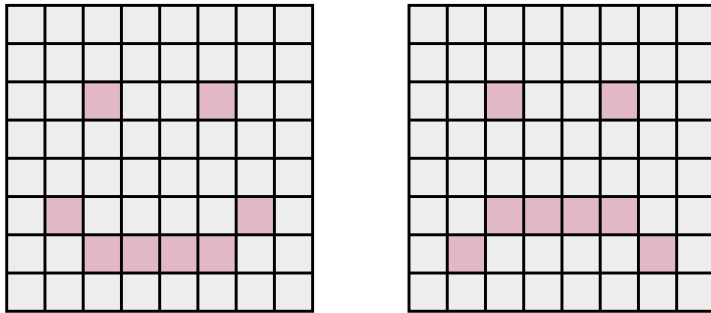# Experiment with the Sense HAT

## 1 Draw your pixel art here:

You can use different colours to create your pixel art in the squares below. You can copy our example, or design your own.

## 2 Label each pixel:

Think of a letter from the alphabet to represent each colour in your pixel art, e.g. w for white or r for red. Write your design out in the box below.

Here's the code for the smiling face, to get you started:

```
w  w  w  w  w  w  w  w

w  w  w  w  w  w  w  w

w  w  r  w  w  r  w  w

w  w  w  w  w  w  w  w

w  w  w  w  w  w  w  w

w  r  w  w  w  w  r  w

w  w  r  r  r  r  w  w

w  w  w  w  w  w  w  w
```

## 3 Code your art in Python 3:

This is the code we use to draw pixel art on the Sense HAT. Can you guess what avatar this code might display?

Open **Python 3**, click **File > New Window**, and type the first two lines in the same way as below:

```python
from sense_hat import SenseHat

sense = SenseHat()

g = (0, 255, 0) # Green
b = (0, 0, 0) # Black

image = [
    g, g, g, g, g, g, g, g,
    g, g, g, g, g, g, g, g,
    g, b, b, g, g, b, b, g,
    g, b, b, g, g, b, b, g,
    g, g, g, b, b, g, g, g,
    g, g, b, b, b, b, g, g,
    g, g, b, b, b, b, g, g,
    g, g, b, g, g, b, g, g
]

sense.set_pixels(image)
```

This is where you set your colour choices

This is where you write each pixel colour label for your pixel art

Now re-write the rest of this code to display your pixel avatar. To run your code, click **Ctrl + S** then **F5**.

# 4 Add both images to your code:

You can use the same system as before, but you may wish to use memorable names for each image:

```
happy = [
w, w, w, w, w, w, w, w,
w, w, w, w, w, w, w, w,
w, w, r, w, w, r, w, w,
w, w, w, w, w, w, w, w,
w, w, w, w, w, w, w, w,
w, r, w, w, w, w, r, w,
w, w, r, r, r, r, w, w,
w, w, w, w, w, w, w, w
]
```

```
sad = [
w, w, w, w, w, w, w, w,
w, w, w, w, w, w, w, w,
w, w, r, w, w, r, w, w,
w, w, w, w, w, w, w, w,
w, w, w, w, w, w, w, w,
w, w, r, r, r, r, w, w,
w, r, w, w, w, w, r, w,
w, w, w, w, w, w, w, w
]
```

# 5 Shake to change the image:

To change the image by shaking your Raspberry Pi, you will need to add this code to the end of your program:

| This displays the first image | ····► `sense.set_pixels(happy)` |
| Gets movement readings from the Sense HAT | ····► `x, y, z = sense.get_accelerometer_raw().values()` |
| This loop waits for the Sense HAT readings to change to 2 on x, y, z axis | ····► `while x < 2 and y < 2 and z < 2:` <br> `    x, y, z = sense.get_accelerometer_raw().values()` |
| This code then displays the second image | ····► `sense.set_pixels(sad)` |

# 6 Save and run your code:

Press **Ctrl + S** on the keyboard to save and **F5** to run your code. You should see your first image.

Now shake your Raspberry Pi and Sense HAT to see the image change!

## What next?

- Can you change the code so that the image flips back to the first one after a period of time?

- Can you make some amazing pixel art?

- Could you use some of the other sensors to change between images?

## List of colours

You can use lots of different colours, like these:

| | | | |
|---|---|---|---|
| **r = (255, 0, 0)** | 🟥 | **i = (75, 0, 130)** | 🟪 |
| **o = (255, 127, 0)** | 🟧 | **v = (159, 0, 255)** | 🟪 |
| **e = (255, 255, 0)** | 🟨 | **b = (0, 0, 0)** | ⬛ |
| **g = (0, 255, 0)** | 🟩 | **w = (255, 255, 255)** | ⬜ |
| **u = (0, 0, 255)** | 🟦 | | |