Name: Yeabsira Feleke

Roll:20222755

Differentiate between centralized and distributed computing using python by measuring execution time.

Code:

import time

def sum\_of\_squares(n):

    return sum(i \* i for i in range(1, n + 1))

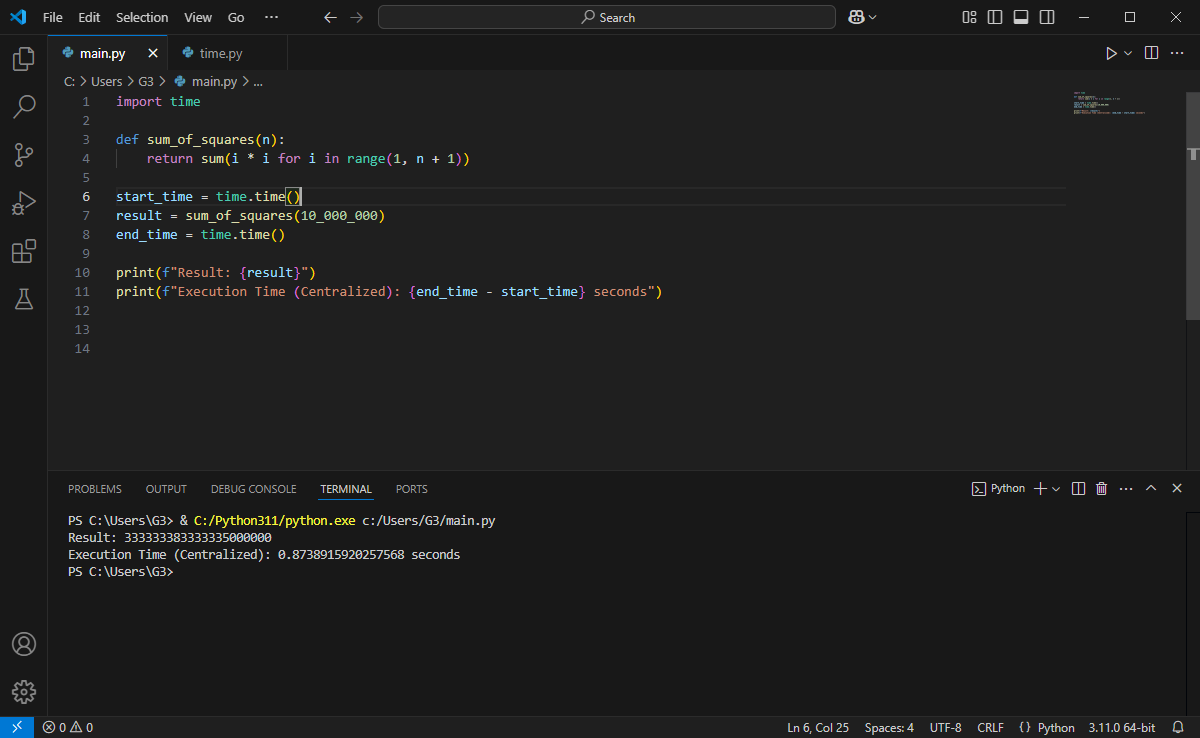
start\_time = time.time()

result = sum\_of\_squares(10\_000\_000)

end\_time = time.time()

print(f"Result: {result}")

print(f"Execution Time (Centralized): {end\_time - start\_time} seconds")

***Result***

***Code:***

import concurrent.futures

import time

def sum\_of\_squares\_range(start, end):

    return sum(i \* i for i in range(start, end))

def process\_range(r):

    return sum\_of\_squares\_range(\*r)

def distributed\_sum\_of\_squares(n, num\_workers=4):

    chunk\_size = n // num\_workers

    ranges = [(i \* chunk\_size + 1, (i + 1) \* chunk\_size + 1) for i in range(num\_workers)]

    with concurrent.futures.ProcessPoolExecutor(max\_workers=num\_workers) as executor:

        results = executor.map(process\_range, ranges)

    return sum(results)

if \_\_name\_\_ == '\_\_main\_\_':

    start\_time = time.time()

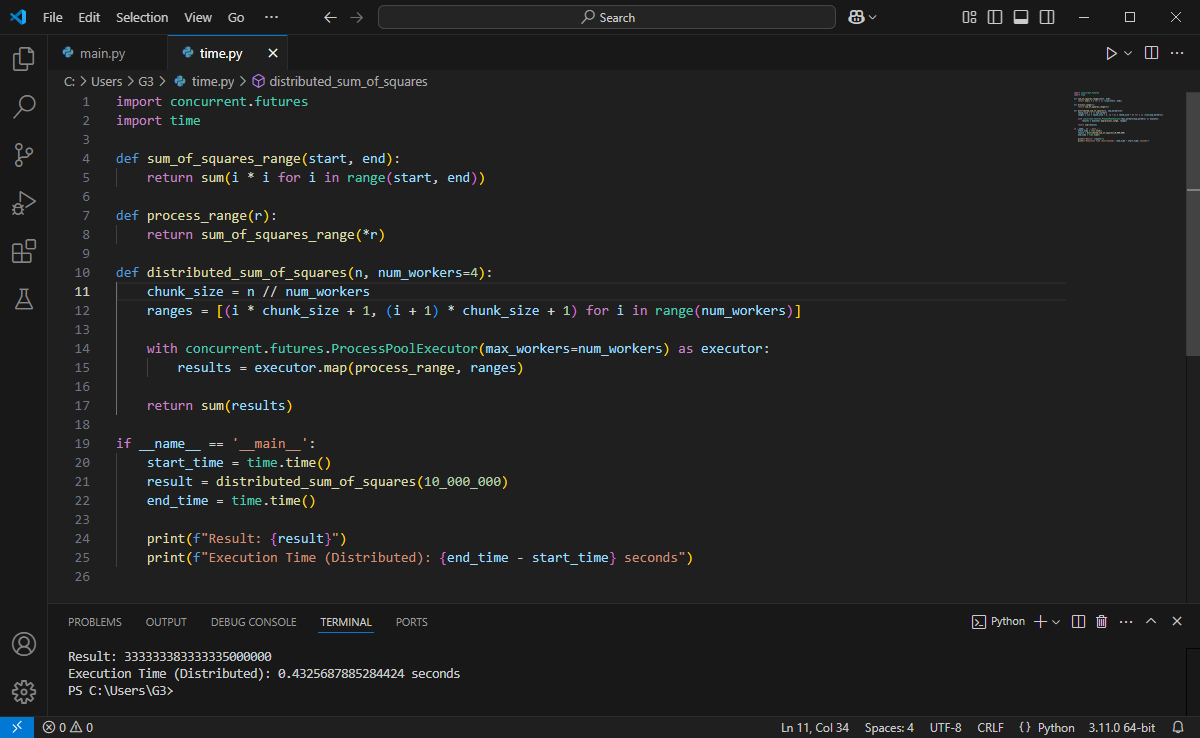
    result = distributed\_sum\_of\_squares(10\_000\_000)

    end\_time = time.time()

    print(f"Result: {result}")

    print(f"Execution Time (Distributed): {end\_time - start\_time} seconds")

***Results:***

******