APSC 1001 & CS 1010- Fall 2021:

Final Raspberry Pi and Python Group Project

Select a project idea and implement a Raspberry Pi-based application

Prof. Kartik Bulusu (MAE Department)

Teaching Assistants:
Katya Karpova & Sara Tenaglio (BME Department)
Zachary Stecher (CEE Department)

Learning Assistants:
Ethan Frink & Alexis Renderos (MAE Department)
Jon Terry, Jack Umina & Olivia Legault (CS Department)

GW School of Engineering & Applied Science
THE GEORGE WASHINGTON UNIVERSITY

Teamwork

- Throughout classes and career, you will need to work in small teams to complete a product or a solution
- Come up with a teamwork plan. Some possible options:
  - Designate one person to be a “scribe” and create a workflow over a virtual or in-person meeting
  - DeepNote allows to collaborate in real-time
  - Instruction team can help you with the Raspberry Pu Hardware
    - You can contact us during office hours
    - Or make an appointment if it works better.
  - Each person can make small updates individually and meet to decide on one
- Your methods are up to you! **In the end, we just want to see a completed project**
- **Using Slack to communicate with your team and instructors is essential**

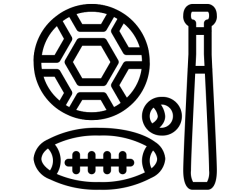
Be communicators and let the instruction team mentor you!

Option 1: Web scraping sports data using Python

*"**Web scraping**, **web harvesting**, or **web data extraction** is data scraping used for extracting data from websites."*

Source: https://en.wikipedia.org/wiki/Web_scraping

- Write a Python program to web scrape a popular sports web page
  - Fetch data and extract from it some basic statistics.
  - Plot your data to show trends
  - Discuss your findings graphically
- This project involves only Python programming
- **Software:** DeepNote
- **Hardware:** no requirements (porting on Raspberry Pi is optional)



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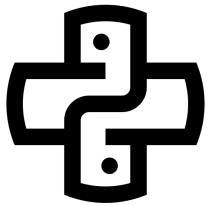

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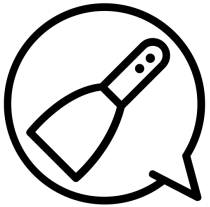

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Option 2: SenseHat-based personal weather station for the SEH Greenhouse

- Use a senseHat to build a Raspberry Pi-bsaed weather station
  - Fetch pressure, temperature and humidity data.
  - Plot your data to show trends
  - Discuss your findings graphically
- **Software:** Thonny Python IDE
- **Hardware:** senseHat, Raspberry Pi 3B+
- **Location:** SEH Greenhouse

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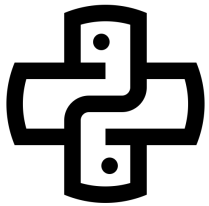

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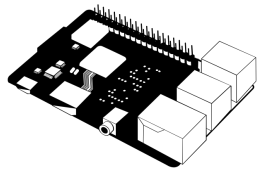

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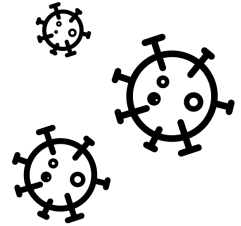
Option 3: Web scraping COVID19 data using Python

*"**Web scraping**, **web harvesting**, or **web data extraction** is data scraping used for extracting data from websites."*

Source: https://en.wikipedia.org/wiki/Web_scraping

- Write a Python program to web scrape a COVID19-data from a known webpage
  - Fetch data and extract from it some basic statistics.
  - Plot your data to show trends
  - Discuss your findings graphically
- **Software:** DeepNote
- **Hardware:** no requirements (porting on Raspberry Pi is optional)



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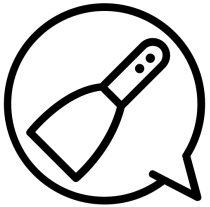

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Option 4: Raspberry Pi-based security camera

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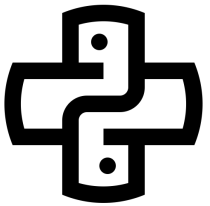
- Use a Pi NoIR camera to build a Raspberry Pi-bsaed security camera
  - Track motion of objects
  - Save images
  - Send an alert
  - Discuss your findings
- **Software:** Thonny Python IDE
- **Hardware:** Pi NoIR Camera, Raspberry Pi 3B+, senseHAT (Optional)
- **Location:** TBD in SEH



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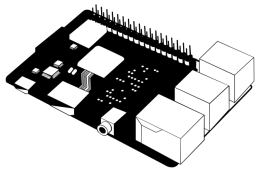

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Option 5: SenseHat-based personal weather station for any SEH location

- Use a senseHat to build a Raspberry Pi-bsaed weather station
  - Fetch pressure, temperature and humidity data.
  - Plot your data to show trends
  - Discuss your findings graphically
- **Software:** Thonny Python IDE
- **Hardware:** senseHAT, Raspberry Pi 3B+
- **Location:** TBD in SEH

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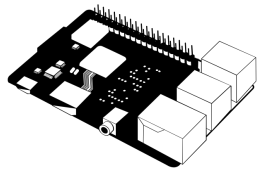

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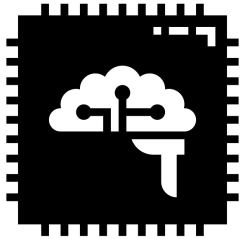
Option 6: Monitor CPU performance of the Raspberry Pi



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- Write a Python program
  - using *psutil* library
  - to get CPU & memory usage,
  - create live graph results
  - Discuss your findings graphically
- **Software:** Thonny Python IDE
- **Hardware:** Raspberry Pi 3B+

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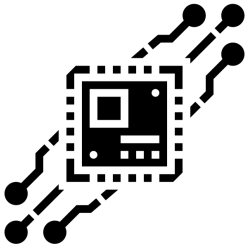

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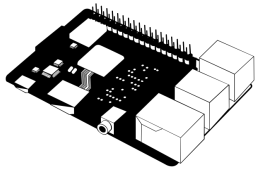

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Option 7: Raspberry Pi-based motion detection in the SEH greenhouse

- Use a Pi NoIR camera to build a Raspberry Pi-bsaed motion tracker
  - Track motion of objects next plants such as venus fly traps
  - Save images
  - Send an alert
  - Discuss your findings
- **Software:** Thonny Python IDE
- **Hardware:** Pi NoIR Camera, Raspberry Pi 3B+, senseHAT (Optional)
- **Location:** SEH Greenhouse

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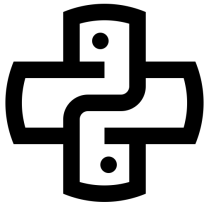

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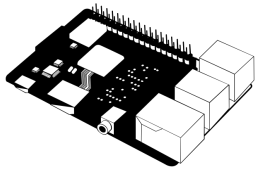

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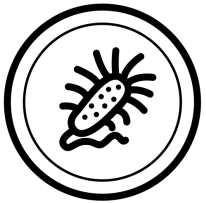
Option 8: SenseHat-based tissue culture incubator monitor



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- Use a senseHat to build a Raspberry Pi-bsaed weather station
  - Fetch pressure, temperature and humidity data.
  - Plot your data to show trends
  - Discuss your findings graphically
- **Software:** Thonny Python IDE
- **Hardware:** senseHAT, Raspberry Pi 3B+, Pi NoIR Camera (optional)
- **Location:** TBD in SEH

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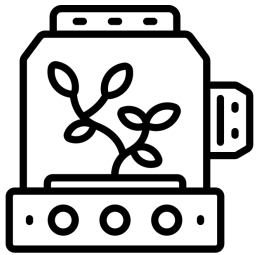

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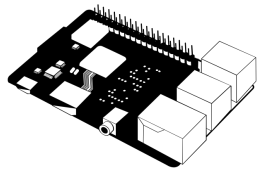

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