APSC 1001 & CS 1010

Deep dive into Raspberry Pi (sense HAT) with Python

Prof. Kartik Bulusu, MAE Dept.

Playing with the [sense HAT]

Teaching Assistants:
Sara Tenaglio, BME Dept.
Catherine Karpova, BME Dept.
Zachary Stecher, CEE Dept.

Learning Assistants:
Jonathan Terry, CS Dept.
Ethan Frink, MAE Dept.
Jack Umina, CS Dept.
Olivia Legault, CS Dept.
Alexis Renderos, MAE Dept.

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THE GEORGE WASHINGTON UNIVERSITY
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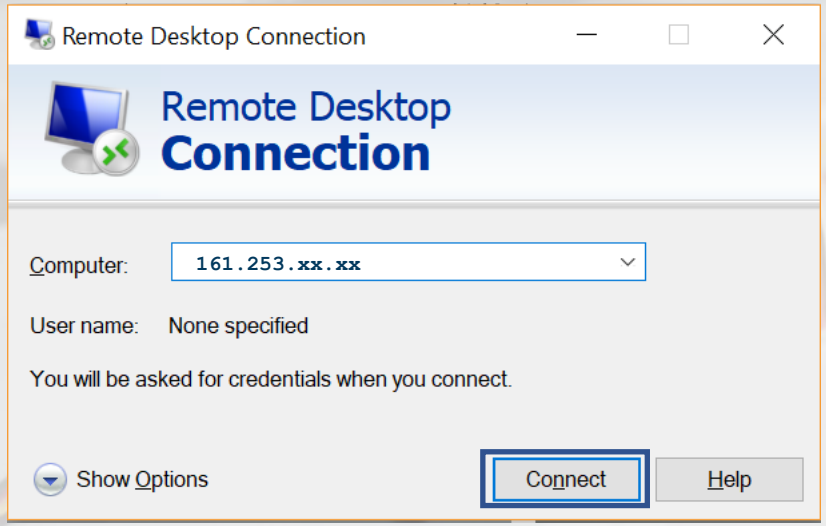
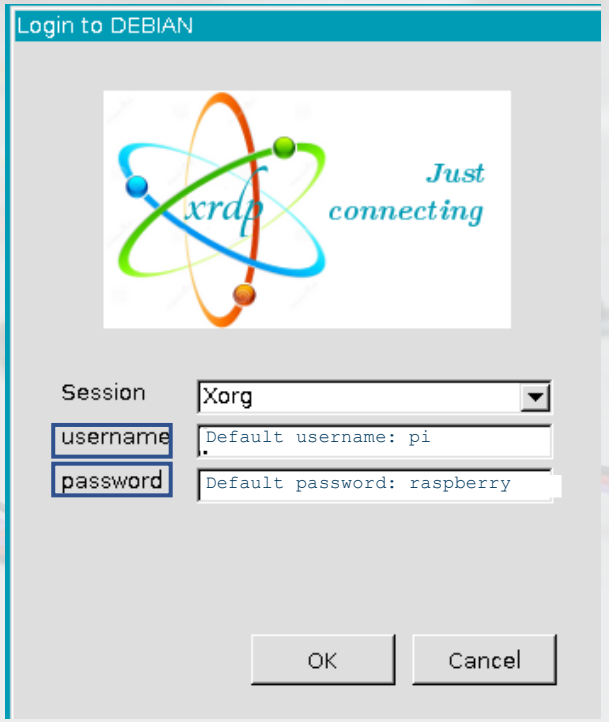
Photo: Kartik Bulusu

Access to the RPi in the laboratory



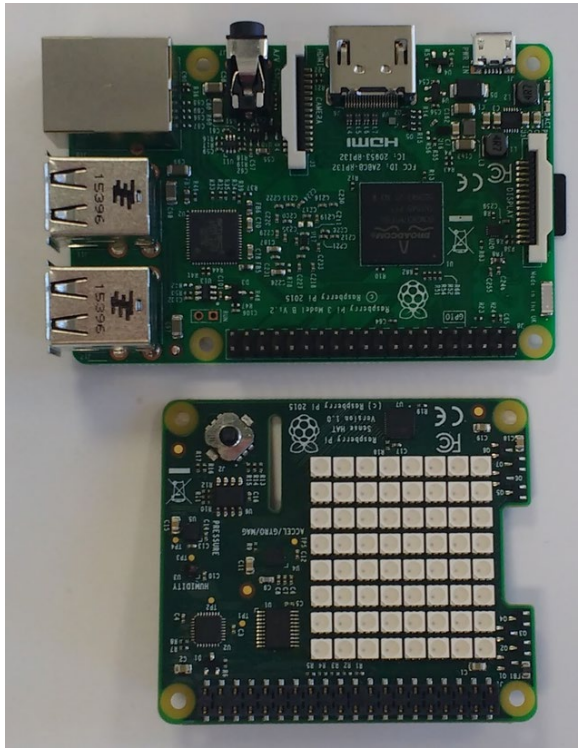


Source: https://upload.wikimedia.org/wikipedia/commons/f/f1/XRDP_Screenshot.png

Each RPi is assigned a unique

- IP address <161.253.xx.xx>
- *username* & *password*

“Put on the Sense HAT” …



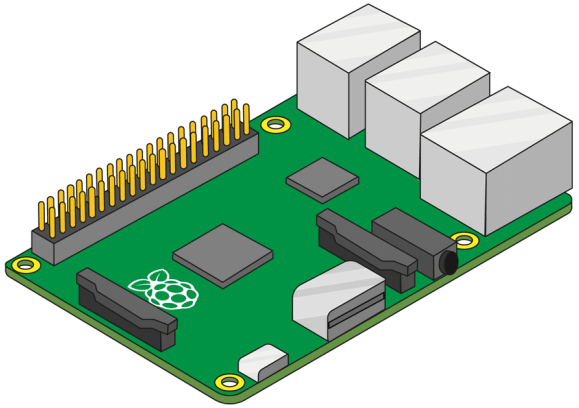


Image and animation source: https://projects.raspberrypi.org/en/projects/getting-started-with-the-sense-hat/2

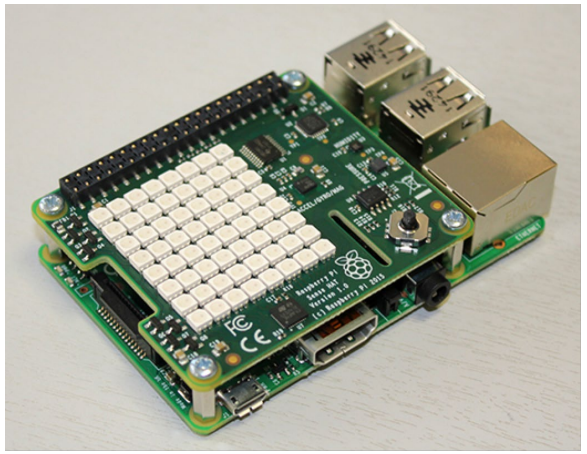


Image source: https://reference.wolfram.com/language/ref/device/SenseHAT.html

Image sourcehttps://youtu.be/8NwWNOMqai4

“and take a closer look” …

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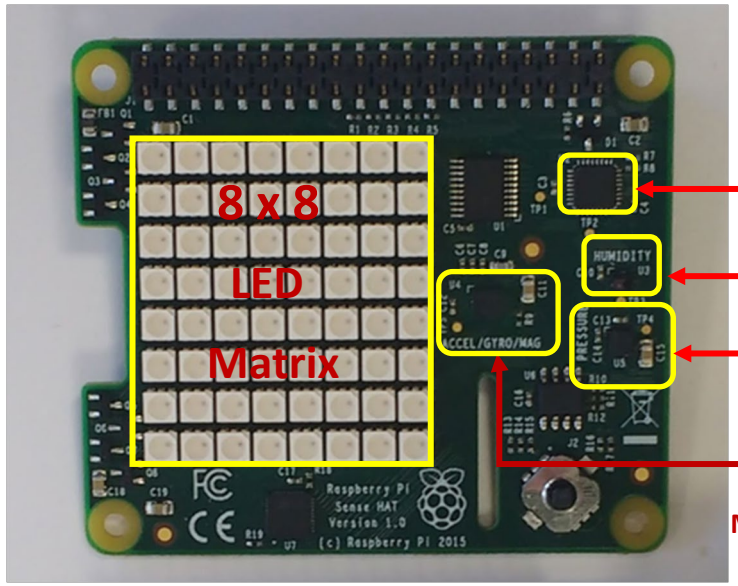
APSC 1001 Introduction to Engineering for Undeclared Majors
CS 1010 Computer Science Orientation



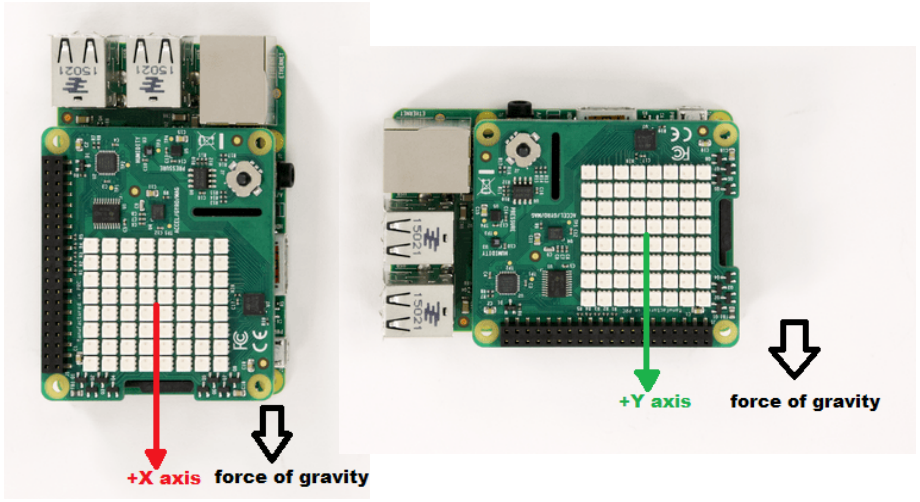
IMU

Inertial Measurement Unit

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

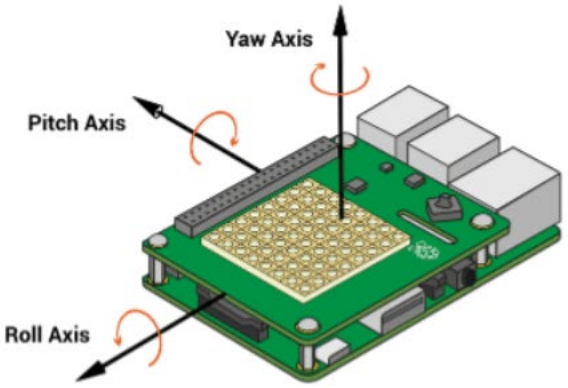
"Temperature"	reads temperature in degrees Celsius
"Humidity"	reads humidity in % RH
"Pressure"	reads atmospheric pressure in millibars
"Rotation"	reads gyroscopic motion in revolutions per second
"Acceleration"	reads acceleration in terms of standard accelerations due to gravity on Earth's surface
"Orientation"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

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



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

- 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://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

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 behaviors