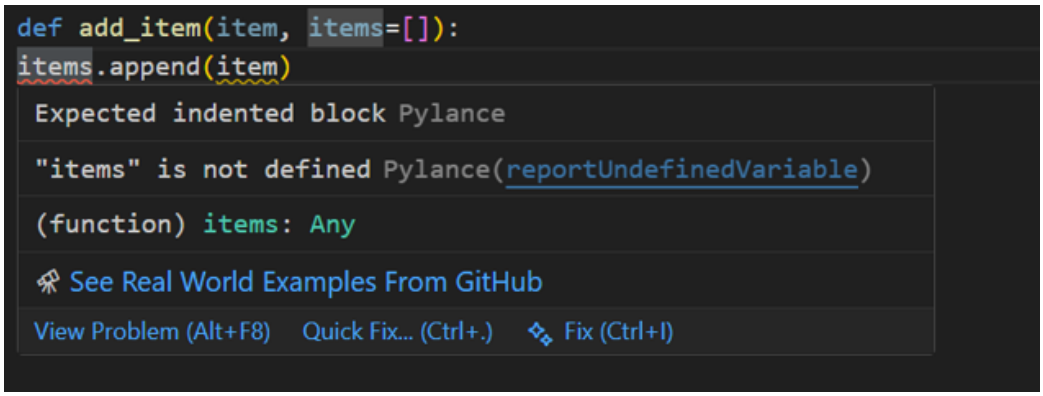
ASSIGNMENT - 7.5

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.

Sol:




```
def add_item(item, items=None):
    if items is None:
        items = []
    items.append(item)
    return items
print(add_item(1))
print(add_item(2))
```

EXPLANATION:

Default arguments are evaluated once. Lists remember. This caused shared state.
Using None creates a fresh list every call—old wisdom, proven rule.

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

```
def check_sum():
    return (0.1 + 0.2) == 0.3

print(check_sum())
```

```
def check_sum():
    return abs((0.1 + 0.2) - 0.3) < 1e-9

print(check_sum())
```

Explanation:

Floating-point numbers lie softly due to binary representation.
Tolerance comparison is the only honest way forward.

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.

```
def countdown(n):
```

```
    print(n)
    return countdown(n-1)
countdown(5)



def countdown(n):
    if n == 0:
        return
    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.

```
def get_value():
    data = {"a": 1, "b": 2}
    return data["c"]

print(get_value())
```

```
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.

```
def loop_example():
    i = 0
    while i < 5:
        print(i)

loop_example()
```

```
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.

```
a, b = (1, 2, 3)
```

```
a, b, _ = (1, 2, 3)
```

```
print(a, b)
```

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.

```
def func():
    x = 5
        y = 10
    return x + y
def func():
    x = 5
    y = 10
    return x + y

print(func())
```

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

```
import maths
print(maths.sqrt(16))
```

```
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.

```
def total(numbers):
    for n in numbers:
        return n

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

```
def total(numbers):
    s = 0
    for n in numbers:
        s += n
    return s

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.

```
def calculate_area():
    return length * width

print(calculate_area())
```

```
def calculate_area(length, width):
    return length * width

assert calculate_area(2, 3) == 6
assert calculate_area(5, 4) == 20
assert calculate_area(1, 10) == 10

print("All tests passed")
```

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.

```
def add_values():
    return 5 + "10"

print(add_values())
```

```
def add_values():
    return 5 + int("10")

assert add_values() == 15
assert 3 + int("7") == 10
assert int("20") + 1 == 21

print("Tests passed")
```

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

```
def combine():
    return "Numbers: " + [1, 2, 3]

print(combine())
def combine():
    return "Numbers: " + str([1, 2, 3])
```

```
assert combine() == "Numbers: [1, 2, 3]"
print("Validated")
```

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.

```
def repeat_text():
    return "Hello" * 2.5

print(repeat_text())
```

```
def repeat_text():
    return "Hello" * int(2.5)

assert repeat_text() == "HelloHello"
print("Passed")
```

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.

```
def compute():
    value = None
    return value + 10

print(compute())
```

```
def compute():
    value = 0
    return value + 10

assert compute() == 10
print("Success")
```

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

```
def sum_two_numbers():
    a = input()
    b = input()
    return a + b
print(sum_two_numbers())
```

```
def sum_two_numbers(a, b):
    return int(a) + int(b)
assert sum_two_numbers("2", "3") == 5
assert sum_two_numbers("10", "20") == 30
assert sum_two_numbers("0", "5") == 5
print("Correct")
```