

Name : Zemali Okba

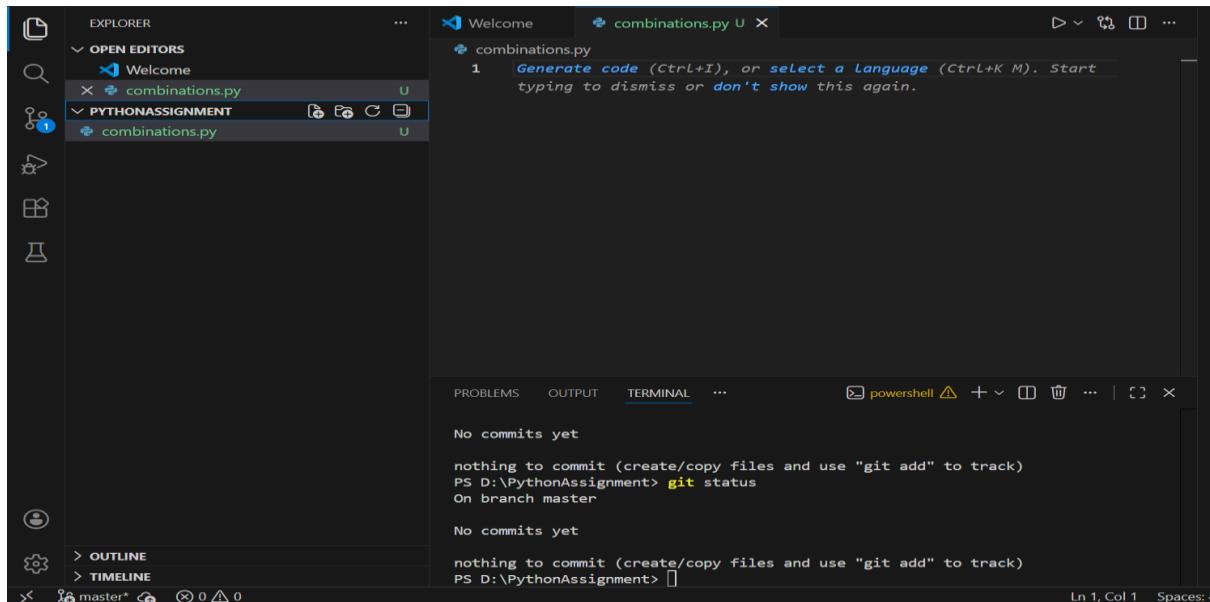
Exercice I: Modularity & VCS

1- Creation of the project directory

2- Creation of GitHub repository

<https://github.com/okba919/Python-Exercicse.git>

3- Git initialization



4- Create a file termed combinations.py and write a first trivial Python code,
Add your file to the staging area, and commit using the message "Trivial comb"

The screenshot shows the VS Code interface with the terminal tab selected. The terminal window displays the following command-line session:

```

PS D:\PythonAssignment> git add combinations.py
fatal: pathspec 'ombinations.py' did not match any files
PS D:\PythonAssignment> git commit -m "Trivial comb"
[master (root-commit) 9433bc4] Trivial comb
 1 file changed, 6 insertions(+)
 create mode 100644 combinations.py
PS D:\PythonAssignment>

```

The status bar at the bottom indicates the current user is Zemali Okba, the file is combinations.py, and the line number is Ln 6, Col 45.

5- improve the code by the definition of an iterative function fact and add the file to the staging area, and commit using the message "With fact Iterative function"

The screenshot shows the VS Code interface with the terminal tab selected. The terminal window displays the following command-line session, showing the addition of the file and a commit with a descriptive message:

```

PS D:\PythonAssignment> git add combinations.py
[master 6f7bc79] With fact Iterative function
 1 file changed, 11 insertions(+), 4 deletions(-)
PS D:\PythonAssignment>

```

The status bar at the bottom indicates the current user is Zemali Okba, the file is combinations.py, and the line number is Ln 10, Col 53.

6- Enhance code with a recursive factorial function and commit "With fact Recursive function".

The screenshot shows the VS Code interface with the following details:

- EXPLORER**: Shows 'OPEN EDITORS' with 'combinations.py' selected.
- TERMINAL**: Displays the following command-line session:


```
gnment/combinations.py
Enter total number of elements n: 5
Enter number of elements to choose k: 2
Number of ways to choose 2 from 5 is: 10
PS D:\PythonAssignment> git add combinations.py
>>
PS D:\PythonAssignment> git commit -m "With fact Recursive function"
>>
[master 64e142c] With fact Recursive function
 1 file changed, 6 insertions(+), 8 deletions(-)
PS D:\PythonAssignment>
```
- STATUS BAR**: Shows 'Zemali Okba (now)' at Ln 11, Col 61, Spaces: 4, UTF-8, CRLF, Python, 3.13.9.

7- Modify code to use math.comb and commit the message "Using the math library"

The screenshot shows the VS Code interface with the following details:

- EXPLORER**: Shows 'OPEN EDITORS' with 'combinations.py' selected.
- TERMINAL**: Displays the following command-line session:


```
gnment/combinations.py
Enter total number of elements n: 5
Enter number of elements to choose k: 2
Number of ways to choose 2 from 5 is: 10
PS D:\PythonAssignment> git add combinations.py
>>
PS D:\PythonAssignment> git commit -m "Using the math library"
>>
[master e723c25] Using the math library
 1 file changed, 2 insertions(+), 6 deletions(-)
PS D:\PythonAssignment>
```
- STATUS BAR**: Shows 'Zemali Okba (2 minutes ago)' at Ln 7, Col 61, Spaces: 4, UTF-8, CRLF, Python, 3.13.9.

8- Push the solution to GitHub

The screenshot shows the VS Code interface. In the Explorer sidebar, there are open editors for 'Welcome' and 'combinations.py'. In the main editor area, the code for 'combinations.py' is displayed:

```

1 import math
2
3 n = int(input("Enter total number of elements n: "))
4 k = int(input("Enter number of elements to choose k: "))
5
6 result = math.comb(n, k)
7 print(f"Number of ways to choose {k} from {n} is: {result}")

```

Below the editor, the Terminal tab is active, showing the command-line output of a git push operation:

```

PS D:\PythonAssignment> git remote add origin https://github.com/okba919/Python-Exercicse.git
PS D:\PythonAssignment> git push -u origin master
>>
info: please complete authentication in your browser...
Enumerating objects: 12, done.
Counting objects: 100% (12/12), done.
Delta compression using up to 4 threads
Compressing objects: 100% (8/8), done.
Writing objects: 100% (12/12), 1.40 KiB | 204.00 KiB/s, done.
Total 12 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (1/1), done.

```

The screenshot shows a GitHub repository page. The repository name is 'Using the math library'. It has 4 commits and was pushed 10 minutes ago. The README file is present and contains a 'Add a README' button.

No description, website, or topics provided.

- Activity
- 0 stars
- 0 watching
- 0 forks

Releases

No releases published

[Create a new release](#)

Exercice II: OOP – Analysis Only

1- Identify a problem suitable for object-oriented design

A chemical reactor system in a chemical plant can be modeled using object-oriented design. Each reactor is an object with specific properties and behaviors that represent its characteristics and operations.

2- List examples of static properties (attributes) and behaviors (methods) of your objects

| Static Properties (Attributes) | Behaviors (Methods / Dynamics) |
|--------------------------------|--------------------------------|
| Volume (liters) | start() – start the reactor |
| Temperature (°C) | heat() – increase temperature |

| Static Properties (Attributes) | Behaviors (Methods / Dynamics) |
|--------------------------------|--------------------------------|
| Pressure (bar) | mix() – mix the reactants |
| Material type | cool() – decrease temperature |
| Maximum capacity | stop() – stop the reactor |

3- Elucidate inheritance and/or polymorphism cases

Inheritance Example:

- General object: Reactor
- Specialized objects inherit from Reactor:
 - BatchReactor (performs batch operations)
 - ContinuousReactor (performs continuous operations)

Polymorphism Example:

- The method start() is implemented for all reactor types.
- Each type behaves differently:
 - BatchReactor starts operation in batches.
 - ContinuousReactor starts operation continuously.