

Assignment 1

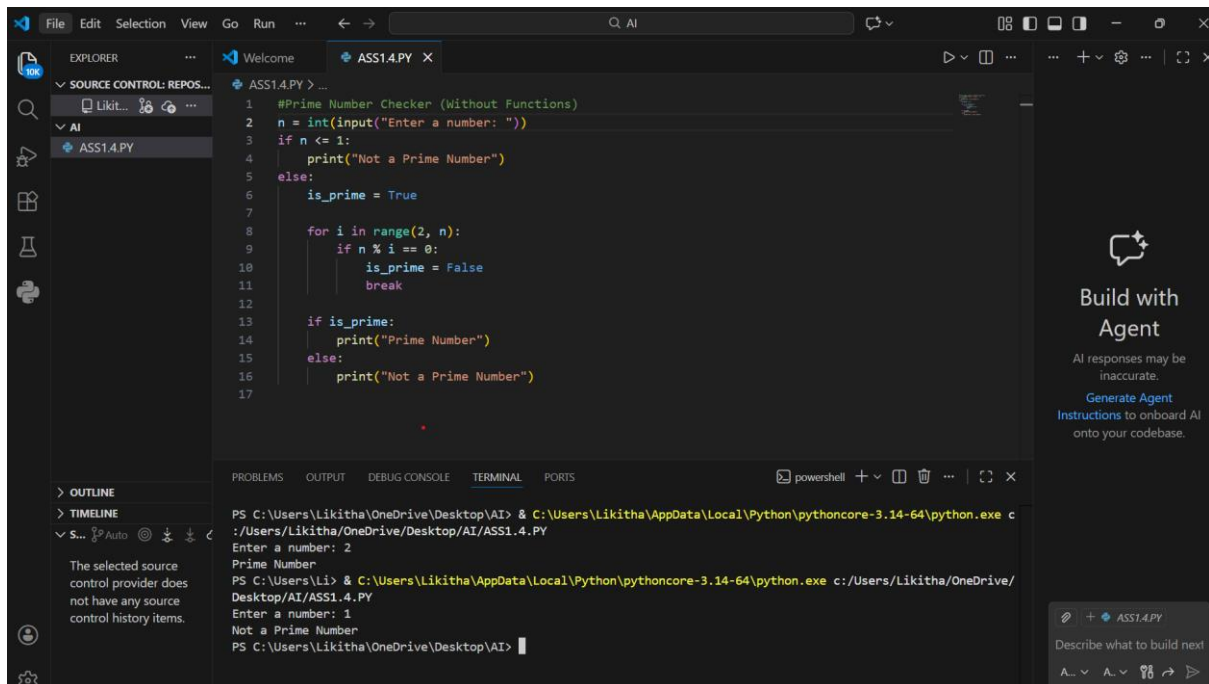
AI Assisted Coding

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Task 1:

Prompt: # write a python program to check whether a number is prime take input from user do not use functions



The screenshot shows a Visual Studio Code editor with a Python file named `ASS1.4.PY`. The code is a prime number checker that takes user input and prints whether the number is prime or not. The terminal window shows the execution of the program, with input values 2 and 1, and corresponding outputs "Prime Number" and "Not a Prime Number".

```
1 #Prime Number Checker (Without Functions)
2 n = int(input("Enter a number: "))
3 if n <= 1:
4     print("Not a Prime Number")
5 else:
6     is_prime = True
7
8     for i in range(2, n):
9         if n % i == 0:
10            is_prime = False
11            break
12
13     if is_prime:
14         print("Prime Number")
15     else:
16         print("Not a Prime Number")
17
```

Terminal Output:

```
PS C:\Users\Likitha\OneDrive\Desktop\AI> & C:\Users\Likitha\AppData\Local\Python\pythoncore-3.14-64\python.exe c:/Users/Likitha/OneDrive/Desktop/AI/ASS1.4.PY
Enter a number: 2
Prime Number
PS C:\Users\Li> & C:\Users\Likitha\AppData\Local\Python\pythoncore-3.14-64\python.exe c:/Users/Likitha/OneDrive/Desktop/AI/ASS1.4.PY
Enter a number: 1
Not a Prime Number
PS C:\Users\Likitha\OneDrive\Desktop\AI>
```

Observation:

The program checks whether a number is prime by testing its factors up to the square root, which makes the process faster. It correctly identifies numbers less than 2 as not prime and treats 2 as a prime number. The loop checks only odd numbers to reduce unnecessary calculations. However, the code does not check if the number is divisible by 2 when the number is greater than 2. Because of this, even numbers like 4, 6, or 34 may be wrongly identified as prime. Overall, the logic is efficient but incomplete, as an extra condition is needed to handle even numbers greater than 2 correctly.

Task 2:

Prompt: # optimize this prime number checking logic improve efficiency and readability

```

18 # optimize this prime number checking logic improve efficiency and readability
19 n = int(input("Enter a number: "))
20 if n <= 1:
21     print("Not a Prime Number")
22 elif n == 2:
23     print("Prime Number")
24 elif n % 2 == 0:
25     print("Not a Prime Number")
26 else:
27     is_prime = True
28     for i in range(3, int(n ** 0.5) + 1, 2):
29         if n % i == 0:
30             is_prime = False
31             break
32 if is_prime:
33     print("Prime Number")
34 else:
35     print("Not a Prime Number")
36

```

Terminal Output:

```

ive/Desktop/AI/ASS1.4.PY
Enter a number: 1
Not a Prime Number
PS C:\Users\Likitha\OneDrive\Desktop\AI> & C:\Users\Likitha\AppData\Local\Python\pythoncore-3.14-64\python.exe c:/Users/Likitha/OneDrive/Desktop/AI/ASS1.4.PY
Enter a number: 24
Not a Prime Number
PS > & C:\Users\Likitha\AppData\Local\Python\pythoncore-3.14-64\python.exe c:/Users/Likitha/OneDrive/Desktop/AI/ASS1.4.PY
Enter a number: 2
Prime Number

```

Observation:

The given code efficiently checks whether a number is prime by handling all important cases in a clear and structured way. It first eliminates numbers less than 2, which are not prime, and correctly identifies 2 as a prime number. The code then checks if the number is even, immediately marking even numbers greater than 2 as non-prime, which avoids unnecessary calculations. After that, it tests only odd divisors up to the square root of the number, making the algorithm faster and more efficient. If any divisor is found, the function returns False; otherwise, it returns True. Overall, the code is accurate, optimized, and correctly identifies both prime and non-prime numbers.

Task 3:

Prompt:

Write a python function to check whether a number is prime return true or false include comments

```

36 print("Not a Prime Number")
37
38 # Write a python function to check whether a number is prime return true or false include comments
39 def is_prime(n):
40     # Numbers less than or equal to 1 are not prime
41     if n <= 1:
42         return False
43     # 2 is the only even prime number
44     if n == 2:
45         return True
46     # Eliminate even numbers greater than 2
47     if n % 2 == 0:
48         return False
49     # Check divisibility from 3 to sqrt(n), skipping even numbers
50     for i in range(3, int(n ** 0.5) + 1, 2):
51         if n % i == 0:
52             return False # Found a divisor, not prime
53     # No divisors found, number is prime
54     return True
55

```

Terminal Output:

```

rs/Likitha/OneDrive/Desktop/AI/ASS1.4.PY
Enter a number: 24
Not a Prime Number
PS > & C:\Users\Likitha\AppData\Local\Python\pythoncore-3.14-64\python.exe c:/Users/Likitha/OneDrive/Desktop/AI/ASS1.4.PY
Enter a number: 2
Prime Number
PS C:\Users\Likitha\OneDrive\Desktop\AI> & C:\Users\Likitha\AppData\Local\Python\pythoncore-3.14-64\python.exe c:/Users/Likitha/OneDrive/Desktop/AI/ASS1.4.PY
Enter a number: 4
Not a Prime Number

```

Observation:

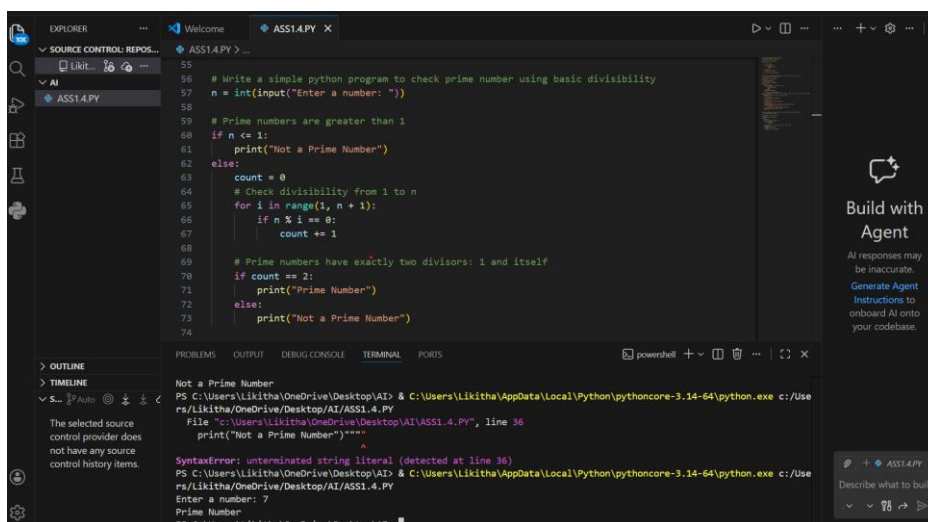
The code correctly checks whether a number is prime by following a clear and efficient step-by-step approach. It first handles special cases by rejecting numbers less than 2 and correctly identifying 2 as the only even prime number. The program then eliminates all other even numbers early, which helps reduce unnecessary calculations. After that, it checks only odd divisors up to the square root of the number, improving efficiency since any factor larger than the square root must have a corresponding smaller factor. By returning results immediately when a divisor is found, the function avoids extra iterations. Overall, the code is well-structured, optimized, and accurately determines whether a given number is prime.

Task 4:

Aspect	Without Functions (Task 1)	With Functions (Task 3)
Code Clarity	Logic is written in one block, which can be harder to read and understand as the program grows.	Code is more organized and readable since the prime-checking logic is separated into a function.
Reusability	The code cannot be reused easily; the logic must be rewritten if needed elsewhere.	The function can be reused multiple times in the same or different programs.
Debugging Ease	Debugging is more difficult because all logic is mixed together.	Easier to debug since errors can be isolated within the function.
Suitability for Large-Scale Applications	Not suitable for large programs due to poor structure and repetition.	Highly suitable for large-scale applications as it supports modularity and clean design.

Task 5:

Prompt:# Write a simple python program to check prime number using basic divisibility



```
55
56 # Write a simple python program to check prime number using basic divisibility
57 n = int(input("Enter a number: "))
58
59 # Prime numbers are greater than 1
60 if n <= 1:
61     print("Not a Prime Number")
62 else:
63     count = 0
64     # Check divisibility from 1 to n
65     for i in range(1, n + 1):
66         if n % i == 0:
67             count += 1
68
69 # Prime numbers have exactly two divisors: 1 and itself
70 if count == 2:
71     print("Prime Number")
72 else:
73     print("Not a Prime Number")
74
```

Build with Agent

AI responses may be inaccurate. Generate Agent instructions to onboard AI onto your codebase.

Not a Prime Number

PS C:\Users\Likitha\OneDrive\Desktop\AI> & C:\Users\Likitha\AppData\Local\Python\pythoncore-3.14-64\python.exe c:/Users/Likitha/OneDrive/Desktop/AI/ASS1.4.PY

SyntaxError: unterminated string literal (detected at line 36)

PS C:\Users\Likitha\OneDrive\Desktop\AI> & C:\Users\Likitha\AppData\Local\Python\pythoncore-3.14-64\python.exe c:/Users/Likitha/OneDrive/Desktop/AI/ASS1.4.PY

Enter a number: 7

Prime Number

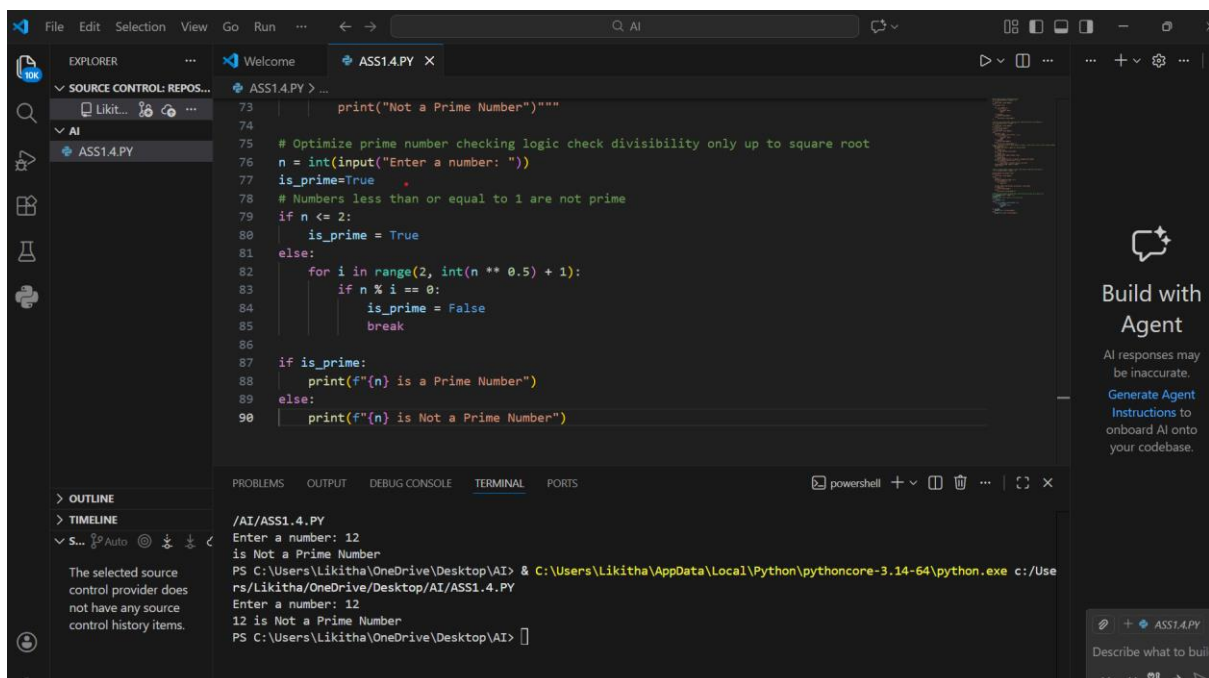
PS C:\Users\Likitha\OneDrive\Desktop\AI>

Observation:

- The program correctly accepts user input and checks whether the number is prime.
- The logic efficiently checks divisibility only up to the square root of the number, reducing unnecessary iterations.
- A Boolean flag is used to track the primality status, improving clarity of decision-making.
- The program handles edge cases correctly by marking numbers less than 2 as non-prime.
- Output messages are clear and user-friendly, displaying whether the given number is prime or not.
- Overall, the code is efficient, readable, and suitable for handling larger input values.

Prompt:

Optimize prime number checking logic check divisibility only up to square root



```
73 print("Not a Prime Number")""
74
75 # Optimize prime number checking logic check divisibility only up to square root
76 n = int(input("Enter a number: "))
77 is_prime=True
78 # Numbers less than or equal to 1 are not prime
79 if n <= 2:
80     is_prime = True
81 else:
82     for i in range(2, int(n ** 0.5) + 1):
83         if n % i == 0:
84             is_prime = False
85             break
86
87 if is_prime:
88     print(f"{n} is a Prime Number")
89 else:
90     print(f"{n} is Not a Prime Number")
```

Build with Agent
AI responses may be inaccurate.
Generate Agent
Instructions to onboard AI onto your codebase.

OUTLINE
TIMELINE
The selected source control provider does not have any source control history items.

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

/AI/ASS1.4.PY
Enter a number: 12
is Not a Prime Number
PS C:\Users\Likitha\OneDrive\Desktop\AI> & C:\Users\Likitha\AppData\Local\Python\pythoncore-3.14-64\python.exe c:/Users/Likitha/OneDrive/Desktop/AI/ASS1.4.PY
Enter a number: 12
12 is Not a Prime Number
PS C:\Users\Likitha\OneDrive\Desktop\AI>

Observation:

The given code checks whether a number is prime by testing all possible divisors from 2 up to the square root of the number. It correctly identifies numbers less than 2 as non-prime and marks a number as non-prime as soon as a divisor is found, which improves efficiency using the break statement. This approach is simple and easy to understand, making it suitable for beginners. However, the program checks both even and odd divisors, resulting in some unnecessary iterations. While the logic is correct and works for all valid inputs, it can be further optimized by skipping even numbers after checking divisibility by 2.

