

Compass

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We used a HMC6352 compass in combination with a raspberry pi to have a continuously polling compass that would output the general direction that it was facing in terms of N, NE, E, SE, S, SW, W and NW. It would also output the exact degree the compass was facing, with north being 0, east 90, south 180 and west 270. The compass was connected using an I²C connection to the pi.

```
import smbus
import time
```

```
def GetOrientation(deg):
    output = ""
    if(22.5 <= deg < 67.5):
        output = "NE "
    elif(67.5 <= deg < 112.5):
        output = "E "
    elif(112.5 <= deg < 157.5):
        output = "SE "
    elif(157.5 <= deg < 202.5):
        output = "S "
    elif(202.5 <= deg < 247.5):
        output = "SW "
    elif(247.5 <= deg < 292.5):
        output = "W "
    elif(292.5 <= deg < 337.5):
        output = "NW "
    else:
        output = "N "
    output = output + str(deg) + " degrees"
    return output
```

```
TIME_SLEEP = 0.2
COMPASS_WRITE_ADDRESS = 0x21
COMPASS_READ_ADDRESS = 0x41
COMPASS_OPERATION_MODE = 0x50
COMPASS_OPERATION_SETUP = 0b00110001
```

```
bus = smbus.SMBus(1)
```

```
bus.write_byte_data(COMPASS_WRITE_ADDRESS,COMPASS_OPERATION_MODE,\
COMPASS_OPERATION_SETUP)
```

```

try:
    while True:
        data = bus.read_i2c_block_data(COMPASS_WRITE_ADDRESS,\
        COMPASS_READ_ADDRESS, 2)
        degrees = ((data[0] << 8) + data[1]) / 10
        print(GetOrientation(degrees))
        time.sleep(TIME_SLEEP)

except KeyboardInterrupt:
    pass

```

We used the smbus library to read and write data to and from the compass. One of our biggest challenges was getting the smbus library to work properly, as initially we tried to run the above code using python3 and would get an error stating that the smbus library could not be found, and even after re-installing this library it still could not be found. It turns out the smbus library only works on python2, knowing this at the start would have saved a lot of time. Another challenge was finding the compasses read and write addresses, eventually we found out that by using the command `sudo i2cdetect -y 1` would tell us the address of the device.

Useful URLs

<https://www.sparkfun.com/datasheets/Components/HMC6352.pdf>

this is the link to the datasheet for the HMC6352, it is obviously useful to know what kind of voltage the unit could handle and for how to set up the circuit. As well as setting up the operation mode byte.

<http://www.raspberrypi-projects.com/pi/programming-in-python/i2c-programming-in-python/using-the-i2c-interface-2>

this link has a list of functions of the smbus library and also gave us the command that we needed to figure out what the address of the device was.

<http://skpang.co.uk/blog/archives/575>

this article shows how to set up the pi so that it can use i2c devices, and also shows how to install smbus.