Assignment-1.4

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B-10

Task-1

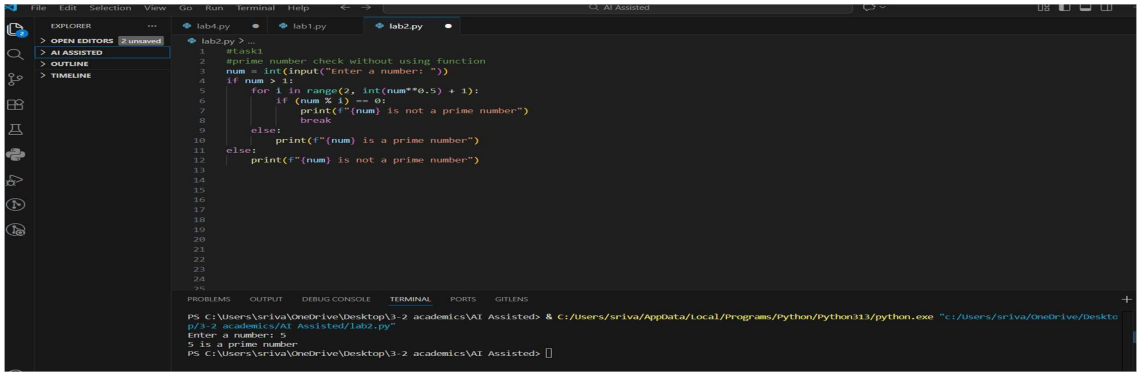
Prompt:

Prime number check without using function.

Code:

```
num = int(input("Enter a number: ")) if
num > 1:
    for i in range(2, int(num**0.5) + 1):
if (num % i) == 0:
        print(f"{num} is not a prime
number")          break    else:
print(f"{num} is a prime number") else:
    print(f"{num} is not a prime number")
```

Output:



Analysis:

- This program checks whether a number is prime by testing if it has any divisors from 2 to √n.
- If it is divisible by any number, it is not prime.
- If no divisor is found, it is prime.
- Numbers less than or equal to 1 are not prime..

Task-2

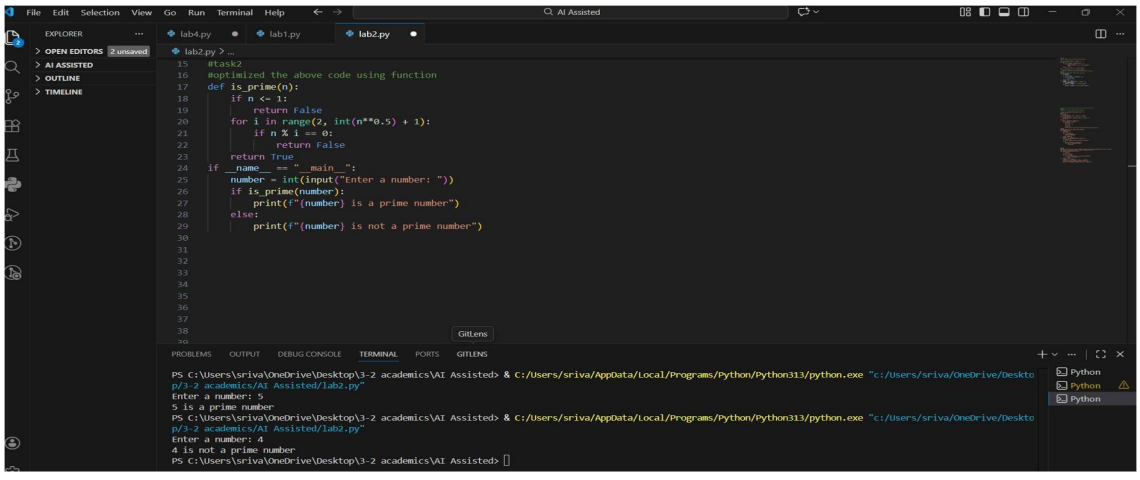
Prompt:

optimized the above code using function.

Code:

```
def is_prime(n):
if n <= 1:
    return False    for i in
range(2, int(n**0.5) + 1):
    if  n  %  i  ==  0:
return False    return True if
__name__ == "__main__":
  number = int(input("Enter a number: "))
if is_prime(number):
    print(f"{number} is a prime number")
else:
    print(f"{number} is not a prime number")
```

Output:



Analysis:

- This program defines a function is_prime() that checks whether a number is prime by trying to divide it by all numbers from 2 up to the square root of the number.

- If any division gives remainder 0, the function returns False (not prime). If no divisor is found, it returns True (prime).
- The main part of the program takes a number from the user, calls the function, and prints whether the number is prime or not.

Task-3

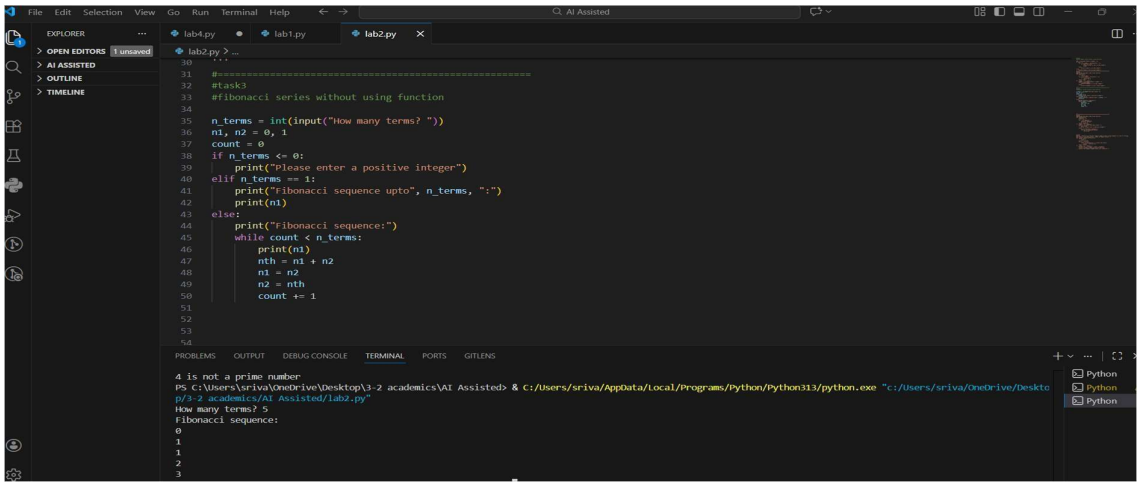
Prompt:

Fibonacci series without using function.

Code:

```
n_terms = int(input("How many terms? "))

n1, n2 = 0, 1 count = 0 if n_terms <= 0:

   print("Please enter a positive integer") elif

n_terms == 1:

   print("Fibonacci sequence upto", n_terms, ":")

print(n1) else:

   print("Fibonacci sequence:")

while count < n_terms:

       print(n1)

nth = n1 + n2

n1 = n2         n2

= nth         count

+= 1
```

Output:



Analysis:

- This program prints the Fibonacci sequence up to the number of terms entered by the user.
  It starts with 0 and 1, then each next number is formed by adding the previous two numbers.
- If the user enters 0 or a negative number, it shows an error message.
  If the user enters 1, it prints only the first term (0).
  Otherwise, it uses a loop to generate and print the required Fibonacci numbers.

Task-4

Prompt: optimized the above code using

function.

Code: def fibonacci(n):

sequence = [] a, b = 0,

1 for _ in range(n):

sequence.append(a)

a, b = b, a + b

return sequence if

__name__ == "__main__":

terms = int(input("How many terms"))

if terms <= 0:

print("Please enter a positive integer")

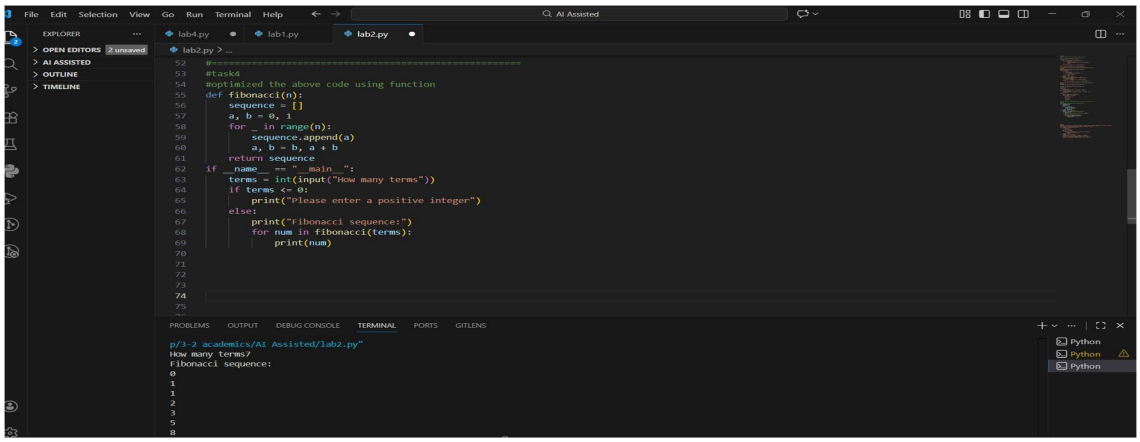
else:

print("Fibonacci sequence:")

for num in fibonacci(terms):

print(num)

Output:



Analysis:

- The function fibonacci(n) creates a list and fills it with Fibonacci numbers starting from 0 and 1. Each new number is formed by adding the previous two numbers. It returns the list of generated numbers.
- In the main part of the program, the user enters how many terms they want. If the number is 0 or negative, the program asks for a positive integer.

- Otherwise, it calls the fibonacci() function and prints the Fibonacci sequence.

Prompt:

#Write a function to find the longest common prefix string amongst an array of strings.

#If there is no common prefix, return an empty string "".

CODE: def

longest_common_prefix(strs): if

not strs: return ""

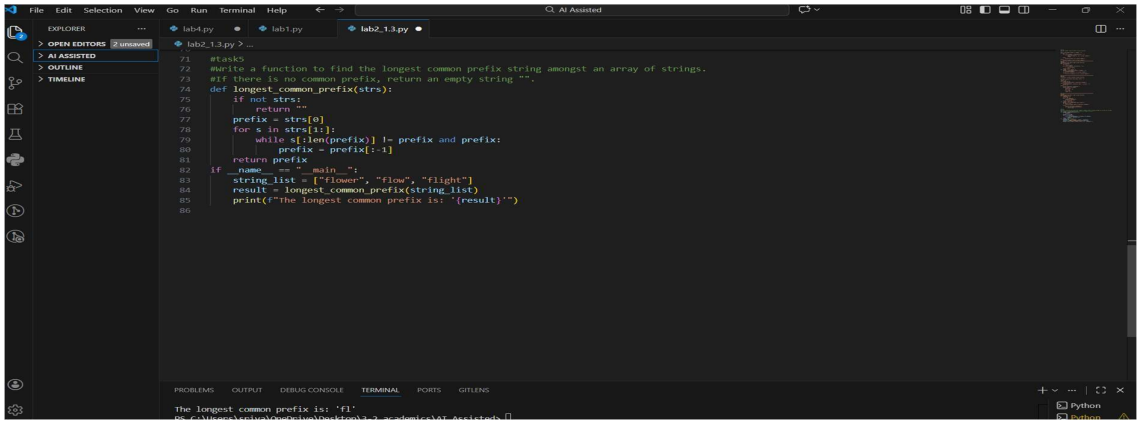
prefix = strs[0]

for s in strs[1:]:

while s[:len(prefix)] != prefix and prefix:

```
        prefix = prefix[:-1]
return prefix if __name__
== "__main__":
    string_list = ["flower", "flow", "flight"]     result
= longest_common_prefix(string_list)
print(f"The longest common prefix is: '{result}'")
```

Output:



Analysis:

- This program finds the longest common prefix (starting part) shared by all strings in a list.
- It begins by assuming the first string is the prefix. Then it compares this prefix with each remaining string. If the current prefix does not match the beginning of a string, it shortens the prefix by removing the last character and checks again.
- This continues until a match is found or the prefix becomes empty.
- After checking all strings, the remaining prefix is the longest common prefix, and it is printed as the result.