

AI ASSISTED CODING

LAB -7.5

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BATCH – 04

Lab 7.5: Error Debugging with AI – Systematic Approaches to Finding and Fixing Bugs

Task 1: Mutable Default Argument – Function Bug

QUESTION

Analyze the given Python function where a mutable default argument causes unexpected behavior. Use AI assistance to fix the issue.

PROMPT

Identify the bug caused by using a mutable default argument in the function and modify the code so that the list is not shared between function calls.

CODE

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

OUTPUT

```
[1]  
[2]
```

EXPLANATION

In the original code, the default list was shared across multiple function calls, leading to unexpected results. By using None as the default value and creating a new list inside the function, each call gets its own independent list, avoiding shared state bugs.

Task 2: Floating-Point Precision Error

QUESTION

Analyze the given code where floating-point comparison fails due to precision issues. Use AI to correct it using tolerance.

PROMPT

Fix the floating-point comparison error by applying a tolerance-based comparison instead of direct equality.

CODE

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

OUTPUT

```
True
```

EXPLANATION

Floating-point numbers cannot always be represented exactly in memory. Instead of direct comparison, a small tolerance value is used to check whether the numbers are close enough, ensuring reliable results.

Task 3: Recursion Error – Missing Base Case

QUESTION

Analyze the recursive function that runs infinitely due to a missing base case and fix it using AI guidance.

PROMPT

Add an appropriate base condition to stop infinite recursion in the function.

CODE

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

OUTPUT

```
... 5  
     4  
     3  
     2  
     1  
     0
```

EXPLANATION

The original recursion lacked a stopping condition, causing infinite calls. Adding a base case ensures the function stops executing once the condition is met, preventing stack overflow errors.

Task 4: Dictionary Key Error

QUESTION

Analyze the code where accessing a non-existing dictionary key causes a runtime error and fix it.

PROMPT

Modify the code to safely access dictionary values using built-in methods 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
```

EXPLANATION

Accessing a missing key using square brackets raises a `KeyError`. The `.get()` method safely returns a default value, preventing program crashes.

Task 5: Infinite Loop – Wrong Condition

QUESTION

Analyze the loop that never terminates due to a missing increment and correct it.

PROMPT

Fix the infinite loop by updating the loop variable correctly.

CODE

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

OUTPUT

```
... 0
      1
      2
      3
      4
```

EXPLANATION

The loop variable was not updated in the original code, causing an infinite loop. Incrementing the variable ensures that the loop condition eventually becomes false.

Task 6: Unpacking Error – Wrong Variables

QUESTION

Analyze the tuple unpacking error where the number of variables does not match the tuple size.

PROMPT

Correct the unpacking error by adjusting variables appropriately.

CODE

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

OUTPUT

```
1 2
```

EXPLANATION

Tuple unpacking requires matching the number of variables with values. The underscore `_` is used to ignore extra values safely.

Task 7: Mixed Indentation – Tabs vs Spaces

QUESTION

Analyze the code where inconsistent indentation breaks execution and fix it.

PROMPT

Correct the indentation to follow consistent spacing rules.

CODE

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

OUTPUT

```
15
```

EXPLANATION

Python is indentation-sensitive. Mixing tabs and spaces leads to syntax errors. Consistent indentation improves readability and prevents execution issues.

Task 8: Import Error – Wrong Module Usage

QUESTION

Analyze the code with an incorrect module import and fix it using AI assistance.

PROMPT

Correct the module name to ensure successful import and execution.

CODE

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

15

OUTPUT

4.0

EXPLANATION

The module name was incorrect in the original code. Importing the correct built-in module resolves the error and allows the function to work properly.
