Data Collection and Processing with Python

Overview

This course teaches you to fetch and process data from services on the Internet. It covers Python list comprehensions and provides opportunities to practice extracting from and processing deeply nested data. You'll also learn how to use the Python requests module to interact with REST APIs and what to look for in documentation of those APIs.

The course is well-suited for you if you have already taken the "Python Basics" and "Python Functions, Files, and Dictionaries" courses (courses 1 and 2 of the Python 3 Programming Specialization). If you are already familiar with Python fundamentals but want practice at retrieving and processing complex nested data from Internet services, you can also benefit from this course without taking the previous two.

Course Outline

Module 1: Nested Data and Nested Iteration

In this module, you will cover more complex data structures. By the end of this week, you will have learned how to process json formatted data, traverse nested data using nested iteration, and extract values from nested data.

- Nested Data
- Nested Lists
- Nested Dictionaries
- JSON Format and the JSON Module
- Processing JSON Results
- Nested Iteration
- Structuring Nested Data
- Shallow Copies

- Deep Copies
- Extracting from Nested Data
- A Worked Example of Nested Iteration

Module 2: Map, Filter, and List Comprehensions

In module two you will be learning more advanced forms of accumulation. By the end of the part, you will have learned how to use the map and filter functions in combination with functions to transform or filter out data and store the resulting data in a new object. You will have also learned how to accumulate data using a list comprehension.

- Map
- Filter
- List Comprehensions
- List Comprehensions Example
- Zip
- The Hangman Blanked Function

Module 3: Internet APIs

In module three you will learn how to request data from the internet using Application Programming Interfaces (APIs). By the end of the week, you will have learned how to access data from a few APIs, cache data that you have requested, and also learned how to read and work with other APIs that were not touched on in the module.

- REST APIs
- URLs, Domain Names, and IP Addresses
- Routing
- HTTP: Behind the Scenes
- URL Query Parameters
- REST API URLs
- The requests Module
- Using REST APIs
- Generating URLs with requests.get
- Reading API Documentation: Datamuse
- Debugging Calls to requests.get
- Caching Response Content
- The requests_with_caching Module
- Practice with REST APIs
- iTunes API
- flickr API

Module 4: Sequence Mutation and Accumulation Patterns

We will present deeper knowledge on using lists, strings, and python objects in general. We will also cover how to use the accumulation pattern with lists and with strings. The final assignment will test your knowledge and skills through application, much like previous assessments and assignments did, though with a more difficult set of tasks now that you have learned the basics.

- Transforming Sequences
- Mutability
- List Element Deletion
- Objects and References
- Aliasing
- Cloning
- Methods on Lists
- Append vs. Concatenate
- Non-Mutating Methods on Strings
- String Format Method
- The Accumulator Pattern with Lists
- The Accumulator Pattern with Strings
- Accumulator Pattern Strategies
- Don't Mutate A List That You Are Iterating Through