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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. Finally, the user will upload both files (PDF,Word and Python script) into a GitHub repository and post a GitHub Web page.

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**):

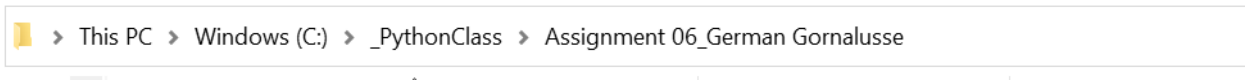

Figure 1. Path to the folder where you will save your Assignment 06. I used my first and last name ("German Gornalusse") as an example to personalize my subfolder.

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**]

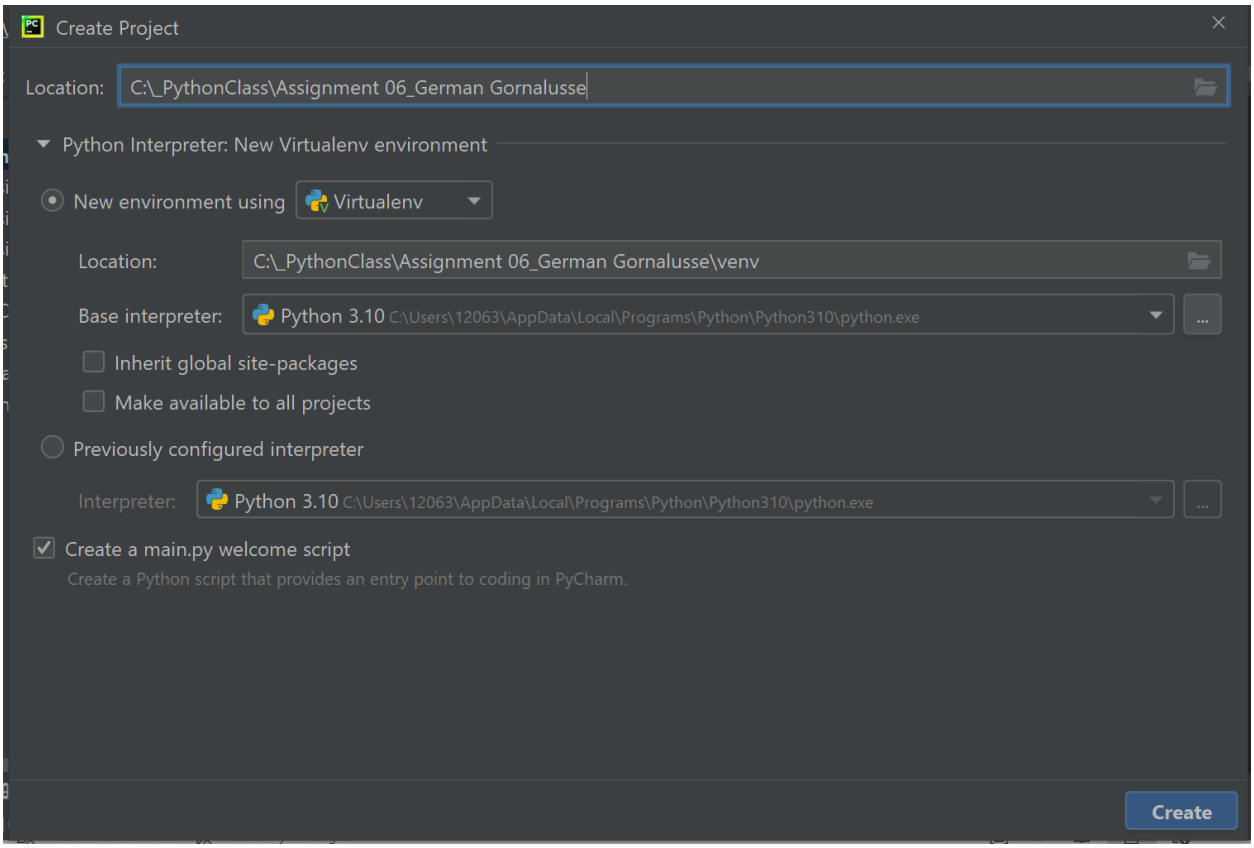

Figure 2 How to create a new project in C:_PythonClass\Assignment 06 subfolder using the IDE PyCharm

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.

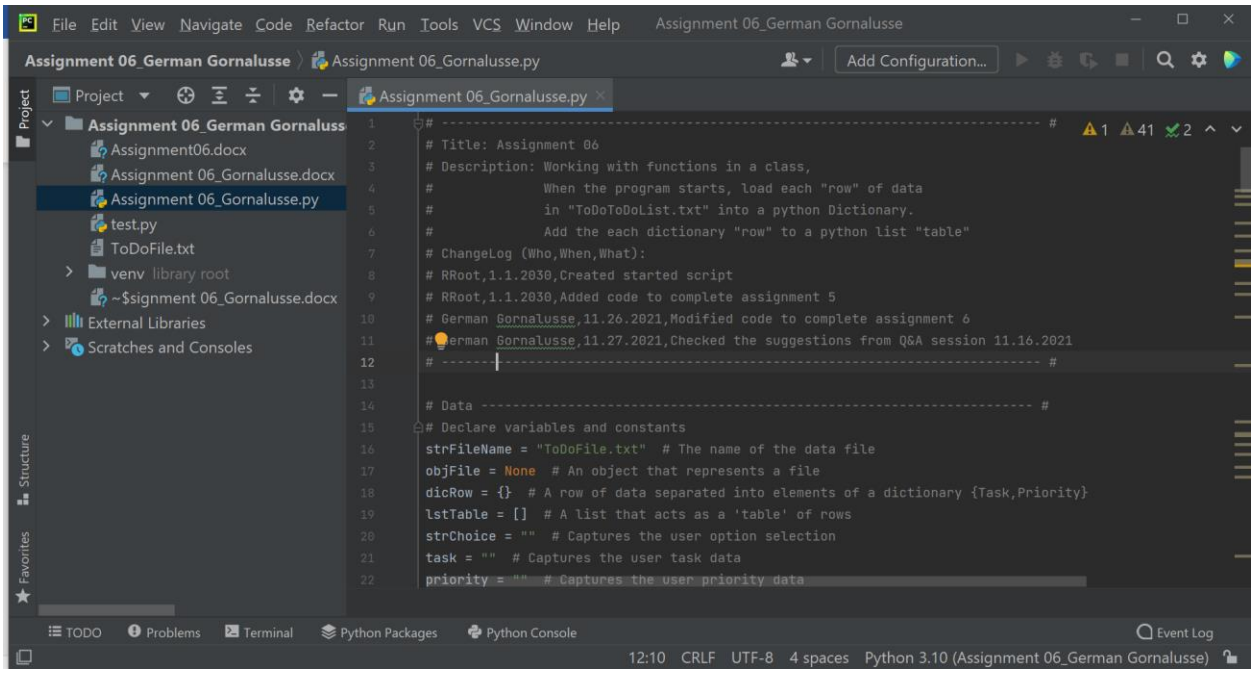

Figure 3. PyCharm window showing current folder where your Python script Assignment05 will be saved

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 Assingnment06_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**)

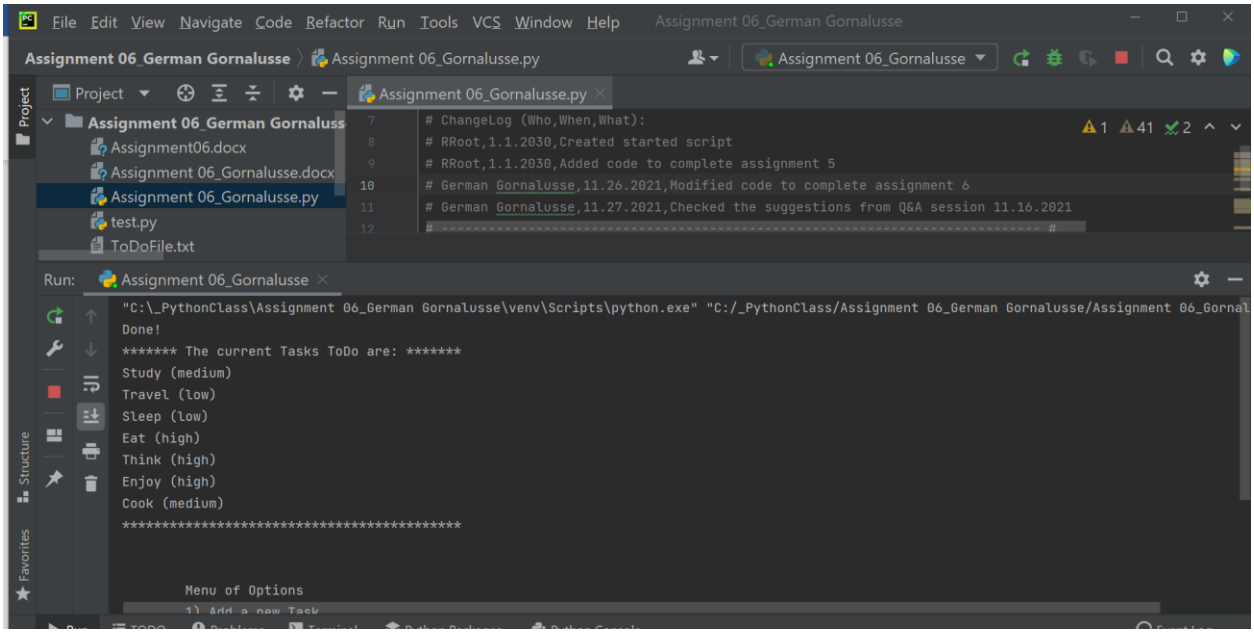

Figure 4 Screening shot of PyCharm showing the script "Assignment06_Gornalusse.py" working properly.

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.**

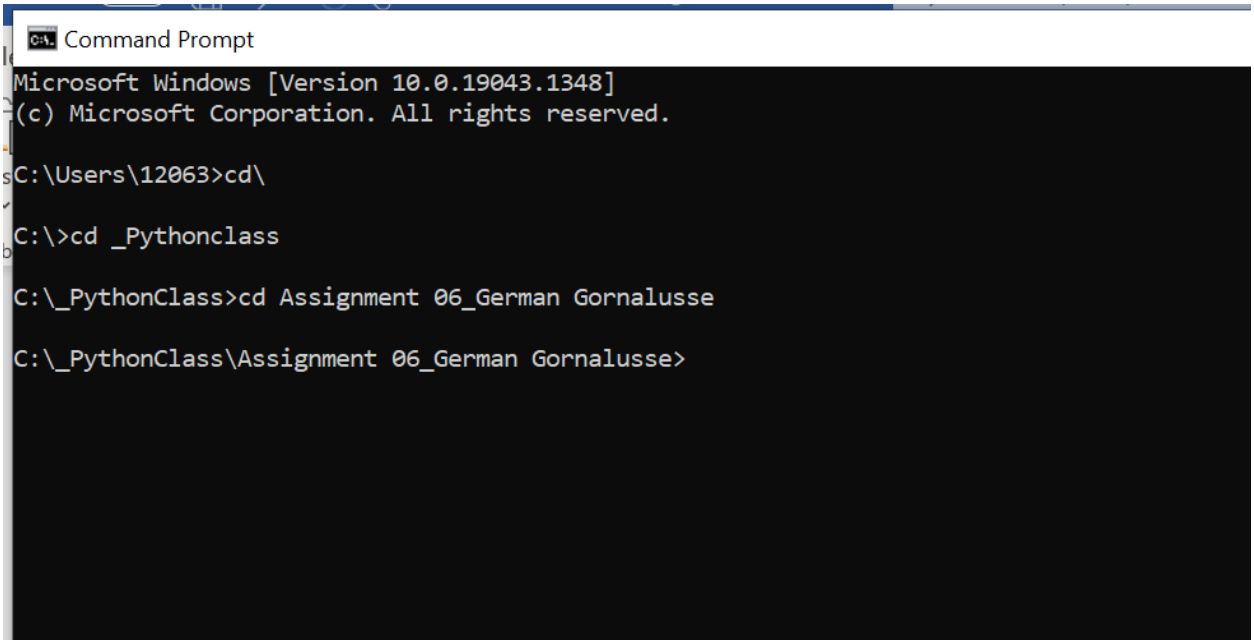

Figure 5 Screenshot of the OS command shell showing how to change directories. You should be able to access the subfolder wherein your Assignment 06 was saved.

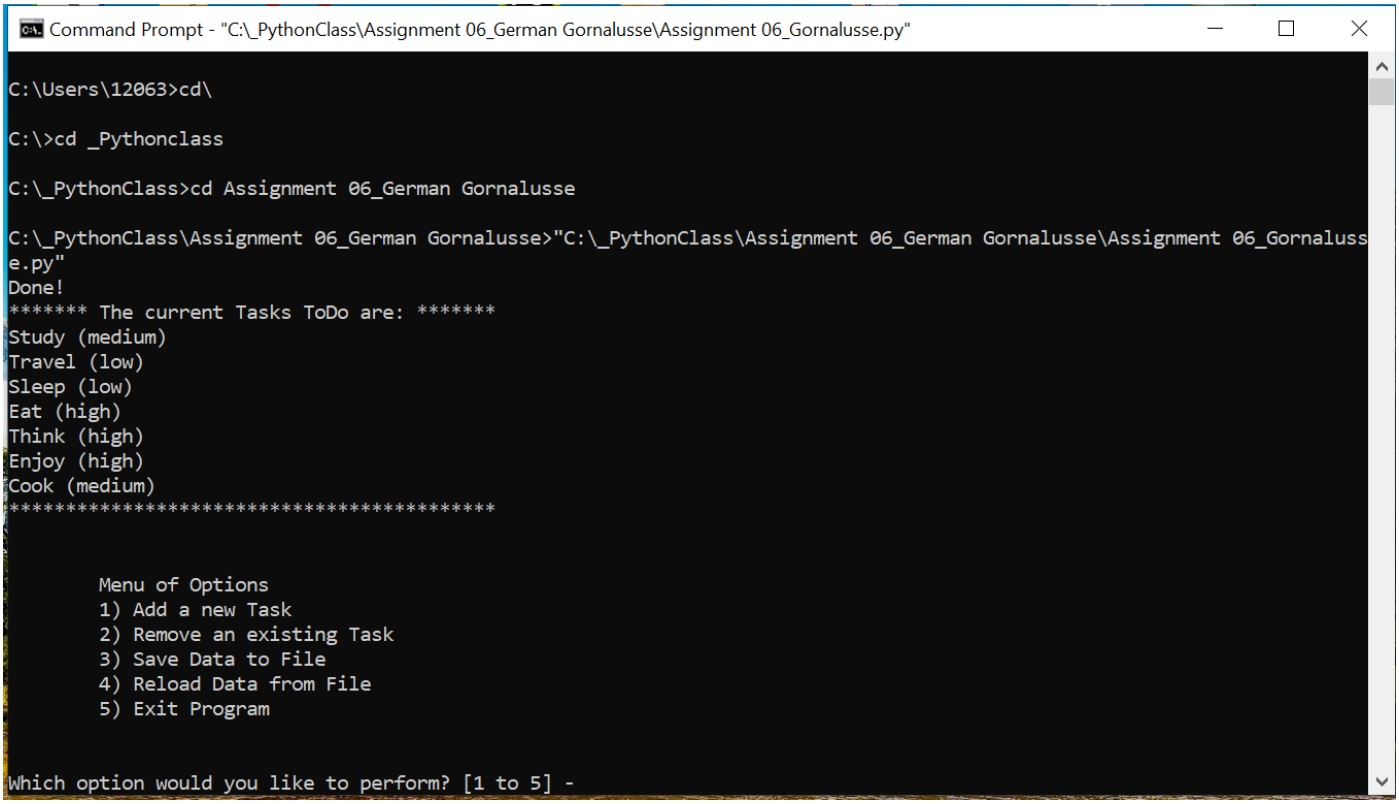

Figure 6 Screenshot of the OS command shell that script runs properly.

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)

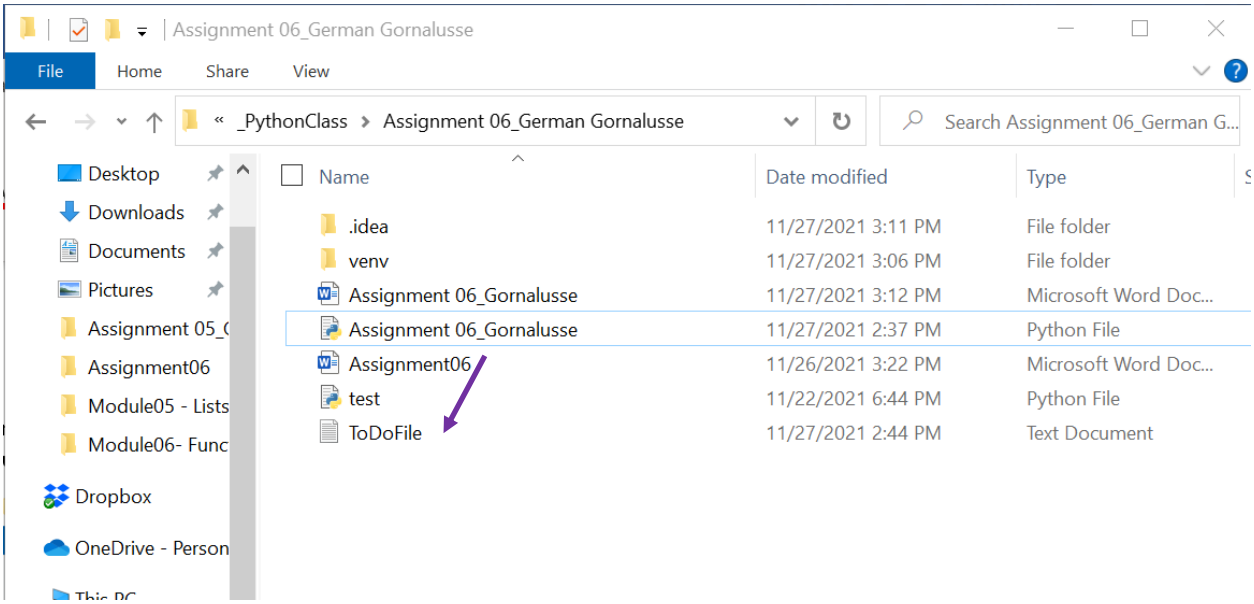

Figure 7 Creation of the text file "ToDoFile" in the folder "Assignment05_Gornalusse"

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

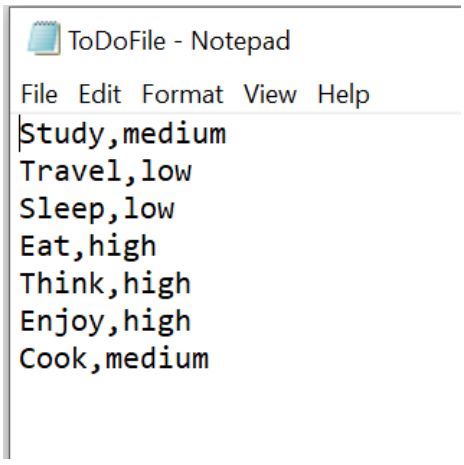

Figure 8 Verification that the text file contains actual data entered by the user

Step 6. Post your Word, PDF and Py Files to GibHub

You will post your files to a repository of your GitHub website so other people can see them and review them.

a) Login to https://github.com

b) Sign in to GitHub using your username and password **(Figure 9)**

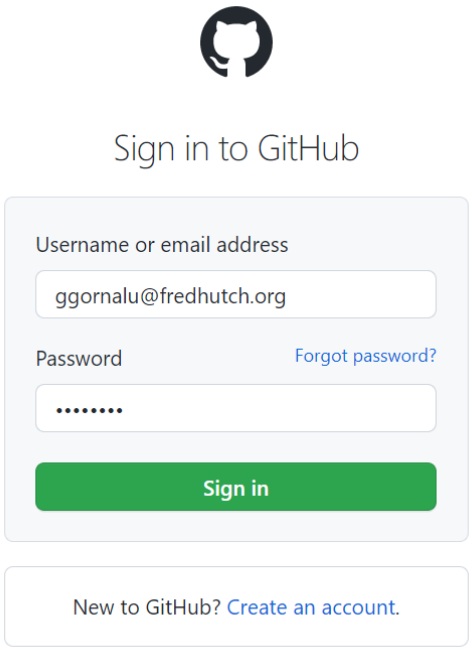

Figure 9 Sign in window to GitHub public repository website

c) .Create a repository called "IntroToProg-Python-Mod06" under your account (**Figure 10**). Type in the name in the “Repository name*” field. Select the option “Add a README file” and create repository (green button in the bottom left).

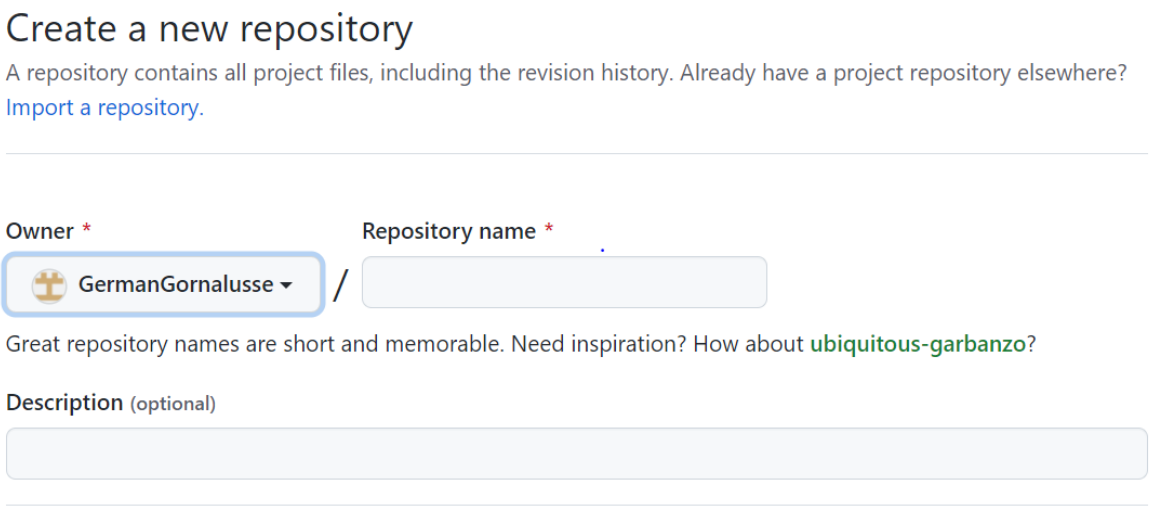

Figure 10 Window to create a new repository

e) Upload both of your files (Word, PDF and Python) to the repository. Select Add file>Upload file>Choose your files and select “Commit changes” to upload them. (**Figure 11a and 11b**)

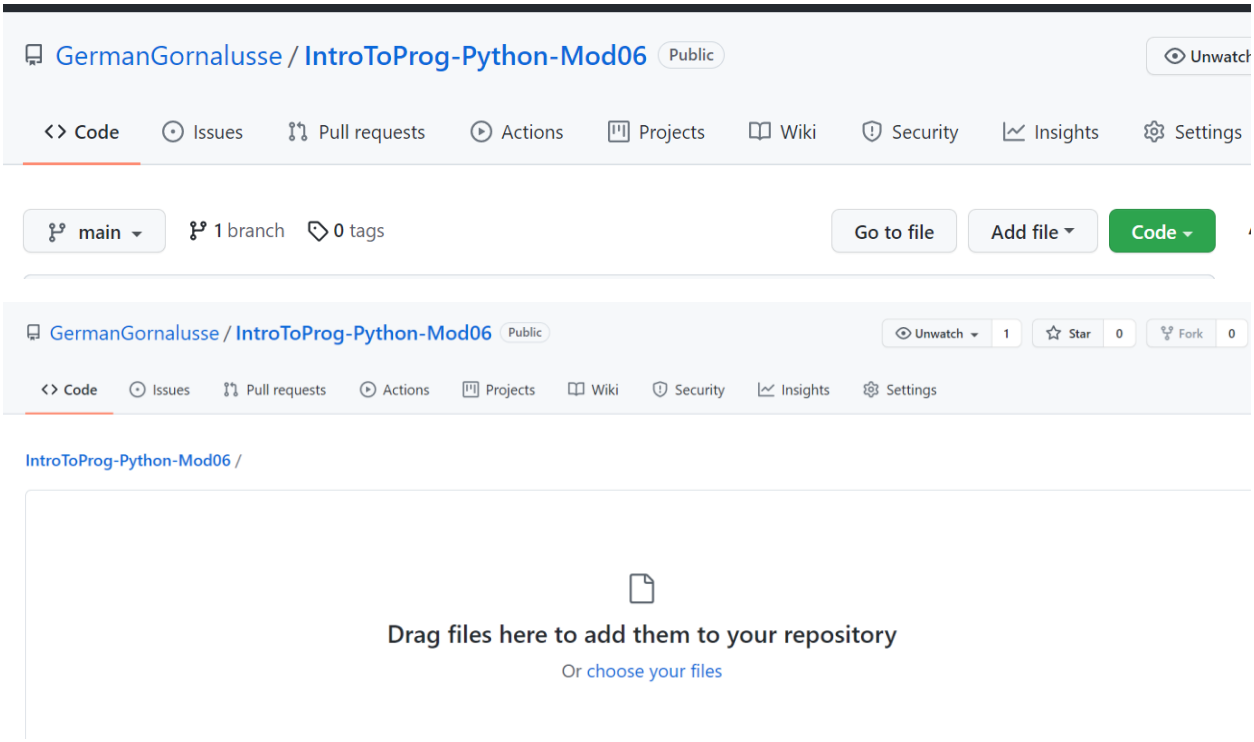

Figure 11 a (Add file) and 11b (Upload file). You will be uploading both the Word, PDF and Python (.py) files into your IntroToProgram-Mod06 repository.

Step7. Add a GitHub Web Page

You will add a GitHub webpage to your repository.

a) Select Add file> Create new file.

b) Select IntroToProg / docs/index.md. Docs is the folder where you generally will be saving webpages. Index.md is a default name for a GiHub web page.

c) In Edit new file, copy and paste the following code into the text entry box (**Figure 12**). Select Commit New File (bottom left green button).

```
# Module06 Website

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[Google Homepage](https://www.google.com "Google's Homepage")

[GitHub Webpage Code CheatSheet](https://github.com/adam-p/markdown-here/wiki/Markdown-Cheatsheet)
```

Figure 12. Initial code for the GitHub web page

d) Select Settings> GitHub Pages

e) Your GitHub Pages site will be built from the `/docs` folder in the `main` branch. Select, in "Source"

Branch: main and folder: /docs.

Save. If you follow the hyperlink provided in blue, you will see your GitHub Web page (**Figure 13**)

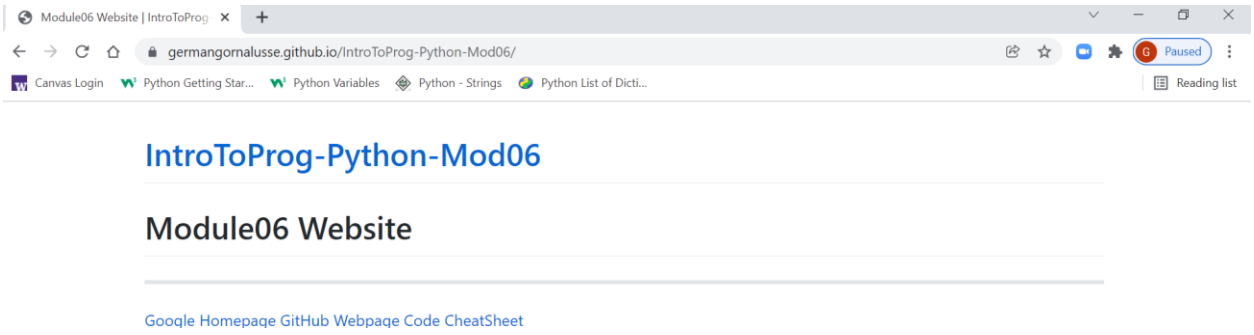

Figure 13. Your GitHub web page associated with Module 06

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.