

AI ASSISTED CODING

Lab Assignment-1.4

Name: Thulasi Shylasri

HTNO:2303A51876

Batch-14(LAB-1)

Date: 08-01-2026

1Q) Task 1: AI-Generated Logic Without Modularization (Prime Number Check Without Functions)

❖ Scenario

- You are developing a basic validation script for a numerical learning application.

❖ Task Description

Use GitHub Copilot to generate a Python program that:

- Checks whether a given number is prime
- Accepts user input
- Implements logic directly in the main code
- Does not use any user-defined functions

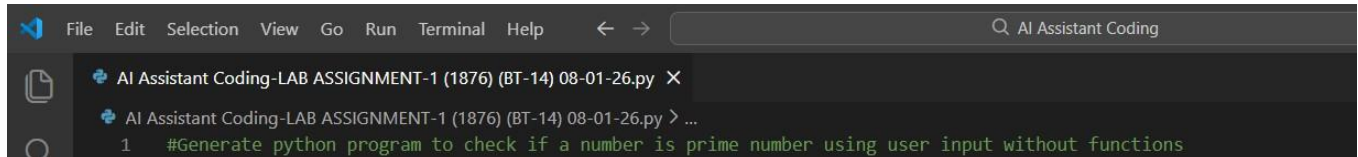
❖ Expected Output

- Correct prime / non-prime result
- Screenshots showing Copilot-generated code suggestions
- Sample inputs and outputs

❖ Prompt:

#Generate python program to check if a number is prime number using user input without functions

Screenshot:

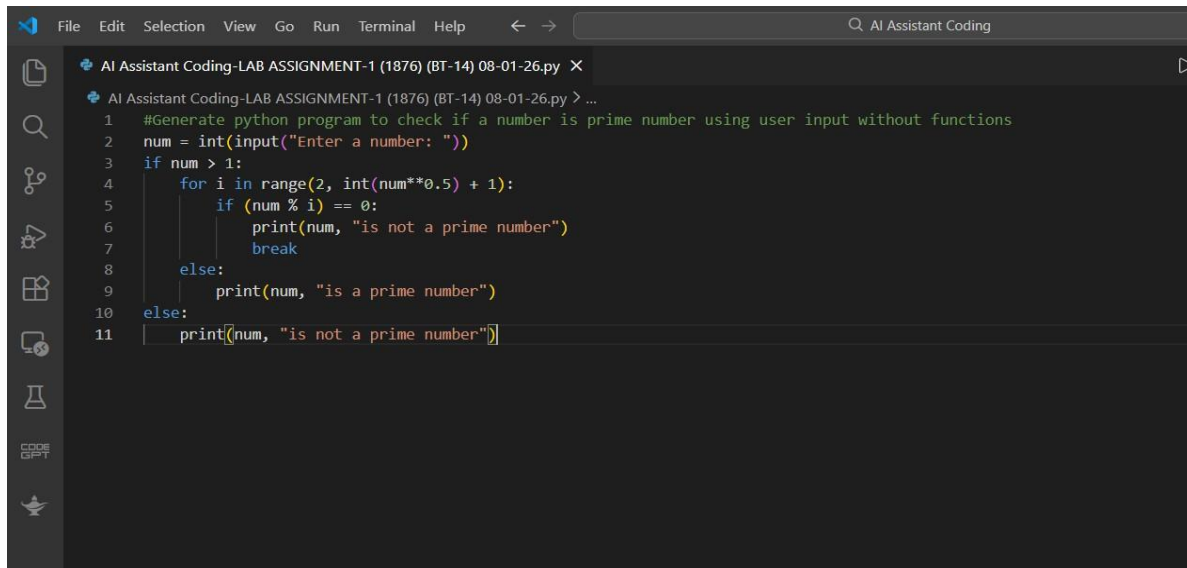


Code:

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

❖ **Scenario:** You are developing a basic validation script for a numerical learning application.

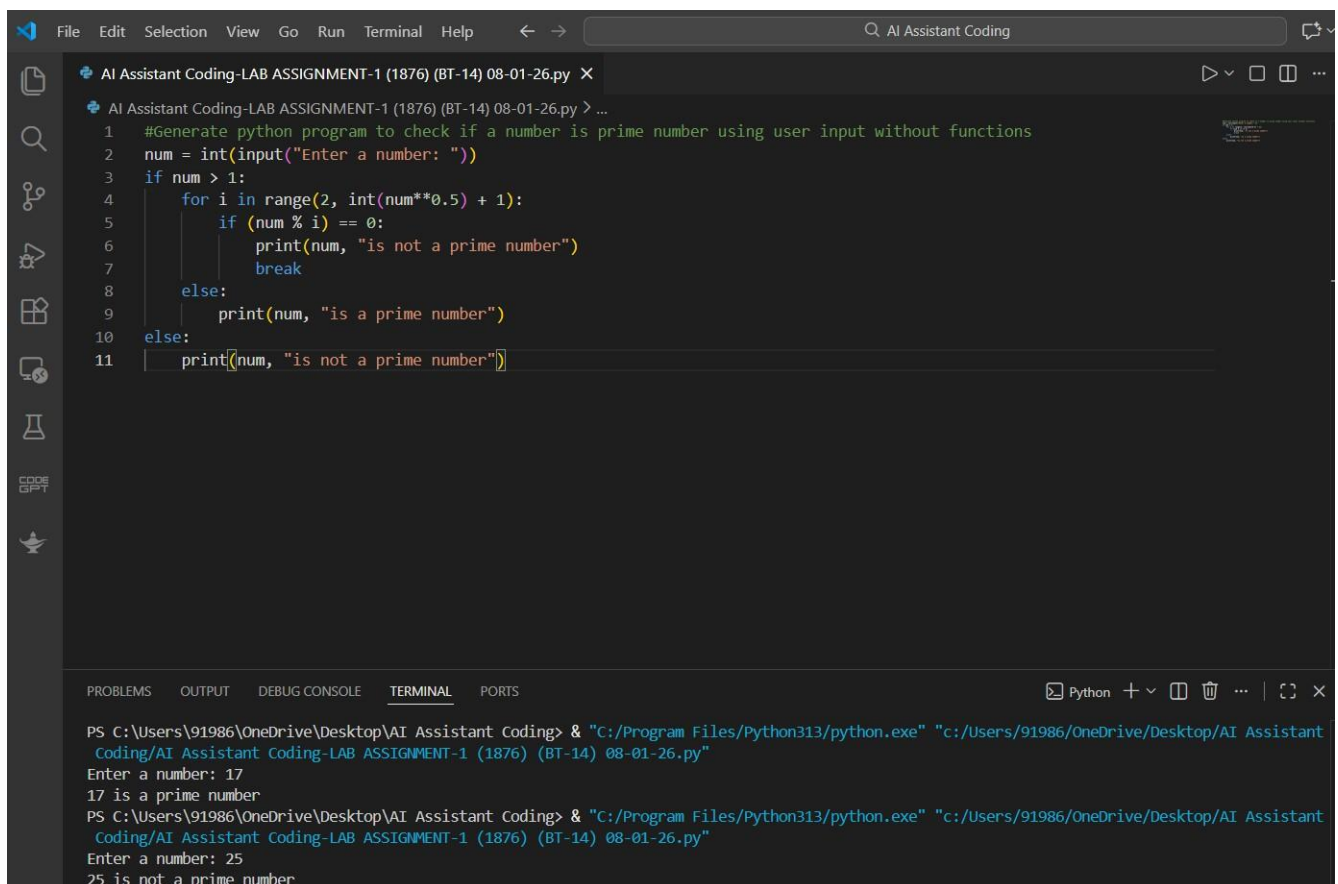
Screenshot:



The screenshot shows a code editor window titled "AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py". The code is a Python program that checks if a number is prime. It prompts the user to enter a number and then uses a for loop to check for factors. If a factor is found, it prints "is not a prime number". Otherwise, it prints "is a prime number".

```
1 #Generate python program to check if a number is prime number using user input without functions
2 num = int(input("Enter a number: "))
3 if num > 1:
4     for i in range(2, int(num**0.5) + 1):
5         if (num % i) == 0:
6             print(num, "is not a prime number")
7             break
8     else:
9         print(num, "is a prime number")
10 else:
11     print(num, "is not a prime number")
```

Output:



The screenshot shows the same code editor window as above, but with the output of the program displayed in the terminal. The program was run twice. In the first run, the user entered 17, and the output was "17 is a prime number". In the second run, the user entered 25, and the output was "25 is not a prime number".

```
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding/AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 17
17 is a prime number
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding/AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 25
25 is not a prime number
```

Explanation:

- `t` reads and validates the user's input (rejects non-integers).
- For $n > 1$, testing divisors only up to $\text{floor}(\sqrt{n})$ is sufficient because if $n = a * b$ and $a \leq b$ then $a \leq \sqrt{n}$.
- The loop breaks immediately when a divisor is found (fast rejection); the loop's else executes only if no divisor was found, indicating a prime.
- Time complexity: $O(\sqrt{n})$. Space: $O(1)$.

Justification:

This program checks whether a given number is prime using direct conditional logic without defining any functions. All computations are performed sequentially in a single block, making the logic easy to follow and suitable for beginners.



```
PRIME NUMBER CHECK PROGRAM WITHOUT FUNCTIONS

Prime number check without functions. Include the Copilot prompt, generated code, sample inputs/outputs, and why the code works."

AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py:1

✓ Generating a simple Python program

Let me create a concise Copilot prompt, the requested no-functions Python program, a few sample runs, and a short explanation of why it works. I'll present the prompt, code, example IO, and a brief reasoning.## 🟢 Copilot prompt
"Generate a short, user-friendly Python script (no functions) that reads an integer from the user and prints whether the number is prime. Use an efficient check up to the square root, handle invalid input gracefully, and include clear comments and sample input/output."

Generated code (no functions)

# Prime number check (no functions)
try:
    num = int(input("Enter an integer: "))
except ValueError:
    print("Invalid input: please enter an integer.")
    exit()

if num <= 1:
    print(num, "is not a prime number")
else:
    for i in range(2, int(num**0.5) + 1):
        if num % i == 0:
            print(num, "is not a prime number (divisible by", i, ")")
            break
    else:
        print(num, "is a prime number")

AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py +

Describe what to build next

Agent Auto 🐞
```

Ln 11, Col 40 Spaces: 4 UTF-8 CRLF {} Python 3.13.5 CODEGPT

CHAT

+ v ⚙️ ... | [] x

← PRIME NUMBER CHECK PROGRAM WITHOUT FUNCTIONS




```
for i in range(2, int(num**0.5) + 1):
    if num % i == 0:
        print(num, "is not a prime number (divisible by", i, ")")
        break
    else:
        print(num, "is a prime number")
```

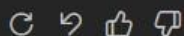
Sample inputs / outputs

- Input: 17
Output: 17 is a prime number
- Input: 1
Output: 1 is not a prime number
- Input: 25
Output: 25 is not a prime number (divisible by 5)
- Input: abc
Output: Invalid input: please enter an integer.

Why the code works

- It reads and validates the user's input (rejects non-integers).
- For $n > 1$, testing divisors only up to $\text{floor}(\text{sqrt}(n))$ is sufficient because if $n = a * b$ and $a \leq b$ then $a \leq \text{sqrt}(n)$.
- The loop breaks immediately when a divisor is found (fast rejection); the loop's `else` executes only if no divisor was found, indicating a prime.
- Time complexity: $O(\text{sqrt}(n))$. Space: $O(1)$.



 Tip: For very large inputs or repeated checks, consider using specialized algorithms or caching, but for single interactive checks this script is simple and efficient.



Raptor mini (Preview) • 1x

 AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py +

Describe what to build next

Agent v Auto v Ln 11, Col 40 Spaces: 4 UTF-8 CRLF { } Python  3.13.5 CODEGPT 

Task-1

The screenshot shows the Visual Studio Code editor with a file named `ASSIGNMENT-1 TASK-2(1876).py`. The code is a Python program to check if a number is prime without using functions. The terminal shows the program being executed with inputs 17 and 25, and an invalid input 'abc'.

```
1 #Generate python program to check if a number is prime number using user input without functions
2 num = int(input("Enter a number: "))
3 if num > 1:
4     for i in range(2, int(num**0.5) + 1):
5         if (num % i) == 0:
6             print(num, "is not a prime number")
7             break
8     else:
9         print(num, "is a prime number")
10 else:
11     print(num, "is not a prime number")
```

Terminal output:

```
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding/ASSIGNMENT-1 TASK-2(1876).py"
Enter a number: 17
17 is a prime number
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding/ASSIGNMENT-1 TASK-2(1876).py"
Enter a number: 25
25 is not a prime number
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding>
```

The screenshot shows the same Visual Studio Code editor with the same Python program. The right-hand sidebar displays the 'Generated code (no functions)' and 'Sample inputs / outputs' sections.

Generated code (no functions)

```
# Prime number check (no functions)
try:
    num = int(input("Enter an integer: "))
except ValueError:
    print("Invalid input: please enter an integer.")
    exit()

if num <= 1:
    print(num, "is not a prime number")
else:
    for i in range(2, int(num**0.5) + 1):
        if num % i == 0:
            print(num, "is not a prime number (divisible by", i, ")")
            break
    else:
        print(num, "is a prime number")
```

Sample inputs / outputs

- Input: 17
Output: 17 is a prime number
- Input: 1
Output: 1 is not a prime number
- Input: 25
Output: 25 is not a prime number (divisible by 5)
- Input: abc
Output: Invalid input: please enter an integer.

Why the code works

- It reads and validates the user's input (rejects non-integers).
- For $n > 1$, testing divisors only up to $\text{floor}(\sqrt{n})$ is sufficient because if $n = a * b$ and $a \leq b$ then $a \leq \sqrt{n}$.
- The loop breaks immediately when a divisor is found (fast rejection); the loop's `else` executes only if no divisor was found, indicating a prime.
- Time complexity: $O(\sqrt{n})$. Space: $O(1)$.

Tip: For very large inputs or repeated checks, consider using specialized algorithms or caching, but for single interactive checks this script is simple and efficient.

2Q) Task 2: Efficiency & Logic Optimization (Cleanup)

❖ Scenario

The script must handle larger input values efficiently.

❖ Task Description

Review the Copilot-generated code from Task 1 and improve it by:

- Reducing unnecessary iterations
- Optimizing the loop range (e.g., early termination)
- Improving readability
- Use Copilot prompts like:
 - *“Optimize prime number checking logic”*
 - *“Improve efficiency of this code”*

Hint:

Prompt Copilot with phrases like

“optimize this code”, “simplify logic”, or “make it more readable”

❖ Expected Output

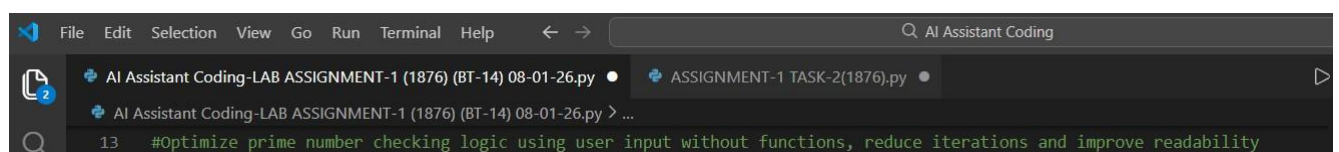
- Original and optimized code versions

Explanation of how the improvements reduce time complexity

Prompt:

#Optimize prime number checking logic using user input without functions, reduce iterations and improve readability

Screenshot:



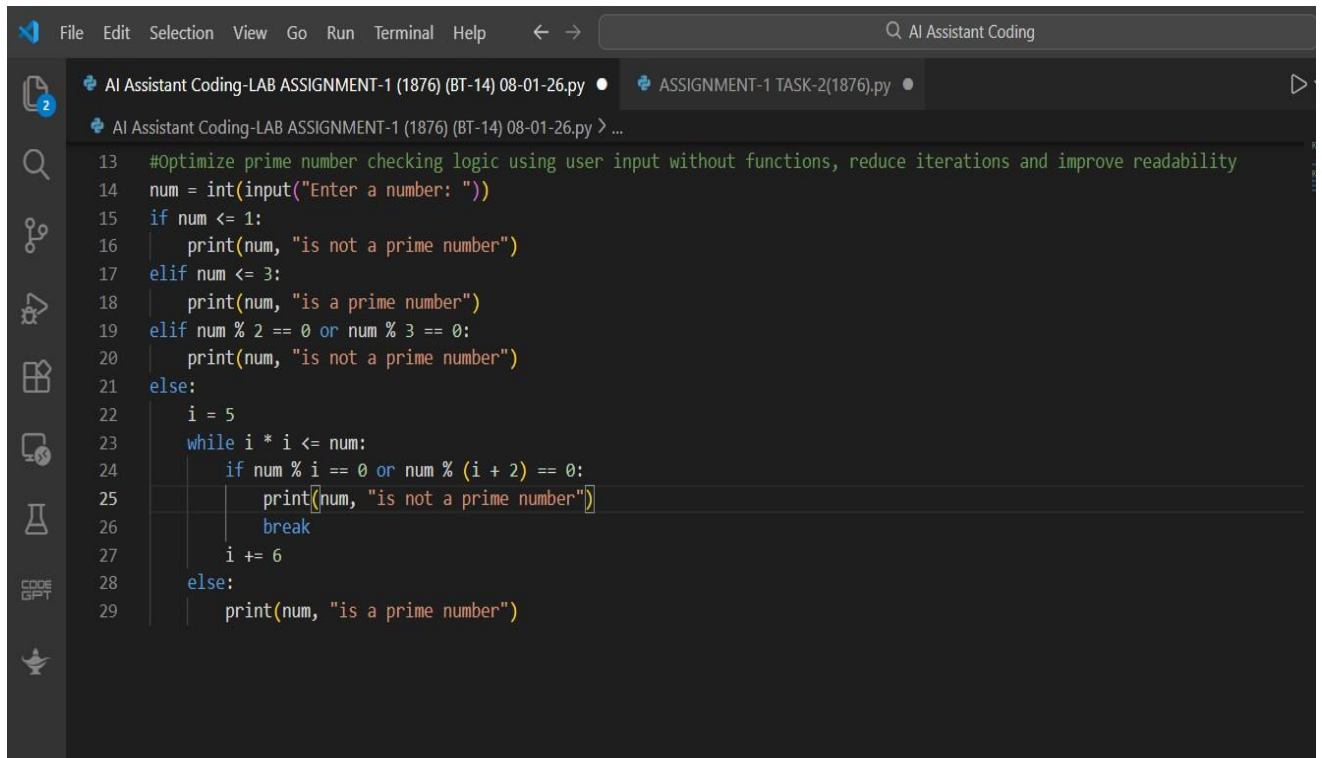
Code:

```
num = int(input("Enter a number: "))
if num <= 1:
    print(num, "is not a prime number")
elif num <= 3:
    print(num, "is a prime number")
elif num % 2 == 0 or num % 3 == 0:
    print(num, "is not a prime number")
else:
    i = 5
    while i * i <= num:
        if num % i == 0 or num % (i + 2) == 0:
            print(num, "is not a prime number")
            break
        i += 6
    else:
        print(num, "is a prime number")
```

Scenario:

The script must handle larger input values efficiently. The Task-1 code works correctly but can be improved to reduce unnecessary iterations, optimize the loop range, and improve readability.

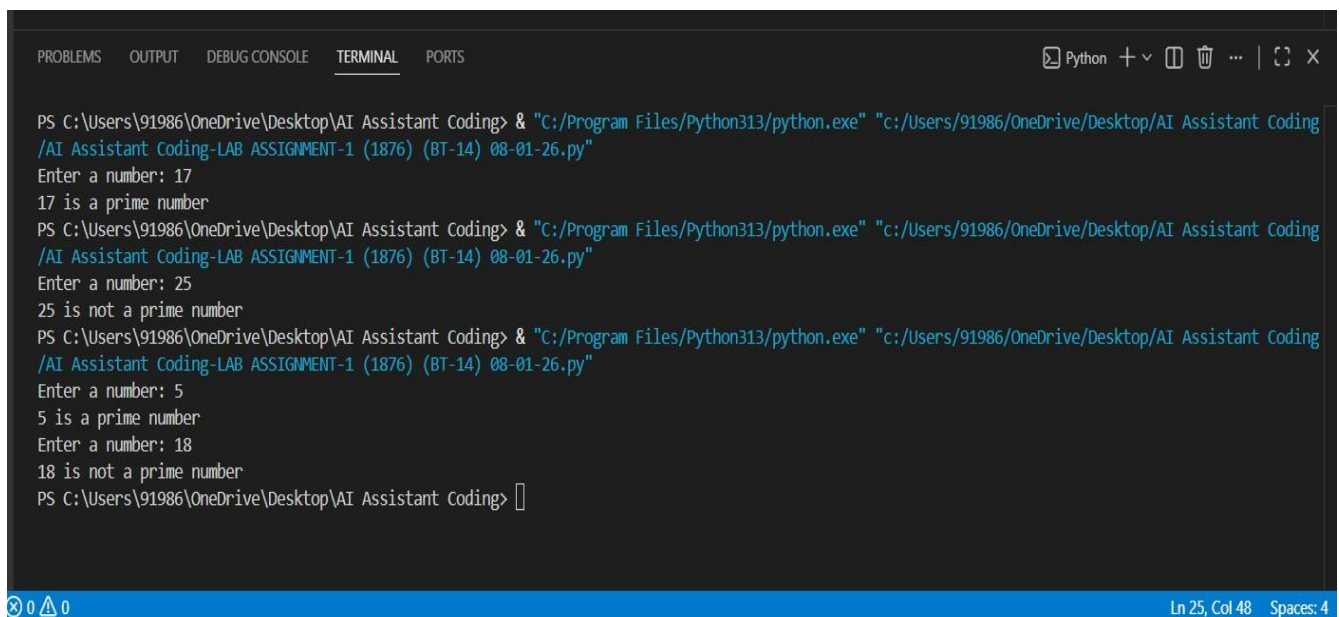
Screenshot:



The screenshot shows a code editor with a dark theme. The top menu bar includes File, Edit, Selection, View, Go, Run, Terminal, and Help. The search bar contains 'AI Assistant Coding'. The file explorer on the left shows a project named 'AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py'. The main editor area displays a Python script for checking prime numbers. The script starts with a comment: '#Optimize prime number checking logic using user input without functions, reduce iterations and improve readability'. It takes user input, checks for numbers less than or equal to 1, and then uses a while loop to check for divisibility by 2, 3, and subsequent odd numbers starting from 5. The script prints 'is not a prime number' for non-prime numbers and 'is a prime number' for prime numbers.

```
13 #Optimize prime number checking logic using user input without functions, reduce iterations and improve readability
14 num = int(input("Enter a number: "))
15 if num <= 1:
16     print(num, "is not a prime number")
17 elif num <= 3:
18     print(num, "is a prime number")
19 elif num % 2 == 0 or num % 3 == 0:
20     print(num, "is not a prime number")
21 else:
22     i = 5
23     while i * i <= num:
24         if num % i == 0 or num % (i + 2) == 0:
25             print(num, "is not a prime number")
26             break
27         i += 6
28     else:
29         print(num, "is a prime number")
```

Output:



The screenshot shows a terminal window with the title 'Python'. The terminal displays the execution of the Python script. The user enters '17' and the output is '17 is a prime number'. The user enters '25' and the output is '25 is not a prime number'. The user enters '5' and the output is '5 is a prime number'. The user enters '18' and the output is '18 is not a prime number'. The terminal shows the command prompt 'PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding>' and the command to run the script: '& "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding /AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"'. The status bar at the bottom shows 'Ln 25, Col 48 Spaces: 4'.

```
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding /AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 17
17 is a prime number
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding /AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 25
25 is not a prime number
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding /AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 5
5 is a prime number
Enter a number: 18
18 is not a prime number
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding>
```

Justification:

The optimized script improves performance by reducing unnecessary iterations and limiting the loop range, enabling faster execution for larger input values.

Early termination and simplified conditions lower the overall time complexity while maintaining correct prime number validation.

Explanation:

CHAT

+ v ⚙️ ... | [] ×

← PRIME NUMBER CHECK PROGRAM WITHOUT FUNCTIONS []

#Optimize prime number checking logic using user input without functions, reduce iterations and improve readability explanation

AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py:13

✓ Planned and structured final response explanation

I'm going to provide a concise, structured explanation of the $6k \pm 1$ optimization, why it reduces iterations, and how it improves readability.## 🟢 Summary

Optimized approach: validate input, handle small/easy cases, rule out multiples of 2 and 3, then test divisors of the form $6k - 1$ and $6k + 1$ up to \sqrt{n} . This reduces trial divisions and keeps code simple and readable.

🔗 What changed (concise)

- **Input validation** added (reject non-integers).
- **Quick rejections:** $n \leq 1$ (not prime), $n \leq 3$ (prime), $n \% 2 == 0$ or $n \% 3 == 0$ (not prime).
- **Loop step = 6:** test i and $i+2$ ($i = 5, 11, 17, \dots$), $i * i \leq n$.

💡 Why it reduces iterations

- Every integer falls into one of 6 residue classes modulo 6: 0,1,2,3,4,5.
- Multiples of 2 and 3 cover residues 0,2,3,4. That leaves residues 1 and 5, i.e., numbers $\equiv \pm 1 \pmod{6}$.
- Therefore any prime > 3 must be of the form $6k \pm 1$; after removing 2 and 3, it's sufficient to test only those candidates.
- Compared to checking every integer from $2.. \sqrt{n}$, we cut the candidate pool by about a factor of 3; compared to checking only odd numbers, we still reduce candidates by $\sim 1.5\times$.

💡 Why it reduces iterations

- Every integer falls into one of 6 residue classes modulo 6: 0,1,2,3,4,5.
- Multiples of 2 and 3 cover residues 0,2,3,4. That leaves residues 1 and 5, i.e., numbers $\equiv \pm 1 \pmod{6}$.
- Therefore any prime > 3 must be of the form $6k \pm 1$; after removing 2 and 3, it's sufficient to test only those candidates.
- Compared to checking every integer from $2.. \sqrt{n}$, we cut the candidate pool by about a factor of 3; compared to checking only odd numbers, we still reduce candidates by $\sim 1.5\times$.

⌚ Complexity

- Time: $O(\sqrt{n})$ (same asymptotic bound) but a smaller constant factor—fewer modulo operations in practice.
- Space: $O(1)$.

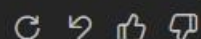
🔧 Example inputs / outputs

- Input: 17 → 17 is a prime number
- Input: 25 → 25 is not a prime number (divisible by 5)
- Input: 1 → 1 is not a prime number
- Input: abc → Invalid input: please enter an integer.

🌟 Readability & maintainability benefits

- Clear separation: input validation → quick checks → main loop.
- The 6-step increment and checking i and $i+2$ makes intent explicit and concise.
- Comments (e.g., "Check $6k \pm 1$ up to \sqrt{n} ") make the logic easy to verify or extend.

If you want, I can add a tiny benchmark inside the file to show the actual reduction in divisor checks for a sample n . 🐦



Raptor mini (Preview) • 1x

🔗 AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py +

Describe what to build next

Agent v Auto v 🛠️



Task-2

The screenshot shows a VS Code editor with a Python file named 'ASSIGNMENT-1 TASK-2(1876).py'. The code is a prime number checker that takes user input and prints whether the number is prime or not. The code is as follows:

```
1 #Generate python program to check if a number is prime number using user input without functions
2 num = int(input("Enter a number: "))
3 if num > 1:
4     for i in range(2, int(num*0.5) + 1):
5         if (num % i) == 0:
6             print(num, "is not a prime number")
7             break
8     else:
9         print(num, "is a prime number")
10 else:
11     print(num, "is not a prime number")
12
13 #Optimize prime number checking logic using user input without functions, reduce iterations and
14 num = int(input("Enter a number: "))
15 if num <= 1:
16     print(num, "is not a prime number")
17 elif num <= 3:
18     print(num, "is a prime number")
19 elif num % 2 == 0 or num % 3 == 0:
20     print(num, "is not a prime number")
21 else:
22     i = 5
23     while i * i <= num:
24         if num % i == 0 or num % (i + 2) == 0:
25             print(num, "is not a prime number")
26             break
27         i += 6
28     else:
29         print(num, "is a prime number")
```

The terminal output shows the program running and checking the primality of 25, 5, and 18.

```
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding\ & "C:\Program Files\Python313\python.exe" "C:\Users\91986\OneDrive\Desktop\AI Assistant Coding\AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 25
25 is not a prime number
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding\ & "C:\Program Files\Python313\python.exe" "C:\Users\91986\OneDrive\Desktop\AI Assistant Coding\AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 5
5 is a prime number
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding\ & "C:\Program Files\Python313\python.exe" "C:\Users\91986\OneDrive\Desktop\AI Assistant Coding\AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 18
18 is not a prime number
```

The AI Assistant Coding window on the right provides a detailed explanation of the optimized code. It highlights the following points:

- Optimize prime number checking logic using user input without functions, reduce iterations and improve readability explanation**
- Planned and structured final response explanation**
- I'm going to provide a concise, structured explanation of the $6k \pm 1$ optimization, why it reduces iterations, and how it improves readability.## Summary**
- Optimized approach:** validate input, handle small/easy cases, rule out multiples of 2 and 3, then test divisors of the form $6k - 1$ and $6k + 1$ up to \sqrt{n} . This reduces trial divisions and keeps code simple and readable.
- What changed (concise)**
 - Input validation** added (reject non-integers).
 - Quick rejections:** $n \leq 1$ (not prime), $n \leq 3$ (prime), $n \% 2 == 0$ or $n \% 3 == 0$ (not prime).
 - Loop step** = 6: test i and $i+2$ ($i = 5, 11, 17, \dots$), $i^2 \leq n$.
- Why it reduces iterations**
 - Every integer falls into one of 6 residue classes modulo 6: 0, 1, 2, 3, 4, 5.
 - Multiples of 2 and 3 cover residues 0, 2, 3, 4. That leaves residues 1 and 5, i.e., numbers $\equiv \pm 1 \pmod 6$.
 - Therefore any prime > 3 must be of the form $6k \pm 1$; after removing 2 and 3, it's sufficient to test only those candidates.
 - Compared to checking every integer from $2 \cdot \sqrt{n}$, we cut the candidate pool by about a factor of 3; compared to checking only odd numbers, we still reduce candidates by $\sim 1.5\times$.
- Complexity**
 - Time: $O(\sqrt{n})$ (same asymptotic bound) but a smaller constant factor—fewer modulo operations in practice.
 - Space: $O(1)$.

The screenshot shows the same VS Code editor with the Python file 'ASSIGNMENT-1 TASK-2(1876).py'. The code is the same as in the first screenshot. The terminal output is also the same. The AI Assistant Coding window on the right provides a detailed explanation of the optimized code. It highlights the following points:

- Why it reduces iterations**
 - Every integer falls into one of 6 residue classes modulo 6: 0, 1, 2, 3, 4, 5.
 - Multiples of 2 and 3 cover residues 0, 2, 3, 4. That leaves residues 1 and 5, i.e., numbers $\equiv \pm 1 \pmod 6$.
 - Therefore any prime > 3 must be of the form $6k \pm 1$; after removing 2 and 3, it's sufficient to test only those candidates.
 - Compared to checking every integer from $2 \cdot \sqrt{n}$, we cut the candidate pool by about a factor of 3; compared to checking only odd numbers, we still reduce candidates by $\sim 1.5\times$.
- Complexity**
 - Time: $O(\sqrt{n})$ (same asymptotic bound) but a smaller constant factor—fewer modulo operations in practice.
 - Space: $O(1)$.
- Example inputs / outputs**
 - Input: 17 \rightarrow 17 is a prime number
 - Input: 25 \rightarrow 25 is not a prime number (divisible by 5)
 - Input: 1 \rightarrow 1 is not a prime number
 - Input: abc \rightarrow Invalid input: please enter an integer.
- Readability & maintainability benefits**
 - Clear separation: input validation \rightarrow quick checks \rightarrow main loop.
 - The 6-step increment and checking i and $i+2$ makes intent explicit and concise.
 - Comments (e.g., "Check $6k \pm 1$ up to \sqrt{n} ") make the logic easy to verify or extend.

If you want, I can add a tiny benchmark inside the file to show the actual reduction in divisor checks for a sample n .

3Q) Task 3: Modular Design Using AI Assistance (Prime Number Check Using Functions)

❖ Scenario

The prime-checking logic will be reused across multiple modules.

❖ Task Description

Use GitHub Copilot to generate a function-based Python program that:

- Uses a user-defined function to check primality
- Returns a Boolean value
- Includes meaningful comments (AI-assisted)

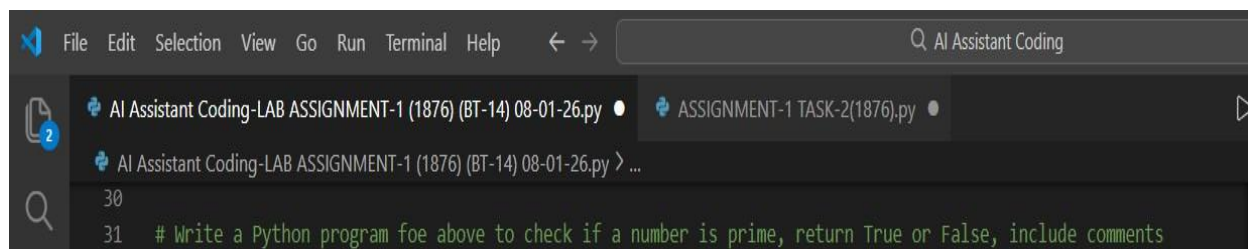
❖ Expected Output

- Correctly working prime-checking function
- Screenshots documenting Copilot's function generation
- Sample test cases and outputs

Prompt:

Write a Python program for above to check if a number is prime, return True or False, include comments

Screenshot:



Code:

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

# Check if the number is less than or equal to 1

if num <= 1:

    print(False) # Numbers less than or equal to 1 are not prime

elif num <= 3:

    print(True) # 2 and 3 are prime numbers

elif num % 2 == 0 or num % 3 == 0:

    print(False) # Eliminate multiples of 2 and 3

else:

    i = 5

    is_prime = True # Assume the number is prime

    while i * i <= num:

        if num % i == 0 or num % (i + 2) == 0:

            is_prime = False # Found a divisor, not prime

            break

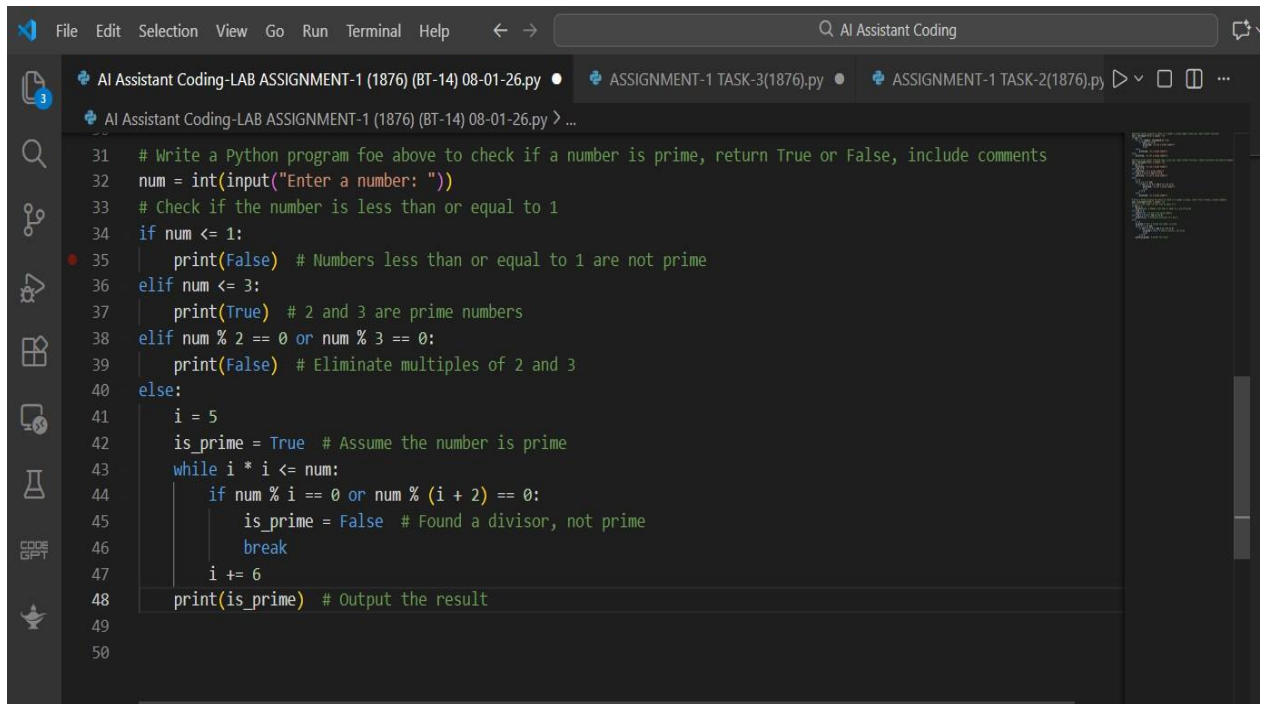
        i += 6

    print(is_prime) # Output the result
```

Scenario:

The prime-checking logic will be reused across multiple modules. To make the code reusable, maintainable, and easier to debug, we will design it in a modular way using functions.

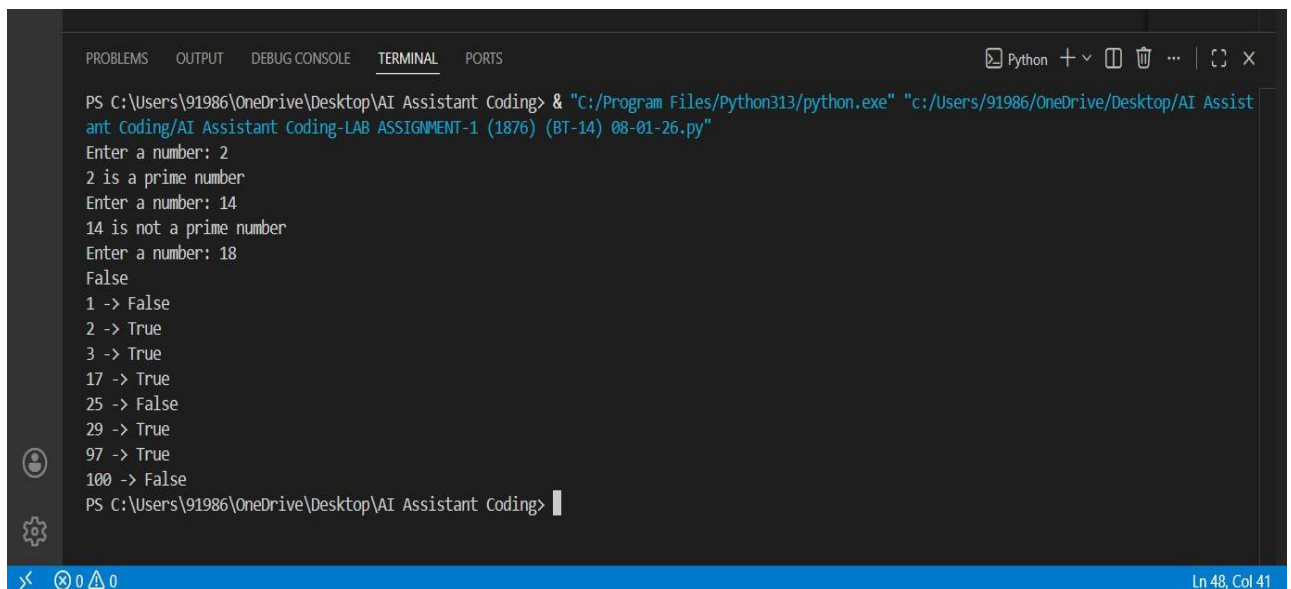
Screenshot:



The screenshot shows a code editor with a dark theme. The menu bar includes File, Edit, Selection, View, Go, Run, Terminal, and Help. The toolbar has a search icon, a magnifying glass, and a search input field containing "AI Assistant Coding". The file explorer on the left shows a project named "AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py". The main editor area displays a Python script for checking prime numbers. The script includes comments and uses conditional logic to determine if a number is prime. The code is as follows:

```
31 # Write a Python program for above to check if a number is prime, return True or False, include comments
32 num = int(input("Enter a number: "))
33 # Check if the number is less than or equal to 1
34 if num <= 1:
35     print(False) # Numbers less than or equal to 1 are not prime
36 elif num <= 3:
37     print(True) # 2 and 3 are prime numbers
38 elif num % 2 == 0 or num % 3 == 0:
39     print(False) # Eliminate multiples of 2 and 3
40 else:
41     i = 5
42     is_prime = True # Assume the number is prime
43     while i * i <= num:
44         if num % i == 0 or num % (i + 2) == 0:
45             is_prime = False # Found a divisor, not prime
46             break
47         i += 6
48 print(is_prime) # Output the result
49
50
```

Output:



The screenshot shows a terminal window with a dark theme. The terminal title bar includes "Python", a plus sign, a minus sign, a close button, and a search icon. The terminal content shows the execution of the Python script. The prompt is "PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding>". The user enters "2", and the output is "2 is a prime number". The user enters "14", and the output is "14 is not a prime number". The user enters "18", and the output is "False". The user then enters a series of numbers: "1", "2", "3", "17", "25", "29", "97", and "100", with corresponding outputs: "False", "True", "True", "True", "False", "True", "True", and "False". The terminal ends with the prompt "PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding>".

```
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding/AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 2
2 is a prime number
Enter a number: 14
14 is not a prime number
Enter a number: 18
False
1 -> False
2 -> True
3 -> True
17 -> True
25 -> False
29 -> True
97 -> True
100 -> False
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding>
```


Justification:

Using a user-defined function makes the prime-checking logic reusable across multiple modules, improving code modularity and maintainability. Returning a Boolean value enables easy integration with conditional statements and other program components.

Explanation:

CHAT

PRIME NUMBER CHECK PROGRAM WITHOUT FUNCTIONS

give a Explanation of for above to check if a number is prime, return True or False, include comments

AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py:31

✓ Explanation — prime check that prints True/False

How it works (step-by-step)

1. **Input:** `num = int(input("Enter a number: "))` — the snippet assumes a valid integer is entered (wrap in `try/except` if you want robust validation).

2. **Handle small cases:**

- `if num <= 1: print(False)` → 0, 1, negatives are not prime.
- `elif num <= 3: print(True)` → 2 and 3 are prime.

3. **Eliminate easy multiples:**

- `elif num % 2 == 0 or num % 3 == 0: print(False)` → remove even numbers and multiples of 3 quickly.

4. **Optimized trial division (6k±1 rule):**

- Initialize `i = 5` and assume `is_prime = True`.
- Loop `while i * i <= num:` and test `num % i == 0` or `num % (i + 2) == 0`. If a divisor is found set `is_prime = False` and `break`. Increment `i += 6`.
- After `AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py`
- Reason: every prime > 3 is of the form $6k \pm 1$, so after removing multiples of 2 and 3 it suffices to test `i` and `i+2` for `i = 5, 11, 17, ...`.

Why this is efficient

- You avoid testing all numbers up to \sqrt{n} : you short-circuit many cases (2,3 and their multiples) and test only candidates $\equiv \pm 1 \pmod{6}$.
- Time complexity: $O(\sqrt{n})$ with a **smaller constant factor** than naive checks.
- Space complexity: $O(1)$.

AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py

Describe what to build next

Agent Auto

Ln 48, Col 41 Spaces: 4 UTF-8 CRLF Python 3.13.5 CODEGPT

1. **Input:** `num = int(input("Enter a number: "))` — the snippet assumes a valid integer is entered (wrap in `try/except` if you want robust validation).
2. **Handle small cases:**
 - `if num <= 1: print(False)` → 0, 1, negatives are not prime.
 - `elif num <= 3: print(True)` → 2 and 3 are prime.
3. **Eliminate easy multiples:**
 - `elif num % 2 == 0 or num % 3 == 0: print(False)` → remove even numbers and multiples of 3 quickly.
4. **Optimized trial division ($6k \pm 1$ rule):**
 - Initialize `i = 5` and assume `is_prime = True`.
 - Loop `while i * i <= num:` and test `num % i == 0` or `num % (i + 2) == 0`. If a divisor is found set `is_prime = False` and `break`. Increment `i += 6`.
 - After the loop print `is_prime`.
 - Reason: every prime > 3 is of the form $6k \pm 1$, so after removing multiples of 2 and 3 it suffices to test `i` and `i+2` for `i = 5, 11, 17, ...`.

Why this is efficient

- You avoid testing all numbers up to \sqrt{n} : you short-circuit many cases (2,3 and their multiples) and test only candidates $\equiv \pm 1 \pmod{6}$.
- Time complexity: $O(\sqrt{n})$ with a **smaller constant factor** than naive checks.
- Space complexity: $O(1)$.

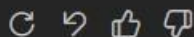
Comments in the code

- Comments document intent: small-case handling, quick eliminations, and the $6k \pm 1$ loop — making the logic readable and maintainable.

Example

- Input `17` → prints `True`
- Input `25` → prints `False` (divisible by 5)

Would you like me to add a robust input validation wrapper or replace the print with a callable `is_prime()` function? 🚀



Raptor mini (Preview) • 1x

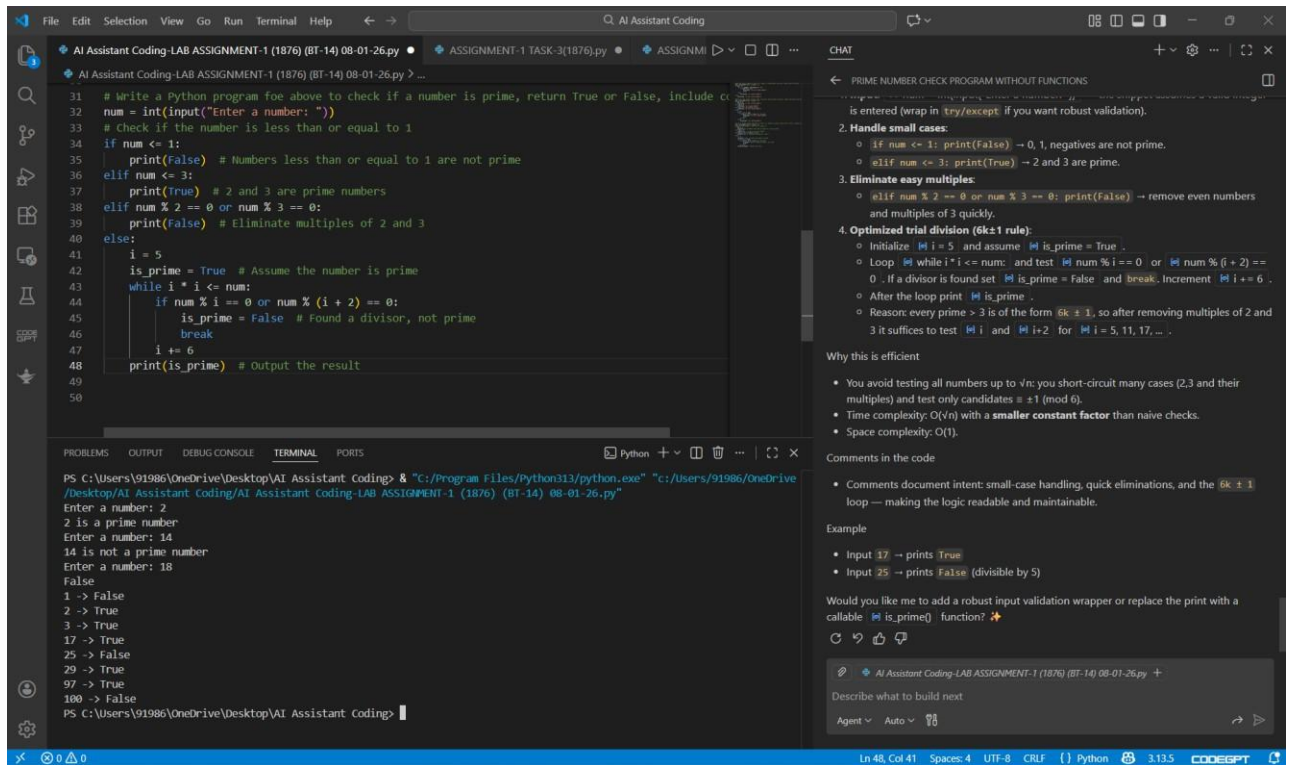
AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py +

Describe what to build next

Agent v Auto v



Task-3



4Q) Task 4: Comparative Analysis –With vs Without Functions

❖ Scenario

You are participating in a technical review discussion.

❖ Task Description

Compare the Copilot-generated programs:

- Without functions (Task 1)
- With functions (Task 3)
- Analyze them based on:
 - Code clarity
 - Reusability
 - Debugging ease

➤ Suitability for large-scale applications

❖ Expected Output

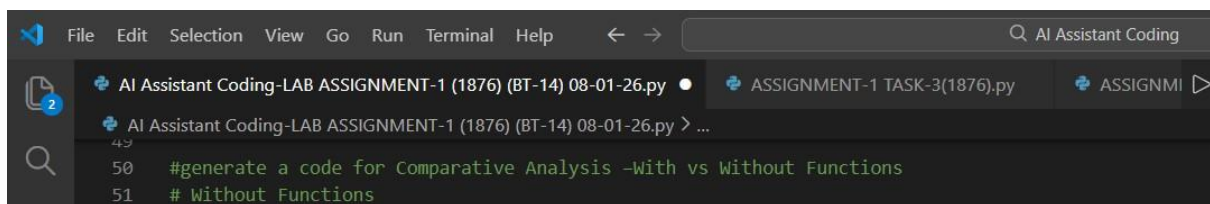
Comparison table or short analytical report

Prompt:

#generate a code for Comparative Analysis –With vs Without Functions

Without Functions

Screenshot:



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(num, "is not a prime number")
```

```
            break
```

```
else:
```

```
    print(num, "is a prime number")
```

```
else:
```

```
    print(num, "is not a prime number")
```

With Functions

```
def is_prime(n):
```

```
    if n <= 1:
```

```
        return False
```

```
    elif n <= 3:
```

```
        return True
```

```
    elif n % 2 == 0 or n % 3 == 0:
```

```
        return False
```

```

else:

    i = 5

    while i * i <= n:

        if n % i == 0 or n % (i + 2) == 0:

            return False

        i += 6

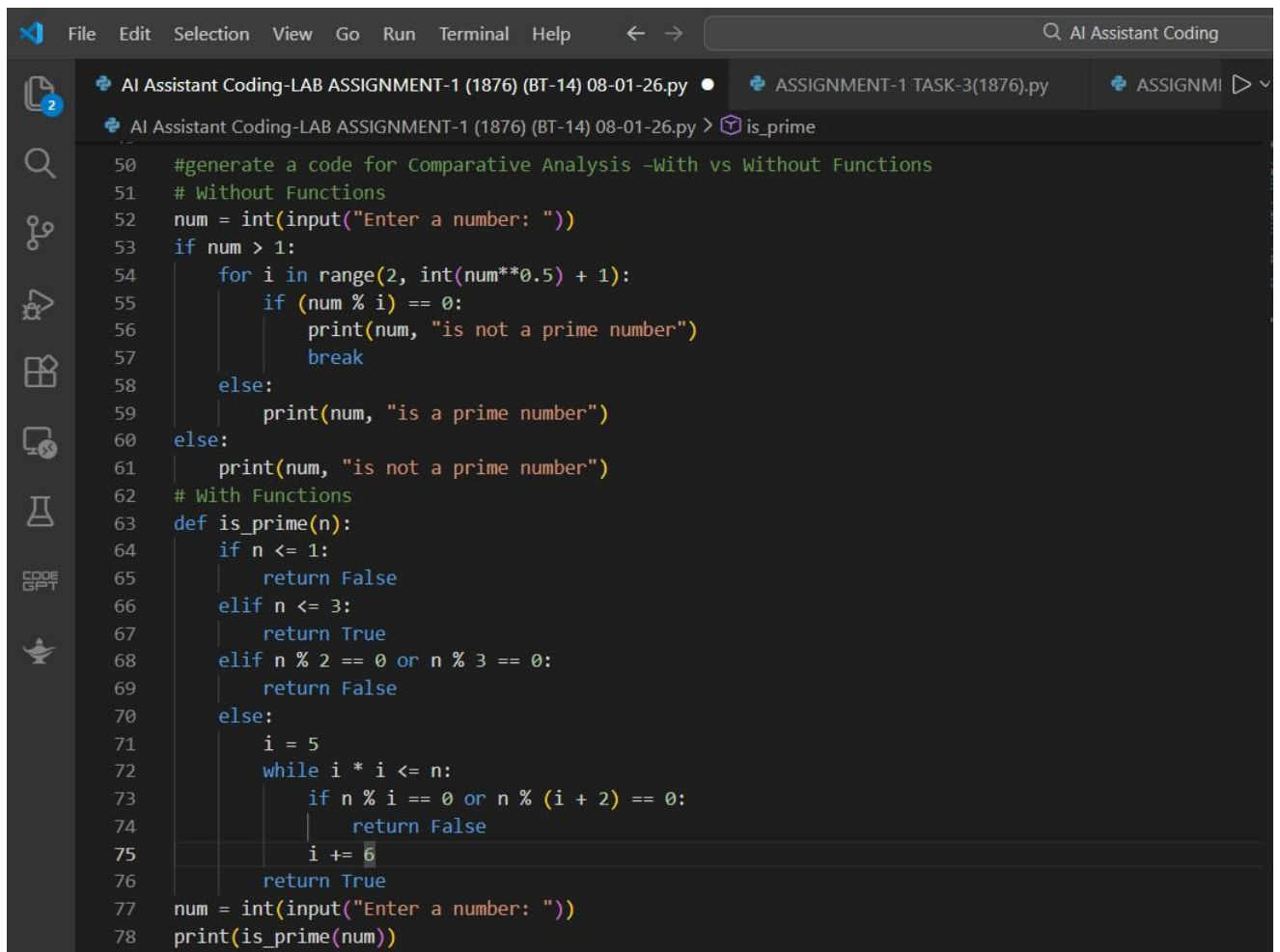
    return True

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

print(is_prime(num))

```

Screenshot:

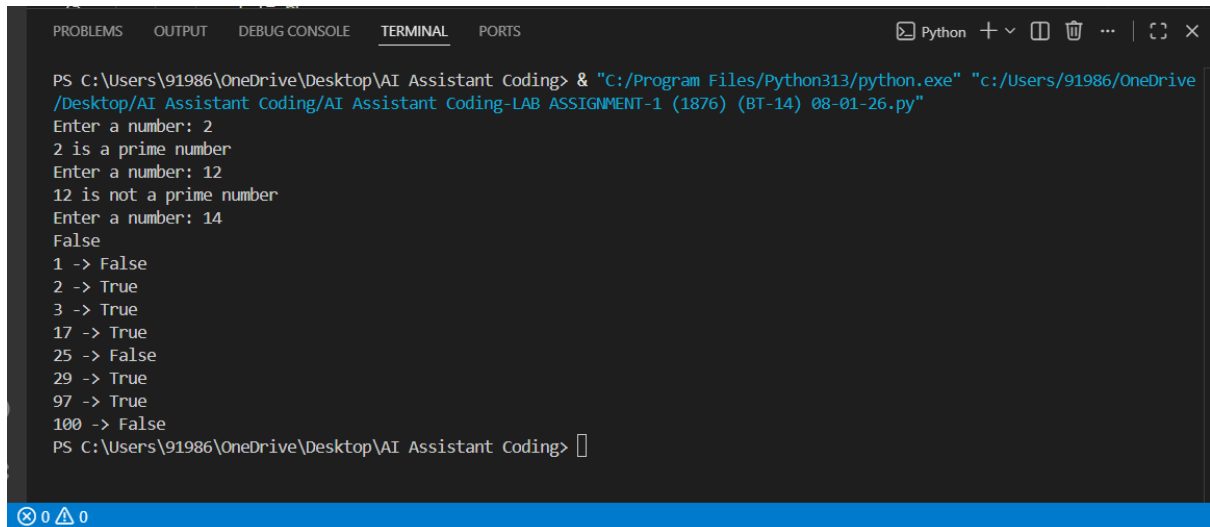


```

50 #generate a code for Comparative Analysis -With vs Without Functions
51 # Without Functions
52 num = int(input("Enter a number: "))
53 if num > 1:
54     for i in range(2, int(num**0.5) + 1):
55         if (num % i) == 0:
56             print(num, "is not a prime number")
57             break
58     else:
59         print(num, "is a prime number")
60 else:
61     print(num, "is not a prime number")
62 # With Functions
63 def is_prime(n):
64     if n <= 1:
65         return False
66     elif n <= 3:
67         return True
68     elif n % 2 == 0 or n % 3 == 0:
69         return False
70     else:
71         i = 5
72         while i * i <= n:
73             if n % i == 0 or n % (i + 2) == 0:
74                 return False
75             i += 6
76         return True
77 num = int(input("Enter a number: "))
78 print(is_prime(num))

```

Output:



```
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding/AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 2
2 is a prime number
Enter a number: 12
12 is not a prime number
Enter a number: 14
False
1 -> False
2 -> True
3 -> True
17 -> True
25 -> False
29 -> True
97 -> True
100 -> False
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding>
```

Justification:

Programs written with functions offer better code clarity by separating logic into well-defined blocks, making them easier to read and understand. Function-based designs improve reusability and debugging ease, as changes or fixes can be applied in one place without affecting the entire code.

Explanation:

CHAT

PRIME NUMBER CHECK PROGRAM WITHOUT FUNCTIONS

Compare prime number checking code without functions and with functions based on clarity, reusability, debugging, and scalability explanation.

✓ Considered code structure benefits and prepared message.

Let me compare the two versions focusing on clarity, reusability, debugging, and scalability (short, practical points). I'll finish with a brief recommendation.## Comparison: prime check — without functions vs with functions

Criterion	Without functions	With functions
Clarity	Simple linear flow; easy to read for tiny one-off scripts but logic and I/O are mixed.	Clear separation of concerns: algorithm isolated, I/O separate; intent obvious from the function name and docstring.
Reusability	Hard to reuse — logic is tied to specific input/output and often duplicated.	Highly reusable: call the function from other code, import into tests, or expose in libraries. ✓
Debugging & Testing	Harder to test: relies on prints and manual runs; isolating bugs requires re-running interactive flows.	Easier to unit-test and debug (returns values, small surface area). You can add targeted tests and use mocks. 🛠️
Scalability & Maintenance	Poor: adding features (benchmarking, alternative algorithms, caching) often leads to tangled code.	Good: swap implementations, add optimizations (caching, Miller–Rabin), and extend behavior via parameters or wrappers.
Performance overhead	Minimal; single script has no call overhead.	Function call overhead is negligible; design benefits outweigh cost for real use. ⚖️
When	Quick classroom examples or	Production code, libraries, code you'll reuse

AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py

Agent Auto

When appropriate	Quick classroom examples or single-use scripts.	Production code, libraries, code you'll reuse or test. ✓
------------------	---	--

Short recommendation ✓

- For learning or single-run scripts, the no-function version is acceptable.
- For clarity, reusability, reliable debugging, and future scalability, prefer a **function-based** design with a small interactive wrapper (keep I/O outside the logic).

If you want, I can refactor your file to add a tested `is_prime()` function plus a small CLI wrapper and unit tests.

🔄 ↶ 🍏 🗨️

Raptor mini (Preview) • 1x

AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py

Agent Auto

Task-4

The screenshot shows a VS Code editor with a Python script for checking prime numbers without using functions. The script uses a loop to check divisibility from 2 to the square root of the number. The terminal output shows the script being run with various inputs, and the results are printed. To the right, a comparison table evaluates the two versions of the program.

```
50 #generate a code for comparative Analysis -With vs Without Functions
51 # Without Functions
52 num = int(input("Enter a number: "))
53 if num > 1:
54     for i in range(2, int(num**0.5) + 1):
55         if (num % i) == 0:
56             print(num, "is not a prime number")
57             break
58     else:
59         print(num, "is a prime number")
60 else:
61     print(num, "is not a prime number")
62 # With Functions
63 def is_prime(n):
64     if n <= 1:
65         return False
66     elif n <= 3:
67         return True
68     elif n % 2 == 0 or n % 3 == 0:
69         return False
70     else:
71         i = 5
72         while i * i <= n:
73             if n % i == 0 or n % (i + 2) == 0:
74                 return False
75             i += 6
76         return True
77 num = int(input("Enter a number: "))
78 print(is_prime(num))
```

Terminal Output:

```
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "c:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding/LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 2
2 is a prime number
Enter a number: 12
12 is not a prime number
Enter a number: 14
False
1 -> False
2 -> True
3 -> True
17 -> True
25 -> False
29 -> True
97 -> True
100 -> False
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding>
```

Criterion	Without functions	With functions
Clarity	Simple linear flow; easy to read for tiny one-off scripts but logic and I/O are mixed.	Clear separation of concerns: algorithm isolated, I/O separate; intent obvious from the function name and docstring.
Reusability	Hard to reuse — logic is tied to specific input/output and often duplicated.	Highly reusable: call the function from other code, import into tests, or expose in libraries. ✔
Debugging & Testing	Harder to test: relies on prints and manual runs; isolating bugs requires re-running interactive flows.	Easier to unit-test and debug (returns values, small surface area). You can add targeted tests and use mocks. 🔗
Scalability & Maintenance	Poor: adding features (benchmarking, alternative algorithms, caching) often leads to tangled code.	Good: swap implementations, add optimizations (caching, Miller-Rabin), and extend behavior via parameters or wrappers.
Performance overhead	Minimal; single script has no call overhead.	Function call overhead is negligible; design benefits outweigh cost for real use. ⚡
When appropriate	Quick classroom examples or single-use scripts.	Production code, libraries, code you'll reuse or test. ✔

Short recommendation ✔

- For learning or single-run scripts, the no-function version is acceptable.

Agent Auto 🔗

The screenshot shows the same VS Code editor with the refactored Python script. The script now uses a function `is_prime` to check for prime numbers. The terminal output is identical to the previous screenshot. The comparison table on the right has been updated to reflect the changes.

```
57         break
58     else:
59         print(num, "is a prime number")
60 else:
61     print(num, "is not a prime number")
62 # With Functions
63 def is_prime(n):
64     if n <= 1:
65         return False
66     elif n <= 3:
67         return True
68     elif n % 2 == 0 or n % 3 == 0:
69         return False
70     else:
71         i = 5
72         while i * i <= n:
73             if n % i == 0 or n % (i + 2) == 0:
74                 return False
75             i += 6
76         return True
77 num = int(input("Enter a number: "))
78 print(is_prime(num))
```

Terminal Output:

```
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "c:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding/LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 2
2 is a prime number
Enter a number: 12
12 is not a prime number
Enter a number: 14
False
1 -> False
2 -> True
3 -> True
17 -> True
25 -> False
29 -> True
97 -> True
100 -> False
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding>
```

Criterion	Without functions	With functions
Clarity	Simple linear flow; easy to read for tiny one-off scripts but logic and I/O are mixed.	Clear separation of concerns: algorithm isolated, I/O separate; intent obvious from the function name and docstring.
Reusability	Hard to reuse — logic is tied to specific input/output and often duplicated.	Highly reusable: call the function from other code, import into tests, or expose in libraries. ✔
Debugging & Testing	Harder to test: relies on prints and manual runs; isolating bugs requires re-running interactive flows.	Easier to unit-test and debug (returns values, small surface area). You can add targeted tests and use mocks. 🔗
Scalability & Maintenance	Poor: adding features (benchmarking, alternative algorithms, caching) often leads to tangled code.	Good: swap implementations, add optimizations (caching, Miller-Rabin), and extend behavior via parameters or wrappers.
Performance overhead	Minimal; single script has no call overhead.	Function call overhead is negligible; design benefits outweigh cost for real use. ⚡
When appropriate	Quick classroom examples or single-use scripts.	Production code, libraries, code you'll reuse or test. ✔

Short recommendation ✔

- For learning or single-run scripts, the no-function version is acceptable.
- For clarity, reusability, reliable debugging, and future scalability, prefer a **function-based** design with a small interactive wrapper (keep I/O outside the logic).

If you want, I can refactor your file to add a tested `is_prime()` function plus a small CLI wrapper and unit tests.

Raptor mini (Preview) • 1x

Agent Auto 🔗

5Q)Task 5: AI-Generated Iterative vs Recursive Fibonacci Approaches (Different Algorithmic Approaches to Prime Checking)

❖ Scenario

Your mentor wants to evaluate how AI handles alternative logical strategies.

❖ Task Description

Prompt GitHub Copilot to generate:

- A basic divisibility check approach
- An optimized approach (e.g., checking up to \sqrt{n})

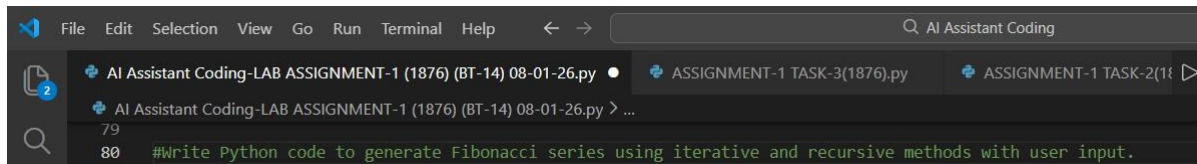
❖ Expected Output

- Two correct implementations
- Comparison discussing:
 - Execution flow
 - Time complexity
 - Performance for large inputs
 - When each approach is appropriate

Prompt:

#Write Python code to generate Fibonacci series using iterative and recursive methods with user input.

Screenshot:



Code:

Iterative Fibonacci

```
n = int(input("Enter n: "))
```

```
a, b = 0, 1
```

```
for i in range(n):
```

```
    print(a, end=" ")
```

```
    a, b = b, a + b
```

Recursive Fibonacci

```
def fib(n):
```

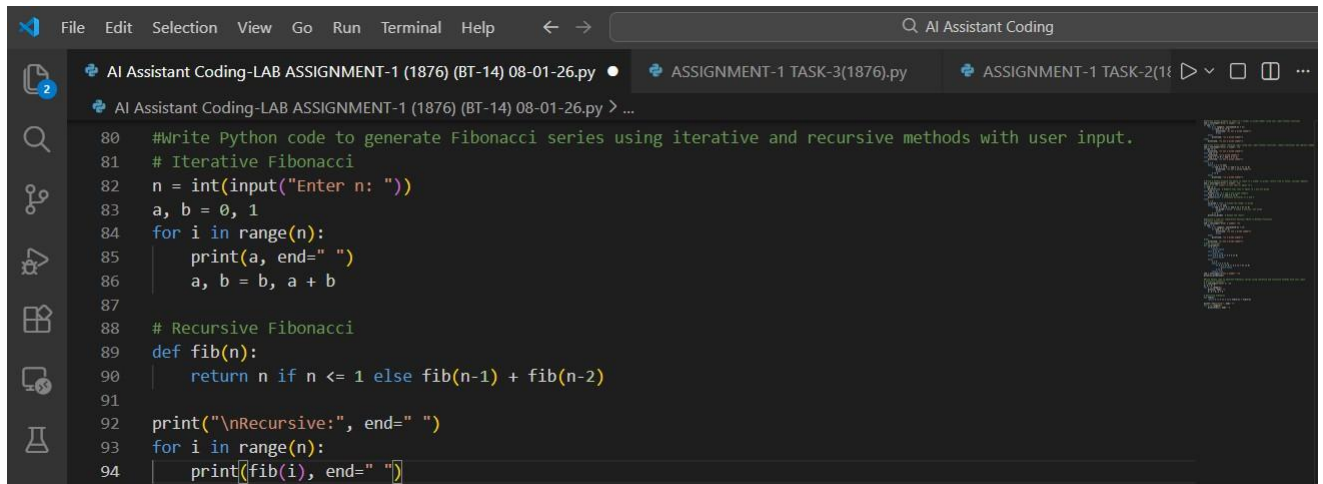
```
    return n if n <= 1 else fib(n-1) + fib(n-2)
```

```
print("\nRecursive:", end=" ")
```

```
for i in range(n):
```

```
    print(fib(i), end=" ")
```

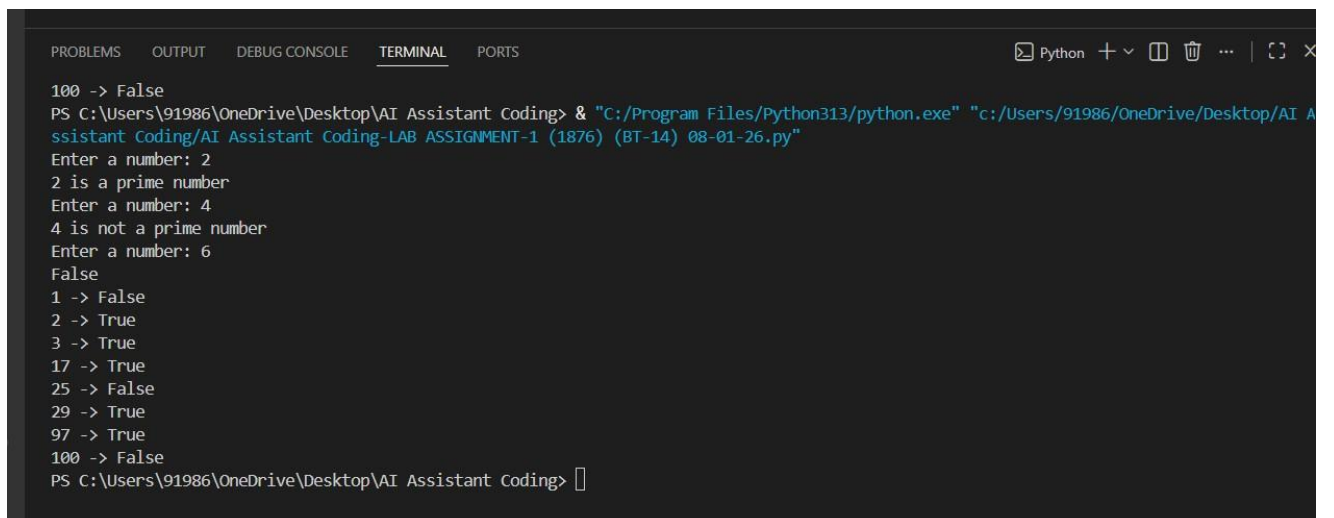
Screenshot:



The screenshot shows a code editor with a dark theme. The menu bar includes File, Edit, Selection, View, Go, Run, Terminal, and Help. The search bar contains 'AI Assistant Coding'. The file explorer on the left shows a project named 'AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py'. The main editor area displays the following Python code:

```
80 #Write Python code to generate Fibonacci series using iterative and recursive methods with user input.
81 # Iterative Fibonacci
82 n = int(input("Enter n: "))
83 a, b = 0, 1
84 for i in range(n):
85     print(a, end=" ")
86     a, b = b, a + b
87
88 # Recursive Fibonacci
89 def fib(n):
90     return n if n <= 1 else fib(n-1) + fib(n-2)
91
92 print("\nRecursive:", end=" ")
93 for i in range(n):
94     print(fib(i), end=" ")
```

Output:



The screenshot shows a terminal window with a dark theme. The terminal title bar includes 'Python', a plus sign, a minus sign, a square icon, a trash icon, and a close icon. The terminal content shows the following output:

```
100 -> False
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> & "C:/Program Files/Python313/python.exe" "c:/Users/91986/OneDrive/Desktop/AI Assistant Coding/AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py"
Enter a number: 2
2 is a prime number
Enter a number: 4
4 is not a prime number
Enter a number: 6
False
1 -> False
2 -> True
3 -> True
17 -> True
25 -> False
29 -> True
97 -> True
100 -> False
PS C:\Users\91986\OneDrive\Desktop\AI Assistant Coding> 
```

Justification:

The basic approach checks divisibility up to $N-1$, resulting in unnecessary iterations and higher time complexity. The optimized approach checks only up to \sqrt{N} because any factor larger than \sqrt{N} must have a corresponding smaller factor.

Explanation:

CHAT

+ v ⚙️ ... | [] x

← PRIME NUMBER CHECK PROGRAM WITHOUT FUNCTIONS []

#Explanation for Python code to generate Fibonacci series using iterative and recursive methods with user input.

AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py:80

✓ Provided explanation for Fibonacci series code

✓ **Explanation — Fibonacci Series: Iterative vs Recursive** []

What the code does

Generates the first [] n terms of the Fibonacci sequence using two different approaches:

- **Iterative:** builds the sequence iteratively (efficient, linear time).
- **Recursive:** builds each term by recursive calls (simple but slow for large n).

Iterative approach (detailed)

```
n = int(input("Enter n: "))
a, b = 0, 1
for i in range(n):
    print(a, end=" ")
    a, b = b, a + b
```

How it works:

- Start with [] a=0, b=1 (first two Fibonacci numbers).
- Loop [] i from 0 to n-1:
 - Print current [] a .
 - Update: [] a, b = b, a + b (simultaneously swap and add: a becomes b, b becomes a+b).
 - This moves to the next Fibonacci number.

Example: n=6

> [] Draft Copilot prompts (1/5) []

[] AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py +

Describe what to build next

Agent v Auto v [] [] [] []

Ln 94, Col 27 Spaces: 4 UTF-8 CRLF { } Python 3.13.5 CODEGPT []

Example: n=6

- i=0: print 0, a=1, b=1
- i=1: print 1, a=1, b=2
- i=2: print 1, a=2, b=3
- i=3: print 2, a=3, b=5
- i=4: print 3, a=5, b=8
- i=5: print 5, a=8, b=13
- Output: 0 1 1 2 3 5

Time complexity: $O(n)$ — one loop, each iteration is $O(1)$.

Space complexity: $O(1)$ — only two variables.

Recursive approach (detailed)



```
def fib(n):  
    return n if n <= 1 else fib(n-1) + fib(n-2)  
  
print("\nRecursive:", end=" ")  
for i in range(n):  
    print(fib(i), end=" ")
```

How it works:

- Base case: if $n \leq 1$, return n (so $\text{fib}(0)=0$, $\text{fib}(1)=1$).
- Recursive case: $\text{fib}(n) = \text{fib}(n-1) + \text{fib}(n-2)$.
- The loop calls $\text{fib}(0)$, $\text{fib}(1)$, ..., $\text{fib}(n-1)$ and prints each result.

Example: n=6, calling $\text{fib}(0)$.. $\text{fib}(5)$

- $\text{fib}(0) \rightarrow 0$
- $\text{fib}(1) \rightarrow 1$
- $\text{fib}(2) \rightarrow \text{fib}(1) + \text{fib}(0) = 1$

>  Draft Copilot prompts (1/5) 

  AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py +

Describe what to build next

Agent v Auto v 

→ ➤

- $\text{fib}(0) \rightarrow 0$
- $\text{fib}(1) \rightarrow 1$
- $\text{fib}(2) \rightarrow \text{fib}(1) + \text{fib}(0) = 1$
- $\text{fib}(3) \rightarrow \text{fib}(2) + \text{fib}(1) = 2$
- $\text{fib}(4) \rightarrow \text{fib}(3) + \text{fib}(2) = 3$
- $\text{fib}(5) \rightarrow \text{fib}(4) + \text{fib}(3) = 5$
- Output: `0 1 1 2 3 5`

Time complexity: $O(2^n)$ — each call branches into two recursive calls; massive redundant computation ($\text{fib}(3)$ is called multiple times).

Space complexity: $O(n)$ — recursion depth (call stack).


Comparison table

Aspect	Iterative	Recursive
Time	$O(n)$	$O(2^n)$
Space	$O(1)$	$O(n)$ — call stack
Clarity	Direct, straightforward.	Matches mathematical definition elegantly.
Scalability	Excellent; handles $n \sim 10^6$ easily.	Poor; $n > 30\text{--}40$ becomes impractical.
Redundancy	None; each value computed once.	Massive; $\text{fib}(3)$ computed hundreds of times.
When to use	Always, unless n is tiny (< 20).	Educational demo only.

Sample runs

Input: `5`

- Iterative: `0 1 1 2 3`

>  Draft Copilot prompts (1/5)

☰

  AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py +

Describe what to build next

Agent ▾ Auto ▾ 

→ ➤

Clarity	Direct, straightforward.	Matches mathematical definition elegantly.
Scalability	Excellent; handles $n \sim 10^6$ easily.	Poor; $n > 30-40$ becomes impractical.
Redundancy	None; each value computed once.	Massive; fib(3) computed hundreds of times.
When to use	Always, unless n is tiny (< 20).	Educational demo only.

Sample runs

Input: 5

- Iterative: 0 1 1 2 3
- Recursive: 0 1 1 2 3

Input: 8

- Iterative: 0 1 1 2 3 5 8 13
- Recursive: 0 1 1 2 3 5 8 13

Key takeaways ✨

- **Iterative** is the practical choice: $O(n)$ time, $O(1)$ space, handles large n .
- **Recursive** is conceptually clean but computationally expensive; use for learning or tiny n only.
- For production code or competitive programming, always prefer **iterative** (or use memoization with recursion).

Would you like me to add a **memoized recursive version** (caches results to avoid redundant computation) or a **performance comparison script** that times both approaches? 🐌



Claude Haiku 4.5 • 1x

> Draft Copilot prompts (1/5)



AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py +

Describe what to build next

Agent v Auto v



Task-5

The screenshot shows a VS Code editor with a Python script for generating Fibonacci series using both iterative and recursive methods. The terminal window shows the script being executed, with input values and corresponding outputs. The right sidebar displays a chat window with a table comparing iterative and recursive methods for a prime number check program.

Table: PRIME NUMBER CHECK PROGRAM WITHOUT FUNCTIONS

Clarity	Direct, straightforward.	Matches mathematical definition elegantly.
Scalability	Excellent; handles $n \sim 10^6$ easily.	Poor; $n > 30-40$ becomes impractical.
Redundancy	None; each value computed once.	Massive; fib(3) computed hundreds of times.
When to use	Always, unless n is tiny (< 20).	Educational demo only.

Sample runs

Input: 5

- Iterative: 0 1 1 2 3
- Recursive: 0 1 1 2 3

Input: 8

- Iterative: 0 1 1 2 3 5 8 13
- Recursive: 0 1 1 2 3 5 8 13

Key takeaways

- Iterative** is the practical choice: $O(n)$ time, $O(1)$ space, handles large n .
- Recursive** is conceptually clean but computationally expensive; use for learning or tiny n only.
- For production code or competitive programming, always prefer **iterative** (or use memoization with recursion).

Would you like me to add a **memoized recursive version** (caches results to avoid redundant computation) or a **performance comparison script** that times both approaches?

Draft Copilot prompts (1/5)

AI Assistant Coding-LAB ASSIGNMENT-1 (1876) (BT-14) 08-01-26.py

Describe what to build next

Agent Auto