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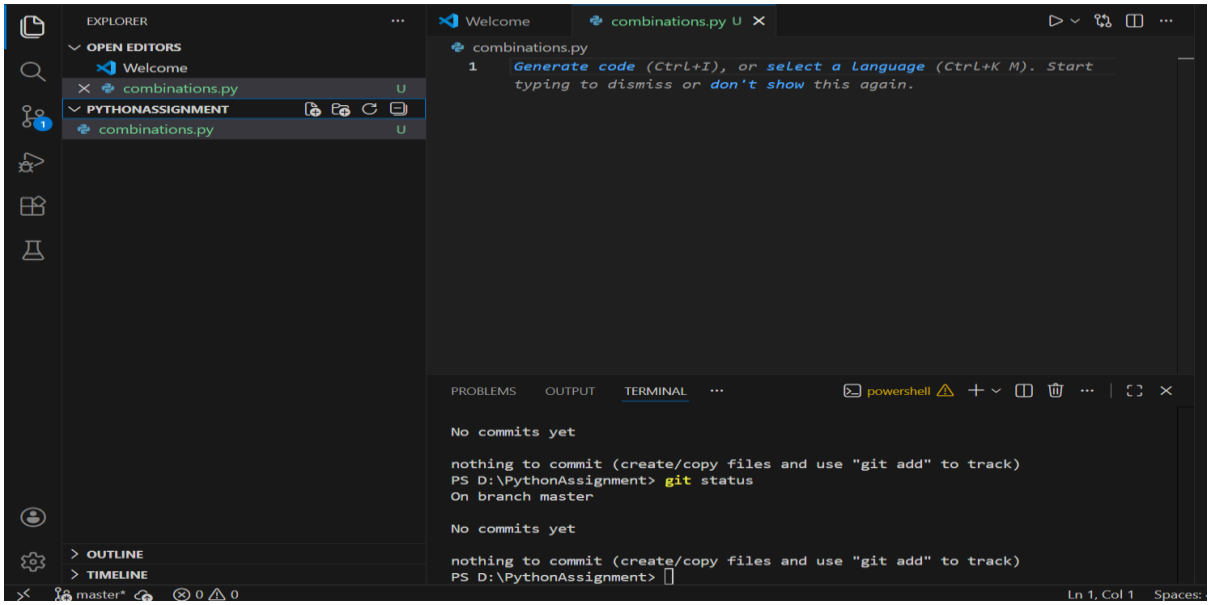
Exercice I: Modularity & VCS

1- Creation of the project directory

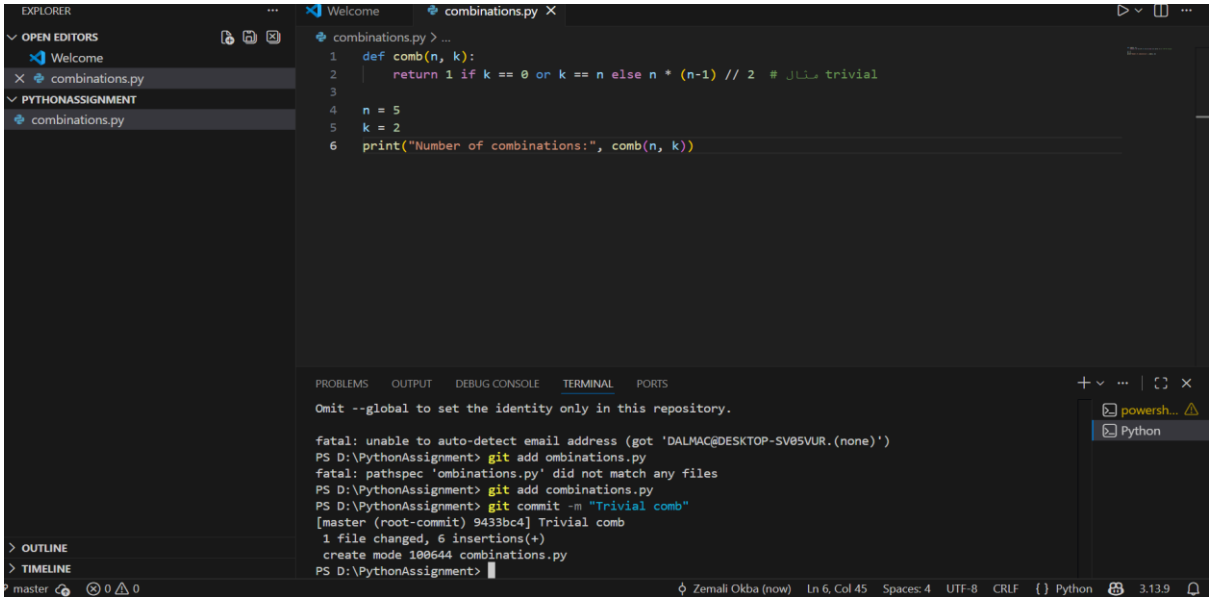
2- Creation of GitHub repository

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

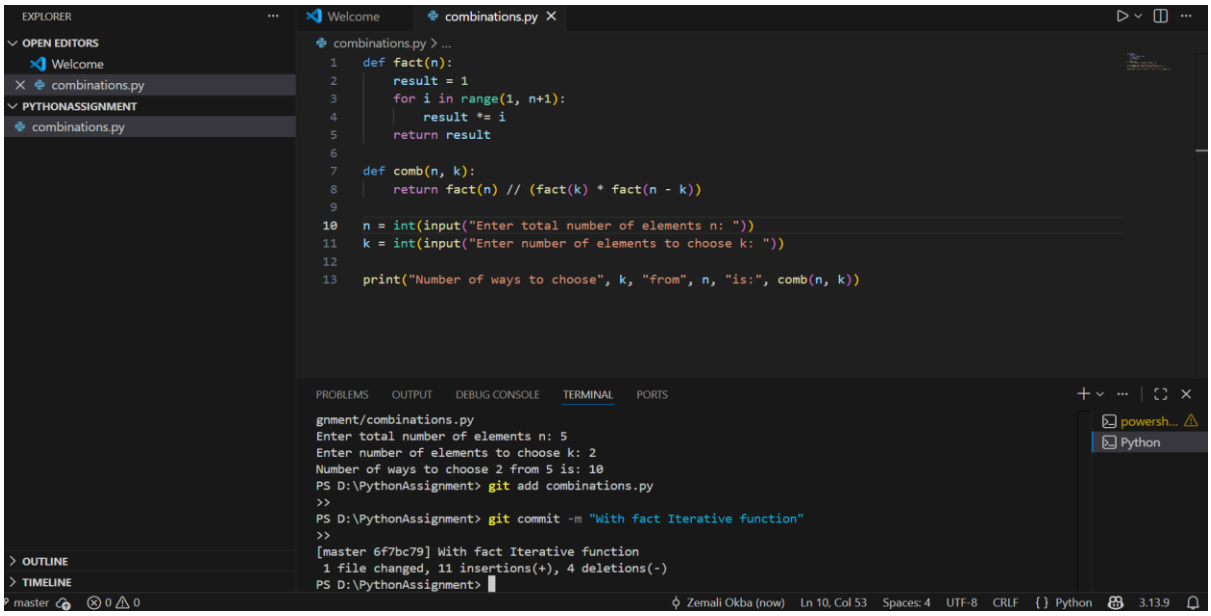
3- Git initialization



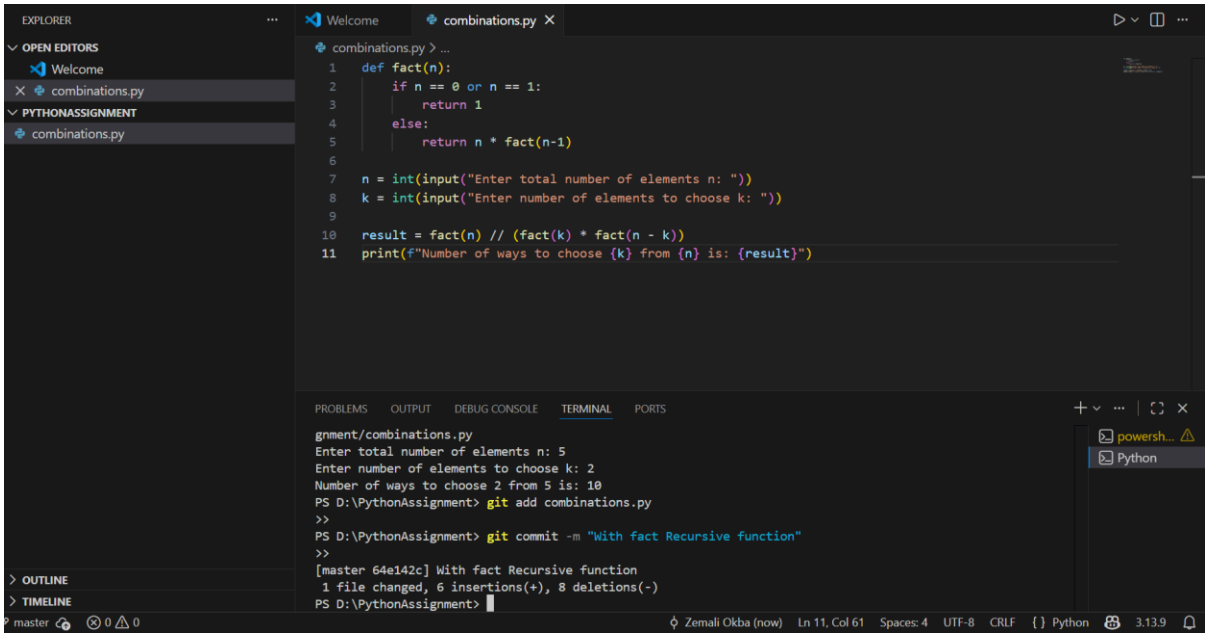
4- Create a file termed combinations.py and write a first trivial Python code, Add your file to the staging area, and commit using the message ”Trivial comb”



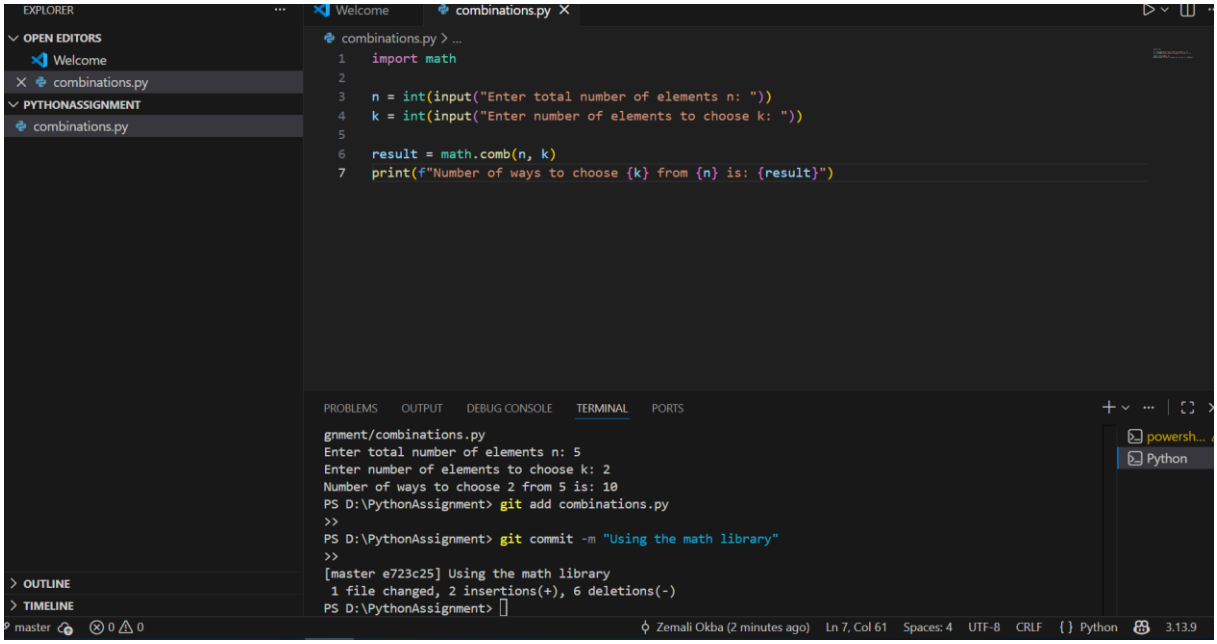
5- improve the code by the definition of an iterative function fact and add the file to the staging area, and commit using the message ”With fact Iterative function”



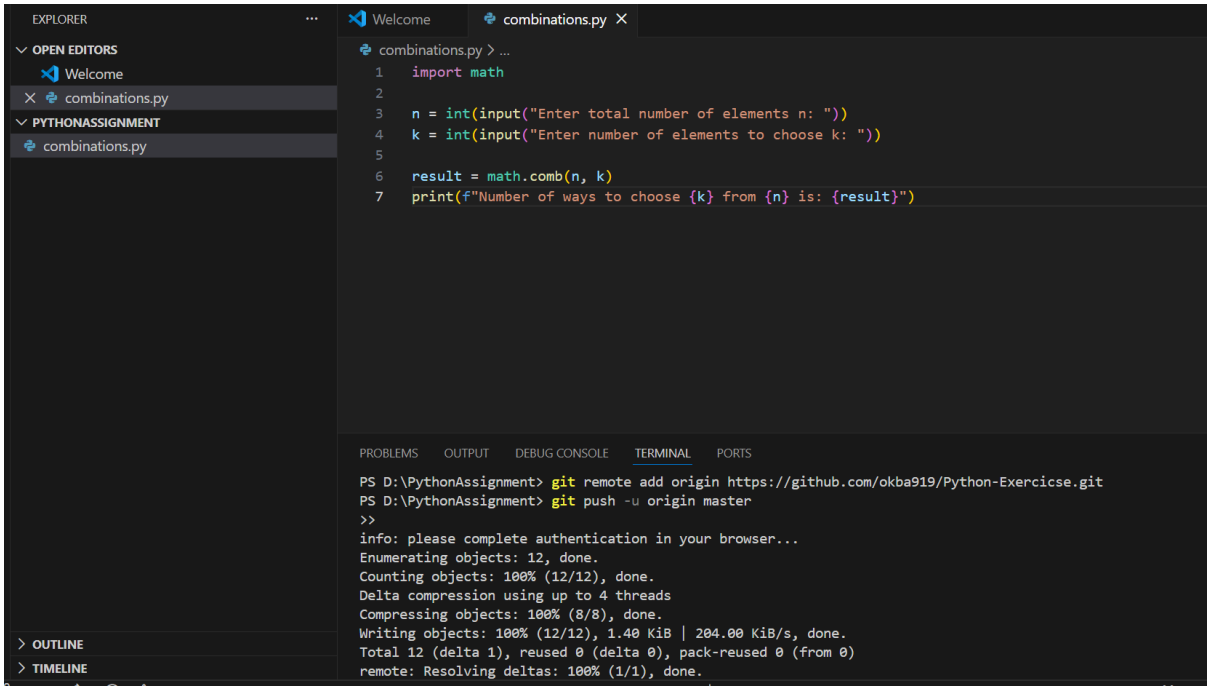
6- Enhance code with a recursive factorial function and commit "With fact Recursive function".

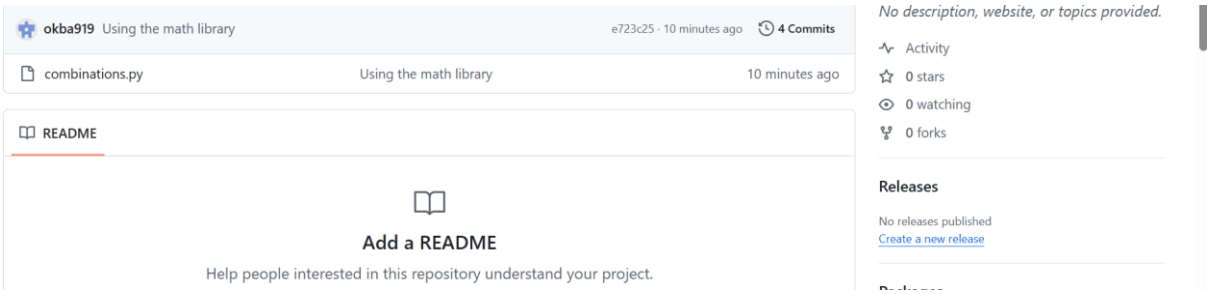


7- Modify code to use math.comb and commit the message "Using the math library"



8- Push the solution to GitHub





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.