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05/21/2025

IT FDN 100 A

Assignment 5

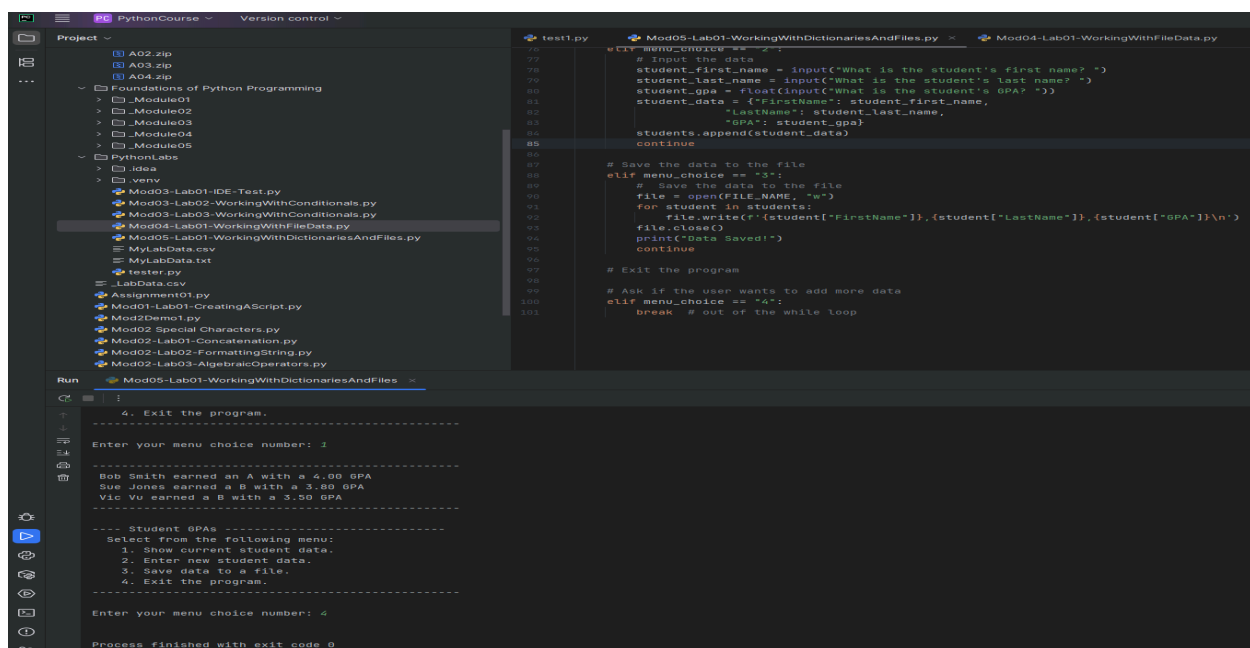
## Advanced Collections and Error Handling

### Introduction:

The fifth module teaches us some advanced data collection methods utilizing JSON interactions and using error handling to our advantage. I'll begin by explaining the key takeaways from the module notes, labs, and video demos. I will then share my process for creating the required program and testing the program.

### Performing the Assignment:

The module opened with practicing adding and removing data from example dictionaries within Python scripts and also within CSV files (Figure 01).

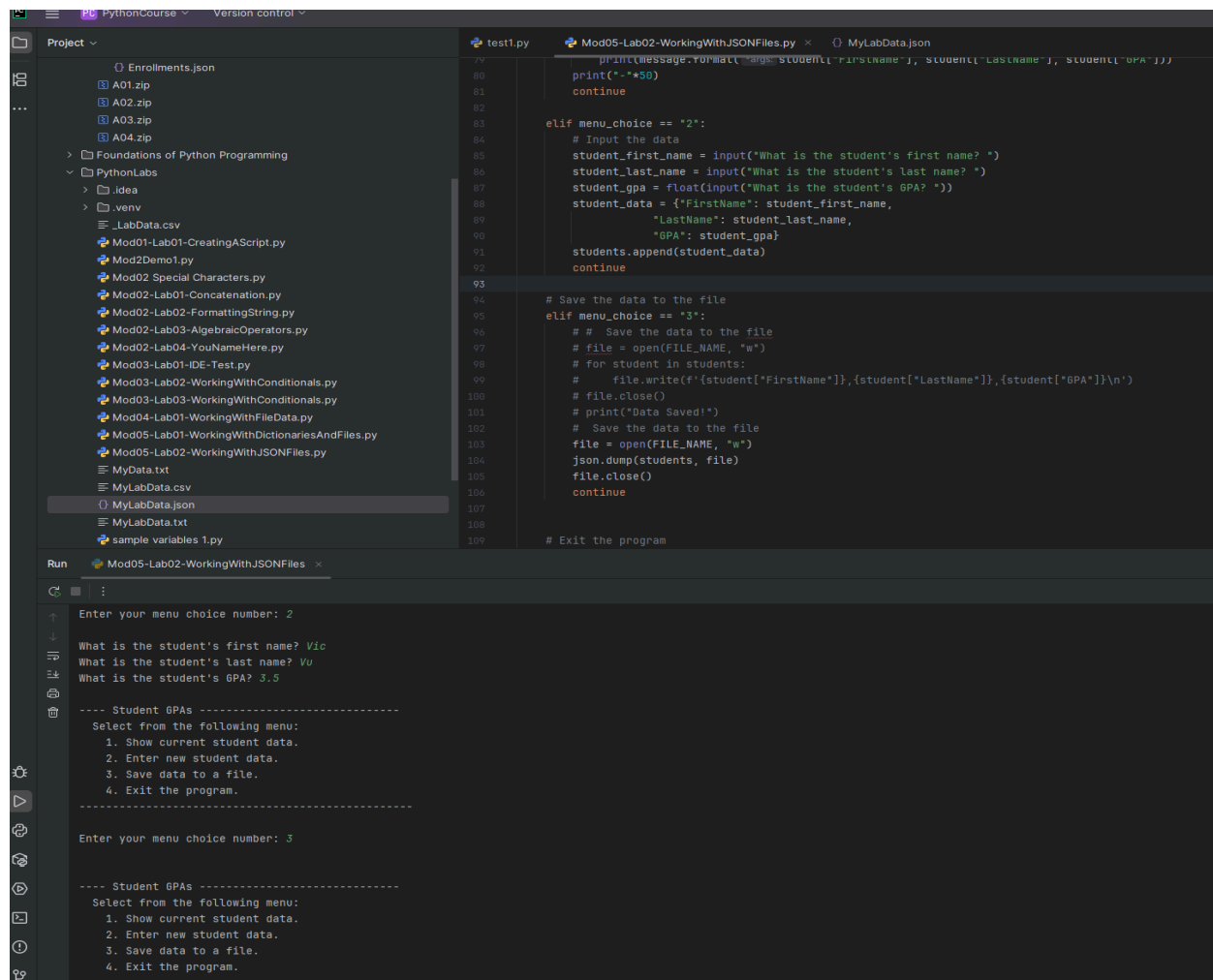


The screenshot displays an IDE with a project explorer on the left, a code editor in the center, and a run console at the bottom. The project explorer shows a directory structure for 'PythonCourse' with various modules and labs. The code editor shows the file 'Mod05-Lab01-WorkingWithDictionariesAndFiles.py'. The script defines a menu with four options: 1. Show current student data, 2. Enter new student data, 3. Save data to a file, and 4. Exit the program. It uses a while loop to repeatedly prompt the user for a menu choice. The run console shows the program's execution, including the menu display and the user's input of '1' to view current student data.

```
test1.py  Mod05-Lab01-WorkingWithDictionariesAndFiles.py  Mod04-Lab01-WorkingWithFileData.py
76  # Input the data
77  student_first_name = input("What is the student's first name? ")
78  student_last_name = input("What is the student's last name? ")
79  student_gpa = float(input("What is the student's GPA? "))
80  student_data = {"FirstName": student_first_name,
81                  "LastName": student_last_name,
82                  "GPA": student_gpa}
83  students.append(student_data)
84  continue
85
86  # Save the data to the file
87  elif menu_choice == "3":
88      # Save the data to the file
89      file = open(FILE_NAME, "w")
90      for student in students:
91          file.write(f'{student["FirstName"]},{student["LastName"]},{student["GPA"]}\n')
92      file.close()
93      print("Data Saved!")
94      continue
95
96  # Exit the program
97  elif menu_choice == "4":
98      break # out of the while loop
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```

After getting the basics down, we learned about JSON files and the benefits/use-cases of using them versus CSV files. One of the most important aspects that I was introduced to (at this point) was utilizing Python's modules. These were familiar to me as a SAS (Statistical Analysis System) user, as they are similar to procedures (PROC) in SAS programming. I was able to grasp the concepts of the second lab rather easily because of the similarities of SAS procedures and Python modules; the ordering and syntax is very similar (Figure 02).



The screenshot shows a Python IDE with a project explorer on the left, a code editor in the center, and a run console at the bottom. The project explorer shows a folder named 'PythonLabs' containing several subfolders and files. The code editor displays a Python script named 'Mod05-Lab02-WorkingWithJSONFiles.py'. The script defines a list of student data, prompts the user for input, and saves the data to a JSON file. The run console shows the output of the script, including prompts for student information and a menu for saving data.

```
test1.py  Mod05-Lab02-WorkingWithJSONFiles.py  MyLabData.json
77 print(message.format("Name: {student['first_name']}, {student['last_name']}, {student['GPA']}"))
78 print("-"*50)
79 continue
80
81 elif menu_choice == "2":
82     # Input the data
83     student_first_name = input("What is the student's first name? ")
84     student_last_name = input("What is the student's last name? ")
85     student_gpa = float(input("What is the student's GPA? "))
86     student_data = {"first_name": student_first_name,
87                   "last_name": student_last_name,
88                   "GPA": student_gpa}
89     students.append(student_data)
90     continue
91
92 # Save the data to the file
93 elif menu_choice == "3":
94     # Save the data to the file
95     # file = open(FILE_NAME, "w")
96     # for student in students:
97     #     file.write(f'{student["first_name"]},{student["last_name"]},{student["GPA"]}\n')
98     # file.close()
99     # print("Data Saved!")
100     # Save the data to the file
101     file = open(FILE_NAME, "w")
102     json.dump(students, file)
103     file.close()
104     continue
105
106 # Exit the program
```

Run Mod05-Lab02-WorkingWithJSONFiles

```
Enter your menu choice number: 2
What is the student's first name? Vic
What is the student's last name? Vu
What is the student's GPA? 3.5
----- Student GPAs -----
Select from the following menu:
1. Show current student data.
2. Enter new student data.
3. Save data to a file.
4. Exit the program.
Enter your menu choice number: 3
----- Student GPAs -----
Select from the following menu:
1. Show current student data.
2. Enter new student data.
3. Save data to a file.
4. Exit the program.
```

Figure 02 - Practicing writing new data with JSON with Lab02

The next useful tool introduced was error-handling. It's a useful way to keep your program from stopping completely and allowing the user to navigate mistake correction from within the program; useful especially when working with many different types of inputs and users. Lab 3 built on the first two labs by taking the program that was

incrementally built upon and added in error-handling and exception management. It also gave great examples of what those errors should look like and how to make them understandable to the user (Figure 03).

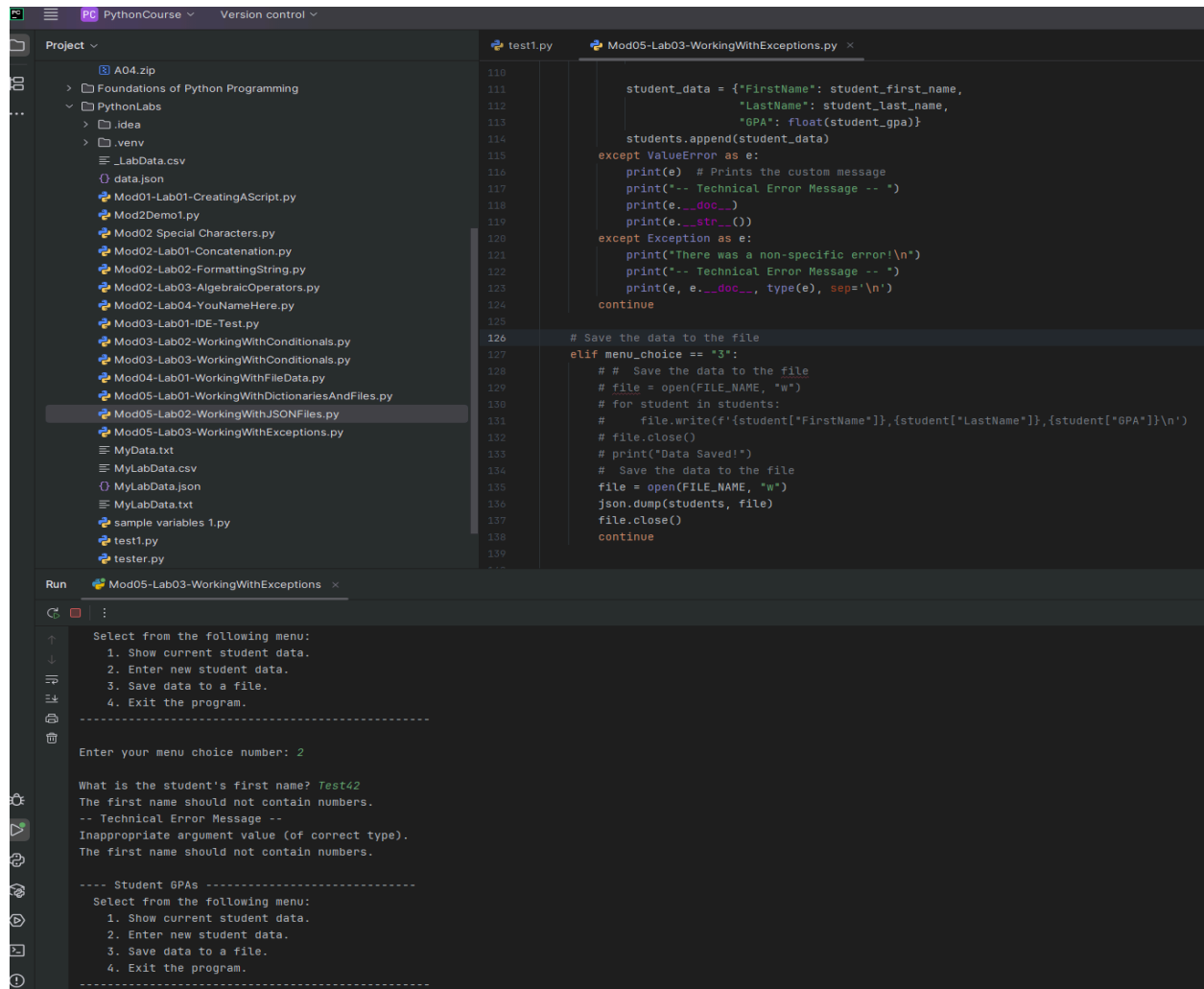


Figure 03 - Practicing writing new data with JSON plus Error Handling with Lab03

The assignment pulled all the items I learned in this module and required me to build a program utilizing JSON interaction and understanding, structured error handling, and also utilizing a new aspect: GitHub repositories. GitHub is a useful tool for organizing code work, storing files, and documenting version histories. I tried to utilize multiple tricks I learned in this module and from previous modules to make this program work as smoothly as possible (Figure 04).

```
Assignment05.py x
1 # -----
2 # Title: Assignment05
3 # Desc: This assignment demonstrates using dictionaries, files, and exception handling
4 # Change Log: (Who, When, What)
5 #   Ryan Swearingen, 5/20/2025, Created Script
6 # -----
7
8 # Import modules
9 import json
10
11 # Define the Data Constants
12 FILE_NAME = str = "Enrollments.json"
13 MENU: str = '''
14
15 ---- Course Registration Program ----
16 Select from the following menu:
17 1. Register a Student for a Course
18 2. Show current data
19 3. Save data to a file
20 4. Exit the program
21 -----
22 '''
23
24 # Define the Data Variables
25 student_first_name: str = '' # Holds the first name of a student entered by the user.
26 student_last_name: str = '' # Holds the last name of a student entered by the user.
27 course_name: str = '' # Holds the name of a course entered by the user.
28 file = None # Holds a reference to an opened file.
29 menu_choice: str = '' # Hold the choice made by the user.
30 student_data: dict = {} # one row of student data
31 students: list = [] # a table of student data
32
33
34 # When the program starts, read the file data into a list of lists (table)
35 # Extract the data from the file
36 try:
37     file = open(FILE_NAME, "r")
38     students = json.load(file)
39     file.close()
40
41 except FileNotFoundError as e:
42     print("Text file must exist before running this script!\n")
43     print("-- Technical Error Message -- ")
44     print(e, e.__doc__, type(e), sep='\n')
45
46 except Exception as e:
47     print("There was a non-specific error!\n")
48     print("-- Technical Error Message -- ")
49     print(e, e.__doc__, type(e), sep='\n')
50
51 finally:
52     if file.closed == False:
53         file.close()
54
55 # Present and Process the data
56 while (True):
57     # Present the menu of choices
58
Command Prompt
C:\Users\rsmcc\Documents\Python\PythonCourse>cd Assignments
C:\Users\rsmcc\Documents\Python\PythonCourse\Assignments>cd A05
C:\Users\rsmcc\Documents\Python\PythonCourse\Assignments\A05>python "Assignment05.py"
---- Course Registration Program ----
Select from the following menu:
1. Register a Student for a Course
2. Show current data
3. Save data to a file
4. Exit the program
-----
What would you like to do: 1
What is the student's first name? Ben
What is the student's last name? Kenobi
What is the course name? Python250
---- Course Registration Program ----
Select from the following menu:
1. Register a Student for a Course
2. Show current data
3. Save data to a file
4. Exit the program
-----
What would you like to do: 2
Student Patrick Stewart is enrolled in Python100
Student Luke Skywalker is enrolled in Python200
Student Ryan Swearry is enrolled in Python400
Student Ryan James is enrolled in Python600
Student James Kirk is enrolled in Python800
Student Ben Kenobi is enrolled in Python250
---- Course Registration Program ----
Select from the following menu:
1. Register a Student for a Course
2. Show current data
3. Save data to a file
4. Exit the program
-----
What would you like to do: 3
The following data was saved to file!
Student Patrick Stewart is enrolled in Python100
Student Luke Skywalker is enrolled in Python200
Student Ryan Swearry is enrolled in Python400
Student Ryan James is enrolled in Python600
Student James Kirk is enrolled in Python800
Student Ben Kenobi is enrolled in Python250
---- Course Registration Program ----
Select from the following menu:
1. Register a Student for a Course
2. Show current data
3. Save data to a file
4. Exit the program
-----
What would you like to do: 4
Program Ended
C:\Users\rsmcc\Documents\Python\PythonCourse\Assignments\A05>
```

Figure 04 - Testing Assignment 5 in Command Prompt

The GitHub repository link for this assignment is located here:

<https://github.com/swearry17/IntroToProg-Python-Mod05.git>

**Conclusion:**

Learning about JSON interactions, modules within Python, error handling, as well as resources like GitHub has really helped me understand the capabilities of Python.