID EEPROM) ID_SC	28
29	GPIO05		Ground	30
31	GPIO06		GPIO12	32
33	GPIO13		Ground	34
35	GPIO19		GPIO16	36
37	GPIO26		GPIO20	38
39	Ground		GPIO21	40

Tips for reducing the risk of damage to your Raspberry Pi

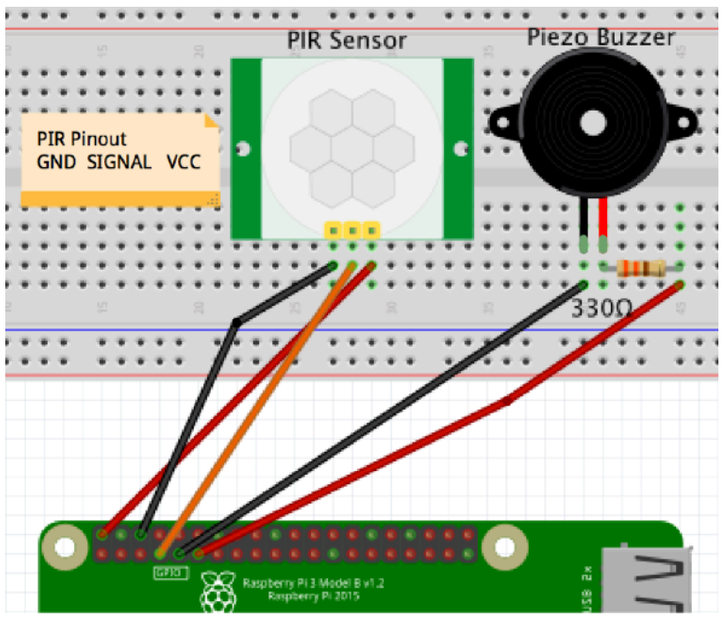
- Ensure your Pi is powered off when connecting circuitry
- Do not put more than 3.3 V on any GPIO pin
- Do not draw more than 3 mA per output.
- Do not poke at the GPIO connector with a screwdriver or metal object when the Pi is powered on
- Do not power the Pi with more than 5V
- Do not draw more than a total of 50 mA from the 3.3 V supply pins
- Do not draw more than a total of 250 mA from the 5V supply pins

Raspberry Pi



Working with GPIO Pins

Practical Examples



Standard Raspberry Pi Components needed

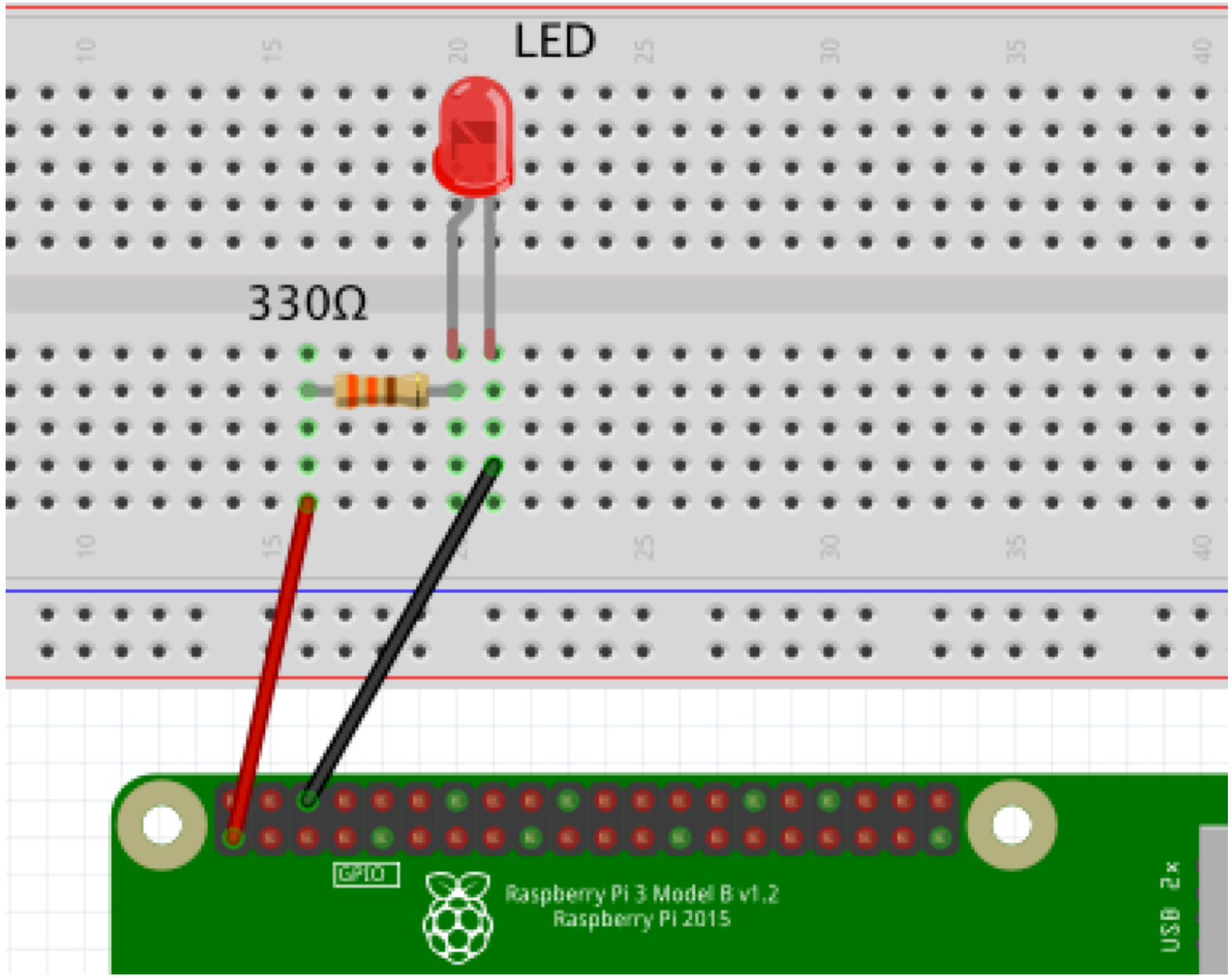
- Raspberry Pi 3
- SD Card (flashed with the Raspbian OS)
- USB keyboard
- USB mouse
- Monitor
- HDMI cable
  - Alternative HDMI-VGA adapter if needed
- 5 V Power Supply

Power an LED

Additional parts needed

- LED
- 330 Ω resistor
- Connecting wires
  - 2 Male-Female wires

Power an LED



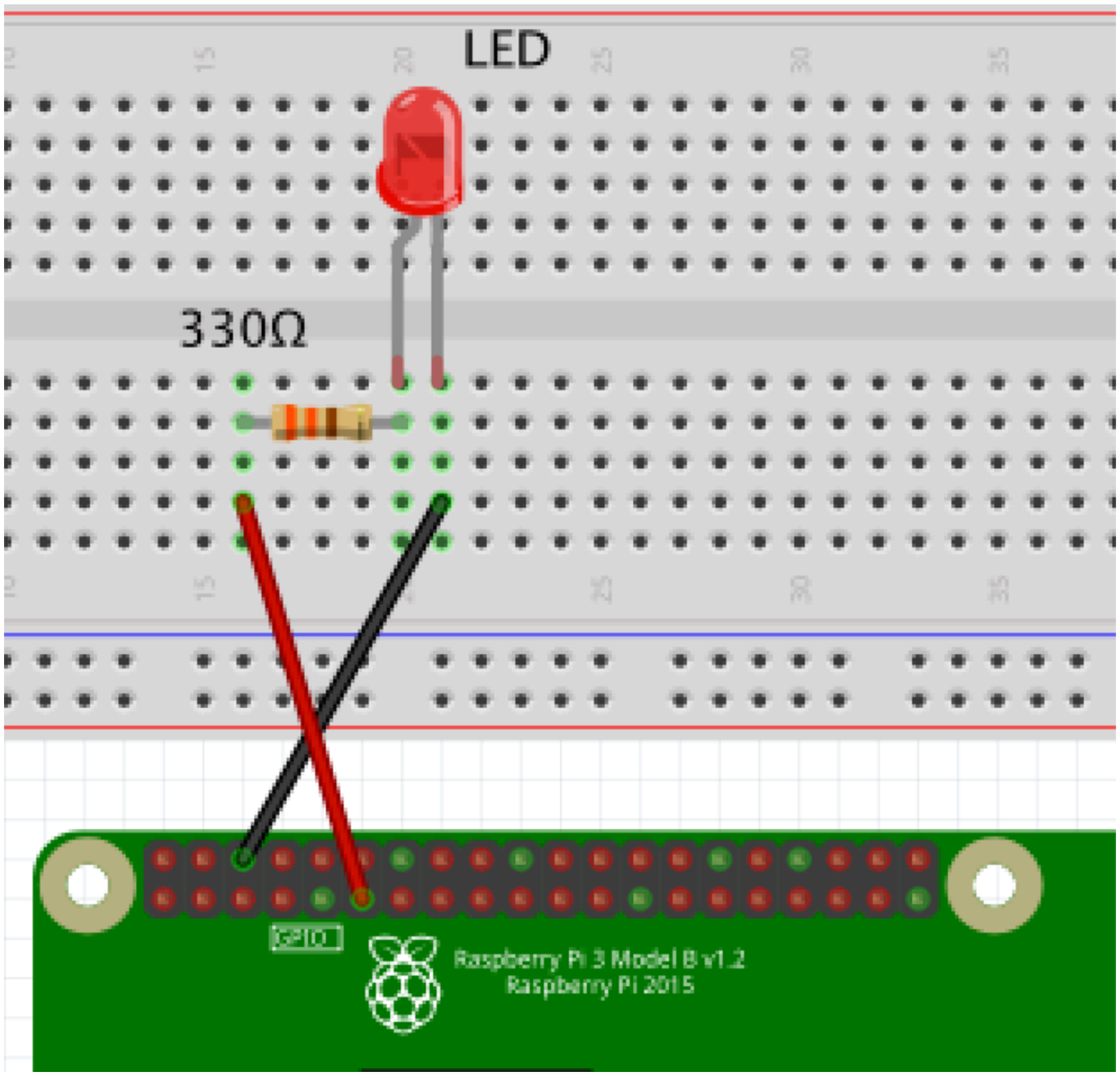
Pin#	GPIO#	Connection
1	3.3V	Resistor to LED Anode
6	GND	LED Cathode

Blink an LED

Additional parts needed

- LED
- 330 Ω resistor
- Connecting wires
  - 2 Male-Female wires

Blink an LED



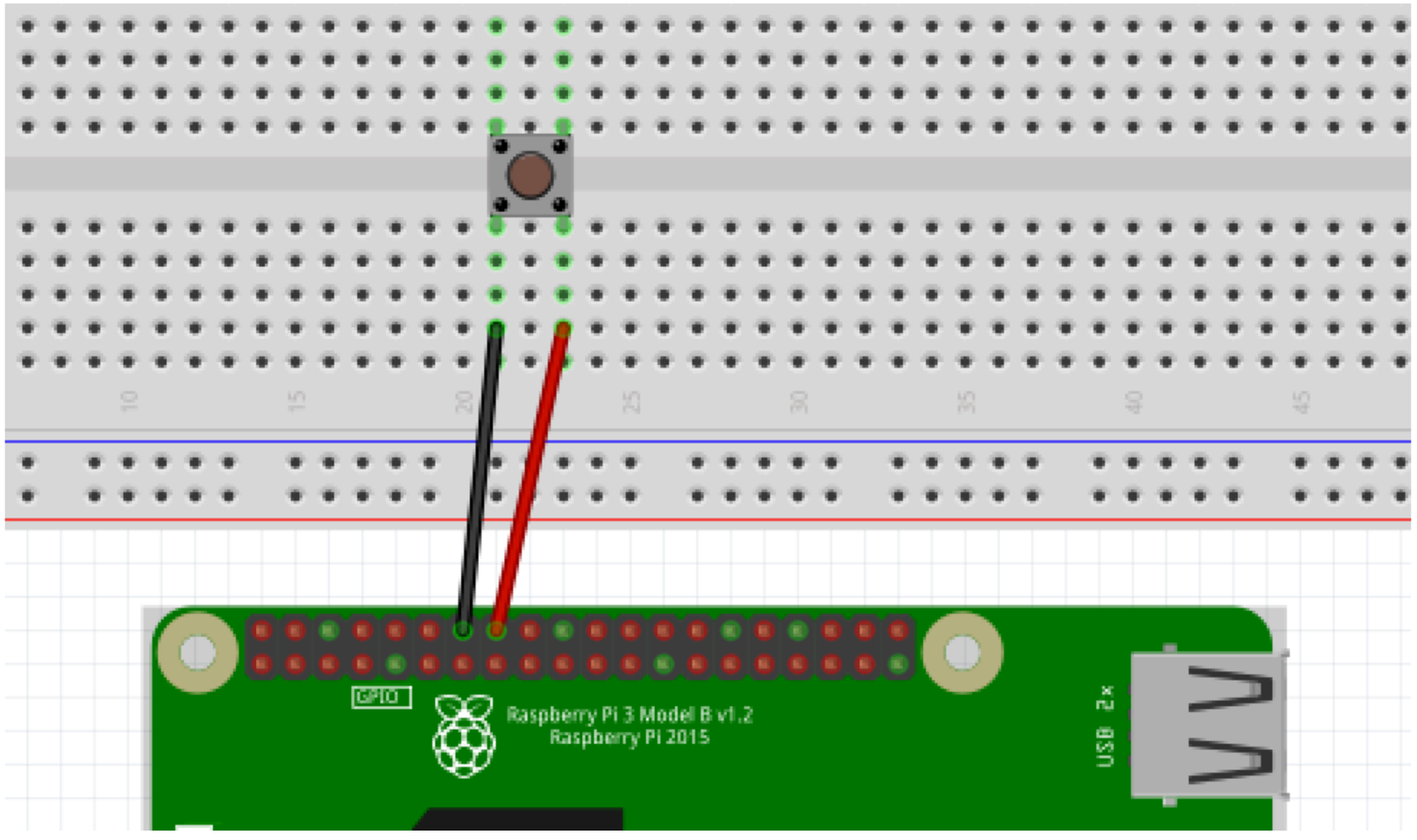
Pin#	GPIO#	Connection
11	GPIO17	Resistor to LED Anode
6	GND	LED Cathode

Detecting a button press

Additional parts needed

- Push button switch
- Connecting wires
  - 2 Male-Female wires

Detecting a button press



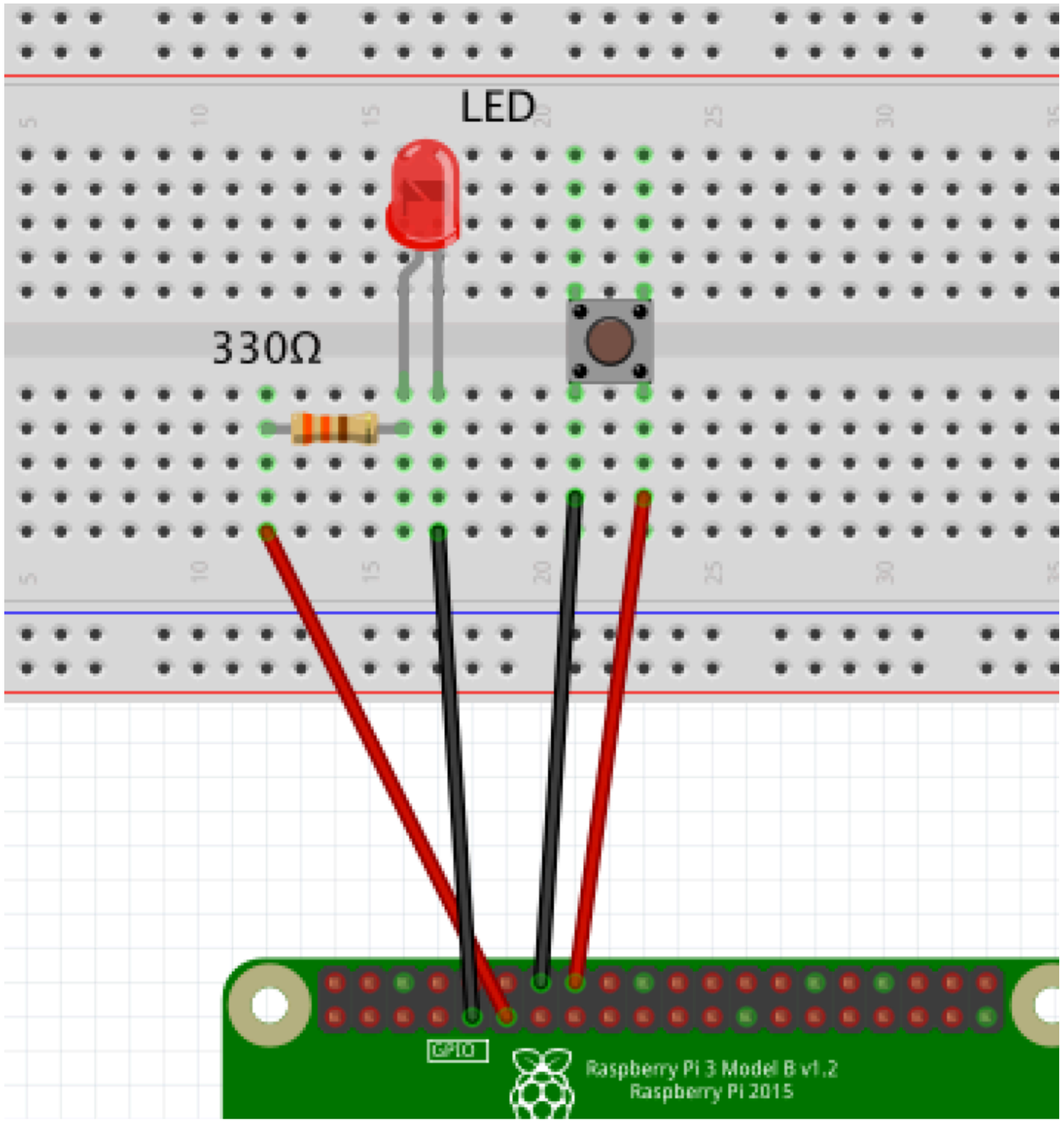
Pin#	GPIO#	Connection
14	GND	Button pin
16	GPIO23	Button pin

Using a button to control an LED

Additional parts needed

- LED
- 330 Ω resistor
- Push button switch
- Connecting wires
  - 4 Male-Female wires

Using a button to control an LED

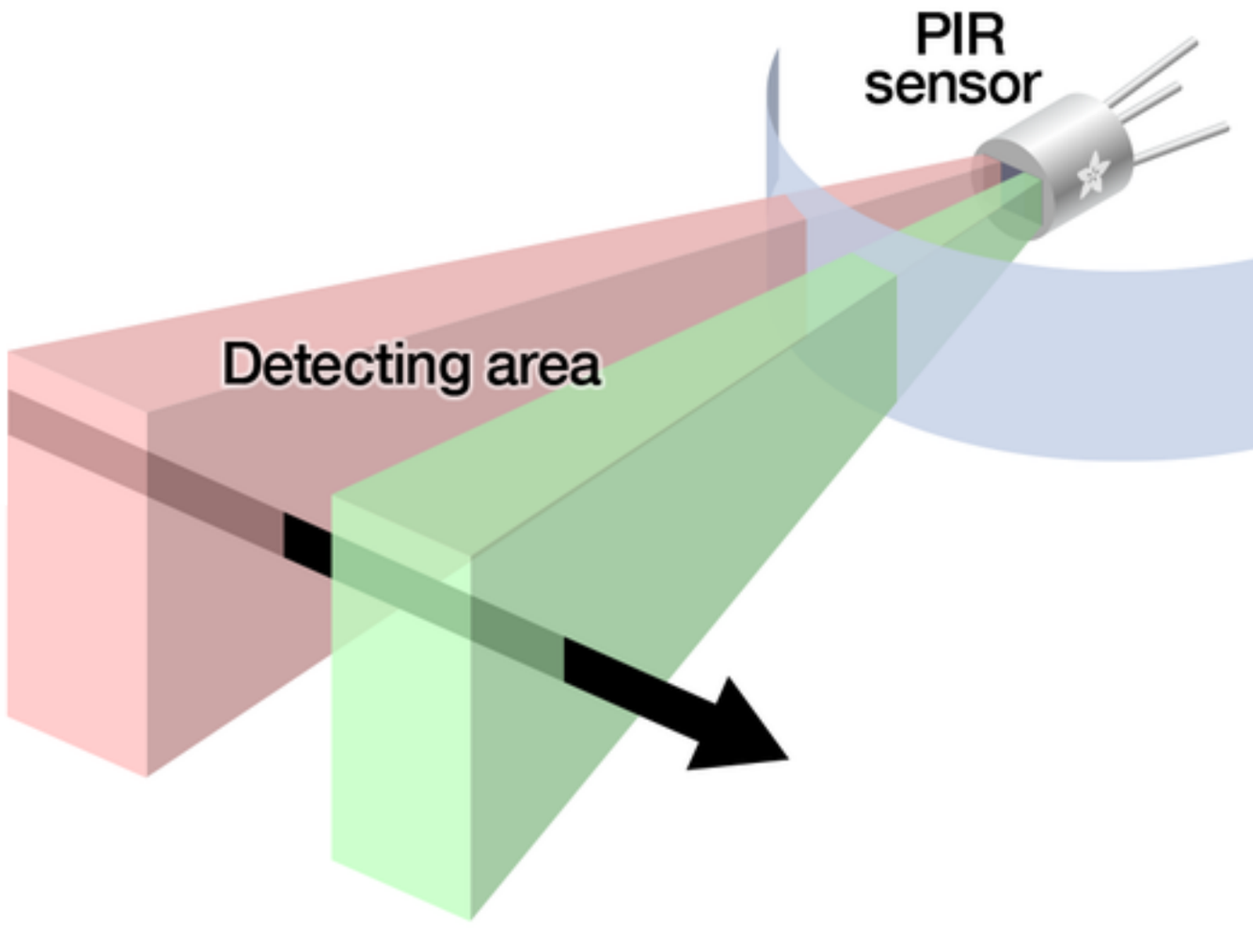


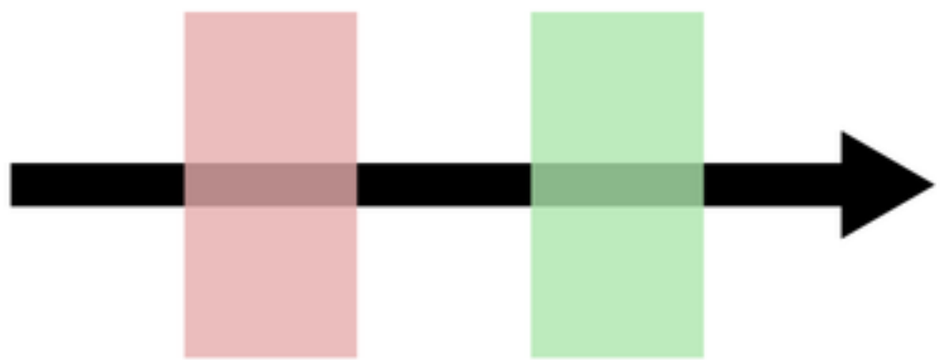
Pin#	GPIO#	Connection
14	GND	Button pin
16	GPIO23	Button pin
11	GPIO17	Resistor to LED Anode
9	GND	LED Cathode

Working with a PIR Sensor

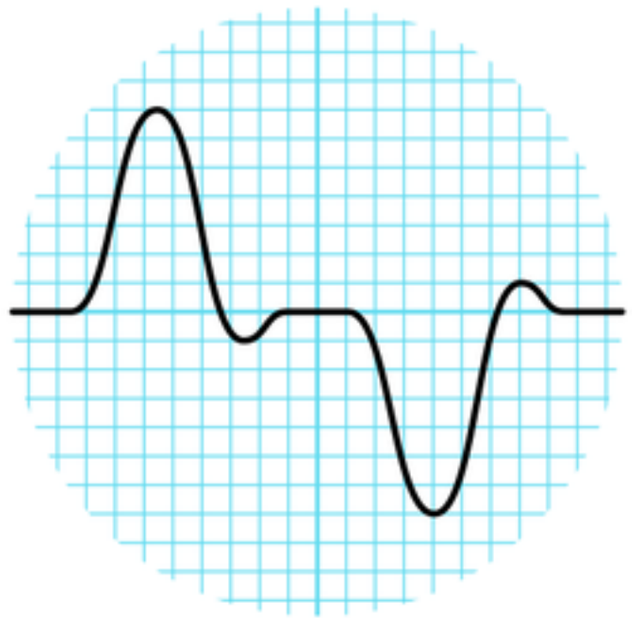
Additional parts needed

- PIR Sensor
- Connecting wires
- 3 Female-Female wires



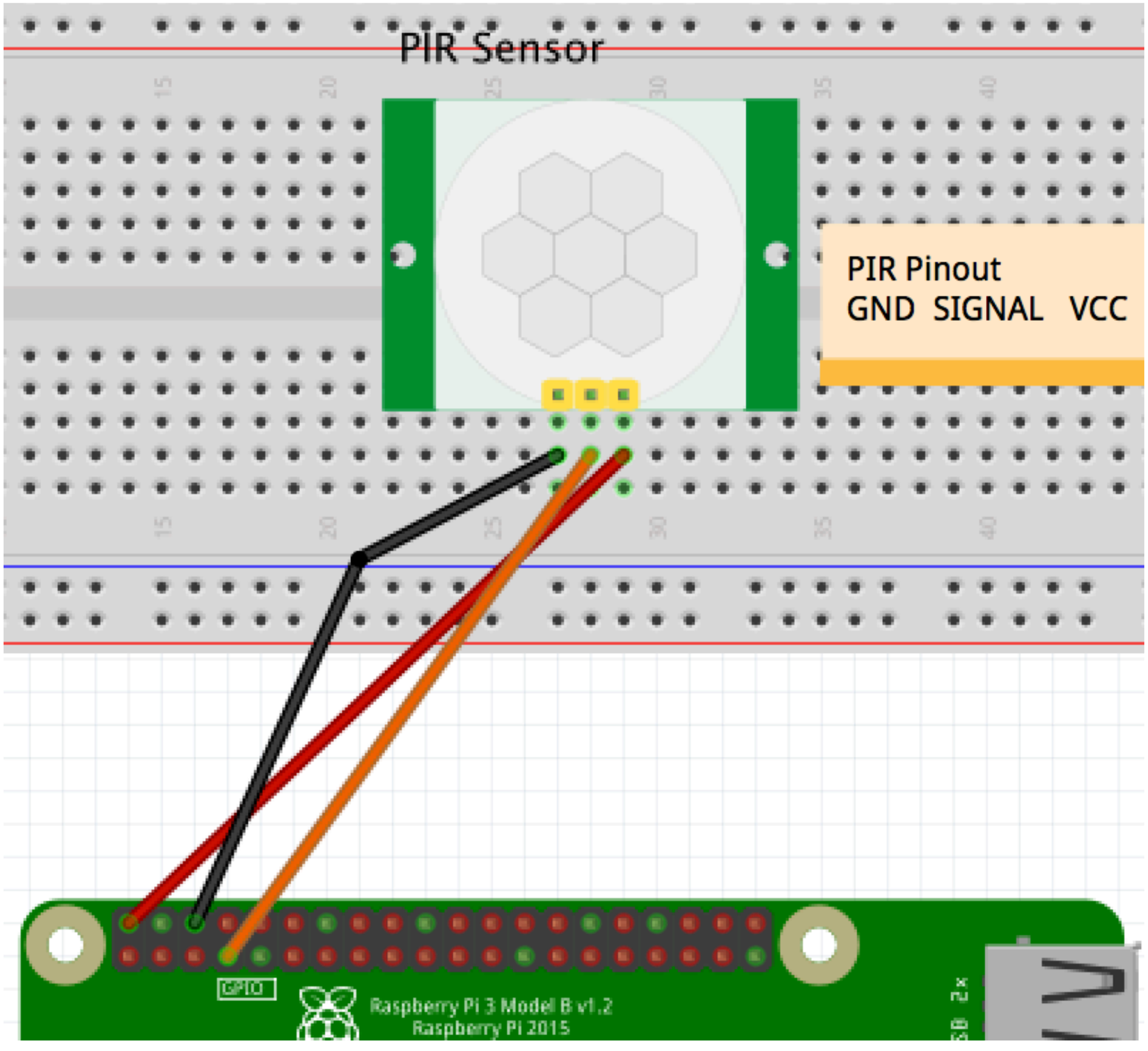


Heat source movement



Output signal

PIR sensor



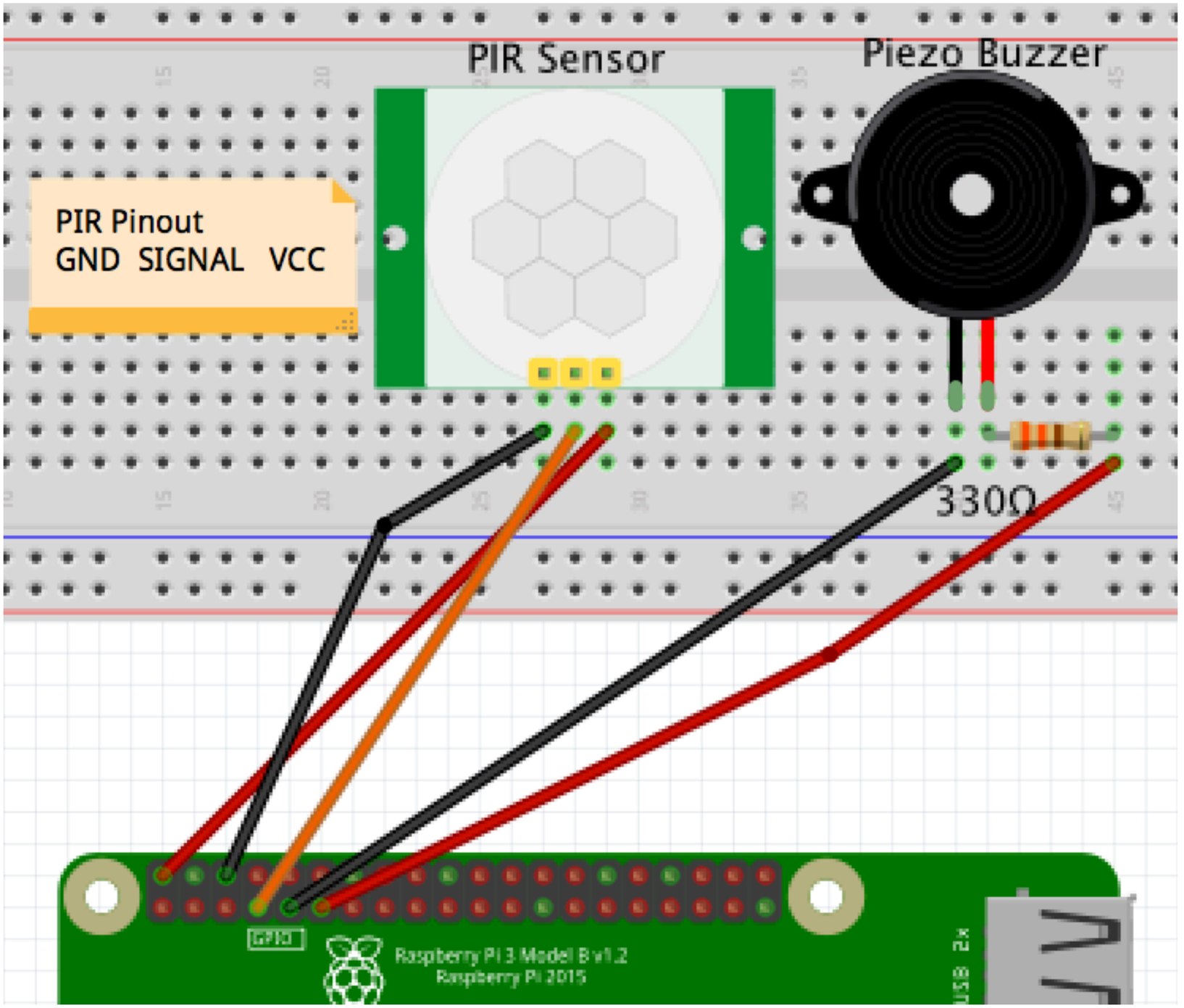
Pin#	GPIO#	Connection
2	5V	PIR - VCC
6	GND	PIR - GND
7	GPIO4	PIR - Signal

PIR Sensor Alarm

Additional arts needed

- PIR Sensor
- Piezo Buzzer
- 330 Ω resistor
- Connecting wires
  - 3 Female-Female wires
  - 2 Male-Female wires

PIR sensor alarm



Pin#	GPIO#	Connection
2	5V	PIR - VCC
6	GND	PIR - GND
7	GPIO4	PIR - Signal
11	GPIO17	Resistor to +ve piezo
9	GND	-ve piezo