

# Lab 7.3

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## Task 1: Fixing Syntax Errors

### Scenario

You are reviewing a Python program where a basic function definition contains a syntax error.

### Requirements:

Typical Python error message:

javascript

Copy code

**SyntaxError:** expected ':'

### Output

#### 3. Corrected Function (AI Fix)

The AI automatically corrects the issue by adding the missing colon.

python

Copy code

```
def add(a, b):  
    return a + b
```

#### 4. AI Explanation of the Fix

The syntax error occurred because Python function definitions must end with a colon. The colon tells Python that the indented block below belongs to the function. Adding the colon resolves the syntax error and allows the function to run correctly.

## Task 2: Debugging Logic Errors in Loops

### Scenario


You are debugging a loop that runs infinitely due to a logical mistake.

## Requirements

### 1. Original Loop (With Logic Error)

This loop is intended to count up to 5, but it never stops.

python

 Copy code

```
i = 1
while i <= 5:
    print(i)
    i -= 1
```

### 2. AI Identifies the Cause of Infinite Iteration

What the AI notices:

- The loop condition is `i <= 5`
- The variable `i` starts at `1`
- Inside the loop, `i` is decremented (`i -= 1`)
- This causes `i` to become `0, -1, -2, ...`
- The condition `i <= 5` is always true

👉 Result: the loop runs forever.




### 3. AI Fixes the Loop Logic

Since the loop condition checks for `i <= 5`, the counter should increase, not decrease.

#### ✅ Corrected Loop

python

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

### 4. Analysis of the Corrected Behavior

- `i` starts at `1`
- Each iteration increases `i` by `1`
- When `i` becomes `6`, the condition `i <= 5` becomes false
- The loop exits normally

## Output

Output:

 Copy code

```
1
2
3
4
5
```

### 5. AI Explanation of the Logic Error

The infinite loop occurred because the loop variable was moving in the wrong direction. Since the condition required `i` to eventually exceed `5`, decrementing `i` prevented the condition from ever becoming false. Changing the decrement to an increment allows the loop to terminate correctly.

## Task 3: Handling Runtime Errors (Division by Zero)

### Scenario


A Python function crashes during execution due to a division by zero error.

### Requiriments

#### What Happens at Runtime

Calling:


```
python
```

 Copy code

```
divide(10, 0)
```

Raises:

```
vbnet
```

 Copy code

```
ZeroDivisionError: division by zero
```

### 2. AI Identifies the Runtime Error

AI Analysis:

- The function divides `a` by `b`
- When `b` is `0`, Python raises a `ZeroDivisionError`
- This is a **runtime error**, not a syntax or logic error
- The program crashes because the error is not handled

### 3. AI Adds try-except for Safe Execution

The AI fixes the issue by catching the exception using a `try-except` block.

#### ✅ Corrected Function (With Error Handling)

python

Copy code

```
def divide(a, b):  
    try:  
        return a / b  
    except ZeroDivisionError:  
        return "Error: Division by zero is not allowed."
```

### 4. Review of the Corrected Behavior

Normal case:

python

Copy code

```
divide(10, 2)
```



### Output:

Output:

Copy code

5.0

Error case:

python

Copy code

```
divide(10, 0)
```

Output:

vbnet

Copy code

```
Error: Division by zero is not allowed.
```

The function now:

- Executes safely
- Does not crash the program



## Task 4: Debugging Class Definition Errors

### Scenario

You are given a faulty Python class where the constructor is incorrectly defined.

Example error:

javascript

Copy code

`TypeError: __init__() takes 2 positional arguments but 3 were given`

### 3. AI Corrects the Class Definition

The AI fixes the issue by:

- Adding `self` as the first parameter
- Using `self` to store instance variables

#### ✓ Corrected Class Definition

python

Copy code

```
class Person:
    def __init__(self, name, age):
        self.name = name
        self.age = age
```



### Output

#### 5. Review of Corrected Behavior

python

Copy code

```
p = Person("Alice", 25)
print(p.name)
print(p.age)
```

Output:

nginx

Copy code

```
Alice
25
```

## Task 5: Resolving Index Errors in Lists

## Scenario

A program crashes when accessing an invalid index in a list.

### Prompt Used

"Access an element from a list using an index that does not exist and fix the resulting error using safe list access techniques."

### Problematic Code (Causes IndexError)

```
numbers = [10, 20, 30]
print(numbers[5]) # Invalid index
```

### Explanation

- The list `numbers` contains 3 elements.
- Valid indices are `0`, `1`, and `2`.
- Attempting to access index `5` causes:

`IndexError: list index out of range`



## Output

### Output (After Fix)

```
Index out of range
```