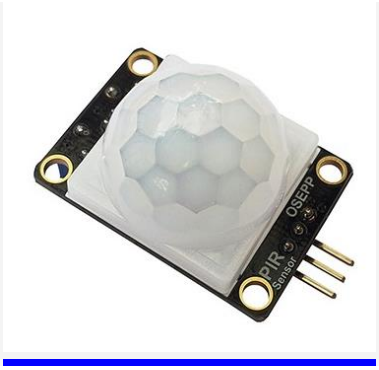
Option

Vcc- Connects to 5V of positive voltage for power
Trig- A pulse is sent here for the sensor to go into ranging mode for object detection
Echo- The echo sends a signal back if an object has been detected or not. If a signal is returned, an object has been detected. If not, no object has been detected.
GND- Completes electrical pathway of the power.

http://www.learningaboutelectronics.com/Articles/HC-SR04-ultrasonic-distance-sensor-circuit.php

https://www.teachmemicro.com/raspberry-pi-ultrasonic-sensor-tutorial/



Passive Infrared Sensor (PIR) Module

Codes:

Code for Distance sensor

```
import RPi.GPIO as GPIO
import time
GPIO.setmode(GPIO.BCM)

triggerPin = 23
echoPin = 24

GPIO.setup(triggerPin,GPIO.OUT)
GPIO.setup(echoPin,GPIO.IN)

#make this infinite loop
while True:
    GPIO.output(triggerPin, False)
    time.sleep(2)

#generate 10us pulse
    GPIO.output(triggerPin, True)
    time.sleep(0.00001)
    GPIO.output(triggerPin, False)
```

```
#note the start of the pulse at echo pin
    while GPIO.input(echoPin)==0:
        pulseStart = time.time()

#note the end of the pulse at echo pin
    while GPIO.input(echoPin)==1:
        pulseEnd = time.time()

    pulseDuration = pulseEnd - pulseStart

    distance = pulseDuration * 17150

#round off to 2 decimal places
    distance = round(distance, 2)

    print("Distance: %s cm") %distance

GPIO.cleanup()
```

Code for PIR sensor

```
form gpiozero import MotioSensor

PIR = MotionSensor(7) //GPIO 7

while True:
PIR.wait_for_motion()
Print(“Motion detected”)
PIR.wait_for_no_motion()
Print(“Motion stopped”)
```

Code for servo

```
form gpiozero import Servo

servo = Servo(26)
while True:
servo.min()
sleep(2)
servo.max()
sleep(2)
servo.mid()
sleep(2)
```

GPIO 23 – PWM Trig distance sensor

GPIO 24 -ECHO distance sensor

GPIO 7 – motion sensor

GPIO 26 – PWM servo motor