

LAB 2 – PYTHON BASICS: EXERCISES

GETTING STARTED...

The goal of this set of exercises is to experiment with the basic concepts of Python with the PyCharm IDE.

If two or more of you share a single computer, adopt the pair programming¹ technique and change role at the beginning of each exercise.

Recap:

1. *To create a new Python project in PyCharm, select File > New Project > Pure Python from the PyCharm menu and assign the desired location for it.*
2. *To create a new Python script right click on the project (in the Project tab that you find on the left) and select New > Python File.*
3. *To execute your script right click on it (in the Project tab that you find on the left) and select Run. In this way PyCharm will create a new “Run/Debug Configuration” that you can find in the “Configurations” list (accessible through the menu Run -> Edit Configurations)*

EXERCISE 1 – TODO LIST

Given a list of tasks (i.e., actions that the user wants to do in the future) implement a `todo_manager` program to perform 4 actions:

1. insert a new task (a string of text);
2. remove a task (by typing its content, exactly);
3. show all existing tasks, sorted in alphabetic order;
4. close the program.

At startup, the program shows a menu with the 4 options and, for each choice, performs the requested action. After the action (except action 4), the program returns to the prompt for actions.

Hint 1: to show a sorted list of tasks you can use the `sorted()` function.

Example:

Run the program: > todo_manager

First screen shown by the program:

¹ In pair programming, two programmers work as a pair, together on one computer. One, the driver, writes code while the other, the navigator, reviews each line of code as it is typed in and helps plan and catch errors.

Insert the number corresponding to the action you want to perform:

- 1. insert a new task;*
- 2. remove a task;*
- 3. show all the existing tasks in alphabetic order;*
- 4. close the program.*

Your choice:

EXERCISE 2 – TODO LIST SAVED TO FILE

Extend the program developed in the previous exercise to save and retrieve the list of tasks to/from a text file. The file name is read as the first parameter from the command line.

Consequently, at startup, the program takes the list of tasks from the file and saves the changes to the file as soon as the user decides to close the program.

For this exercise, you can get the `task_list.txt` file from the Aml website (direct link: <https://goo.gl/6EFKnn>). It contains 6 tasks saved as a separate line on the file.

Hint 2: *to specify one or more string to be passed as input parameters to the application, you can modify the Configuration created when you run the program for the first time. The Configuration is accessible through the menu Run -> Edit Configurations. Specify your parameters in the “Script parameters” field.*

Example:

Run the program: `> todo_manager task_list.txt`

First screen shown by the program:

Insert the number corresponding to the action you want to perform:

- 1. insert a new task;*
- 2. remove a task;*
- 3. show all the existing tasks in alphabetic order;*
- 4. close the program.*

EXERCISE 3 – TASKS DELETION EXTENSION

Modify the program developed in the previous exercise to remove all the tasks that contains a specified substring. For example, when user types “shopping”, the program will use the provided string to delete all tasks that contain the substring “shopping”.

Example:

Run the program: `> todo_manager task_list.txt`

First screen shown by the program:

Insert the number corresponding to the action you want to perform:

1. insert a new task;
2. remove a task;
3. remove all the existing tasks that contain a provided string;
4. show all the existing tasks in alphabetic order;
5. close the program.

EXERCISE 4 - FIND URGENT TASKS - DICTIONARIES

Given a “2D dictionary” of tasks, like this one (i.e., tasks):

```
task1 = {'todo': 'call John for Aml project organization', 'urgent': True}
task2 = {'todo': 'buy a new mouse', 'urgent': True}
task3 = {'todo': 'find a present for Angelina's birthday', 'urgent': False}
task4 = {'todo': 'organize mega party (last week of April)', 'urgent': False}
task5 = {'todo': 'book summer holidays', 'urgent': False}
task6 = {'todo': 'whatsapp Mary for a coffee', 'urgent': False}
```

return a new dictionary, using the same “2D” format, that contains only the urgent tasks, i.e., take the dictionaries that have a True value in the urgent field and combine them in a single new dictionary as shown in the example.

Example:

Run the program: `> find_urgent_tasks`

Result returned by the program:

```
{'task1': {'todo': 'call John for AmI project organization', 'urgent': True }, 'task2':
{'todo': 'buy a new mouse', 'urgent': True}}
```