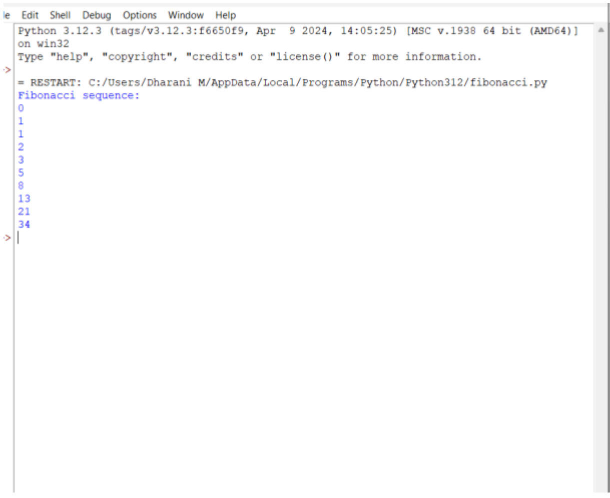
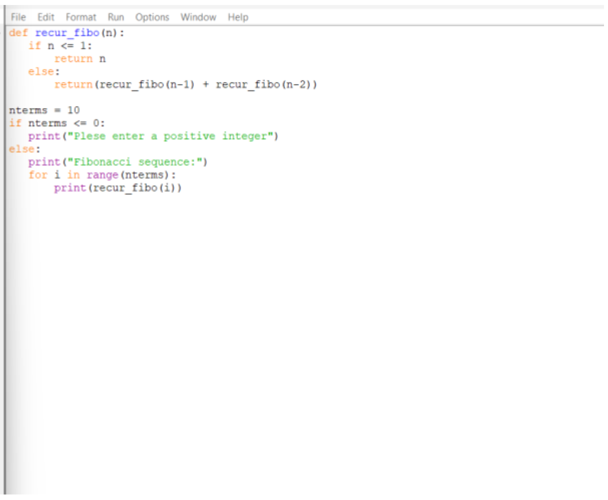
1. Write a program to Print Fibonacci Series using recursion.

F(n) = F(n-1) + F(n-2)

TIME COMPLEXITY: O(2n)



```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/fibonacci.py
Fibonacci sequence:
0
1
1
2
3
5
8
13
21
34
>
```

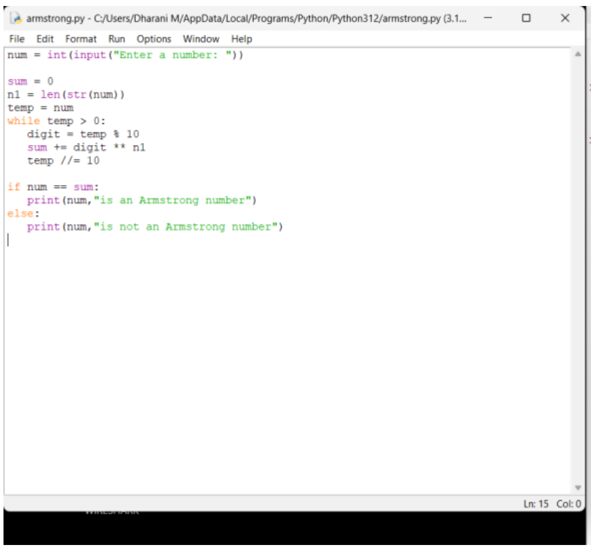


```python
def recur_fibo(n):
   if n <= 1:
       return n
   else:
       return(recur_fibo(n-1) + recur_fibo(n-2))

nterms = 10
if nterms <= 0:
   print("Plese enter a positive integer")
else:
   print("Fibonacci sequence:")
   for i in range(nterms):
       print(recur_fibo(i))
```

2. Write a program to check the given no is Armstrong or not using recursive function.

TIME COMPLEXITY: O(1).



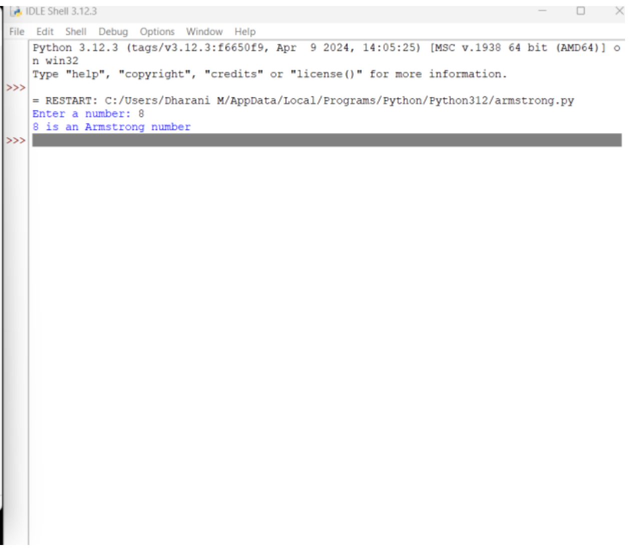
armstrong.py - C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/armstrong.py (3.1...

```python
num = int(input("Enter a number: "))

sum = 0
n1 = len(str(num))
temp = num
while temp > 0:
   digit = temp % 10
   sum += digit ** n1
   temp //= 10

if num == sum:
   print(num,"is an Armstrong number")
else:
   print(num,"is not an Armstrong number")
```

Ln: 15 Col: 0

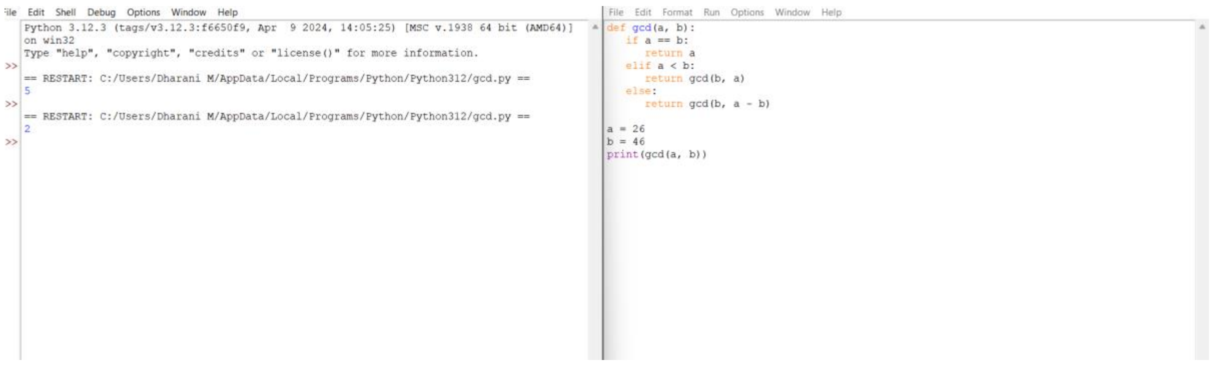


IDLE Shell 3.12.3

```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64)] o
n win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/armstrong.py
Enter a number: 8
8 is an Armstrong number
>>>
```

3. Write a program to find the GCD of two numbers using recursive factorization

TIME COMPLEXITY: O(log(min(a,b))),


ile Edit Shell Debug Options Window Help
File Edit Format Run Options Window Help

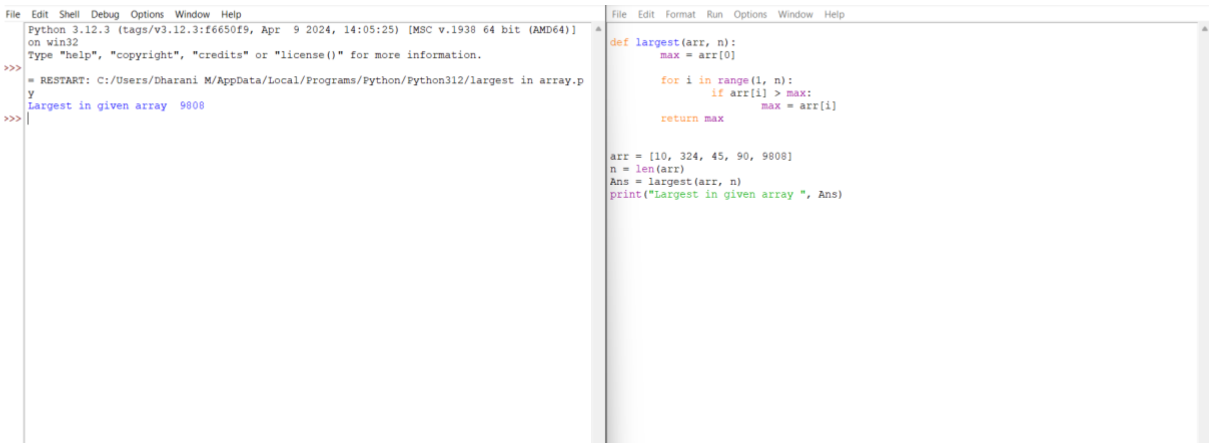
```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>
== RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/gcd.py ==
5
>>
== RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/gcd.py ==
2
>>
```

```
def gcd(a, b):
    if a == b:
        return a
    elif a < b:
        return gcd(b, a)
    else:
        return gcd(b, a - b)

a = 26
b = 46
print(gcd(a, b))
```

4. Write a program to get the largest element of an array.

TIME COMPLEXITY: O(N),


File Edit Shell Debug Options Window Help
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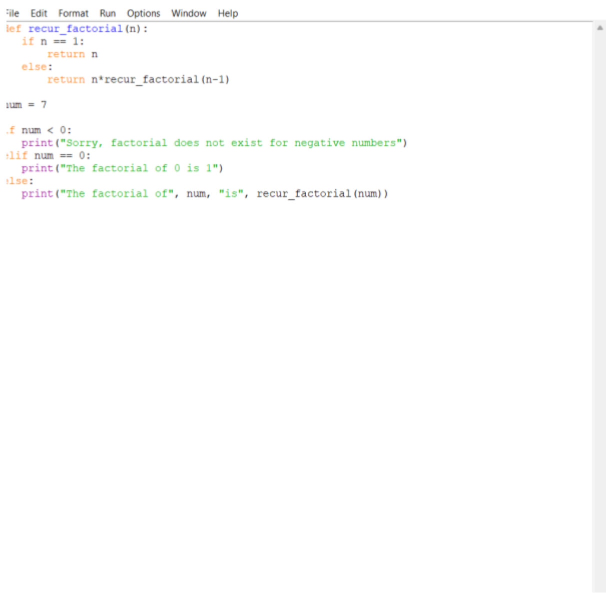
```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/largest in array.p
y
Largest in given array  9808
>>> |
```

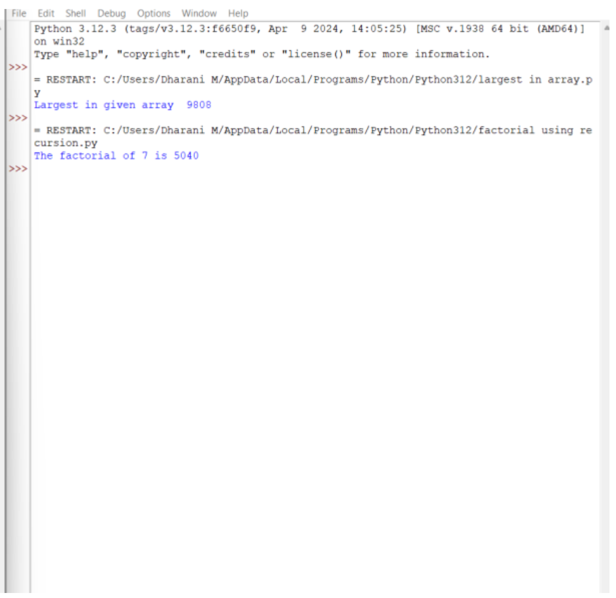
```

def largest(arr, n):
        max = arr[0]

        for i in range(1, n):
                if arr[i] > max:
                        max = arr[i]
        return max


arr = [10, 324, 45, 90, 9808]
n = len(arr)
Ans = largest(arr, n)
print("Largest in given array ", Ans)
```

5. Write a program to find the Factorial of a number using recursion.

TIME COMPLEXITY: : O(N)



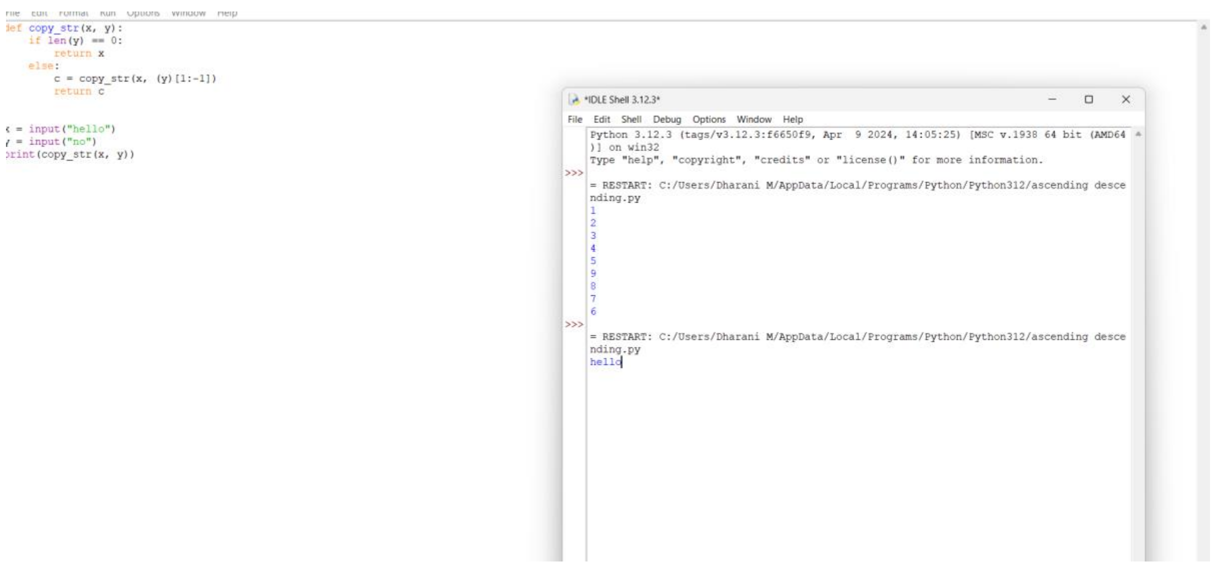
```
ef recur_factorial(n):
   if n == 1:
       return n
   else:
       return n*recur_factorial(n-1)

um = 7

f num < 0:
   print("Sorry, factorial does not exist for negative numbers")
lif num == 0:
   print("The factorial of 0 is 1")
lse:
   print("The factorial of", num, "is", recur_factorial(num))
```



```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/largest in array.p
y
Largest in given array  9808
>>>
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/factorial using re
cursion.py
The factorial of 7 is 5040
>>>
```

6. Write a program for to copy one string to another using recursion

TIME COMPLEXITY: O(m)

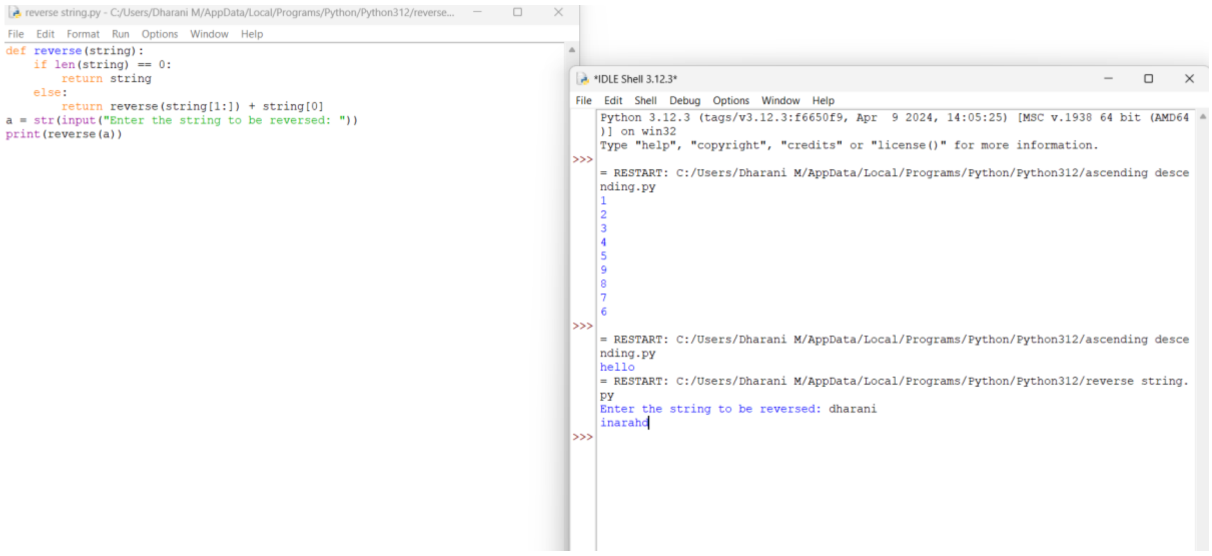

File Edit Format Run Options Window Help
IDLE Shell 3.12.3
File Edit Shell Debug Options Window Help

```
ef copy_str(x, y):
   if len(y) == 0:
       return x
   else:
       c = copy_str(x, (y)[1:-1])
       return c


 = input("hello")
 = input("no")
rint(copy_str(x, y))
```

```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64
)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/ascending desce
nding.py
1
2
3
4
5
9
8
7
6
>>>
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/ascending desce
nding.py
hello
```

7. Write a program   to print the reverse of a string using recursion

TIME COMPLEXITY: O(n)

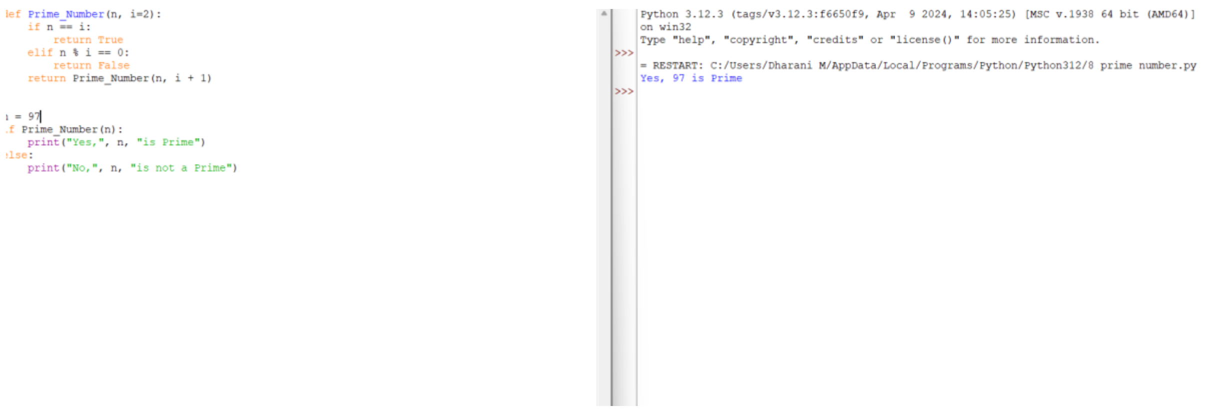


```python
def reverse(string):
    if len(string) == 0:
        return string
    else:
        return reverse(string[1:]) + string[0]
a = str(input("Enter the string to be reversed: "))
print(reverse(a))
```

```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64
)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> 
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/ascending desce
nding.py
1
2
3
4
5
9
8
7
6
>>> 
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/ascending desce
nding.py
hello
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/reverse string.
py
Enter the string to be reversed: dharani
inarahd
>>> 
```

8. Write a program   to generate all the prime numbers using recursion

TIME COMPLEXITY: O(√N).

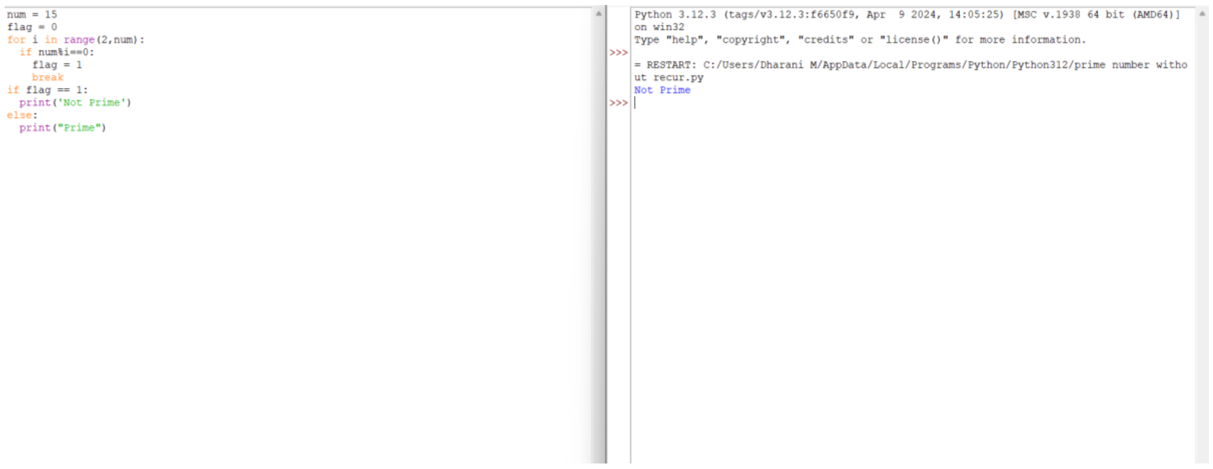


```python
lef Prime_Number(n, i=2):
    if n == i:
        return True
    elif n % i == 0:
        return False
    return Prime_Number(n, i + 1)


ı = 97
.f Prime_Number(n):
    print("Yes,", n, "is Prime")
ılse:
    print("No,", n, "is not a Prime")
```

```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> 
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/8 prime number.py
Yes, 97 is Prime
>>> 
```

9. Write a program to check a number is a prime number or not using recursion.

TIME COMPLEXITY: O(n)

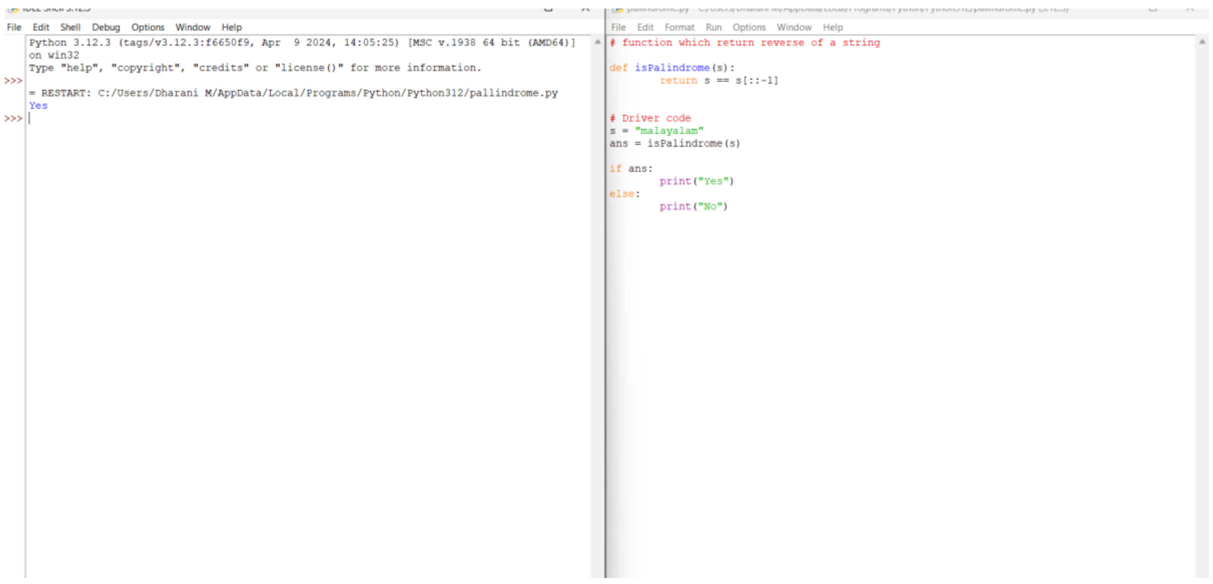


```python
num = 15
flag = 0
for i in range(2,num):
  if num%i==0:
    flag = 1
    break
if flag == 1:
  print('Not Prime')
else:
  print("Prime")
```

```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/prime number witho
ut recur.py
Not Prime
>>>
```

10.Write a program for to check whether a given String is Palindrome or not using recursion

TIME COMPLEXITY: O(n)



File Edit Shell Debug Options Window Help
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```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/Dharani M/AppData/Local/Programs/Python/Python312/pallindrome.py
Yes
>>>
```

```python
# function which return reverse of a string

def isPalindrome(s):
        return s == s[::-1]


# Driver code
s = "malayalam"
ans = isPalindrome(s)

if ans:
        print("Yes")
else:
        print("No")
```