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**
  - **Create a workflow** over a virtual or in-person meeting
  - **Designate one person to be a “scribe”**
  - DeepNote allows to **collaborate in real-time**
  - Instruction team can help you with the **Raspberry Pi Hardware**
    - You can contact us during office hours
    - Or make an appointment if it works better
- **Using Slack to communicate with your team and instructors is essential**
- Each person can make small updates individually and meet to decide on one
  - Your methods are up to you! But **we need to see a contributions from each group member.**
- **In the end, we just want to see a completed project**

Be communicators and let the instruction team mentor you!

Project mentor: Jack Umina (Learning Assistant)
Email: jumina@gwmail.gwu.edu

Option 1:
Web scraping sports data using Python

Created by Agus Rijwan Jaelani
from Noun Project

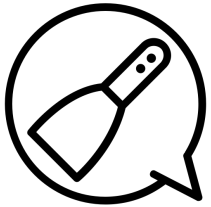
*"**Web scraping**, **web harvesting**, or **web data extraction** is data scraping used for extracting data from websites."*

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

Created by Danil Polshin
from Noun Project

- **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)

Created by Wilson Joseph
from Noun Project



Created by Guilherme Simoes
from Noun Project

Project mentors Prof. Kartik Bulusu and Katya Karpova (Learning Assistant)
Email: bulusu@gwu.edu; katyakarpova@gwmail.gwu.edu

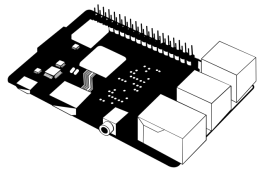
Option 2:
Sense HAT-based personal weather station for the SEH Greenhouse

Created by Ralf Schmitzer
from Noun Project

- **Use a senseHat to build a Raspberry Pi-based 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

Created by Danil Polshin
from Noun Project

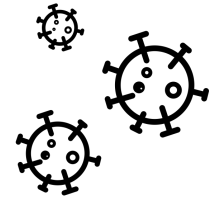
Created by Wilson Joseph
from Noun Project



Created by Batibull
from Noun Project

Project mentor: Jack Umina (Learning Assistant)
Email: jumina@gwmail.gwu.edu

Option 3:
Web scraping COVID19 data using Python



Created by Marilu Castro
from Noun Project

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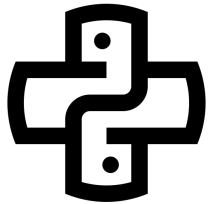
Source: https://en.wikipedia.org/wiki/Web_scraping



Created by Danil Polshin
from Noun Project

- **Write a Python program to web scrape a COVID19-data from a reliable website**
  - 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)

Created by Wilson Joseph
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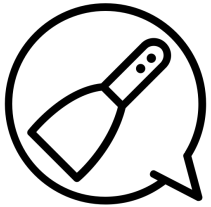


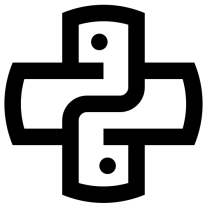
Created by Guilherme Simoes
from Noun Project

Project mentors: Jon Terry (Learning Assistant) and Prof. Kartik Bulusu
Email: jterry82@gwmail.gwu.edu; bulusu@gwu.edu

Option 4:
Raspberry Pi-based security camera

Created by Nibras@design from Noun Project

- **Use a Pi NoIR camera to build a Raspberry Pi-based 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+, Sense HAT (Optional)
- **Location:** TBD in SEH



Created by Danil Polshin from Noun Project

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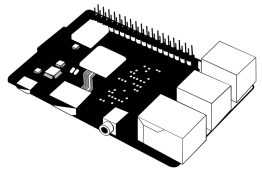

Created by Batibull from Noun Project

Project mentors: Prof. Kartik Bulusu and Sara Tenaglio (Learning Assistant)
Email: bulusu@gwu.edu; sara_tenaglio@gwmail.gwu.edu

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

- **Use a senseHat to build a Raspberry Pi-based 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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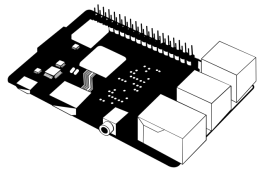
from Noun Project

Created by Danil Polshin
from Noun Project

Created by Wilson Joseph
from Noun Project



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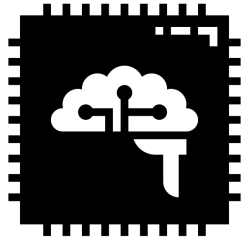
Option 6:
Monitor CPU performance of the Raspberry Pi 3B+

- **Monitor the CPU usage on the Raspberry Pi**
- 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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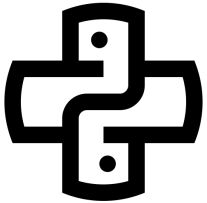

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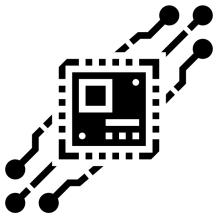

Created by Eucalyp
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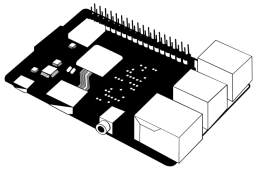

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Email: bulusu@gwu.edu; katyakarpova@gwmail.gwu.edu

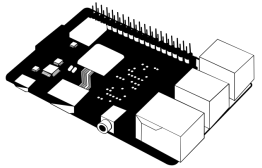
Option 7: Raspberry Pi-based motion detection in the SEH greenhouse

Created by Ian Ransley
from Noun Project

- **Use a Pi NoIR camera to build a Raspberry Pi-based 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+, Sense HAT (Optional)
- **Location:** SEH Greenhouse

Created by Danil Polshin
from Noun Project

Created by Nibras@design
from Noun Project



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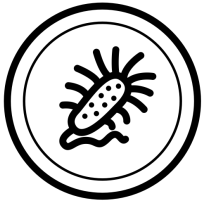
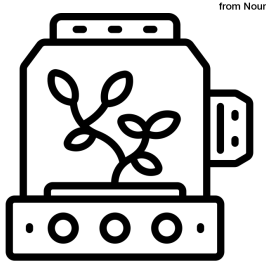
Option 8:
Sense HAT-based incubator climate monitoring system



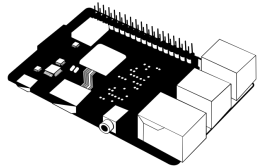
Created by Anthony Bossard from Noun Project

Created by Danil Polshin from Noun Project

- **Use a Sense HAT to build incubator climate monitoring system for tissue cultures for biomedical research**
  - Fetch pressure, temperature and humidity data.
  - Plot your data to show trends
  - Discuss your findings graphically
- **Software:** Thonny Python IDE
- **Hardware:** Sense HAT, Raspberry Pi 3B+, Pi NoIR Camera (optional)
- **Location:** TBD in SEH



Created by Sandro Berger from Noun Project



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