

Germán Gornalusse

Tuesday November 27, 2021

IT FDN 110 A Au21: Foundations of Programming: Python

Assignment Module 06: Functions and Classes

GitHubURL: <https://github.com/GermanGornalusse/IntroToProg-Python-Mod06>

GitHub Web Page: <https://germangornalusse.github.io/IntroToProg-Python-Mod06/>

## How to Use Functions and Classes to Organize your Program Using Separation of Concern (SoC) Pattern

### Introduction

In this paper, I will use an example of a script in which the user will read a text file containing tasks and priorities into a dictionary and how the dictionary will be converted into a list. The script will also ask the user for different choices that include to visualize the current data, add a new item, remove an existing item, save the data to a file or exit the program. The statements will be collapsed using different classes (Processor, Input/Output) and functions, and the script will be written applying the concept of Separation of Concerns (SoC), to improve the readability.

For simplicity, I will assume you will be using Windows operating system.

### Step 1. Create a subfolder in your C: Drive\\_PythonClass

The following instructions will allow you to create this subfolder in your hard drive:

**C:/\_PythonClass/Assignment06**

- a) Left double click on “\_PythonClass” folder (to open it)
- b) Right click> New > Folder
- c) Name the folder as Assignment 06\_Yourlastname

I am showing you how the final path to this folder will look like (**Figure 1**):



This PC > Windows (C:) > \_PythonClass > Assignment 06\_German Gornalusse

**Figure 1. Path to the folder where you will save your Assignment 06. I used my first and last name (“German Gornalusse”) as an example to personalize my subfolder.**

## Step 2. Create a new Project in PyCharm

You will create a new project in PyCharm that uses the `_PythonClass\Assignment06_` last name folder as its location. I assume you will have installed PyCharm on your `C:\` drive or on your desktop.

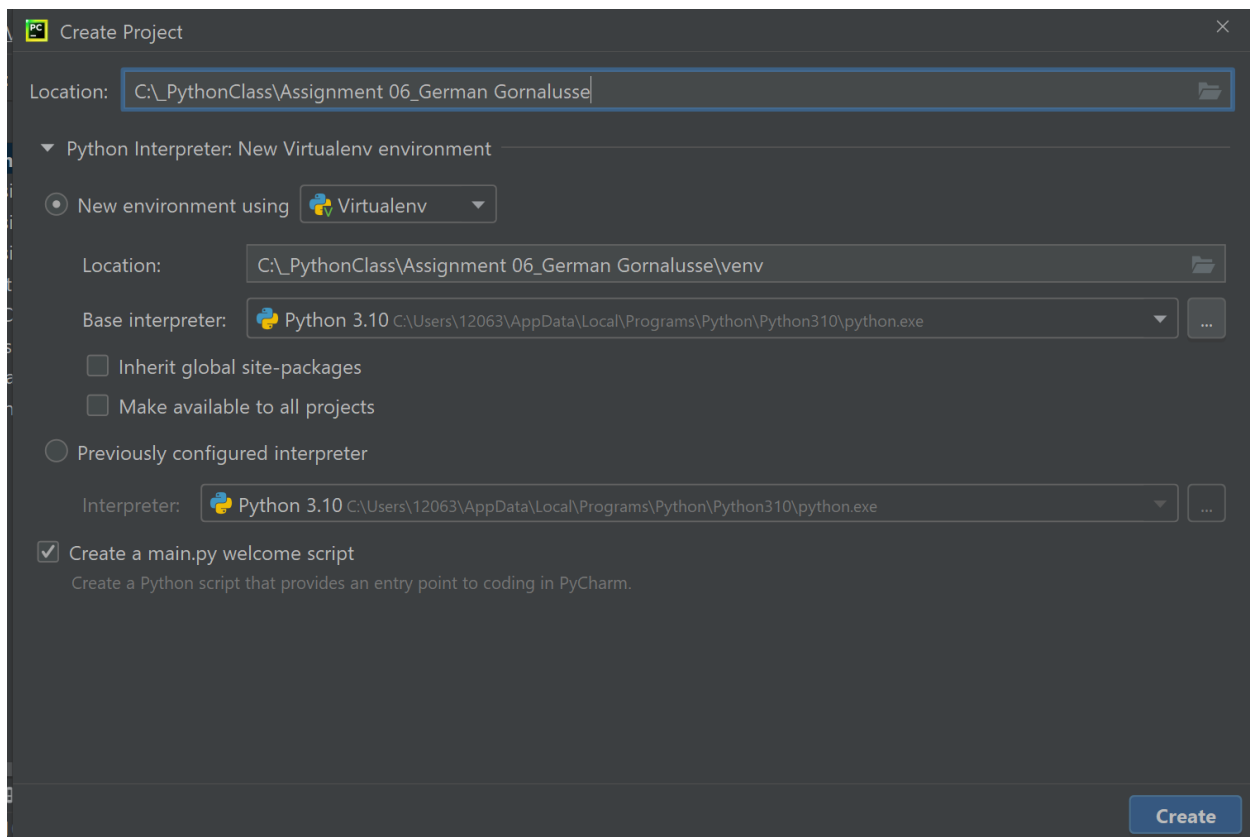
a) Double click the icon “PyCharm Community Edition 2021.2.3”. Mine shows up on my desktop.

b) Select: File> New Project

c) In location type `C:\_PythonClass\Assignment06` to select the file subfolder wherein you will save your project. Alternatively, you can browse the destination folder by selecting the “open folder” symbol at the end of “Location” and manually by browsing and selecting the final folder. [See yellow arrow, on **Figure 2**]

d) Select “New environment using Virtualenv” option. And “Create a main.py” welcome script option. [See orange arrow, Figure 2]. Make sure the Base interpreter is set “Python 3.10” (or the latest version you installed in your computer).

e) Select “Create” (lower right corner of your screen). [**Figure 2**]



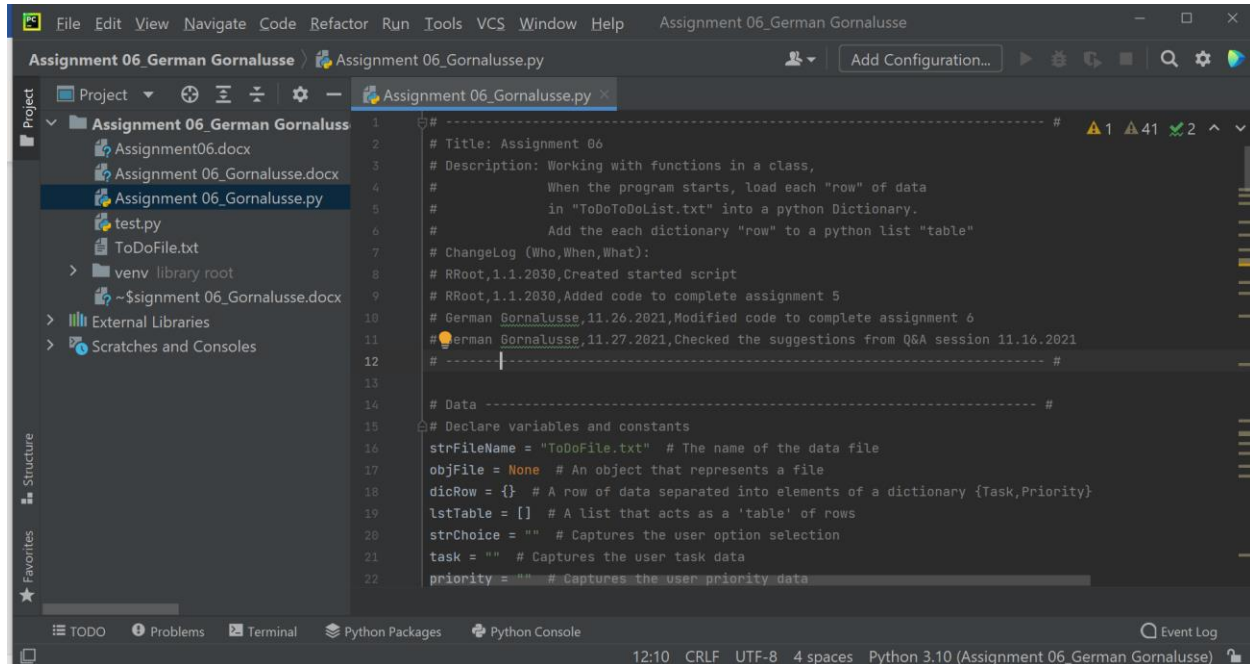
**Figure 2** How to create a new project in `C:\_PythonClass\Assignment 06` subfolder using the IDE PyCharm

To do that:

a) File> Open

b) Select Assignment 06 subfolder

c) Select either “This window” or “New Window”. Notice how, on the left-hand side, the “Assignment 06” subfolder shows up. In **Figure 3** I am illustrating this example.



**Figure 3.** PyCharm window showing current folder where your Python script Assignment05 will be saved

### Step 3. Open a Python Script in the Project Folder: “Assignment06\_Starter”.

At this point, you should have copied and pasted the file “Assignment06\_Starter” from Module 06 to Assingment06\_German Gornalusse folder.

Figure 2 above shows you the initial script loaded into “Assignment06\_Starter”.

### Step 4. Add Code to the Python File “Assignment06\_Starter.py”.

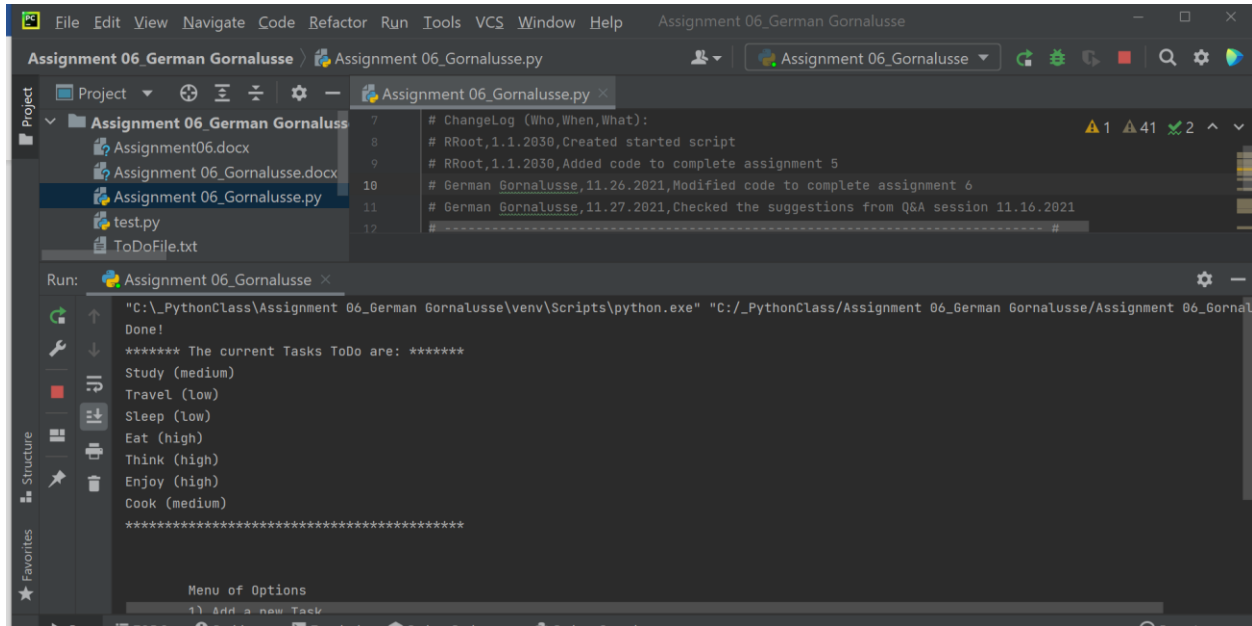
You will start writing the header and comments, as indicated in the **Figure 3** above. And then, you add the code shown above.

Once you finish completing the code, I renamed the file to “Assignment06\_Gornalusse.py”.

### Step 5. Run the Script using PyCharm and the OS Command Shell

First you will run your code using PyCharm.

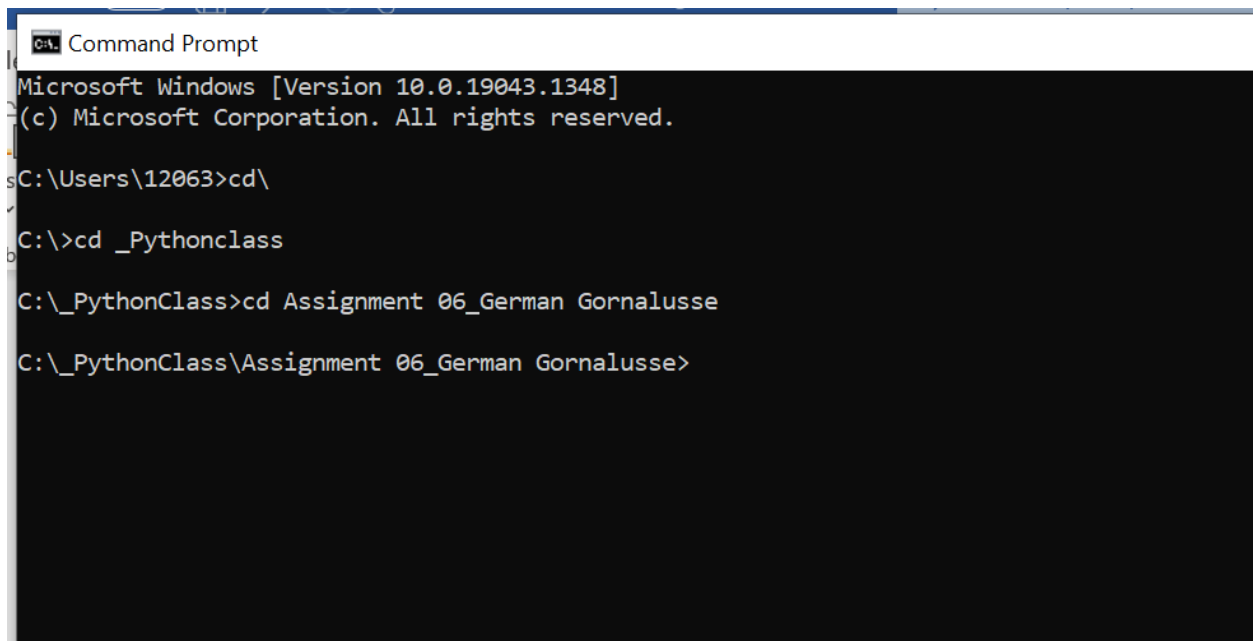
- a) Select your block of code.
- b) Right Click > Run
- c) In the bottom of the PyCharm screen, it will show the program working (**Figure 4**)



**Figure 4** Screening shot of PyCharm showing the script "Assignment06\_Gornalusse.py" working properly.

I will now check that the Script can be also run from the OS Command Shell.

- a) Open CMD from the Windows menu
- b) Use the command `cd` to access Assignment06\_German Gornalusse directory as shown in **Figure 5**.
- b) Paste the path to the file "Assignment05\_Gornalusse.py", as shown in **Figure 6**.



```
Command Prompt
Microsoft Windows [Version 10.0.19043.1348]
(c) Microsoft Corporation. All rights reserved.

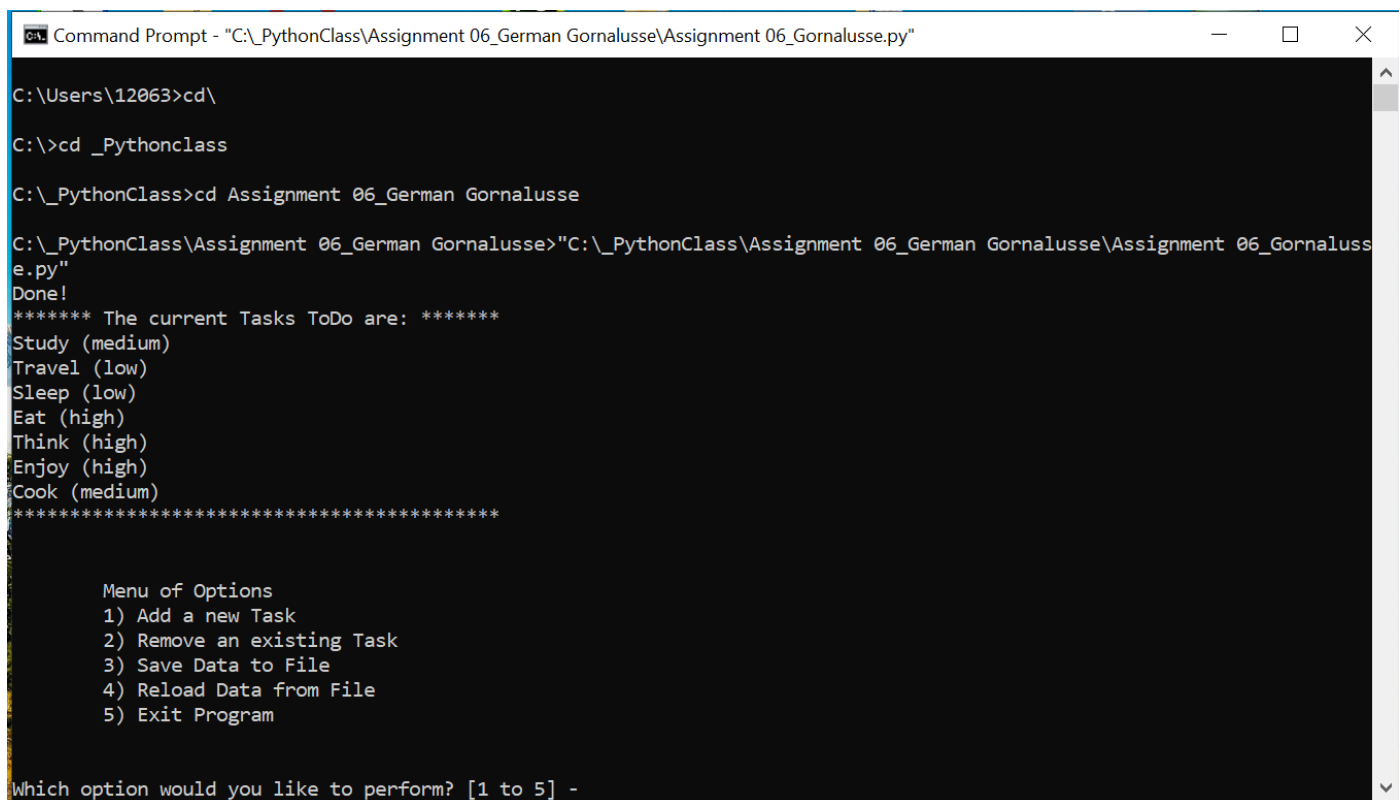
C:\Users\12063>cd\

C:\>cd _Pythonclass

C:\_PythonClass>cd Assignment 06_German Gornalusse

C:\_PythonClass\Assignment 06_German Gornalusse>
```

*Figure 5 Screenshot of the OS command shell showing how to change directories. You should be able to access the subfolder wherein your Assignment 06 was saved.*



```
Command Prompt - "C:\_PythonClass\Assignment 06_German Gornalusse\Assignment 06_Gornalusse.py"

C:\Users\12063>cd\

C:\>cd _Pythonclass

C:\_PythonClass>cd Assignment 06_German Gornalusse

C:\_PythonClass\Assignment 06_German Gornalusse>"C:\_PythonClass\Assignment 06_German Gornalusse\Assignment 06_Gornalusse.py"
Done!
***** The current Tasks ToDo are: *****
Study (medium)
Travel (low)
Sleep (low)
Eat (high)
Think (high)
Enjoy (high)
Cook (medium)
*****

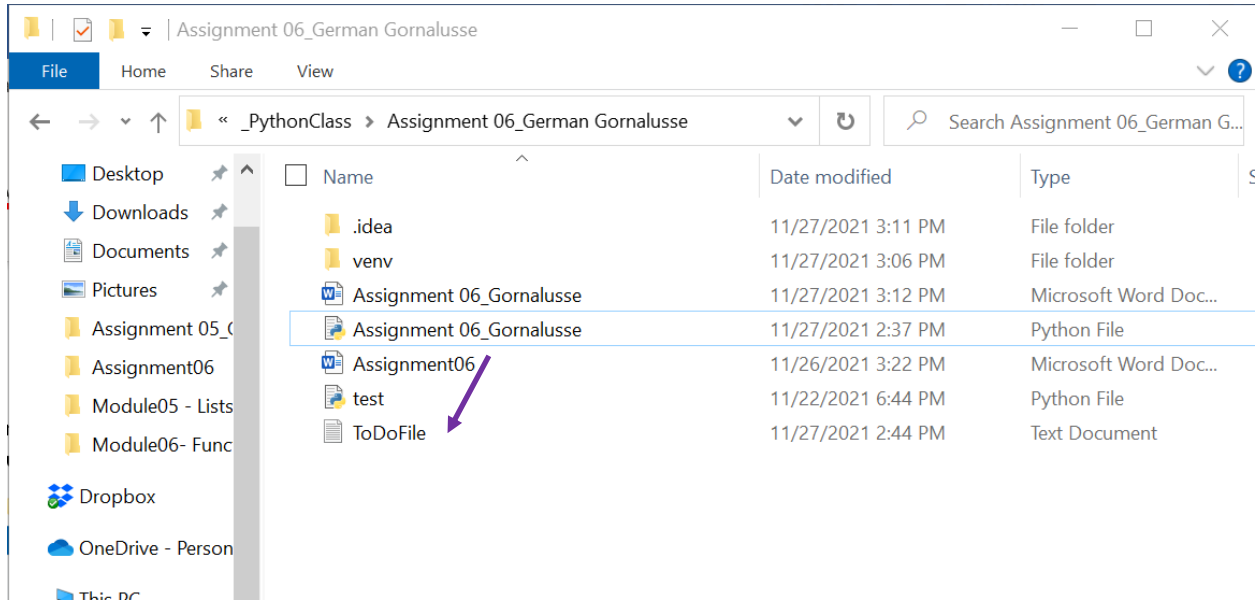
Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Reload Data from File
5) Exit Program

Which option would you like to perform? [1 to 5] -
```

*Figure 6 Screenshot of the OS command shell that script runs properly.*

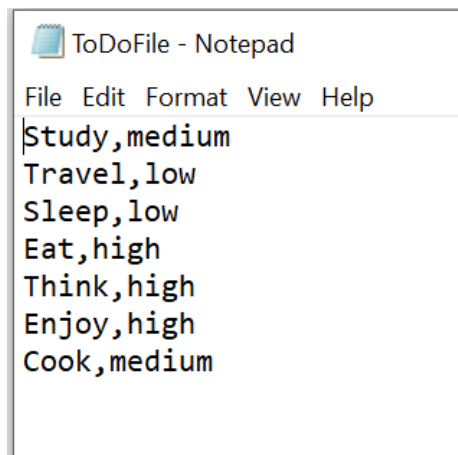
## Step 5. Verify that the Data Entered were Captured and Saved in the Text File

Enter the folder Assignment06\_German Gornalusse and you must see the text file “ToDoFile.txt” (see purple arrow, **Figure 7** below)



**Figure 7** Creation of the text file "ToDoFile" in the folder "Assignment05\_Gornalusse"

Once you open the text file, you will see that it contains different dyads of Tasks and Priorities, separated by commas (**Figure 8**).



**Figure 8** Verification that the text file contains actual data entered by the user

## Summary

In this project, by organizing the statements in classes and functions, the user is introduced to a script in which different parts of the program are clearly separated and it follows the “Separation of Concerns”

(SoC) design for programming. First, the user will have to define processing functions such as to read data from a file, to add or remove data to or from a list and to write data to a file. In a separate class, the user will state different input/output functions that include printing menu tasks, entering new dyads of tasks and priorities or indicating what task needs to be removed. In the body of the script, the user will learn how to “collapse” different classes and functions and will apply a menu-like algorithm to navigate through different options.