

AI Assisted Coding

Assignment – 7.4

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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.

Code:

```
def add_item_fixed(item, items=None):
```

```
    if items is None:
```

```
        items = []
```

```
    items.append(item)
```

```
    return items
```

```
print(add_item_fixed(1))
```

```
print(add_item_fixed(2))
```

output: [1]

[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

Code:

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

Output :

True

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

Code:

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

```
    if n == 0:
        return
    print(n)
    return countdown(n-1)
countdown(5)
```

Output :

```
5
4
3
2
1
```

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

Code:

```
def get_value():
    data = {"a": 1, "b": 2}
    return data.get("c", "Key not found")
print(get_value())
```

output:

Key not found

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.

Code:

```
def loop_example():
    i = 0
    while i < 5:
        print(i)
        i+=1
```

output:

```
1
2
3
4
5
```

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

Code :

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

Output :

```
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
```

Code:

```
def func():
```

```
    x = 5
```

```
    y = 10
```

```
    return x + y
```

```
print(func())
```

Output : 15

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

Code :

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

output :

4.0

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.

Code :

```
def total(numbers):
```

```
    total_sum = 0
```

```
    for n in numbers:
```

```
        total_sum += n
```

```
    return total_sum
```

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

Output : 6**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.

Code :

```
def calculate_area(length, width):  
    return length * width  
print(calculate_area(5, 10))  
print(calculate_area(7, 3))  
print(calculate_area(4, 6))
```

Output :

50

21

24

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.

Code:

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

print(add_values())
```

OUTPUT :

15

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

Code:

```
def combine():  
    numbers = [1, 2, 3]  
  
    #Fix using conversion (str([1,2,3]) or " ".join()).  
    return "Numbers: " + " ".join(map(str, numbers))  
  
print(combine())  
  
#use 3 assert test cases  
  
assert combine() == "Numbers: 1 2 3"  
  
assert "1" in combine()  
  
assert "3" in combine()
```

OUTPUT:

Numbers: 1 2 3

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.**

Code:

```
def repeat_text():  
    #fix Multiplying string by float
```

```
# Convert float to integer for string multiplication
multiplier = int(2.5)

return "Hello" * multiplier

print(repeat_text())

#Add 3 assert test cases.

assert repeat_text() == "HelloHello"

assert len(repeat_text()) == 10

assert repeat_text().count("Hello") == 2
```

Output :

HelloHello

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.**

Code:

```
def compute():
```

```
    # fix Adding None and integer
```

```
value = None
```

```
return value + 10 if value is not None else 10
```

```
print(compute())
```

OUTPUT :

10

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.

Code:

```
def sum_two_numbers():  
    a = input("Enter first number: ")  
    b = input("Enter second number: ")  
    # Convert the input strings to integers and return their sum  
    return int(a) + int(b)  
print(sum_two_numbers())
```

OUTPUT:

Enter first number: 5

Enter second number: 6

11