**In Class-Lab Week 6- b**

**Problem 1: Fibonacci Sequence**

**Problem: Fibonacci Sequence Using Recursion**

Write a Python program that calculates the nth Fibonacci number using recursion. The Fibonacci sequence is defined as follows:

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The program should do the following:

1. Prompt the user to enter an integer n.
2. Use a recursive function to calculate the nth Fibonacci number.
3. Display the result to the user.

**Example:**

For n = 6, the Fibonacci sequence would be:  
0, 1, 1, 2, 3, 5, 8

The 6th Fibonacci number is 8.

Paste the screenshot of your code below:

def F(n):

if n < 0:

raise ValueError("`n` should be greater than or equal to 0")

if n <= 1:

return n

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

n = int(input("Please enter an integer as `n`: "))

print(f"The result is: {F(n)}")

Paste the screenshot of your output below:

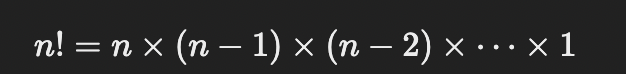
Please enter an integer as `n`: 6

The result is: 8

**Problem 2:**

**!! Use Recursive Function for this problem:**

Write a Python program to calculate the factorial of a given number using recursion. The factorial of a number n! is defined as:



For example:

* 5! = 5 × 4 × 3 × 2 × 1 = 120
* 3! = 3 × 2 × 1 = 6

**Steps:**

1. Define a recursive function factorial(n) that returns the factorial of n.
   * The base case is when n is 0 or 1 (because 0!=1!=1)
   * For other values, use the recursive relation n!=n×(n−1)!
2. In the main() function, prompt the user to enter a number and call the factorial() function to calculate the factorial.

**Example:**

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Paste the screenshot of your code below:

def factorial(n):

if n < 0:

raise ValueError("`n` should be greater than or equal to 0")

if n <= 1:

return 1

return n \* factorial(n-1)

def main():

n = int(input("Enter a number: "))

print(f"The factorial of {n} is {factorial(n)}")

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

main()

Paste the screenshot of your output below:

Enter a number: 5

The factorial of 5 is 120