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Foundations of Programming (Python)
Assignment 06

# Assignment 06: Functions

**Introduction**
In this document I will cover the completion of assignment six for Foundations of Programming – Python, functions and classes. The follow topics will be discussed within this document.

- Terms to know
- Steps taken for assignment 06
- Summary of learnings

**Terms to Know**
Classes: in Python, classes are a form of grouping variables, functions and constants by way of their class. (cited from Mod06 notes)
Functions: a block of code that will run only when it is called upon. One can pass known parameters and data into a function (cited from W3schools.com)

**Steps Taken for Assignment 06**
For assignment six we were provided with starter code. I opened the starter code in PyCharm and updated the starter code header to reflect the work I would be completing. See figure 1.

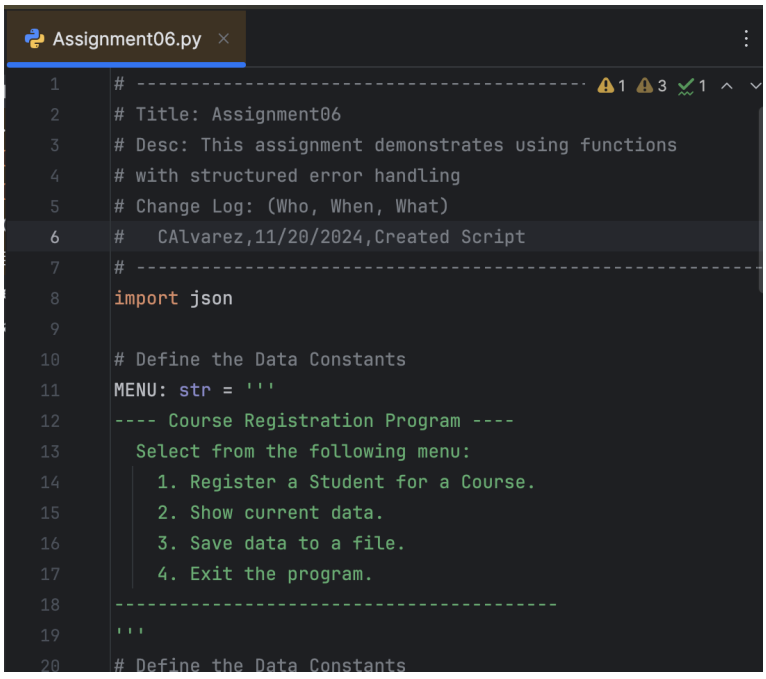

Figure 1. Started code updated

Next I added the two classes, File Processor and IO. Pictured below.

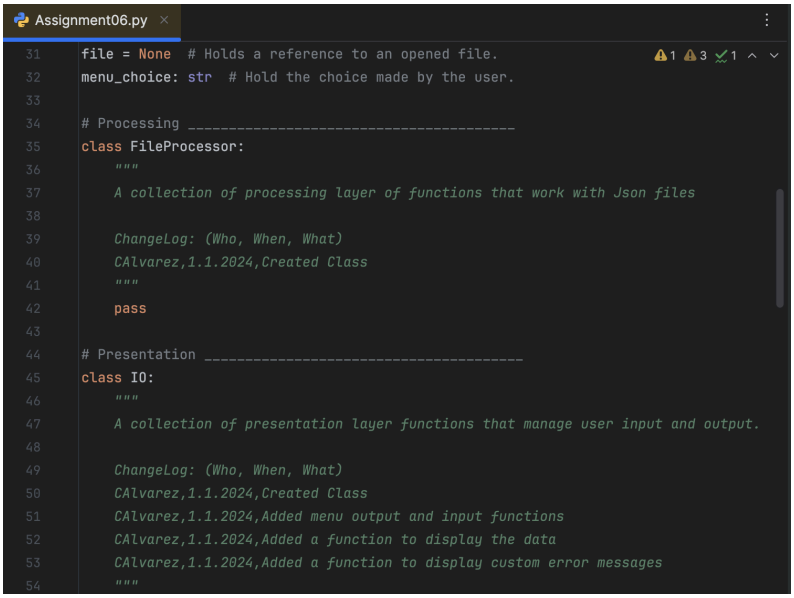

Figure 2. Classes added to code

The function that was used in the labs for module six was also added to the code. See figure 3.

Figure 3. Function added

From here I added the output menu and updated where the output menu would be used. Figure 4 and 5 below.

```python
    @staticmethod
    def output_menu(menu: str):
        """ This function displays the menu of choices to the user.

        ChangeLog: (Who, When, What)
        CAlvarez,11.18.2024,Created Class

        :return: None
        """
        print() # Space added for aesthetics
        print(menu)
        print() # Space added for aesthetics
```

Figure 4. Added output menu

```python
# Present and Process the data
while (True):

    # Present the menu of choices
    IO.output_menu(menu=MENU)
```

Figure 5. Updated usage of menu

Added the output menu function. See figure 6. And updated in the code where this function would be called. See figure 7.

```python
@staticmethod
def input_menu_choice():
    """ This function gets a menu choice from the user.

    ChangeLog: (Who, When, What)
    CAlvarez,11.18.2024,Created Class

    :return: string with the users choice
    """
    choice = "0"
    try:
        choice = input("Enter your menu choice number: ")
        if choice not in ("1","2","3","4"):
            raise Exception("Please, choose only 1,2,3, or 4")
    except Exception as e:
        IO.output_error_messages(e.__str__()) # Not passing e to a

    return choice
```

Figure 6. Output menu function

```
132     # Present the menu of choices
133     IO.output_menu(menu=MENU)
134
135     menu_choice = IO.input_menu_choice()
136
```

Figure 7. Output menu usage

From here I added the function to support the output of the student course and made the updates to support this function to menu choice two. See figure 8 and 9.

```
99      @staticmethod
100     def output_student_and_course_name(student_data: list):
101         """ This function displays the student and course name
102
103         ChangeLog: (Who, When, What)
104         CAlvarez,11.18.2024,Created Class
105
106         :return: None
107         """
108     print("-" * 50)
109     for student in student_data:
110         print(f'student {student["FirstName"]}'
111               f'{student["LastName"]} is enrolled in {student["CourseName"]}')
112         print("-" * 50)
113
```

Figure 8. Function added for student course output

```
181     # Present the current data
182     elif menu_choice == "2":
183
184         # Updated to use function output_student_course
185         IO.output_student_and_course_name(students)
186         continue
187
```

Figure 9. Menu choice two updated to above function

The next function was for input of the student data. I recalled some of the work from one of the labs and carried over the learnings here. Figure 10 and 11 show the updates to support input of student data and the update to menu choice one.

```python
    @staticmethod
    def input_student_data(student_data: list):
        """ This function gets the first name, last name and a course name.

        ChangeLog: (Who, When, What)
        CAlvarez,11.18.2024,Created Class

        :return: list
        """

        try:
            student_first_name = input("Enter the student's first name: ")
            if not student_first_name.isalpha():
                raise ValueError("The first name should not contain numbers.")
            student_last_name = input("Enter the student's last name: ")
            if not student_last_name.isalpha():
                raise ValueError("The last name should not contain numbers.")
            course_name = input("What is the student's course name? ")
            student = {"FirstName": student_first_name,
                       "LastName": student_last_name,
                       "CourseName": course_name}
            student_data.append(student)
            print(f"You have registered {student_first_name} {student_last_name} for {course_name}.")
        except ValueError as e:
            IO.output_error_messages(message="Please check data entered one of the values was incorrect.", Exception=e)
        except Exception as e:
            IO.output_error_messages(message="Error: There was a problem with the data entered", Exception=e)
```

Figure 10. Input student data function

```python

        # Input user data
        if menu_choice == "1":  # This will not work if it is an integer!
            students=IO.input_student_data(student_data=students)
            continue

```

Figure 11. Menu choice one update

Next, I worked on the read data from file function. Figure 12 depicts the update to the file processing field.

```python
class FileProcessor:
    def read_data_from_file(file_name: str, student_data: list):

        ChangeLog: (Who, When, What)
        CAlvarez,11.18.2024,Created function

        :return: list
         """
        try:
            file = open(file_name, "r")
            student_data = json.load(file)
            file.close()
        except Exception as e:
            IO.output_error_messages(message="Error: There was a problem with reading the file.", error=e)

        finally:
            if file.closed == False:
                file.close()
```

Figure 12. Function for read data file

I completed the last function for the assignment which was to write the data to file. I added the function to support this, see figure 13 and 14.

```python
    def write_data_to_file(file_name: str, student_data: list):
        """ This function writes data to json file

        ChangeLog: (Who, When, What)
        CAlvarez,11.18.2024,Created function

        :return: none
        """
        try:
            file = open(file_name, "w")
            json.dump(student_data, file)
            file.close()
            IO.output_student_and_course_name(student_data=student_data)
        except Exception as e:
            message = "Error: There is a problem with writing to file.\n"
            message += "Please check that the file is not open in another program."
            IO.output_error_messages(message=message, error=e)

        finally:
            if file.closed == False:
                file.close()
```

Figure 13. Function to write to data file

```python
    # Save the data to a file
    elif menu_choice == "3":

        FileProcessor.write_data_to_file(file_name=FILE_NAME, student_data=students)
        continue
```

Figure 14. Update to menu choice three

Lastly, I ran the code to ensure all was working as expected. See figure 15. And uploaded to GitHub, https://github.com/Christina64/IntroToProg-Python-Mod06.

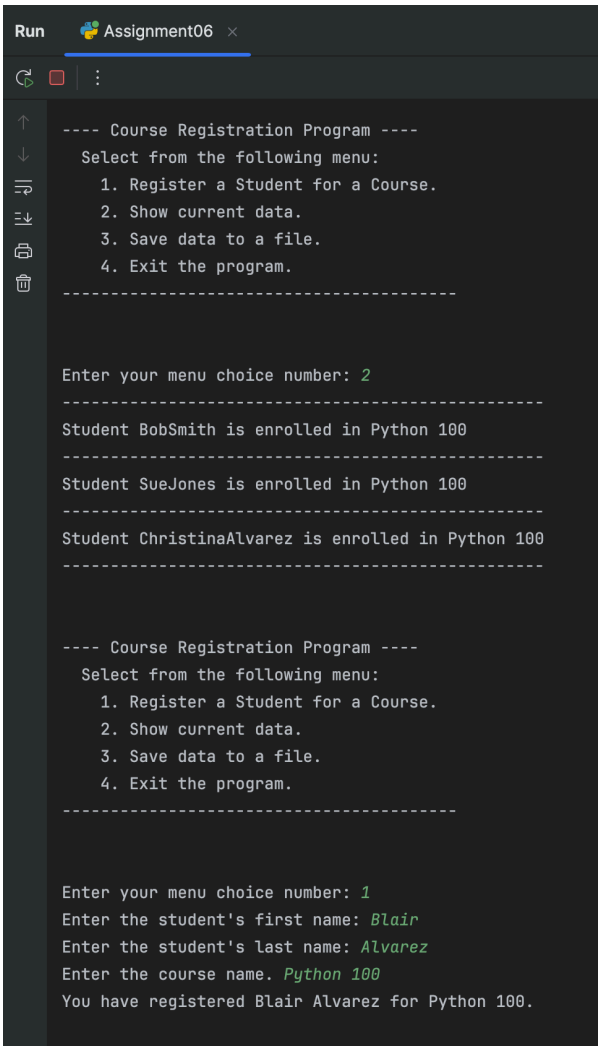

Figure 15. Check to ensure code runs

**Summary of learnings**

Assignment six was a more challenging assignment ensuring that functions were accurately represented and that the menu choices were updated along the way to eliminate duplication. Observations from this assignment is that functions can simplify the coding process by using code that was defined in previous projects. Additionally, functions seem to make code relatively top heavy and the actual body of the code a lot leaner. One big learning from this assignment was the importance of indentation.