

Assignment 5

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Introduction

For this our fifth Assignment, we are diving further into programming tools by adding error handling, dictionaries, use of the JSON library, and use of other supporting tools outside Python, like Git (versioning) and GitHub (repository). The programming assignment continues to build on our work accomplished over the previous weeks. We will create a list of dictionaries and open, read, and write to a JSON library. Assignment 5 reminds us that the course is actually quite short, only 8 weeks long.

Getting Started

The goals of today's session are:

- Continuing the learning cycle on collections this time focusing on dictionaries,
- Start this document,
- Review the assignment,
- Draft the bones of the assignment in Pycharm,
- Download Git,
- Make a GitHub account,
- Do something with JSON, and
- Try a "try block" for error handling.

Wow. Have to really get on this long list. Prior to setting down for this document's initial write-up, I have watched our video lecture, all the assigned "to watch videos", and the lab videos. I was in the middle of a

costuming project, so I had a lot of hand sewing to accomplish. Thus, I was listening more than watching. I probably will have to go back and look at these again to “see” the language used. Turns out the “read about” really was reading this week just when I could have used more videos! YouTube offered me an interesting Python focused video by *Scholastica* on Python dictionaries that was very well done and helpful.

Here’s the Assignment 5 objective copied from the Module 3 text:

“Create a Python program that demonstrates using constants, variables, and print statements to display a message about a student’s registration for a Python course. This program is very similar to Assignment 04, but it adds on the use of data processing using dictionaries and exception handling. Start by opening and reviewing the starter file Assignment05-Starter.py.”

Note that this week we have new chores to accomplish not specifically mentioned above:

- Use JSON and not a .csv file for saving and retrieving data.
- Use Git for versioning (?)
- Use GitHub to create a shared repository. This is Task 6 on Assignment 5.
- Post the link to GitHub to the Canvas discussion board and to the heading on this paper – This is Task 7.

Task 8 is to submit assignment per usual, and finally we have the option to provide a peer review for “step 9”. I’m updating the progress table below now, so I don’t forget.

First impressions of assignment: We are building on our existing structure. Git will be good to have once it’s understood. GitHub is a little daunting for a rank beginner, but you know I will not be the first. A few weeks ago, I erased a half-built script – so some backup system would be good.

Here’s me thinking about what we are doing here in the script itself:

- Opening JSON Library
- When the program starts the JSON file is automatically read.
- Offer a menu to choose from.
- Know what someone’s menu choice and what results.
- Select and perform the correct action for that choice:
 - Choice 1 will collect data, for the “register student for a course” action, and the file will be set to append so it can continue to collect data.
 - Choice 2 will show current data using a print statement – like in previous assignments. The data will be in dictionary form and will be formatted into a string by using the Key for the data. Indexes are no longer needed.
 - Choice 3 will save the data – but I have not actually used choice 3 this way so far.
 - Choice 4 will exit the program, as before.
 - Remember to close the file near where it is opened, using a while statement is helpful as it closes automatically.
 - Two new variables are assigned and used: student_data is still a list and students are now dictionaries.
 - The output is a saved JSON file that is an array in the JSON format.
- Add Try – Finally blocks for error handling/exceptions.

This Laptop did not get Pycharm last week, so I now will do software downloads and install: Pycharm, Git, and GitHub.

First Draft of Assignment 5 Script

Accomplishments so far:

- Loaded Pycharm on MS Surface, loaded GIT on Surface, made a GitHub account. Linked Pycharm to GitHub.
- Copied over last week's script to modify for Assignment 5 and started on JSON file management lines using dump and load.

After several hours of thinking and trials, I am probably close to opening and reading a new JSON file. I needed to create the file in the directory first!!

Now that I'm into it I'm finding the assignment very confusing about what we are doing, but this is what I decided:

- We are taking information (string) from a student and making a dictionary with three keys.
- Each person's information creates one dictionary.
- The dictionaries (basically a row of data in a spreadsheet) are together (all the rows) a List.
- The list is NOT one dictionary with three keys per row.

This seems correct to me after trialing each person's information as a set of three dictionaries each with one key. That was awkward!

Open and writing to JSON was not so straightforward. I found an on-line suggestion to use "def", which it turns out is in the way of making a function, which seems really, really handy. Something that this class has not taught, but I think I need. So, I'm using that now.

Observations on the Videos

Notes on the videos, as they are important.

1) Important THINGS to note about Dictionaries:

- a. Can be made up of anything, not just numbers or strings, and can be quite complex.
- b. Information is organized using named "Keys".
- c. The Keys are immutable.
- d. You can pop them apart, add things. You can add elements at the Key level, like if you have a list as one of the things in the dictionary, you can add to the list by using the Key.
- e. Are the information is mutable (add, remove, or "modify" elements). (not the Keys).
- f. THE KEYS are "STRINGS" (forget this and you are doomed, although Pycharm is charming about this oversight).

g. *Dictionaries have {Have curly brackets}, {Yo ho ho!}.*

h. A dictionary can look like this:

- i. `{"FIRSTKEY": [1,2,3], "SECONDKEY": 2.1415, "THIRDPKEY": "GOLDFISH"}`

ii. A [LIST] of {dictionaries} is like this:

```
[{"FIRSTKEY": [1,2,3], "SECONDKEY": 2.1415, "THIRDPKEY":
"GROUND SLOTH"},
{"FIRSTKEY": [4,5,6], "SECONDKEY": 4, "THIRDPKEY":
"GOLDFISH"},
{"FIRSTKEY": [7,8,9], "SECONDKEY": 8, "THIRDPKEY":
"POSSUM"},
{"FIRSTKEY": [1,2,3], "SECONDKEY": 16, "THIRDPKEY":
"AARDVARK"},
```

Figure 1. First trial to make a list of dictionaries and use JSON (note this script does not work yet).

```
while welcome_str.upper() == 'Y':
    print(MENU)
    menu_choice: str = input("Please make a choice from the menu above (1/2/3/4)  ")

    # Requests user make a choice from the menu offer choices 1 through 4 using if and else.
    if menu_choice == str(1):
        student_first_name = input("What is your first name? ").strip().title()
        student_last_name = input("What is your last name? ").strip().title()
        course_name = input("Please enter the name of the course: ").strip().title()
        student_data = ({ "FirstName": student_first_name, "LastName": student_last_name,
                           "CourseName": course_name })
        students.append(student_data)
        with json.dumps(students): #rewrite the whole file using json.dumps
            for student_row in students:
                print(f"You have registered { "FirstName" } { "LastName" } for"
                      f" { "CourseName" }.")

    elif menu_choice == str(2):
        students=read_file_obj(FILE_NAME)
        for student_row in students:
            student_first_name, student_last_name, course_name = student_row
            print(f'{student_first_name}, '
                  f'{student_last_name}, '
                  f'{course_name}')
```

Good things here: I think I know what I'm trying to do, just not the details of how to do it at this point. Not a bad place to be! The JSON dump is currently one issue, and there are others.

Table 1 gives a status towards completion at this point.

Table 1. Status toward completing the assignment – first check in.

1. Read module text	Done
2. Watch the module videos.	Done
3. Create a program	Program created and does not work
4. Document your knowledge.	Under sail
5. Submit your work.	submit just the URL to GitHub Not Started
6. Post Files to GitHub	Not Started
7. Post Link to GitHub Files on Canvas	Not started
8. Post per usual to Canvas	Not Started
9. Make a Peer Review (optional)	

I wrote a JSON files in Notepad. I made up some dummy information and followed an example of the formatting with all the indents and brackets. This is readable by my script! Cooool!

Here's how some output looks now (**Figure 2**). This is incorrect, but at least it runs. You can see what's in the JSON file, but unfortunately recently entered data was not appended as row 3. And the print statement is not functioning as expected.

I am using the Key, but the forming must be incorrect as it prints the Key name and not the value at that Key. Formatting issues are normal problem for me.

So, in trying to fix the lack of appending, I managed to erase the information in the JSON file. Ugh. I now know what the "line 362" errors arise from no information to read or incorrect formatting in the JSON file.

Figure 2. Output with it running, but incorrectly.

```
Please make a choice from the menu above (1/2/3/4) 1
What is your first name? Z
What is your last name? Z
Please enter the name of the course: XXX
{'FirstName': 'K', 'LastName': 'D', 'CourseName': 'Py'}
{'FirstName': 'R', 'LastName': 'R', 'CourseName': 'Py'}
You have registered FirstName LastName for CourseName.
```

Good things here: The script is successfully reading the JSON file and showing the results. It does not throw an error!

Let's do a QC check and see how close to the acceptance requirements this is now (Figure 3).

Figure 3. Results of the JSON import. Also, adding each student's information to the List as Dictionaries.

```
----Course Registration Program Menu-----
1. Register a student for a course
2. Show current data
3. Save data to a file
4. Exit this program

Please make a choice from the menu above (1/2/3/4) 1
What is your first name? K
What is your last name? D
Please enter the name of the course: PY 100
[{'First Name': 'K', 'Last Name': 'D', 'Course Name': 'Py'}, {'First Name': 'B', 'Last Name': 'R', 'Course Name': 'Py'}, {'First Name': 'Frunigus', 'Last Name': 'Mungohampton', 'Course Name': 'Underwater Glass Blowing 117'}, {'First Name': 'K', 'Last Name': 'D', 'Course Name': 'Py 100'}]
You have registered K D for Py 100.
```

Good things here: Quite exciting! Really, very fun to see this work!

Attended Office Hours

As office Hours approached, I still had not added any error handling. I started this part during office hours following Jeremy's excellent example. I can see how this might work on my script. Clarification on how the "as e" part worked was needed. Also I had more error handling than required in the end.

I copied the “def read_file” function to make a “def save_file” function. I needed some external coaching to figure out that json.dump needed a parameter of indent=2 to make it format somewhat nicely as a JSON file.

On review, all appears to continue to be working and meeting the acceptance criteria. The formatting has improved. I didn’t need to use JSON after all – but I was so deep into that, I was not interested in returning to .csv by the time I learned this.

I used Pycharm’s interface (with a lot of fiddling around) to commit the file to GitHub. I was unable to get this document into that interface, so I will have to upload manually.

Table 2. Status toward completing the assignment – first check in.

1. Read module text	Done
2. Watch the module videos.	Done
3. Create a program	Program created and works
4. Document your knowledge.	Done
Submit your work.	
5. Post Files to GitHub	Done
6. Post Link to GitHub Files on Canvas	Done
7. Post per usual to Canvas	Done
8. Make a Peer Review (optional)	Will not do this time

Conclusions

Assignment 05 focused on producing a script that uses error handling, JSON files for saving and reading a list of dictionaries. Importantly, this assignment had our first interface with dictionaries, one of Python’s collections. This was an interesting and useful exercise, and it is clear that more study to gain mastery of dictionaries is essential.

References

Dawson, Michael. 2010. Python Programming for the Absolute Beginner. Third Edition. Published by Course Technology PTR a part of Cengage Learning. Boston, MA, USA.