Session Title: Files, Pip and APIs
Session No: 5

Learning Objectives:

By the end of this session students will be able to:

- Create programs that read and write to files
- Explain the purpose of the pip package manager
- Gather data using a web API

Session Outline

Intro & Framing
Time: 5 mins

This session focuses on working with files and making requests to Web APIs.

In the first part of this session, students will learn how to read and write data to text files. They will also learn how to read and write to csv files, which is particularly relevant for students that want to learn more about data science.

The second part of this session focuses on making requests to Web APIs. Students are introduced to the pip package manager, which is used to install third-party packages from PyPI. They will use the requests module to make requests to the Pokemon API, a free API that provides stats about different Pokemon.

This session intentionally covers less content than the previous sessions. This is so that you can either:

- Cover any content that you missed from previous sessions
- Have more time for team projects

Block #1: Reading and Writing Files

5 minutes

This block covers reading and writing files with Python. When demonstrating the code to students make sure you draw attention to the following:

- The `with` and `as` keywords
- The file permissions argument for the `open()` function ('r' for read and 'w+' for write)
- Using the `open()` function in the `with` block automatically closes the file at the end of the block

Relevant Exercise(s):

Exercise 5.1: 10 minutes

- Students will create a todo list program that allows users to add items to a file
- Steps are provided to help the students
- Students should manually create a `todo.txt` in the same directory as their program before running the program
- Make sure you also create the `todo.txt` file before running the solution

Block #2: Working With CSV Files
5 minutes

This section builds on the previous one to show students how to read and write csv files. CSV is a format for spreadsheets. If students are interested in data science or want to know how to automate part of their job, they might find this particularly useful.

Relevant Exercise(s):

Exercise 5.2: 10 minutes

- Students will need to write code to open a csv file
- The required csv file is provided with the student course materials
- Save the csv file in the same folder as the Python file

Block #3: Pip Package Manager

5 minutes

This block introduces students to the pip package manager. The Pip package manager is used to help install third-party packages so that they can be used in Python programs. Having access to a wide variety of packages is one of the reasons that Python is so popular. Third-party packages mean that programmers can reuse code that someone else has written to do a specific task, meaning that they don't have to write it themselves.

Relevant Exercise(s):

N/A

Block #4: Requests

10 minutes

This final block introduces students to the requests library. The requests library allows Python code to communicate with external Web APIs. Web APIs can be used to retrieve data from data sources on the internet.

To practice interacting with Web APIs, students will write a short program to get information from the

Pokemon API. The Pokemon API stores data about every Pokemon in the Pokemon series of games. It is designed for teaching beginners and does not require authentication. You may need to explain what Pokemon are to students.

It is important for students to understand how to use the requests library as it is the most used Python package outside of the standard library.

Some students using Macs may have an error about SSL when using the requests library. This might be because their version of OpenSSL is out of date. They can fix this by installing a newer version of OpenSSL

Relevant Exercise(s):

Exercise 5.3: 10 minutes

- Students will use the Pokemon API and requests library to retrieve data about a specific Pokemon
- Students should refer back to the example code
- Extension: Print the names of all of a specific Pokemon's moves
- The API urls can be viewed in Firefox to make the JSON responses easier to read

Recap & Closing

5 minutes

Recap questions:

Question 1: What is a web API?

A web API is a program/application on the internet that you can interact with to do things like retrieve data

Question 2: What is the purpose of pip and PyPI?

Pip is used to install Python third-party packages. PyPI is a website that has stores a large number of Python third-party packages.

Question 3: Explain what this code does.

The code uses the `requests` library to make a request to the Pokemon API url for items. It then gets the data from the response and prints the name of the item.

Homework Tasks

Learning Task:

Session 5 homework questions in the student guide

Guide for Instructors

General comments

Some students using Macs may have an error about SSL when using the requests library. This might be because their version of OpenSSL is out of date. They can fix this by installing a newer version of OpenSSL