

Assignment 01

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Task 1: AI-Generated Logic Without Modularization (Fibonacci Sequence Without Functions)

PROMPT:

Write a code for printing fibonacci series up to n terms without using functions

CODE:

The screenshot shows a Jupyter Notebook interface with the following details:

- File Bar:** File, Edit, Selection, View, Go, Run, ...
- Search Bar:** Search
- Toolbar:** Copy, Paste, Find, Selection, Cell, Kernel, Help
- Code Cell:** The code cell contains the following Python script:

```
1 #Write a code for printing fibonacci series up to n terms without using functions
2 n = int(input("Enter the number of terms in Fibonacci series: "))
3 a, b = 0, 1
4 count = 0
5 if n <= 0:
6     print("Please enter a positive integer")
7 elif n == 1:
8     print("Fibonacci series up to", n, "term:")
9     print(a)
10 else:
11     print("Fibonacci series up to", n, "terms:")
12     while count < n:
13         print(a, end=' ')
14         a, b = b, a + b
15         count += 1
16 
```

OUTPUT:

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Python + ⌂ ⌂ ⌂ ... | ⌂ ⌂ ⌂

● PS C:\Users\Geetha & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"
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
○ PS C:\Users\Geetha> █

Ln 19, Col 9 | Spaces: 4 | UTF-8 | CRLF | { } Python | 3.13.5 | ⌂ ⌂ ⌂
```

JUSTIFICATION:

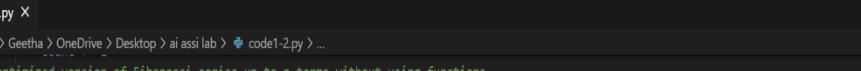
By completing this task , we have printed the required fibonacci series up to n terms without modularization. In this code we are printing the series with only one for loop

Task 2: AI Code Optimization & Cleanup (Improving Efficiency)

PROMPT:

Optimized version of Fibonacci series up to n terms without using functions

CODE:



The screenshot shows a code editor window with the following details:

- File Menu:** File, Edit, Selection, View, Go, Run, ...
- Search Bar:** Q, Search
- Toolbar:** Includes icons for file operations like Open, Save, Print, and Close.
- Code Area:** Displays Python code for generating a Fibonacci series up to n terms. The code uses a for loop and a list comprehension to calculate the series.
- Status Bar:** Shows the current file path: C:\Users\Geetha\OneDrive\Desktop\ai assi lab>code1-2.py > ...

```
#optimized version of Fibonacci series up to n terms without using functions
n = int(input("\nEnter the number of terms in Fibonacci series: "))
a, b = 0, 1
fib_series = []
for _ in range(n):
    fib_series.append(a)
    a, b = b, a + b
print("Fibonacci series up to", n, "terms:")
print(' '.join(map(str, fib_series)))
```

OUTPUT:

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Python + - ×

PS C:\Users\Geetha> & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"
0 1 1 2 3 5 8 13 21 34
● PS C:\Users\Geetha> & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"

● 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
○ PS C:\Users\Geetha> 
```

JUSTIFICATION:

By completing this task , we have got the optimized version of the previous code , as we can see the code which we have got the in task 1 is already optimized one.

Optimization of the code is very much important, as it reduces the time complexity and space complexity of the code, for the code which has more time complexity takes more time to run(slower) and which has more space complexity will utilize maximum space. So for completing our task efficiently , we need to Optimize our code

Task 3: Modular Design Using AI Assistance (Fibonacci Using Functions)

PROMPT:

Optimized version of Fibonacci series up to n terms using functions

CODE:

The screenshot shows a Python code editor interface. The title bar includes standard file operations like File, Edit, Selection, View, Go, Run, and a search bar. The main area displays the following Python script:

```
26 #Optimized version of Fibonacci series up to n terms using functions
27 def fibonacci_series(n):
28     a, b = 0, 1
29     fib_series = []
30     for _ in range(n):
31         fib_series.append(a)
32         a, b = b, a + b
33     return fib_series
34 n = int(input("Enter the number of terms in Fibonacci series: "))
35 fib_series = fibonacci_series(n)
36 print("Fibonacci series up to", n, "terms:")
37 print(' '.join(map(str, fib_series)))
```

OUTPUT:

JUSTIFICATION:

By completing this task , we are able to print the Fibonacci series up to n numbers using functions by using the above code. At first we are calling the user-defined function using function calling statement and then our function runs. In our function the main for loop runs and prints the output

Task 4: Comparative Analysis – Procedural vs Modular Fibonacci Code

PROMPTS:

Procedural : Write a code for printing fibonacci series up to n terms without using functions

Modular : Optimized version of Fibonacci series up to n terms using functions

CODE:

Procedural

```
39  #Write a code for printing fibonacci series up to n terms without using functions
40  n = int(input("Enter the number of terms in Fibonacci series: "))
41  a, b = 0, 1
42  count = 0
43  if n <= 0:
44      print("Please enter a positive integer")
45  elif n == 1:
46      print("Fibonacci series up to", n, "term:")
47      print(a)
48  else:
49      print("Fibonacci series up to", n, "terms:")
50      while count < n:
51          print(a, end=' ')
52          a, b = b, a + b
53          count += 1
54
```

Modular

```
File Edit Selection View Go Run ...
code1-2.py >
C: > Users > Geetha > OneDrive > Desktop > ai assi lab > code1-2.py > ...
54
55  #Optimized version of Fibonacci series up to n terms using functions
56  def fibonacci_series(n):
57      a, b = 0, 1
58      fib_series = []
59      for _ in range(n):
60          fib_series.append(a)
61          a, b = b, a + b
62      return fib_series
63  n = int(input("Enter the number of terms in Fibonacci series: "))
64  fib_series = fibonacci_series(n)
65  print("Fibonacci series up to", n, "terms:")
66  print(' '.join(map(str, fib_series)))
67
68
69
70
71
```

OUTPUT:

Procedural



A screenshot of a terminal window in a code editor. The terminal tab is selected. The output shows the execution of a Python script to generate a Fibonacci series. The user enters '10' and the script prints the first 10 terms: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34.

```
PS C:\Users\Geetha> & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"
PS C:\Users\Geetha> & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"
PS C:\Users\Geetha> & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"
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
PS C:\Users\Geetha>
```

Modular



A screenshot of a terminal window in a code editor. The terminal tab is selected. The output shows the execution of a Python script to generate a Fibonacci series. The user enters '10' and the script prints the first 10 terms: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34.

```
PS C:\Users\Geetha> & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"
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
PS C:\Users\Geetha>
```

JUSTIFICATION:

By this task , we are able to find the difference between Procedural(without using functions) and Modular(with using functions). The main use of function is

- Reusability of the code
- Easy to Debug
- Code Clarity
- Suitable for large systems

By observing, we can analyze that using modular method is a better and clean aproch

Task 5: AI-Generated Iterative vs Recursive Fibonacci Approaches (Different Algorithmic Approaches for Fibonacci Series)

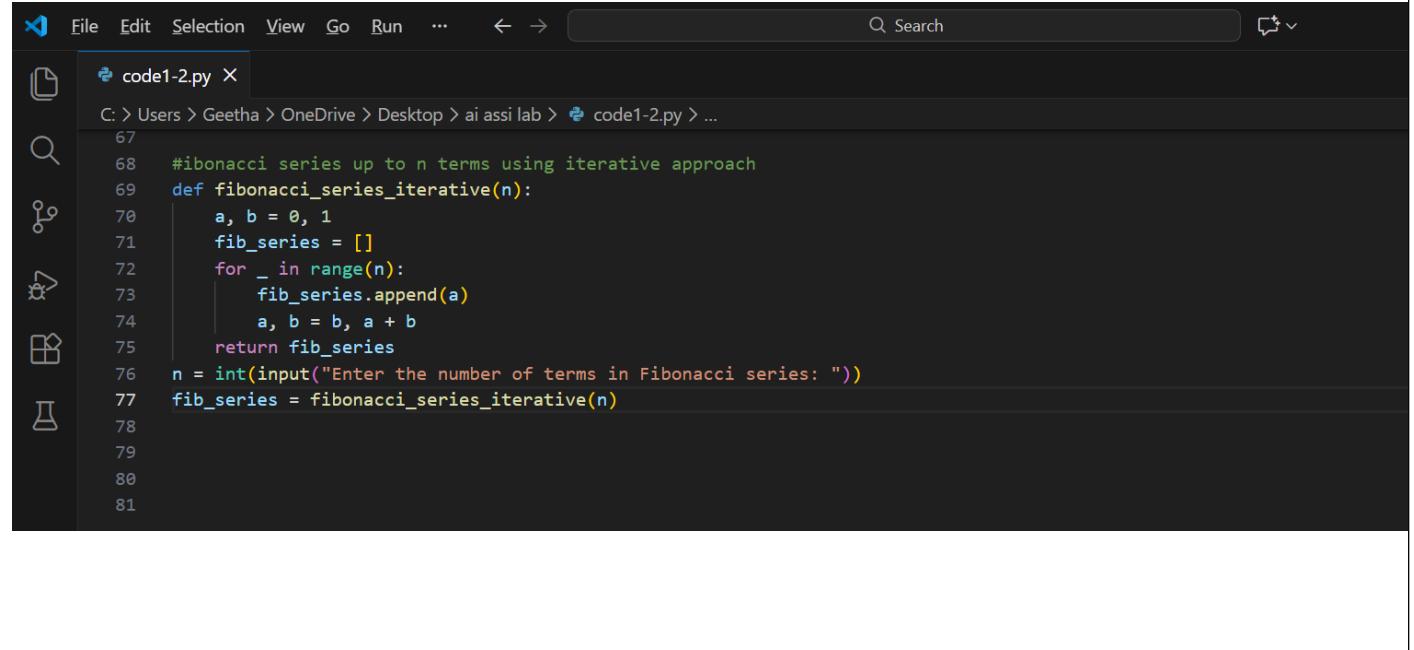
PROMPTS:

Iterative approach: fibonacci series up to n terms using iterative approach

Recursive approach : fibonacci series up to n terms using recursive approach

CODE:

Iterative approach:



The screenshot shows a code editor window with a dark theme. The title bar says "code1-2.py". The menu bar includes File, Edit, Selection, View, Go, Run, and a Help icon. A search bar is at the top right. The code itself is as follows:

```
 67
 68     #fibonacci series up to n terms using iterative approach
 69     def fibonacci_series_iterative(n):
 70         a, b = 0, 1
 71         fib_series = []
 72         for _ in range(n):
 73             fib_series.append(a)
 74             a, b = b, a + b
 75         return fib_series
 76
 77 n = int(input("Enter the number of terms in Fibonacci series: "))
 78
 79
 80
 81
```

Recursive approach :

```
C: > Users > Geetha > OneDrive > Desktop > ai assi lab > code1-2.py > ...
78
79     #fibonacci series up to n terms using recursive approach
80     def fibonacci_series_recursive(n, a=0, b=1, fib_series=None):
81         if fib_series is None:
82             fib_series = []
83         if n == 0:
84             return fib_series
85         fib_series.append(a)
86         return fibonacci_series_recursive(n-1, b, a + b, fib_series)
87     n = int(input("Enter the number of terms in Fibonacci series: "))
88     fib_series = fibonacci_series_recursive(n)
89     print("Fibonacci series up to", n, "terms:")
90
91
```

OUTPUT:

Iterative approach:

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Python + ⌂ ⌂ ⌂ ... ⌂ X
● PS C:\Users\Geetha> & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"
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
○ PS C:\Users\Geetha> └─
Ln 19, Col 9 Spaces:4 UTF-8 CRLF { } Python ⌂ 3.13.5 ⌂
```

Recursive approach

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Python + ⌂ ⌂ ⌂ ... ⌂ X
● PS C:\Users\Geetha> & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"
● PS C:\Users\Geetha> & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"
● PS C:\Users\Geetha> & C:/Users/Geetha/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/Geetha/OneDrive/Desktop/ai assi lab/code1-2.py"
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
○ PS C:\Users\Geetha> └─
Ln 38, Col 1 Spaces:4 UTF-8 CRLF { } Python ⌂ 3.13.5 ⌂
```

JUSTIFICATION:

The iterative Fibonacci approach is usually the better choice because it's faster, uses very little memory, and works well even when the number of terms is large. Recursive Fibonacci, on the other hand, makes many function calls, which slows things down and uses extra memory. For bigger inputs, it can even crash due to recursion limits. That's why, in real-world programs, iteration is generally preferred over recursion.