

Efren Enriquez

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IT FDN 110A

Assignment 05

Assignment 05 – Advance Collections and Error Handling

Introduction

This week in IT FDN 110A the topic of collections of advanced data and error handling was introduced. In this paper there will be a brief overview about some of the concepts learned during the module. Then the process used to write the script for this assignment will be further elaborated on throughout the paper. This will include the use of .json files, advanced data collections, error handling, and managing code files. Finally discussing the initial code setup including setting a menu constant and defining variables, main body code, and testing of the code.

Concepts Learned

This week new concepts were introduced such as dictionary collections, JSON files, error handling, and managing code.

Dictionary Collections and JSON Files

Another way to create a table of data is through the use of creating a list of dictionaries. Dictionaries can be thought of rows of data in a spreadsheet. There are many key differences when using dictionaries when considering using it. First, data organization values for each line can be mapped to specific keys in the file. You can access specific pieces of data by using associated keys making it intuitive to retrieve the desired fields. Data structure of dictionaries has distinct key value pairs and data is validated is structured as specific keys exist and verify values.

A new type of data file was introduced, the .json file. JSON is an acronym for JavaScript Object Notation and is widely used. Examples of ways JSON files can be used for data exchange, configuration files, data storage, and API responses. JSON files are lightweight data interchange format that is easy for both humans to read and write for machines. JSON file structure consists of key-value pairs, strings enclosed in double quotes, values can be: strings, numbers, objects, arrays, Booleans, or null. Also data has to be organized using curly braces for objects and square brackets for arrays. Finally commas separate key-value pairs or elements within an array. When working with JSON files is important to import the built in JSON module that helps to provide methods for working with JSON data.

Structured Error Handling

When programming, it is important to fix bugs immediately and make sure code runs smoothly. In the case others use your code new bugs could be introduced. To avoid errors, error handling improves scripts by managing errors that arise over the course of programming processes. Using the try-except code allows you to trap errors to provide more general and user friendly messages. It is important to display error messages to inform users with less and more experience with simple and complex messages through the use of the exception class. The exception class holds information about the error that just occurred while executing the code. Different errors can be displayed if programmed correctly such as zero division errors, file not found, or general errors that may be run into.

Managing Code

The world of programming is vast and is an excellent space to allow for saving the code, sharing it, and collaborating with others to improve code and share knowledge. It is essential share as it fosters collaboration, bolsters code quality, transfers knowledge, and improves overall software development efficiency. Other reasons it is important to save and share code is code reusability, error detection and debugging, documentation, version control, backup and disaster recovery, and open source development to name a few.

When working on a team it is important to share files either through network file sharing or cloud file sharing is used. Network sharing is the central place to store and share code in a shared folder on a computer network. It is unique in that only those within the organization can access those files and is used today in many companies. On the other hand cloud sharing has become the modern way to share files through the use of remote servers hosted by cloud service providers. Some examples of cloud storage providers include Google Drive, Dropbox, Microsoft OneDrive, and GitHub. GitHub is what is being used during this course as it is a cloud based platform for code hosting and collaboration.

Writing the Program

This week's assignment built upon Assignment 04 but added new concepts learned such as advanced data collections such as dictionaries, JSON files, error handling, and managing the code through GitHub. To start the Assignment04.py and Assignment05-Starter.py file was utilized as a reference and to practice using others code.

Constants and Variables

First the program constants were defined and were not changed throughout the program. Two constants were defined, MENU and FILE_NAME. MENU was a string that displayed the menu for a Course Registration Program and four selections: 1. Register a Student for a Course, 2. Show current data, 3. Save data to a file, and 4. Exit the program. FILE_NAME was created and set to a value of "Enrollments.json" to aid in creating the file with a correct name.

Next various variables were created for this program. These variables include: student_first_name, student_last_name, course_name, json_data, file, menu_choice, student_data, and students. Majority of the variables were set to empty strings as these variables would require user input later down the line. The variables student_data and students were set to dictionaries and empty lists.

Main Body

The main body of the code was very similar to the starter code and I had referenced the review code as I ran into various errors along the way. It was important to integrate error handling as the code was written. The first try-except portion was created to first try opening the correct file in read mode, load the data, and close the file. The except statements included here were looking for `FileNotFoundError` and a non-specific error through the use of an Exception case.

Next the user was presented with the menu and prompted to select a menu choice either 1 2, 3 or 4. If the user selects choice 1, the user is prompted to enter their first, last, and course name. Error handling was incorporated by checking if there were any numerical values in both the first and last name printing error messages. This data is then stored within `student_data` as a dictionary. Next if choice 2 was selected, it presented the current data recorded and from the json file. If choice 3 was selected, then the data was written to the `Enrollments.json`. There was another try-except block checking for type errors and printing corresponding error messages. Finally, if choice 4 was selected then the break was initiated and the loop was ended. From the starter file a else statement was included to choose one of the options.

Testing the Program

To successfully test the program, the program needed to do various things successfully. First was to take the users input for the first, last, and course name and then displaying it correctly (Choice 1 and 2). Then once done, saving the data to the .json file. Finally it is important that the code record, display, and save multiple registrations. The different error handling code integrated into the program was tested as a numerical value was inputted for the first and last name, no file being present to read, and errors while saving to the file. This was done successfully through executing the code both in PyCharm and the Command Shell.

Summary

In conclusion, the necessary tasks for Assignment 05 were completed. Tasks 1 through 3 were done to aid in learning and understanding the material for the week. Task 4 was completed through creating the script `Assignment05.py`. Finally task 5 was completed by writing this paper. Task 6 and 7 will be done following the completion of the documentation through posting files on GitHub. This week it was fun to learn more and build upon previous topics. This week there was lots of content to learn and built upon previous knowledge at the same time. The program that was made this week was challenging but fun to make. To create the program this week the starter file was utilized and revised as this was encouraged. Learning how to use json files was interesting and building upon dictionary knowledge was helpful. The introduction of error handling was a great topic as it will help to ensure future programs will successfully run and could be shared and collaborated on. It was important to comment along the way as this was my feedback from the previous week. I was able to successfully implement new learning in achieving the correct outputs for this week's assignments.