Sense HAT

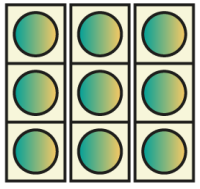
Python 3 cheat sheet

Enabling the Astro Pi mission

To add Sense HAT functionality to your Python programs, add the following lines to import the library for the Sense HAT:

```
from sense_hat import SenseHat
sense = SenseHat()
```

From that point forwards, you can use any of the set of functions from the Sense HAT library.



LED Matrix

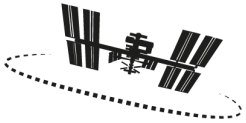
`sense.set_pixel(0, 0, 255, 0, 0)`	Sets the top left LED to the colour red.
`sense.show_letter("J", text_colour=[0, 0, 255])`	Displays the letter "J" on the screen in blue.
`sense.show_message("msg", text_colour=[0, 255, 0])`	Displays the message "msg" on the matrix in green.
`sense.load_image("creeper.png", redraw=True)`	Loads an 8x8 image "creeper.png" image and displays it.
`sense.clear()`	Clears the LEDs and switches them all off.
`sense.set_rotation(r=0)`	Sets the rotation of the LED matrix.

```
R = [255, 0, 0]  # Red
W = [255, 255, 255]  # White

pixel_list = [W, W, W, R, R, W, W, W,
              W, W, R, W, W, R, W, W,
              W, W, W, W, W, R, W, W,
              W, W, W, W, R, W, W, W,
              W, W, W, R, W, W, W, W,
              W, W, W, R, W, W, W, W,
              W, W, W, W, W, W, W, W,
              W, W, W, R, W, W, W, W]

sense.set_pixels(pixel_list)
```

Defines two RGB colours, stored as variables **R** and **W**.

Uses set_pixels to draw a picture on the LED matrix, with each item in the **pixel_list** an instance of **R** or **W**.

Note: Make sure to never mix up the set_pixel and set_pixels commands!



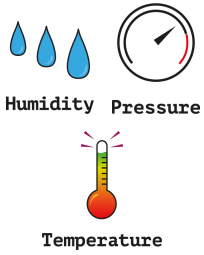
Movement

`orientation_data = sense.get_orientation()`
`pitch = orientation_data['pitch']`
`yaw = orientation_data['yaw']`
`roll = orientation_data['roll']`
	Gets the orientation data, stores their values as **pitch, yaw, roll.**

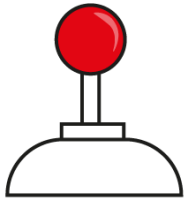
`compass_data = sense.get_compass_raw()`
`m_x = compass_data['x']`
`m_y = compass_data['y']`
`m_z = compass_data['z']`
	Gets the compass data, stores their values as **m_x, m_y, m_z.**

`accelerometer_data = sense.get_accelerometer_raw()`
`x = accelerometer_data['x']`
`y = accelerometer_data['y']`
`z = accelerometer_data['z']`
	Gets the accelerometer data, stores their values as **x, y, z.**

`gyroscope_data = sense.get_gyroscope_raw()`
`g_x = gyroscope_data['x']`
`g_y = gyroscope_data['y']`
`g_z = gyroscope_data['z']`
	Gets the gyroscope data, stores their values as **g_x, g_y, g_z.**



`t = sense.get_temperature_from_humidity()`	Uses the humidity sensor to sense temperature, stores it as **t.**
`t = sense.get_temperature_from_pressure()`	Uses the pressure sensor to sense temperature, stores it as **t.**
`h = sense.get_humidity()`	Measures the humidity, stores it as **h.**
`p = sense.get_pressure()`	Measures the pressure, stores it as **p.**



Joystick

```
while True:
    for event in sense.stick.get_events():
        print( event.direction )
        print( event.action )
```

Continually checks the joystick device and gets a list of events.

For each event in the list, both the direction and the action (pressed, held, released) will be displayed.

Scrolling Message

```
from sense_hat import SenseHat

sense = SenseHat()

while True:
    sense.show_message("Spaaaaaaace!!", scroll_speed=0.05, text_colour=[255, 255, 0], back_colour=[0, 0, 255])
```

Environmental Sensing

```
from sense_hat import SenseHat

sense = SenseHat()

while True:
    t = sense.get_temperature()
    p = sense.get_pressure()
    h = sense.get_humidity()

    t = round(t, 1)
    p = round(p, 1)
    h = round(h, 1)

    msg = "Temp = %s, Pressure = %s, Humidity = %s" % (t, p, h)

    sense.show_message(msg, scroll_speed=0.05)
```

Rotating letter “J”

```
from sense_hat import SenseHat
import time

sense = SenseHat()

sense.show_letter("J")

while True:
  accelerometer_data = sense.get_accelerometer_raw()

  x = round(accelerometer_data['x'], 0)
  y = round(accelerometer_data['y'], 0)

  if x == -1:
      sense.set_rotation(180)
  elif y == -1:
      sense.set_rotation(90)
  elif y == 1:
      sense.set_rotation(270)
  else:
      sense.set_rotation(0)

  time.sleep(0.1)
```

Reaction Game

```
from sense_hat import SenseHat
import time
import random

sense = SenseHat()

# set up the colours (white, green, red, empty)
w = [150, 150, 150]
g = [0, 255, 0]
r = [255, 0, 0]
e = [0, 0, 0]

# create three differently coloured arrows
arrow = [e,e,e,w,w,e,e,e,
         e,e,w,w,w,w,e,e,
         e,w,e,w,w,e,w,e,
         w,e,e,w,w,e,e,w,
         e,e,e,w,w,e,e,e,
         e,e,e,w,w,e,e,e,
         e,e,e,w,w,e,e,e,
         e,e,e,w,w,e,e,e]

arrow_red = [e,e,e,r,r,e,e,e,
             e,e,r,r,r,r,e,e,
             e,r,e,r,r,e,r,e,
             r,e,e,r,r,e,e,r,
             e,e,e,r,r,e,e,e,
             e,e,e,r,r,e,e,e,
             e,e,e,r,r,e,e,e,
             e,e,e,r,r,e,e,e]

arrow_green = [e,e,e,g,g,e,e,e,
               e,e,g,g,g,g,e,e,
               e,g,e,g,g,e,g,e,
               g,e,e,g,g,e,e,g,
               e,e,e,g,g,e,e,e,
               e,e,e,g,g,e,e,e,
               e,e,e,g,g,e,e,e,
               e,e,e,g,g,e,e,e]
```

```
pause = 3
score = 0
angle = 0
play = True

sense.show_message("Keep the arrow pointing up", text_colour=[100, 100, 100])

while play == True:
    last_angle = angle
    while angle == last_angle:
      angle = random.choice([0, 90, 180, 270])
    sense.set_rotation(angle)
    sense.set_pixels(arrow)
    time.sleep(pause)

    accelerometer_data = sense.get_accelerometer_raw()
    x = round(accelerometer_data['x'], 0)
    y = round(accelerometer_data['y'], 0)

    if y == -1 and angle == 180:
      sense.set_pixels(arrow_green)
      score = score + 1
    elif y == 1 and angle == 0:
      sense.set_pixels(arrow_green)
      score = score + 1
    elif x == -1 and angle == 90:
      sense.set_pixels(arrow_green)
      score = score + 1
    elif x == 1 and angle == 270:
      sense.set_pixels(arrow_green)
      score = score + 1
    else:
      sense.set_pixels(arrow_red)
      play = False

    pause = pause * 0.95
    time.sleep(0.5)

msg = "Your score was %s" % (score)
sense.show_message(msg, scroll_speed=0.05, text_colour=[100, 100, 100])
```