CS 1010

Deep dive into Raspberry Pi (sense HAT) with Python

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Playing with the [sense HAT]

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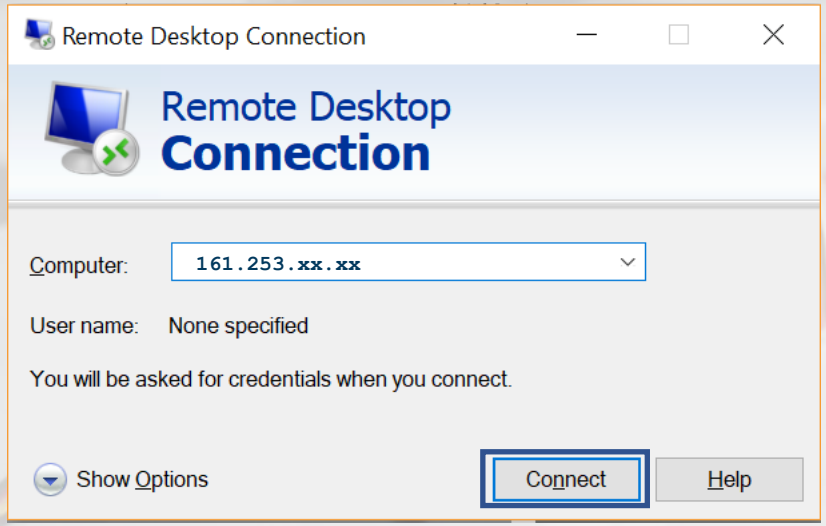
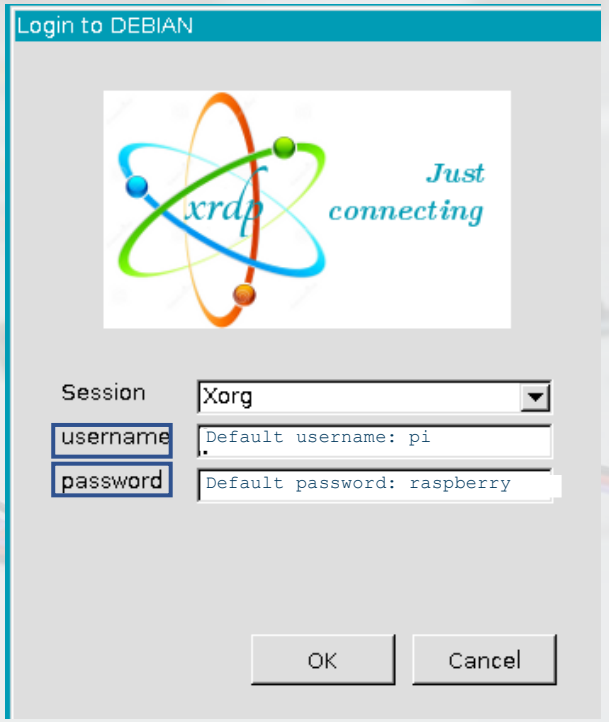
Photo: Kartik Bulusu

Access to the RPi in the laboratory



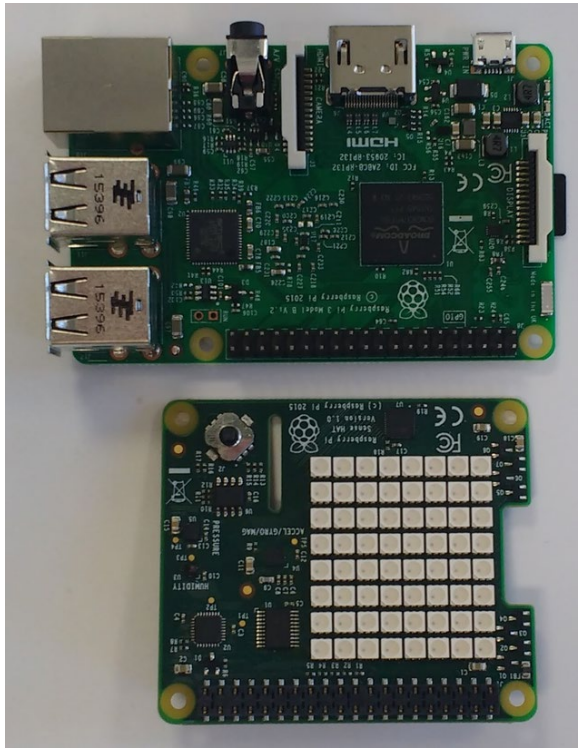


Source: https://upload.wikimedia.org/wikipedia/commons/f/f1/XRDP_Screenshot.png

Each RPi is assigned a unique

- **IP address <161.253.30.xxx>**
- **OR DNS name <kartik###.seas.gwu.edu>**
- ***username & password***

“Put on the Sense HAT” …



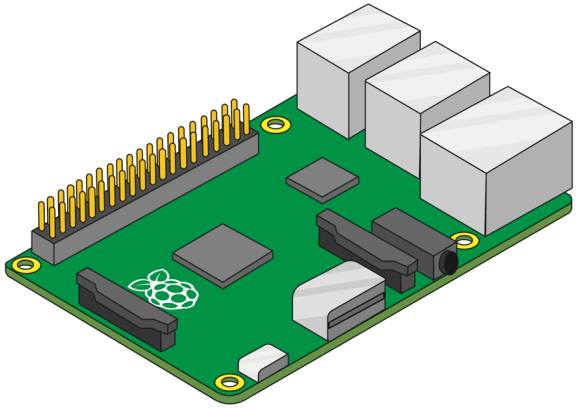


Image and animation source: https://projects.raspberrypi.org/en/projects/getting-started-with-the-sense-hat/2

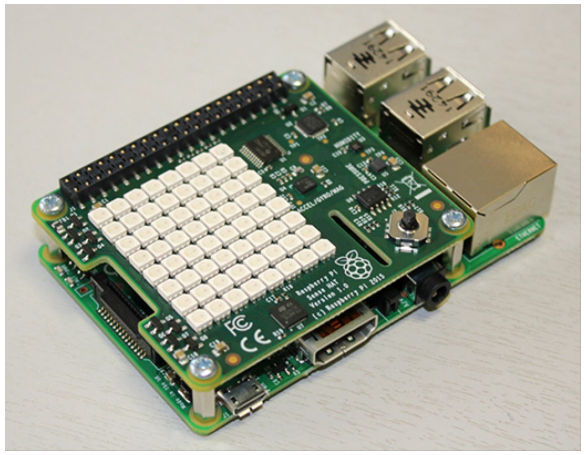


Image source: https://reference.wolfram.com/language/ref/device/SenseHAT.html

Source: https://youtu.be/8NwWNOMqai4

“and take a closer look” …

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CSCi 1010 Computer Science Orientation

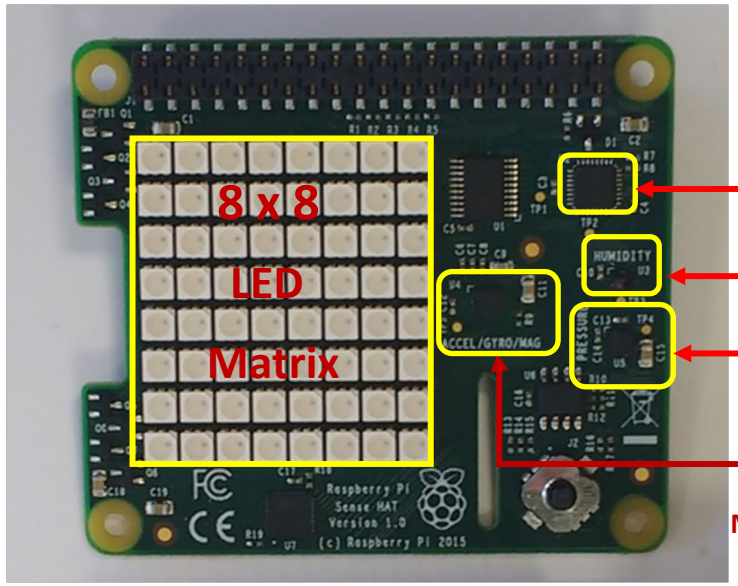
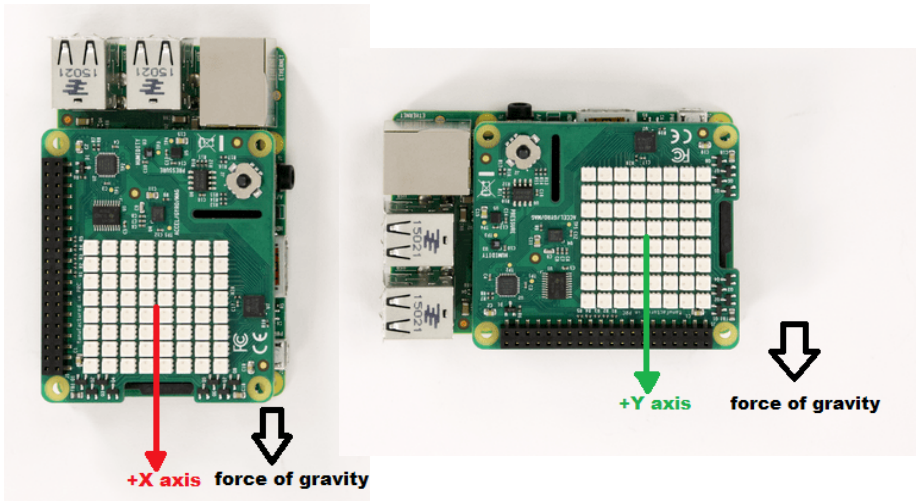


Image source: https://projects.raspberrypi.org/en/projects/getting-started-with-the-sense-hat/2

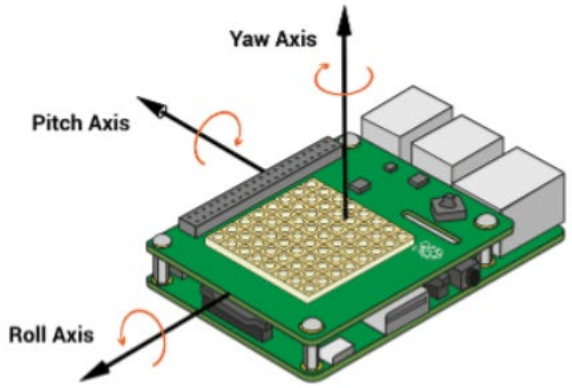
- The Sense HAT has a variety of sensors that can be read from:

"Temperature"	reads temperature in degrees Celsius
"Humidity"	reads humidity in % RH
"Pressure"	reads atmospheric pressure in millibars
"Rotation"	reads gyroscopic motion in revolutions per second
"Acceleration"	reads acceleration in terms of standard accelerations due to gravity on Earth's surface
"Orientation"	reads orientation relative to magnetic north in degrees
"Magnetic Field"	reads strength and direction of a magnetic field around the sensor in microteslas

- The gyroscope, accelerometer, and magnetometer sensors return a list of three values that corresponds to $\{roll, pitch, yaw\}$, as oriented according to the following image:



Source: https://www.mathworks.com/help/supportpkg/raspberrypi/examples/auto-rotate-an-image-displayed-on-sense-hat-led-matrix.html



Source: https://reference.wolfram.com/language/ref/device/SenseHAT.html

Starting point for further exploration:

[Link for "Getting started with the Sense HAT"]

Example of who is using the sense HAT and where - Astro Pi

Source: https://youtu.be/kk_7KNuRLrk

What we will do today

- Co-work
  - Observe, ask and try in groups
- Write small program using Python
- Think about
  - Challenges, Opportunities, Gaps and Surprises

What we will learn today

- Communicate with the Sense HAT using Python
- Access the outputs of the Sense HAT
- Use the Sense HAT library to display messages and images
- Use loops to repeat certain code blocks