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Course: Introduction to Programming with Python

Assignment 04- Data Processing using Dictionaries and Exception Handling

Introduction

In this assignment, I learned data processing using dictionaries and exception handling, and it helped me think more carefully about how programs manage information. I moved beyond simply collecting user input and began organizing data in a structured and meaningful way. I also gained confidence working with JSON files to store and retrieve data, which made the program feel more realistic and practical. This assignment helped me see how different programming concepts—data structures, file handling, and error control—work together to build a stable and interactive application.

Data Processing Using Dictionaries

Working with dictionaries changed the way I think about storing data. Instead of relying on positions in a list, I learned to use descriptive keys like “FirstName” and “LastName” to make the data clearer and easier to understand. This made my program more readable and less prone to mistakes. I realized that dictionaries allow me to organize information in a way that better reflects real-world records. By combining dictionaries inside a list, I was able to manage multiple student registrations in a structured and scalable way. This experience strengthened my understanding of how data can be processed efficiently.

Exception Handling

Learning exception handling helped me understand the importance of writing programs that can handle unexpected situations. Before this assignment, I focused mainly on making my program work when everything was entered correctly. Through this exercise, I learned how to anticipate errors, such as invalid input or missing files, and handle them gracefully using try and except. This made my program more reliable and professional. I now see exception handling as an important part of responsible programming, ensuring that users have smooth experience even when mistakes occur.

How I Completed the Program

To complete this program, I first reviewed the assignment requirements carefully and identified the key components I needed to implement, such as dictionaries, JSON file handling, and structured exception handling. I started by defining the required constants and variables, making sure everything was clearly initialized before building the menu-driven structure. I then focused on replacing the list-based structure from the previous assignment with dictionaries, ensuring that each student's information was stored using meaningful key-value pairs. I tested each menu option individually to confirm that registering students, displaying data, and saving information to the file worked correctly before moving on to the next part.

As I developed the program, I paid close attention to handling possible errors. I implemented "try" and "except" blocks to manage file reading and writing issues, as well as to validate user input when entering student names. I tested the program multiple times in both PyCharm and the command prompt to ensure that it behaved consistently and handled unexpected input without crashing. When errors occurred, I analyzed the error messages carefully and adjusted the code step by step until the program functioned smoothly.

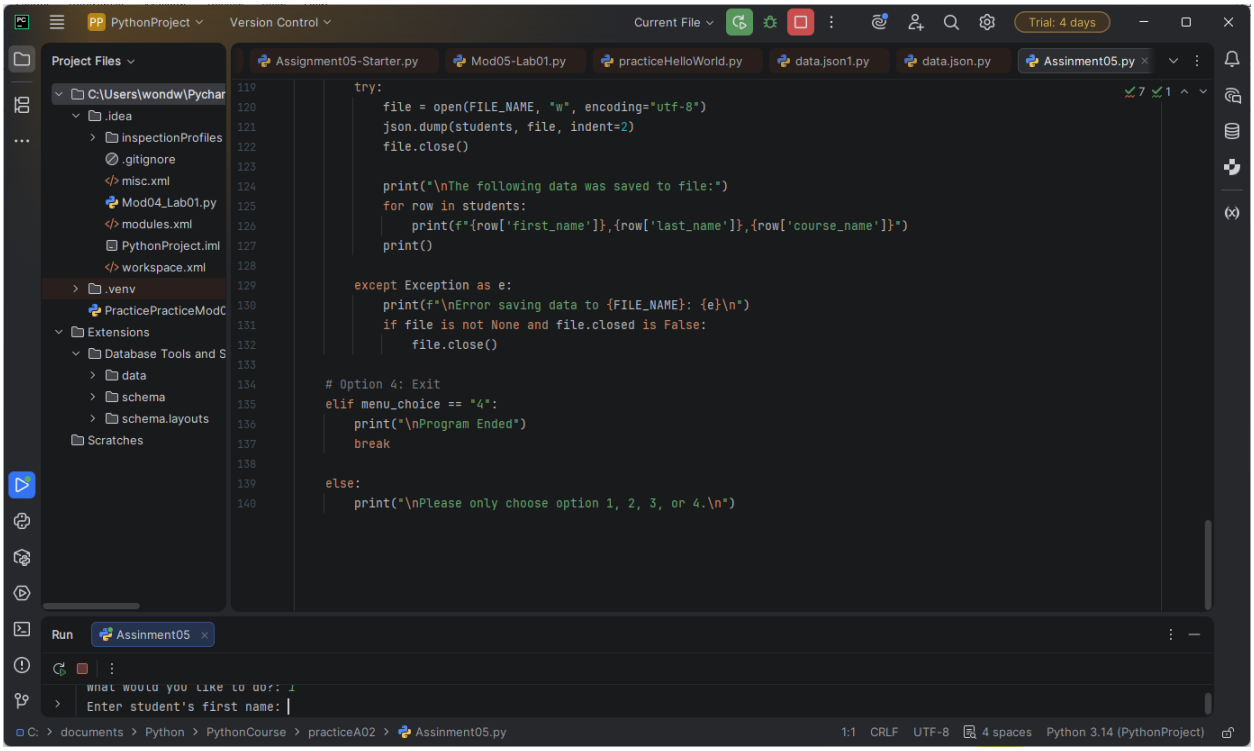

Fig 1. Showing program and receiving input from the user

Summary

Overall, this assignment helped me grow in both technical skill and problem-solving mindset. I learned how to organize data more effectively using dictionaries, persist information using JSON files, and protect my program from crashing through structured exception handling. More importantly, I began to think more like a programmer—anticipating potential errors, designing clearer data structures, and building programs that are both functional and reliable. This experience strengthened my confidence and prepared me for more advanced programming concepts in future assignments.