LAB-01

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BATCH NO:05

TASK-01

Prompt:

#Febonacci series up to n terms it should accept user input

logic directly in main code and do not use any used defined functions

CODE:

```
n = int(input("Enter the number of terms in Fibonacci series: "))
a, b = 0, 1
count = 0
if n <= 0:
   print("Please enter a positive integer.")
elif n == 1:
   print("Fibonacci series up to", n, "term:")
   print(a)
else:
   print("Fibonacci series up to", n, "terms:")
   while count < n:
      print(a, end=' ')
      a, b = b, a + b
      count += 1
```

Output:

Enter the number of terms in Fibonacci series: 10

Fibonacci series up to 10 terms:

0 1 1 2 3 5 8 13 21 34

Explanation:

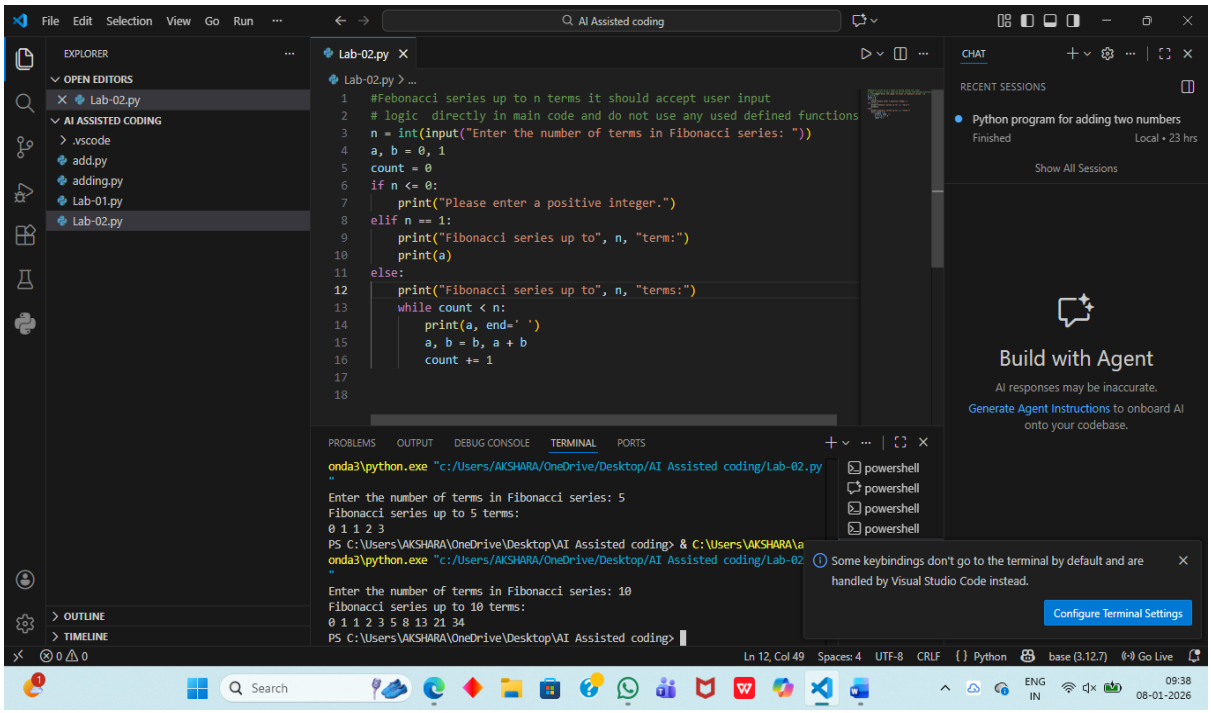
1. The program asks for n and starts the Fibonacci series with a = 0 and b = 1.

2. If n is 0 or negative, it shows an error; if n == 1, it prints only 0.

3. Otherwise, it runs a while loop, printing a each time and updating the values using a, b = b, a + b.

4. The loop stops after printing n numbers.

Implementation:



TASK-02:

Prompt:

#Improve the task 1 by optimize this code,

simplify logic and reduce number of lines of code

CODE:

```
n = int(input("Enter the number of terms in Fibonacci series: "))
a, b = 0, 1
if n <= 0:
    print("Please enter a positive integer.")
else:
    print("Fibonacci series up to", n, "terms:")
    for _ in range(n):
```

```
    print(a, end=' ')
a, b = b, a + b
```

Output:

Enter the number of terms in Fibonacci series: 5

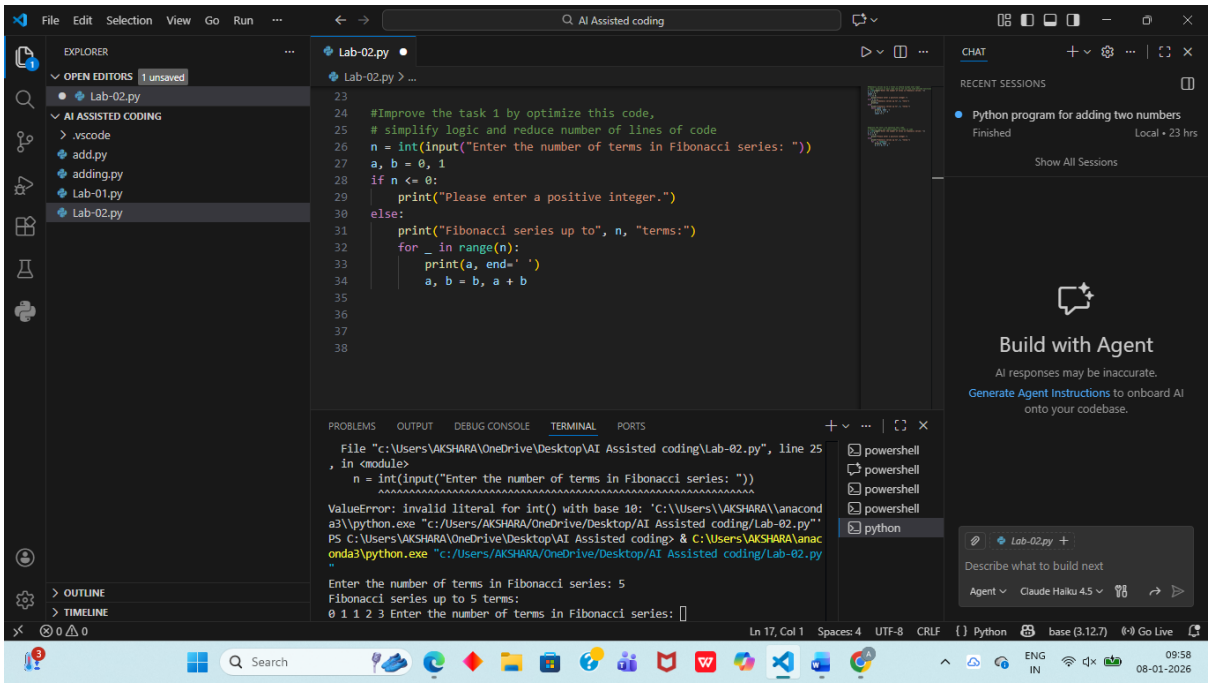
Fibonacci series up to 5 terms:

0 1 1 2 3 Enter the number of terms in Fibonacci series:

Explanation:

1. The program takes n from the user and starts with a = 0 and b = 1.
2. If n is not positive, it shows an error message.
3. Otherwise, a for loop runs n times, printing a each time.
4. Inside the loop, the next Fibonacci number is generated using a, b = b, a + b.

Implementation:



TASK-03

Prompt:

#use user difined function to generate Fibonacci series up to n terms

#print the sequence with comments

Code:

```
def fibonacci_series(n):
    a, b = 0, 1
    series = []
    for _ in range(n):
        series.append(a)
        a, b = b, a + b
    return series
n = int(input("Enter the number of terms in Fibonacci series: "))
if n <= 0:
    print("Please enter a positive integer.")
else:
    print("Fibonacci series up to", n, "terms:")
    print(fibonacci_series(n))
```

Explanation:

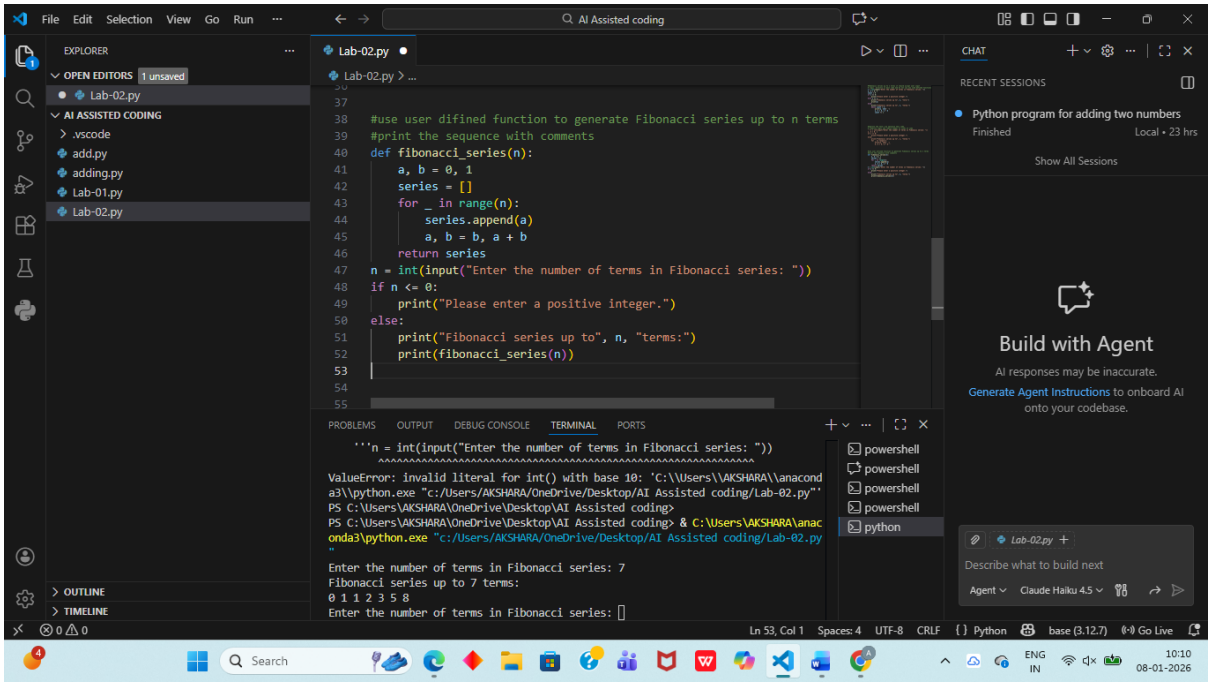
1.The function fibonacci_series(n) starts with a = 0 and b = 1, then uses a loop to build a list of Fibonacci numbers.

2. Each loop adds the current a to the list and updates values using a, b = b, a + b.

3. The function returns the full list of Fibonacci terms.

4. In the main program, the user enters n; if n is positive, the program prints the Fibonacci list — otherwise it shows an error message.

Implementation:



TASK-04

Prompt:

Febonacci series with Procedural vs Modular Fibonacci Code AI code with and without functions

Procedural approach

Code:

```
n = int(input("Enter the number of terms in Fibonacci series: "))
a, b = 0, 1
if n <= 0:
    print("Please enter a positive integer.")
else:
    print("Fibonacci series up to", n, "terms:")
    for _ in range(n):
        print(a, end=' ')
        a, b = b, a + b
print()
# Modular approach
def fibonacci_series(n):
```

```
    a, b = 0, 1
    series = []
    for _ in range(n):
        series.append(a)
        a, b = b, a + b
    return series
n = int(input("Enter the number of terms in  Modular Fibonacci series: "))
if n <= 0:
    print("Please enter a positive integer.")
else:
    print("Fibonacci series up to", n, "terms:")
    print(fibonacci_series(n))
```

Output:

```
Enter the number of terms in Fibonacci series: 7
Fibonacci series up to 7 terms:
0 1 1 2 3 5 8
Enter the number of terms in  Modular Fibonacci series: 7
Fibonacci series up to 7 terms:
[0, 1, 1, 2, 3, 5, 8]
```

Explanation:

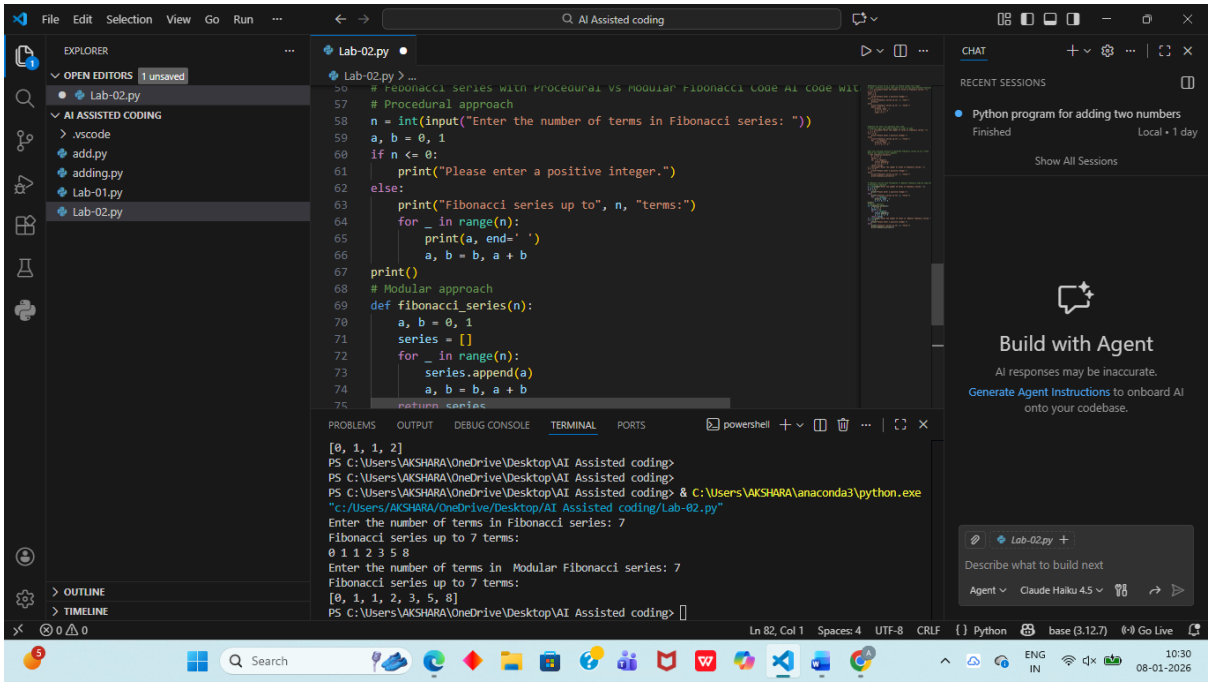
1.First part prints Fibonacci numbers directly using a for loop: it starts with a = 0, b = 1, prints a each time, then updates with a, b = b, a + b.

2.It checks if n is positive before printing the series.

3.The second part uses a modular (function) approach: fibonacci_series(n) builds the sequence in a list and returns it.

4.The program again asks for n, validates it, calls the function, and prints the returned list.

Implementation:



TASK-05

Prompt:

#AI-Generated Iterative vs Recursive Fibonacci Approaches (Different

#Algorithmic Approaches for Fibonacci Series)

Iterative approach and Recursive approach

Code:

```
def fibonacci_iterative(n):
    a, b = 0, 1
    series = []
    for _ in range(n):
        series.append(a)
        a, b = b, a + b
    return series
def fibonacci_recursive(n, a=0, b=1, series=None):
    if series is None:
        series = []
    if n == 0:
        return series
```

```
    series.append(a)
    return fibonacci_recursive(n - 1, b, a + b, series)
n = int(input("Enter the number of terms in Iterative Fibonacci series: "))
if n <= 0:
    print("Please enter a positive integer.")
else:
    print("Iterative Fibonacci series up to", n, "terms:")
    print(fibonacci_iterative(n))
n = int(input("Enter the number of terms in Recursive Fibonacci series: "))
if n <= 0:
    print("Please enter a positive integer.")
else:
    print("Recursive Fibonacci series up to", n, "terms:")
    print(fibonacci_recursive(n))
```

Output:

```
Enter the number of terms in Iterative Fibonacci series: 6
Iterative Fibonacci series up to 6 terms:
[0, 1, 1, 2, 3, 5]
Enter the number of terms in Recursive Fibonacci series: 6
Recursive Fibonacci series up to 6 terms:
[0, 1, 1, 2, 3, 5]
```

Explanation:

1. fibonacci_iterative(n) uses a loop: it starts with a = 0, b = 1, keeps appending a to a list, updates a, b = b, a + b, and finally returns the list.

2.fibonacci_recursive(n, a, b, series) builds the same sequence using recursion: it appends a, then calls itself with n-1 until n becomes 0.

3. The program asks the user for n twice (once for iterative, once for recursive), checks that n is positive, and prints each result**.**

Implementation: