AI Assisted Coding Assignment- 7.5

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💡 **Task 1 (Mutable Default Argument – Function Bug)**

Task: Analyze given code where a mutable default argument causes unexpected behavior. Use AI to fix it.

Bug: Mutable default argument

def add_item(item, items=[]):

items.append(item)

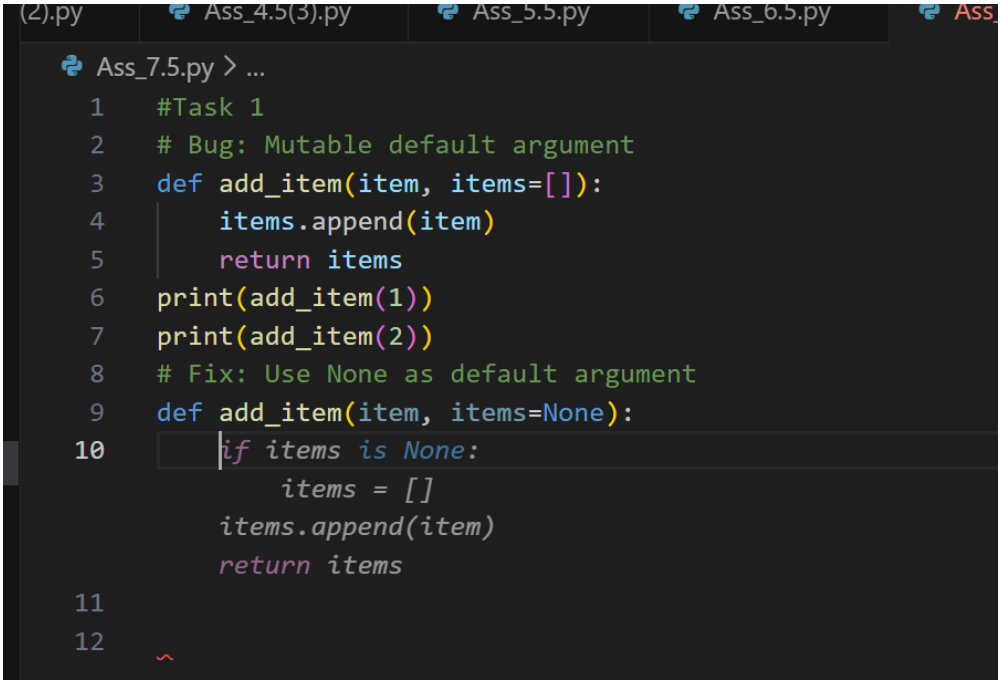
return items

print(add_item(1))

print(add_item(2))

Expected Output: Corrected function avoids shared list bug.

```
#2303a51543
#Task 1
# Bug: Mutable default argument
def add_item(item, items=[]):
    items.append(item)
    return items
print(add_item(1))
print(add_item(2))
# Fix: Use None as default argument
def add_item(item, items=None):
    if items is None:
        items = []
    items.append(item)
    return items
print(add_item(1))
print(add_item(2))
```



💡 **Task 2 (Floating-Point Precision Error)**

Task: Analyze given code where floating-point comparison fails. Use AI to correct with tolerance.

Bug: Floating point precision issue

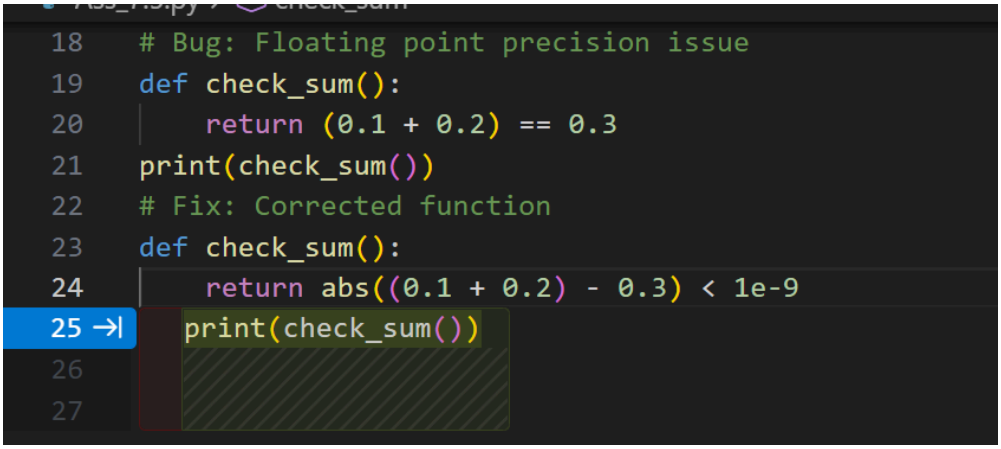
def check_sum():

return (0.1 + 0.2) == 0.3

print(check_sum())

Expected Output: Corrected function

```
#Task -2
# Bug: Floating point precision issue
def check_sum():
    return (0.1 + 0.2) == 0.3
print(check_sum())
# Fix: Corrected function
def check_sum():
    return abs((0.1 + 0.2) - 0.3) < 1e-9
print(check_sum())
```



💡 Task 3 (Recursion Error – Missing Base Case)

Task: Analyze given code where recursion runs infinitely due to missing base case. Use AI to fix.

Bug: No base case

def countdown(n):

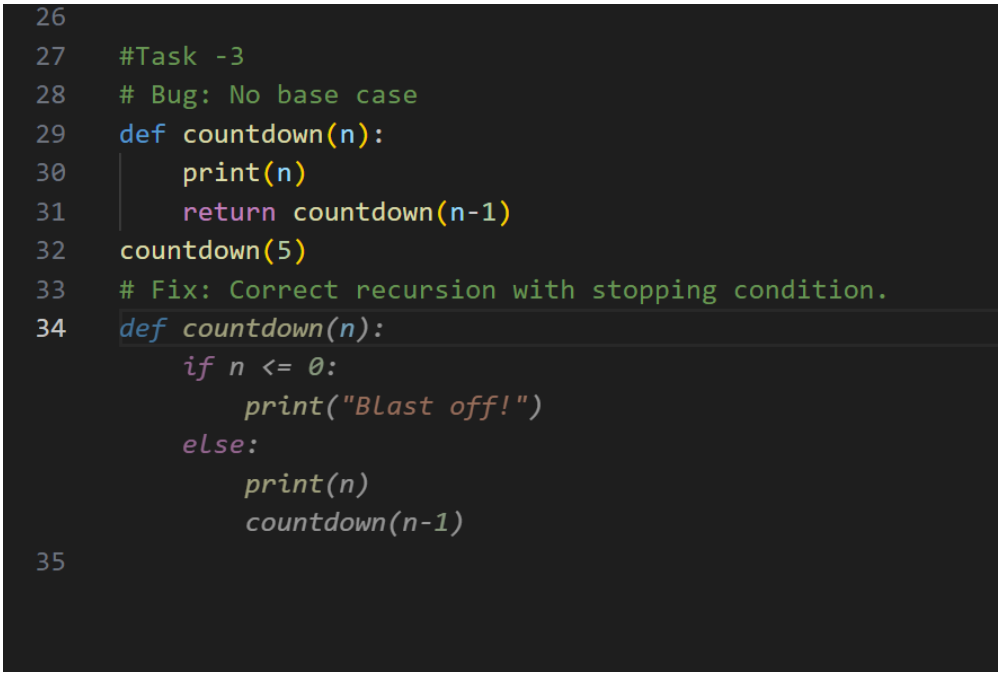
print(n)

return countdown(n-1)

countdown(5)

Expected Output : Correct recursion with stopping condition.

```
#Task -3
# Bug: No base case
#def countdown(n):
#    print(n)
#    return countdown(n-1)
#countdown(5)
# Fix: Correct recursion with stopping condition.
def countdown(n):
    if n <= 0:
        print("Blast off!")
    else:
        print(n)
        countdown(n-1)
countdown(5)
```



💡 Task 4 (Dictionary Key Error)

Task: Analyze given code where a missing dictionary key causes error. Use AI to fix it.

Bug: Accessing non-existing key

def get_value():

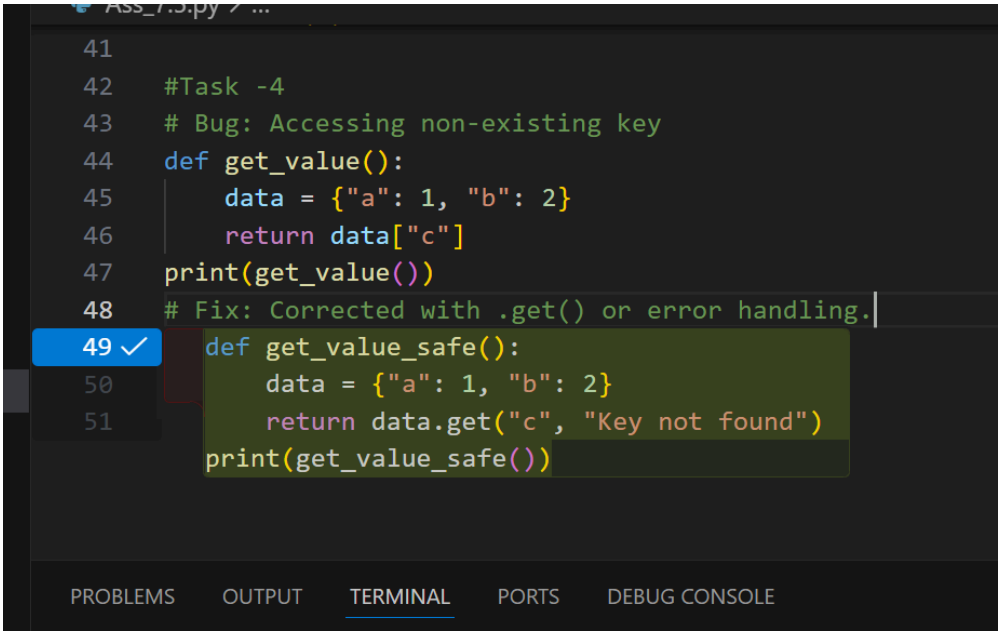
data = {"a": 1, "b": 2}

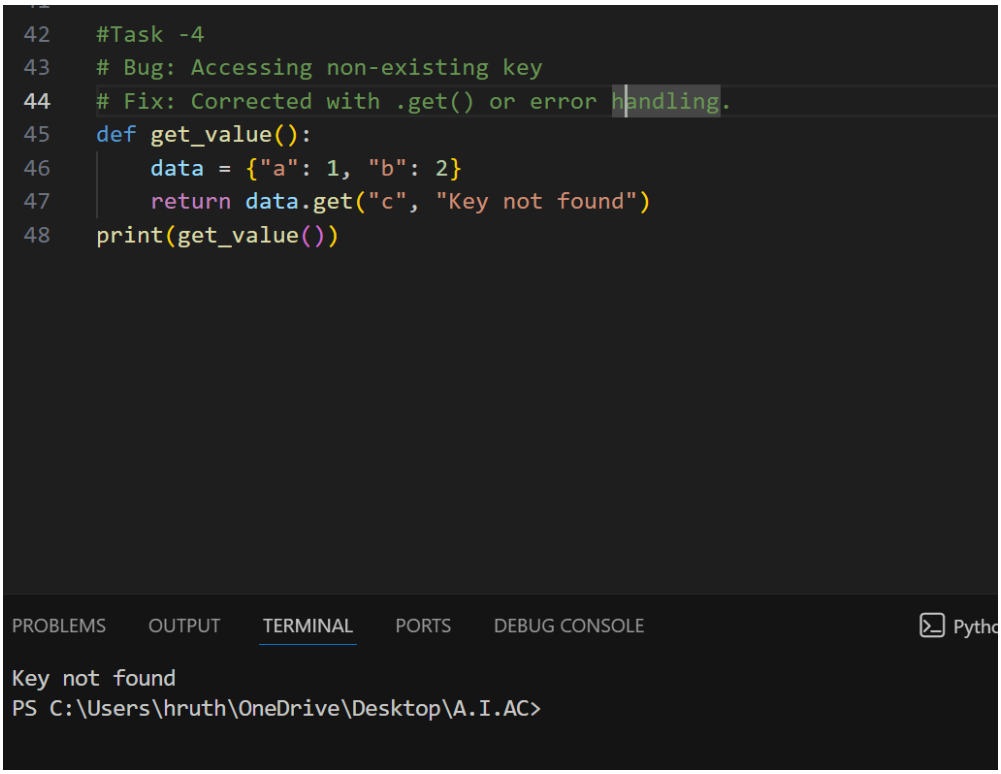
return data["c"]

print(get_value())

Expected Output: Corrected with .get() or error handling.

```
#Task -4
# Bug: Accessing non-existing key
# Fix: Corrected with .get() or error handling.
def get_value():
    data = {"a": 1, "b": 2}
    return data.get("c", "Key not found")
print(get_value())
```





💡 Task 5 (Infinite Loop – Wrong Condition)

Task: Analyze given code where loop never ends. Use AI to detect and fix it.

Bug: Infinite loop

def loop_example():

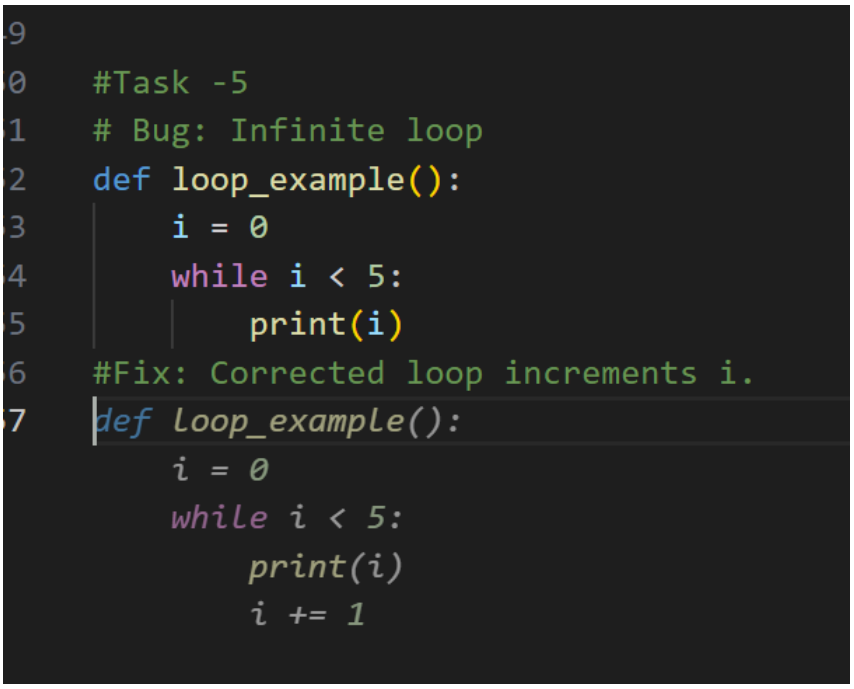
i = 0

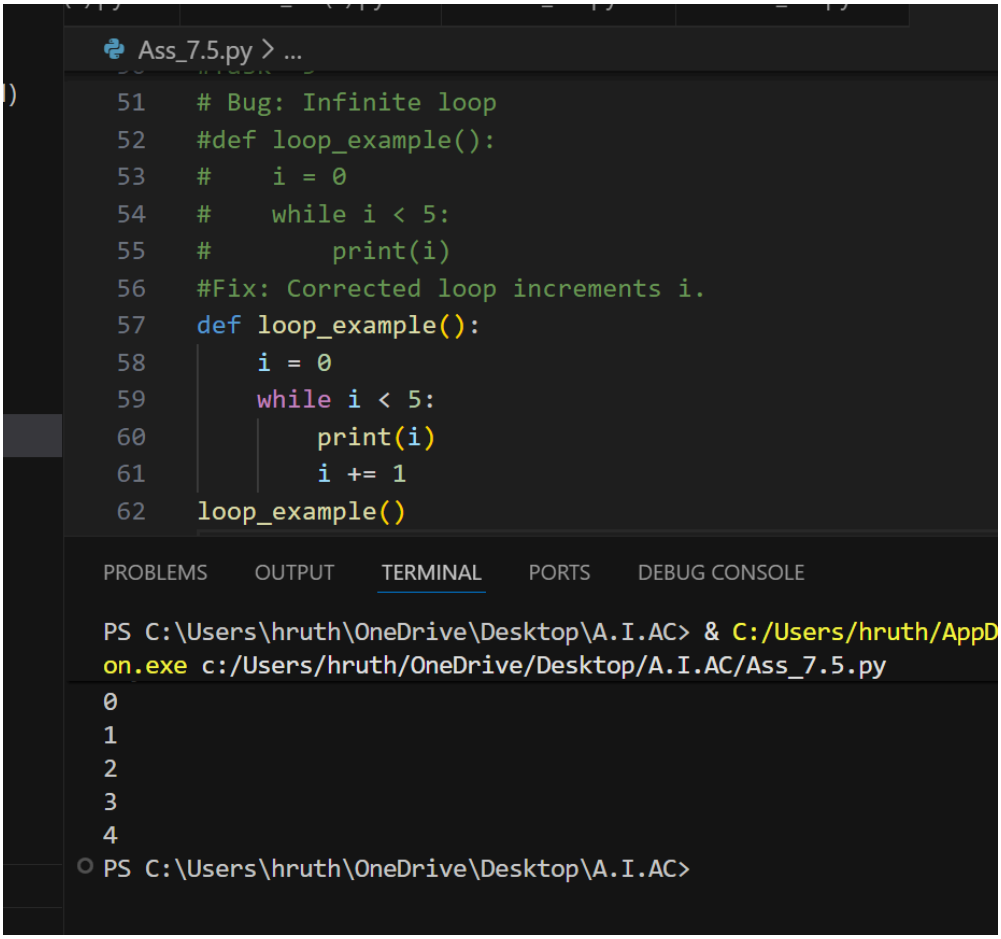
while i < 5:

print(i)

Expected Output: Corrected loop increments i.

```
#Task -5
# Bug: Infinite loop
#def loop_example():
#    i = 0
#    while i < 5:
#        print(i)
#Fix: Corrected loop increments i.
def loop_example():
    i = 0
    while i < 5:
        print(i)
        i += 1
loop_example()
```





Task 6 (Unpacking Error – Wrong Variables)

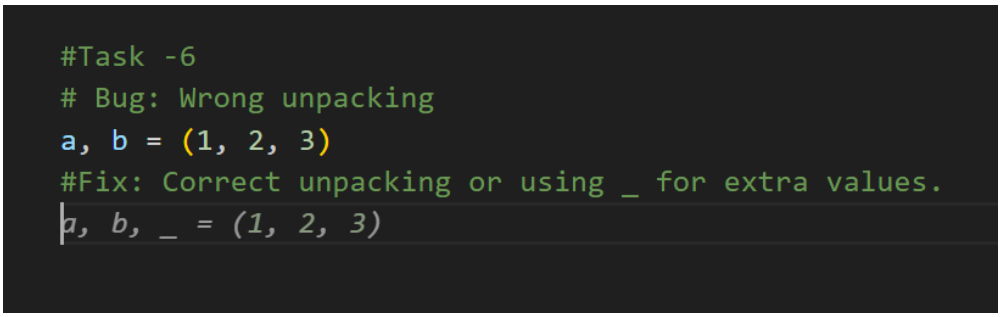
Task: Analyze given code where tuple unpacking fails. Use AI to fix it.

Bug: Wrong unpacking

a, b = (1, 2, 3)

Expected Output: Correct unpacking or using _ for extra values.

```
#Task -6
# Bug: Wrong unpacking
#a, b = (1, 2, 3)
#Fix: Correct unpacking or using _ for extra values.
a, b, _ = (1, 2, 3)
```



💡 Task 7 (Mixed Indentation – Tabs vs Spaces)

Task: Analyze given code where mixed indentation breaks execution. Use AI to fix it.

Bug: Mixed indentation

def func():

x = 5

y = 10

return x+y

Expected Output : Consistent indentation applied.

```
#Task -7
# Bug: Mixed indentation
#def func():
#    x = 5
#        y = 10
#    return x+y
#Fix: Consistent indentation
def func():
    x = 5
    y = 10
    return x + y
print(func())
```

Ass_7.5.py > ...

```
71  # Bug: Mixed indentation
72  def func():
73      x = 5
74          y = 10
75      return x+y
76  #Fix: Consistent indentation
77  def func():
        x = 5
        y = 10
        return x + y
```

```
69
70  #Task -7
71  # Bug: Mixed indentation
72  #def func():
73  #    x = 5
74  #        y = 10
75  #    return x+y
76  #Fix: Consistent indentation
77  def func():
78      x = 5
79      y = 10
80      return x + y
81  print(func())
82
```

PROBLEMS OUTPUT TERMINAL PORTS DEBUG CONSOLE

...

```
4
15
PS C:\Users\hruth\OneDrive\Desktop\A.I.AC>
```

💡 Task 8 (Import Error – Wrong Module Usage)

Task: Analyze given code with incorrect import. Use AI to fix.

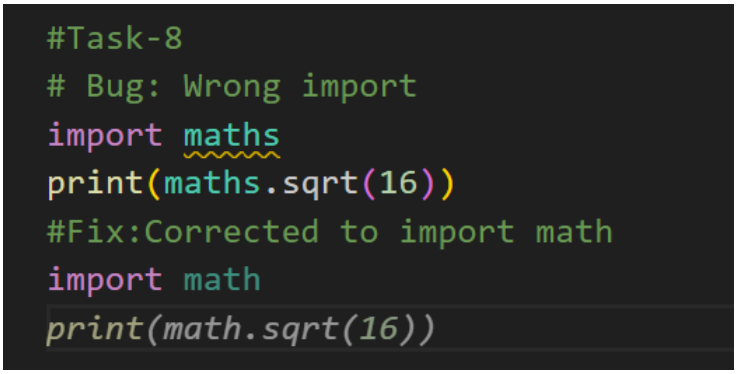
Bug: Wrong import

import maths

print(maths.sqrt(16))

Expected Output: Corrected to import math

```
#Task-8
# Bug: Wrong import
#import maths
#print(maths.sqrt(16))
#Fix:Corrected to import math
import math
print(math.sqrt(16))
```



💡 Task 9 (Unreachable Code – Return Inside Loop)

Task: Analyze given code where a return inside a loop prevents full iteration. Use AI to fix it.

Bug: Early return inside loop

def total(numbers):

for n in numbers:

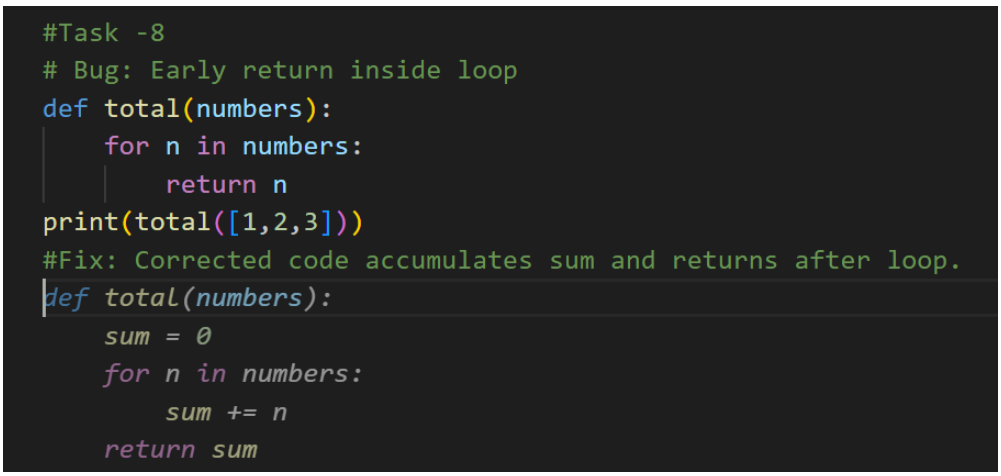
return n

print(total([1,2,3]))

Expected Output: Corrected code accumulates sum and returns after loop.

```
#Task -9
# Bug: Early return inside loop
#def total(numbers):
#    for n in numbers:
#        return n
#print(total([1,2,3]))
```

```
#Fix: Corrected code accumulates sum and returns after loop.
def total(numbers):
    sum = 0
    for n in numbers:
        sum += n
    return sum
print(total([1,2,3]))
```



💡 **Task 10 (Name Error – Undefined Variable)**

Task: Analyze given code where a variable is used before being defined. Let AI detect and fix the error.

Bug: Using undefined variable

def calculate_area():

return length * width

print(calculate_area())

Requirements:

- Run the code to observe the error.
- Ask AI to identify the missing variable definition.
- Fix the bug by defining length and width as parameters.
- Add 3 assert test cases for correctness.

Expected Output :

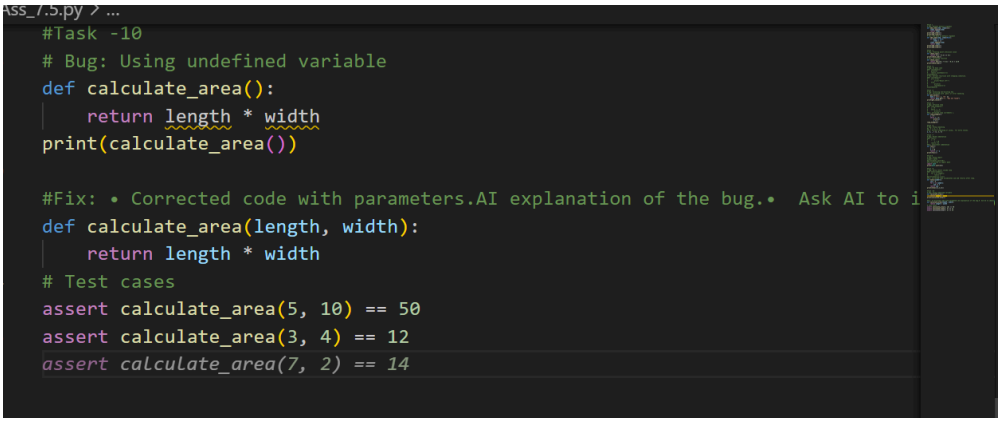
- Corrected code with parameters.
- AI explanation of the bug.

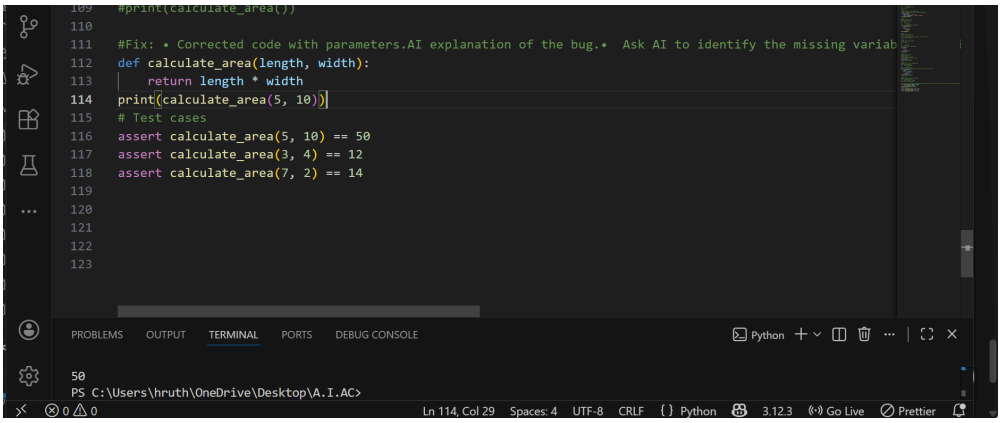
Successful execution of assertions.

```
#Task -10
# Bug: Using undefined variable
#def calculate_area():
#    return length * width
```

```
#print(calculate_area())

#Fix: • Corrected code with parameters.AI explanation of the bug.•  Ask AI to identify th
e missing variable definition.• Fix the bug by defining length and width as parameters.•
Add 3 assert test cases for correctness.
def calculate_area(length, width):
    return length * width
print(calculate_area(5, 10))
# Test cases
assert calculate_area(5, 10) == 50
assert calculate_area(3, 4) == 12
assert calculate_area(7, 2) == 14
```





AI Explanation of the Bug:

The bug occurs because the function `calculate_area()` is using two variables (`length` and `width`) that are not defined within the function. Python needs these variables to be passed to the function as arguments, but they are missing.

How the Fix Works:

To fix this:

1. We define `length` and `width` as parameters in the function.
2. Then, we pass values for these parameters when calling the function.
3. Finally, we added 3 `assert` test cases to make sure the function works correctly for different input values.

💡 Task 11 (Type Error – Mixing Data Types Incorrectly)

Task: Analyze given code where integers and strings are added incorrectly. Let AI detect and fix the error.

Bug: Adding integer and string

def add_values():

return 5 + "10"

print(add_values())

Requirements:

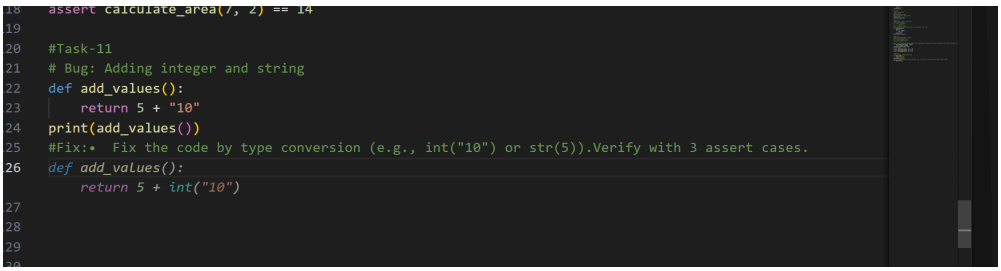
- Run the code to observe the error.
- AI should explain why int + str is invalid.
- Fix the code by type conversion (e.g., int("10") or str(5)).
- Verify with 3 assert cases.

Expected Output #6:

- Corrected code with type handling.
- AI explanation of the fix.

Successful test validation.

```
#Task-11
# Bug: Adding integer and string
#def add_values():
#    return 5 + "10"
#print(add_values())
#Fix:•  Fix the code by type conversion (e.g., int("10") or str(5)).Verify with 3 assert
cases.
def add_values():
    return 5 + int("10")
print(add_values())
```



AI Explanation of the Bug:

The bug happens because Python doesn't allow adding an integer (`5`) and a string (`"10"`) directly. These two types are incompatible for addition.

In Python, an integer is a number, and a string is a sequence of characters. When you try to add them together, Python raises a `TypeError` because it doesn't know how to combine a number and a sequence of characters.

Task 12 (Type Error – String + List Concatenation)
Task: Analyze code where a string is incorrectly added to a list.
# Bug: Adding string and list
def combine():
return "Numbers: " + [1, 2, 3]
print(combine())
Requirements:

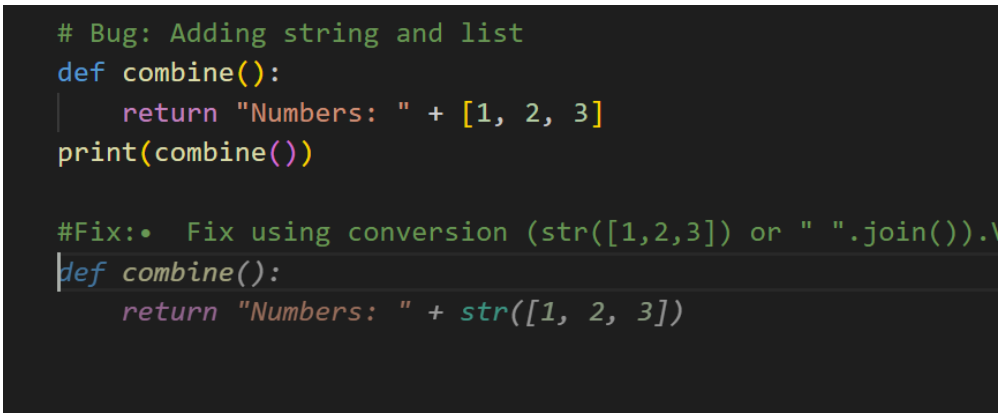
- Run the code to observe the error.
- Explain why str + list is invalid.
- Fix using conversion (str([1,2,3]) or " ".join()).
- Verify with 3 assert cases.

Expected Output:

- Corrected code
- Explanation
- Successful test validation

```
#Task- 12
# Bug: Adding string and list
#def combine():
#    return "Numbers: " + [1, 2, 3]
#print(combine())

#Fix:•  Fix using conversion (str([1,2,3]) or " ".join()).Verify with 3 assert cases.
def combine():
    return "Numbers: " + str([1, 2, 3])
print(combine())
```



AI Explanation of the Bug:

The bug occurs because Python doesn't allow adding a string (`"Numbers: "`) and a list (`[1, 2, 3]`) directly. In Python, a string is a sequence of characters, and a list is a collection of items. Since these are two different data types, trying to

add them together directly will raise a `TypeError`.

💡 Task 13 (Type Error – Multiplying String by Float)

Task: Detect and fix code where a string is multiplied by a float.

Bug: Multiplying string by float

def repeat_text():

return "Hello" * 2.5

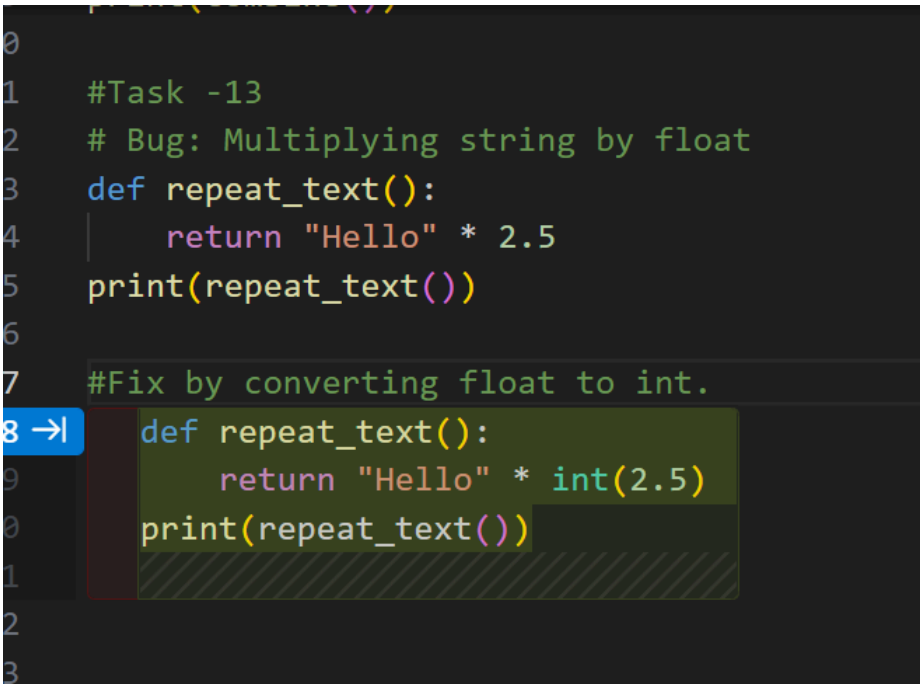
print(repeat_text())

Requirements:

- Observe the error.
- Explain why float multiplication is invalid for strings.
- Fix by converting float to int.
- Add 3 assert test cases.

```
#Task -13
# Bug: Multiplying string by float
#def repeat_text():
#    return "Hello" * 2.5
#print(repeat_text())

#Fix by converting float to int.
def repeat_text():
    return "Hello" * int(2.5)
print(repeat_text())
```



AI Explanation of the Bug:

The bug occurs because Python doesn't allow multiplying a string (`"Hello"`) by a float (`2.5`). String multiplication only works with an integer value, which determines how many times the string should be repeated. When you try to multiply by a float, Python raises a `TypeError`, as it doesn't know how to handle fractional repetitions of a string.

How the Fix Works:

To fix this:

1. We convert the float `2.5` to an integer using `int(2.5)`.
2. This converts `2.5` into `2`, so the string `"Hello"` will be repeated 2 times.
3. Now, we can multiply the string by an integer without causing any errors.

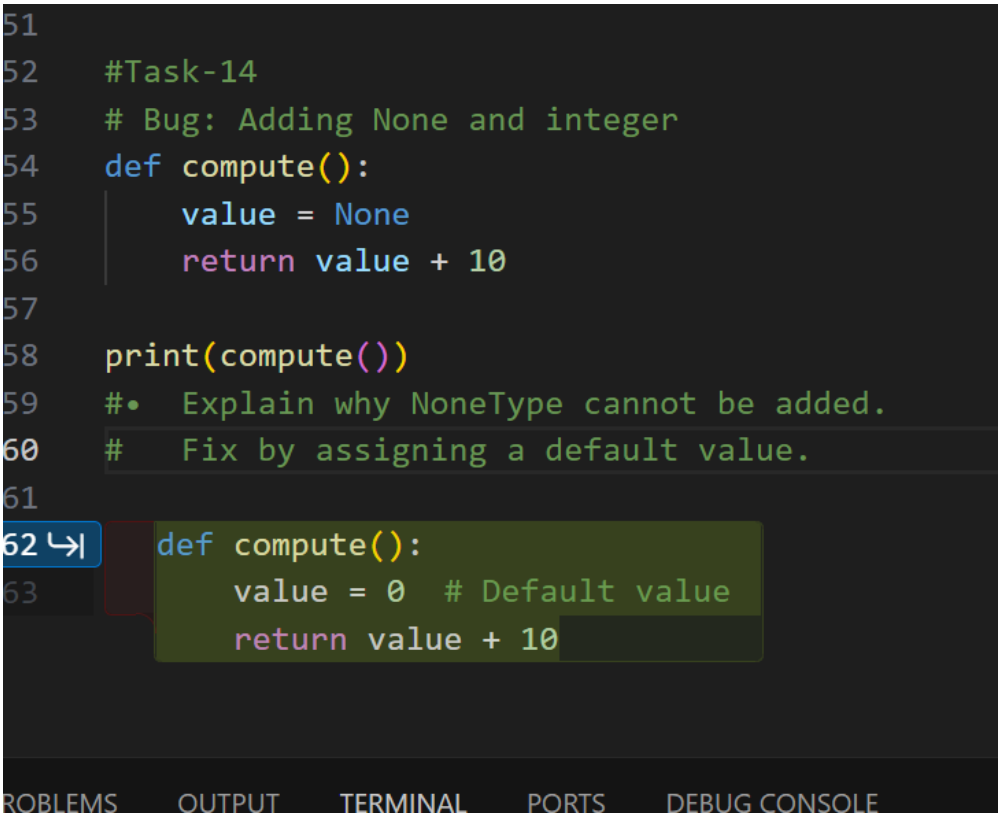
💡 **Task 14 (Type Error – Adding None to Integer)**
Task: Analyze code where None is added to an integer.
# Bug: Adding None and integer
def compute():
value = None
return value + 10
print(compute())
Requirements:

- Run and identify the error.
- Explain why NoneType cannot be added.
- Fix by assigning a default value.
- Validate using asserts.

```
#Task-14
# Bug: Adding None and integer
#def compute():
 #   value = None
#    return value + 10

#print(compute())
#•  Explain why NoneType cannot be added.
#   Fix by assigning a default value.

def compute():
    value = 0  # Default value instead of None
    return value + 10
print(compute())
```



AI Explanation of the Bug:

The bug happens because `None` is a special data type in Python, representing the absence of a value. When you try to add `None` to an integer (like `None + 10`), Python raises a `TypeError` because `None` cannot be directly combined with other data types like integers. The operation is undefined, as `None` is not considered a valid operand for arithmetic.

How the Fix Works:

To fix this:

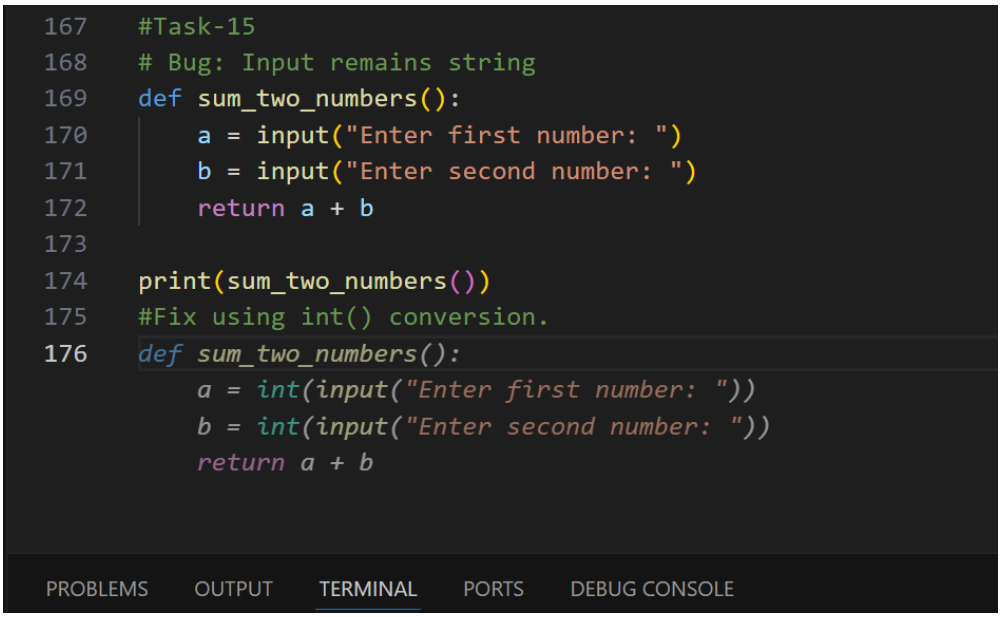
1. We assign a default value, such as `0`, to `value` instead of leaving it as `None`.
2. This ensures that when we perform the addition (`value + 10`), both operands are valid (an integer plus another integer).

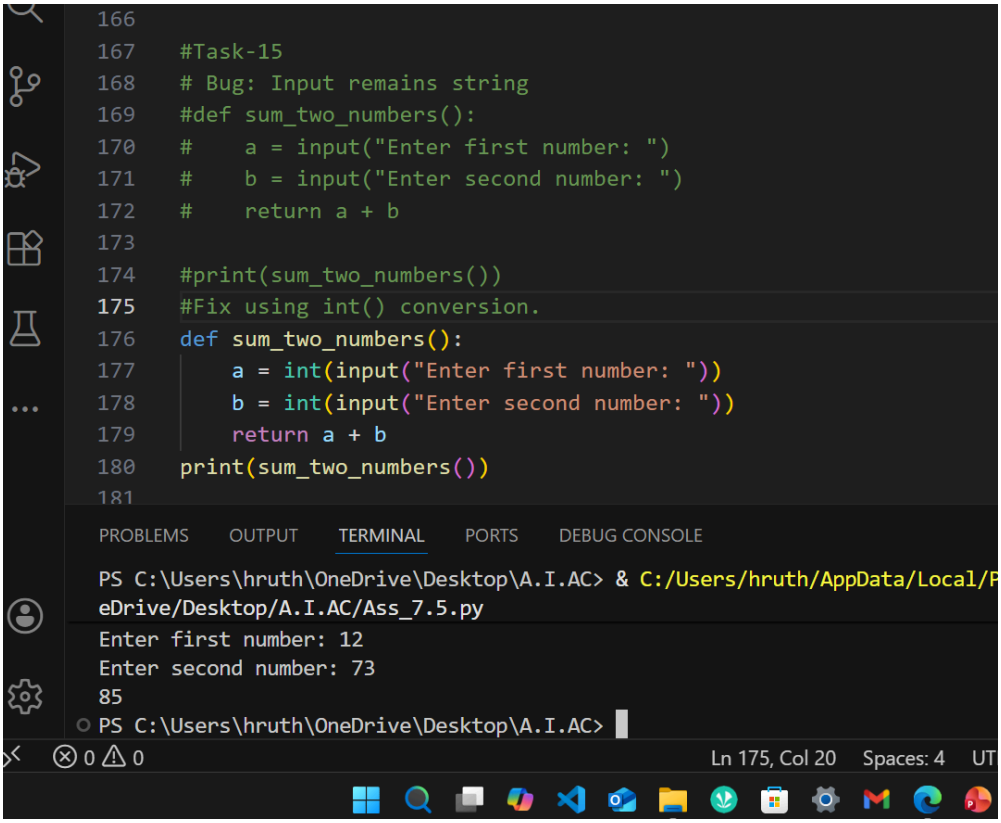
Task 15 (Type Error – Input Treated as String Instead of Number)
Task: Fix code where user input is not converted properly.
# Bug: Input remains string
def sum_two_numbers():
a = input("Enter first number: ")
b = input("Enter second number: ")
return a + b
print(sum_two_numbers())
Requirements:

- Fix using int() conversion.
- Explain why input is always string.
- Verify with assert test cases.

```
#Task-15
# Bug: Input remains string
#def sum_two_numbers():
#    a = input("Enter first number: ")
#    b = input("Enter second number: ")
#    return a + b

#print(sum_two_numbers())
#Fix using int() conversion.
def sum_two_numbers():
    a = int(input("Enter first number: "))
    b = int(input("Enter second number: "))
    return a + b
print(sum_two_numbers())
```





AI Explanation of the Bug:

The bug happens because the `input()` function in Python always returns a string, regardless of what the user types. So, when you try to add two inputs (`a + b`), Python is adding two strings together, not numbers. This results in string concatenation instead of numerical addition.

For example, if the user enters `3` and `5`, the code would treat them as strings (`"3"` and `"5"`) and concatenate them into `"35"` rather than adding them as numbers.