Overview

This short tutorial introduces the reader on how to interface the LC Seth Gun to a Raspberry Pi 4 board. It provides the hardware connections and example Python code as a reference for the readers.
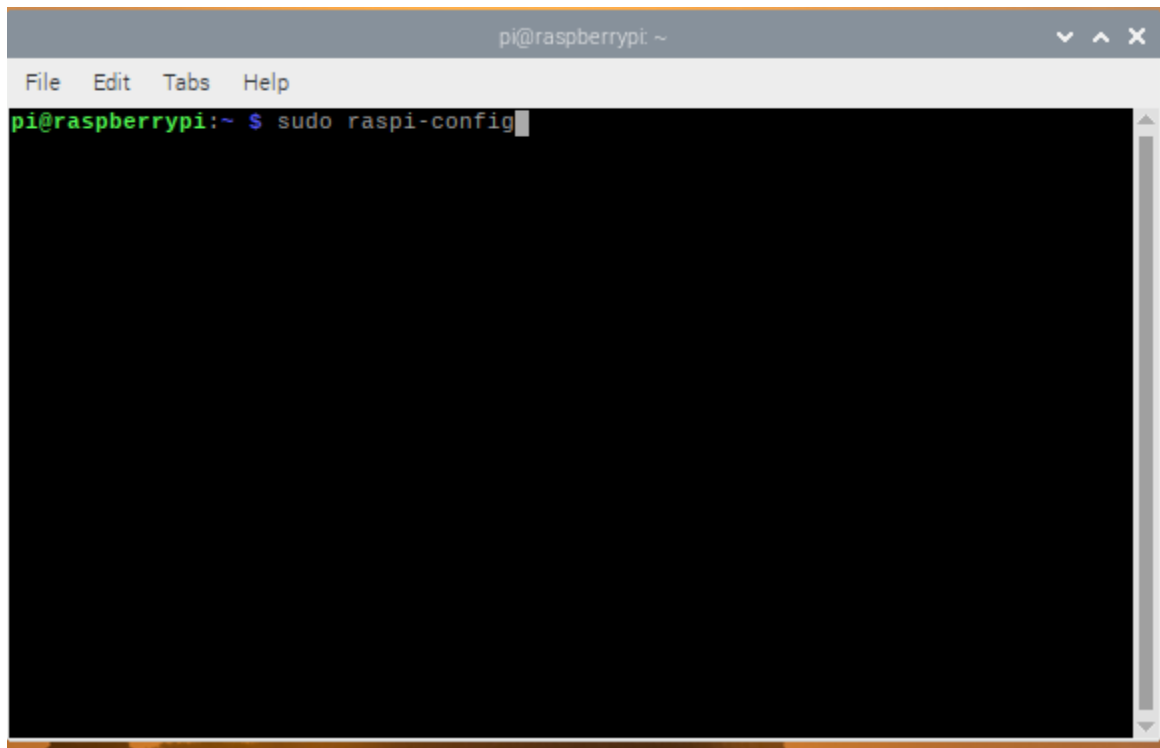
The Seth Gun has a simple serial UART interface making it compatible with any device that has a UART port including the Raspberry Pi. This tutorial assumes that the Raspbian OS has already been installed into the Raspberry Pi.

Configuration

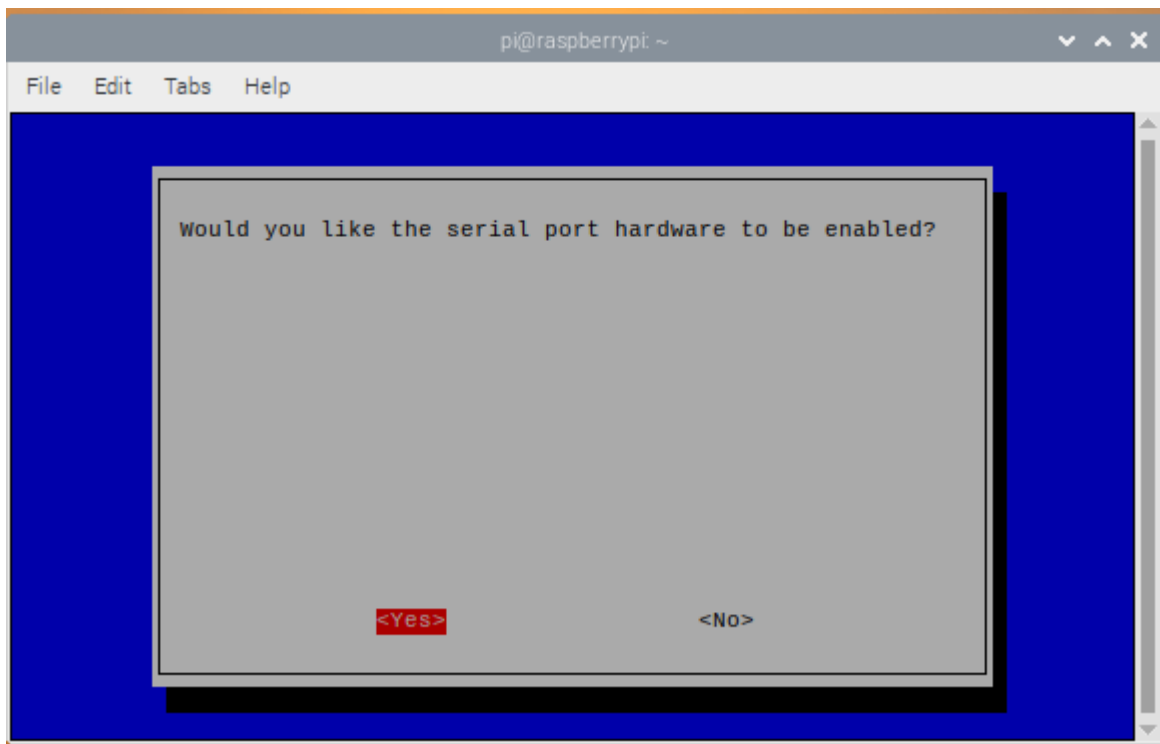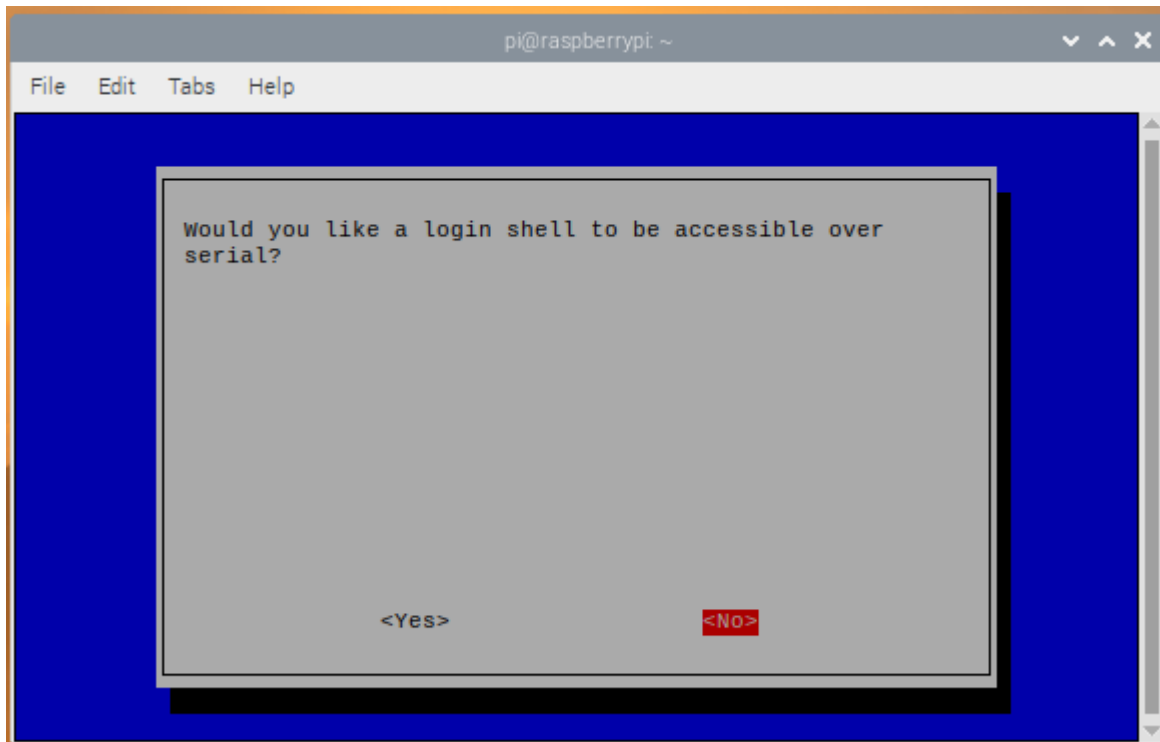The Raspberry Pi must be configured first to have its UART port enabled.

Reference: https://pimylifeup.com/raspberry-pi-serial/
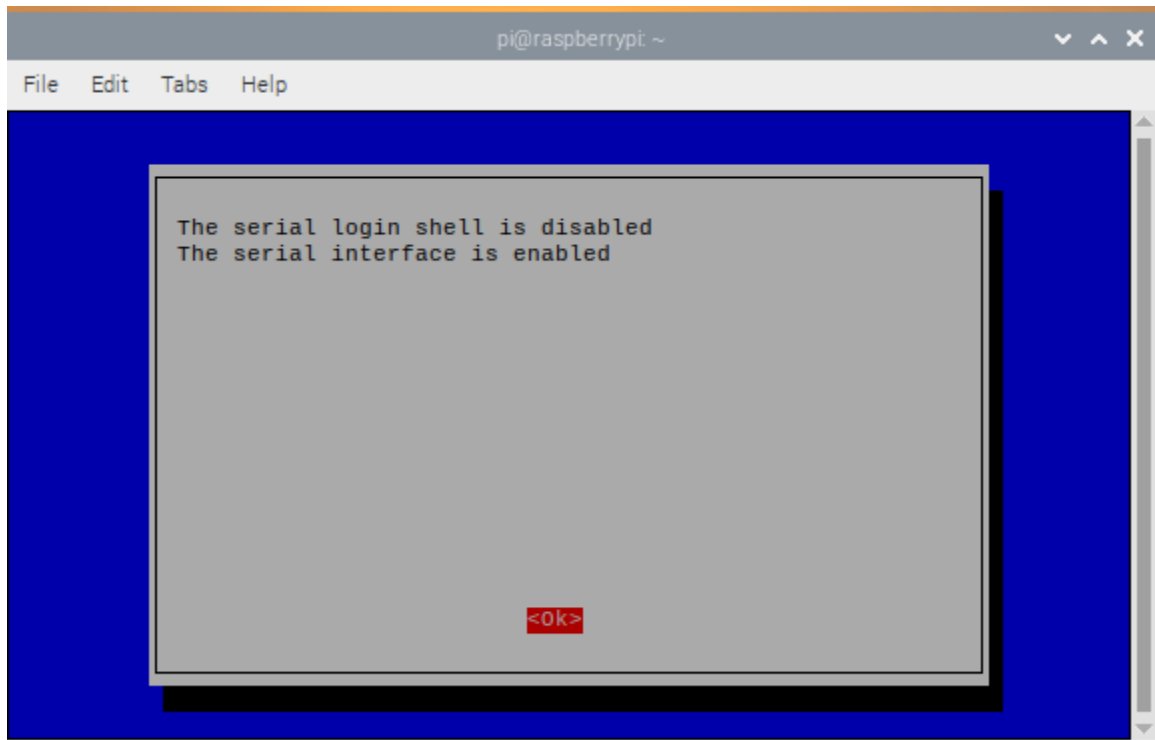
Launch the terminal and follow the screens below:

File   Edit   Tabs   Help

Raspberry Pi 4 Model B Rev 1.2

┤ Raspberry Pi Software Configuration Tool (raspi-config) ├

```
1 System Options         Configure system settings
2 Display Options        Configure display settings
3 Interface Options      Configure connections to peripherals
4 Performance Options    Configure performance settings
5 Localisation Options   Configure language and regional settings
6 Advanced Options       Configure advanced settings
8 Update                 Update this tool to the latest version
9 About raspi-config     Information about this configuration tool
```

<Select>   <Finish>

File   Edit   Tabs   Help

┤ Raspberry Pi Software Configuration Tool (raspi-config) ├

```
P1 Camera       Enable/disable connection to the Raspberry Pi Camera
P2 SSH          Enable/disable remote command line access using SSH
P3 VNC          Enable/disable graphical remote access using RealVNC
P4 SPI          Enable/disable automatic loading of SPI kernel module
P5 I2C          Enable/disable automatic loading of I2C kernel module
P6 Serial Port  Enable/disable shell messages on the serial connection
P7 1-Wire       Enable/disable one-wire interface
P8 Remote GPIO  Enable/disable remote access to GPIO pins
```

<Select>   <Back>

File   Edit   Tabs   Help

Would you like a login shell to be accessible over
serial?

                      <Yes>   <No>

File   Edit   Tabs   Help

Would you like the serial port hardware to be enabled?

                      <Yes>   <No>

The serial login shell is disabled
The serial interface is enabled

<Ok>

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Raspberry Pi Software Configuration Tool (raspi-config)

1 System Options   Configure system settings
2 Display Options   Configure display settings
3 Interface Options   Configure connections to peripherals
4 Performance Options Configure performance settings
5 Localisation Options Configure language and regional settings
6 Advanced Options   Configure advanced settings
8 Update   Update this tool to the latest version
9 About raspi-config Information about this configuration tool

<Select>   <Finish>

Complete the configuration with a reboot:

```
pi@raspberrypi:~ $ sudo raspi-config
pi@raspberrypi:~ $ sudo reboot
```

Hardware Connections

The Seth Gun has a 5V logic at its port so a simple voltage divider network is necessary to safety interface to the Raspberry Pi. Follow the connections below. A button is added to demonstrate how the Raspberry Pi could initiate a reading using the @,R,# command of the Seth Gun.
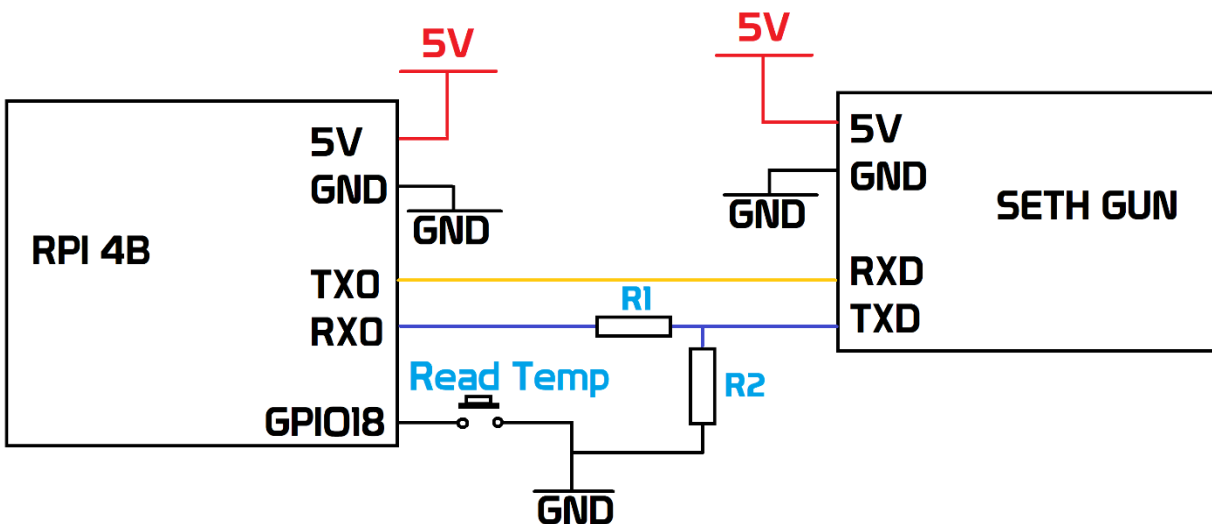
Following a 3.3:5 ratio of the 2 resistors, you may use any of the following combinations:

R1	R2
1KΩ	2KΩ
2.4KΩ	5.1KΩ
4.7KΩ	10KΩ
7.5KΩ	15KΩ
10KΩ	20KΩ

The button used is a normally open push button (momentary switch).

Code

Copy the code below and save as SethGun.py

```
import time
import serial
import RPi.GPIO as GPIO

read_button = 18

GPIO.setwarnings(False)
GPIO.setmode(GPIO.BCM)

GPIO.setup(read_button, GPIO.IN, pull_up_down=GPIO.PUD_UP)

ser = serial.Serial(
        port='/dev/ttyS0',
        baudrate = 9600,
        parity=serial.PARITY_NONE,
        stopbits=serial.STOPBITS_ONE,
        bytesize=serial.EIGHTBITS,
        timeout=1
)

while 1:
    if GPIO.input(read_button)== False:
        ser.write("@,r,#")
    x=ser.readline()
    temp = 0.0
    if x.find('@') != -1:
        y = x.split('@,')[1].split(',B,#')[0]
        temp = float(y)
        print(temp)
```

Running the Code

Run the code from terminal by launching from the location. In this example, SethGun.py was stored in a folder named SethGun. Follow the screens below. After running, you may do 2 things to get a reading:

(1) You may press the trigger button on the SethGun. The temperature should display on the terminal.

(2) You may also press the external button. This will tell the Raspberry Pi to send the command @,R,# [Carriage Return] [New Line] to the SethGun to instruct it to initiate a reading. The temperature reading is displayed on the screen
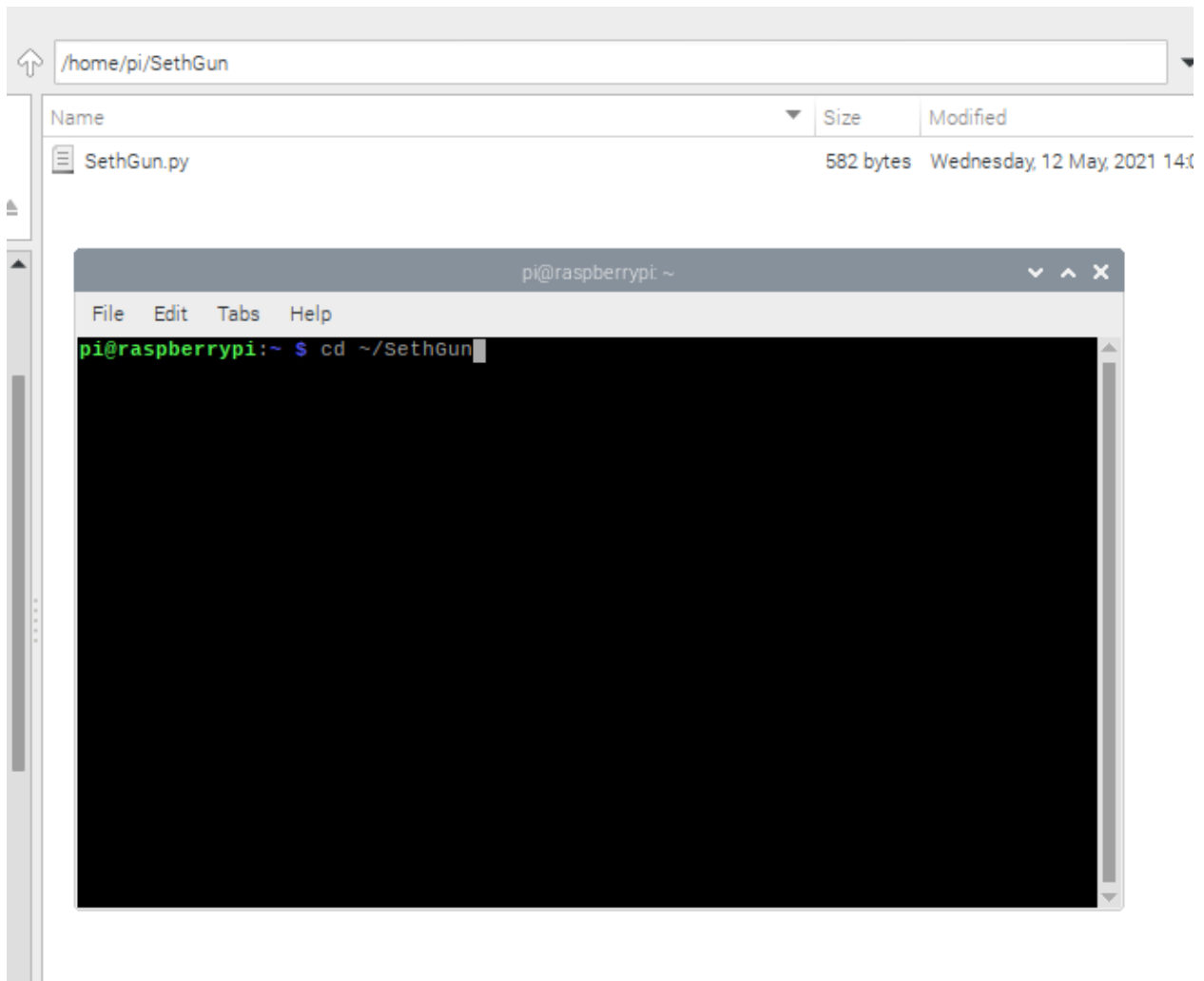
⇧ /home/pi/SethGun

Name		Size	Modified
▤ SethGun.py		582 bytes	Wednesday, 12 May, 2021 14:0

pi@raspberrypi: ~

File   Edit   Tabs   Help

```
pi@raspberrypi:~ $ cd ~/SethGun
```

/home/pi/SethGun

Name		Size	Modified
☰ SethGun.py		582 bytes	Wednesday, 12 May, 2021 14:05

pi@raspberrypi: ~/SethGun

File   Edit   Tabs   Help

```
pi@raspberrypi:~ $ cd ~/SethGun
pi@raspberrypi:~/SethGun $ sudo python SethGun.py
```

/home/pi/SethGun

Name		Size	Modified
SethGun.py		582 bytes	Wednesday, 12 May, 2021 14:05

pi@raspberrypi: ~/SethGun

File   Edit   Tabs   Help

```
pi@raspberrypi:~ $ cd ~/SethGun
pi@raspberrypi:~/SethGun $ sudo python SethGun.py
36.5
```
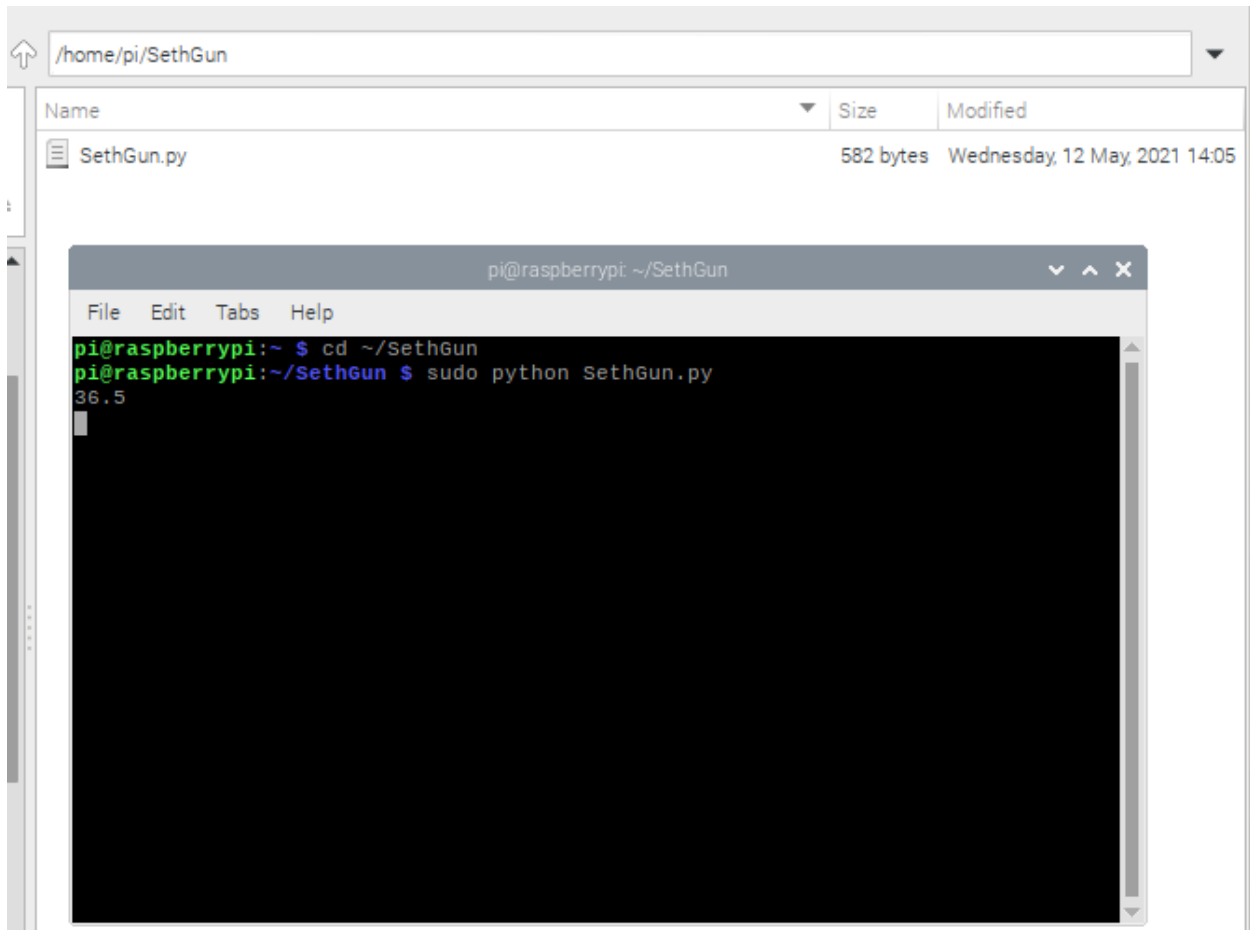
Author: E.A.Binay-an/C.D.Malecdan for Layad Circuits Electronics Engineering / 12 May 2021