AI Assisted Coding (III Year) Assignment

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Batch: 35

Lab 7: Error Debugging with AI – Systematic Approaches to Finding and Fixing Bugs

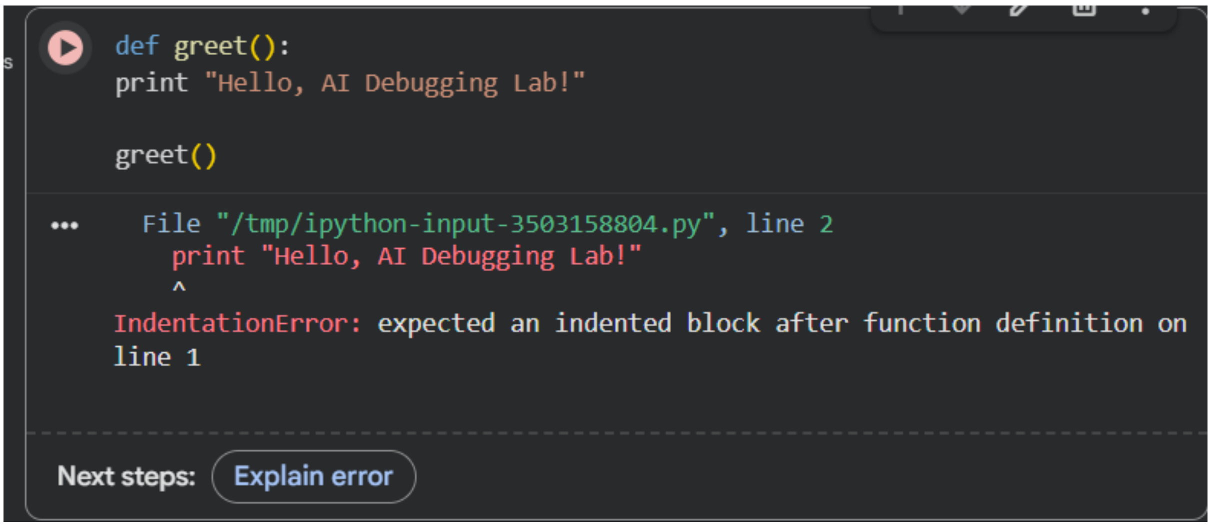
Week 4 – Monday

Lab Objectives

- To identify and correct syntax, logic, and runtime errors in Python programs using AI tools.
- To understand common programming bugs and AI-assisted debugging suggestions.
- To evaluate how AI explains, detects, and fixes different types of coding errors.
- To build confidence in using AI to perform structured debugging practices.

Task 1: Syntax Error – Missing Parentheses in Print Statement

Buggy Code



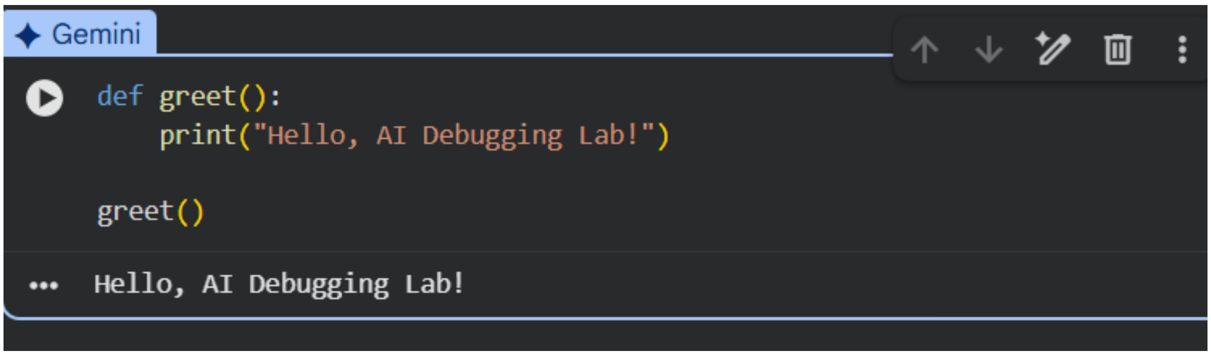
```
def greet():
print "Hello, AI Debugging Lab!"

greet()
```

```
  File "/tmp/ipython-input-3503158804.py", line 2
    print "Hello, AI Debugging Lab!"
    ^
IndentationError: expected an indented block after function definition on
line 1
```

Observed Error

- SyntaxError occurs because Python 3 requires parentheses in print().

AI Fix (Corrected Code):



```
def greet():
    print("Hello, AI Debugging Lab!")

greet()
```

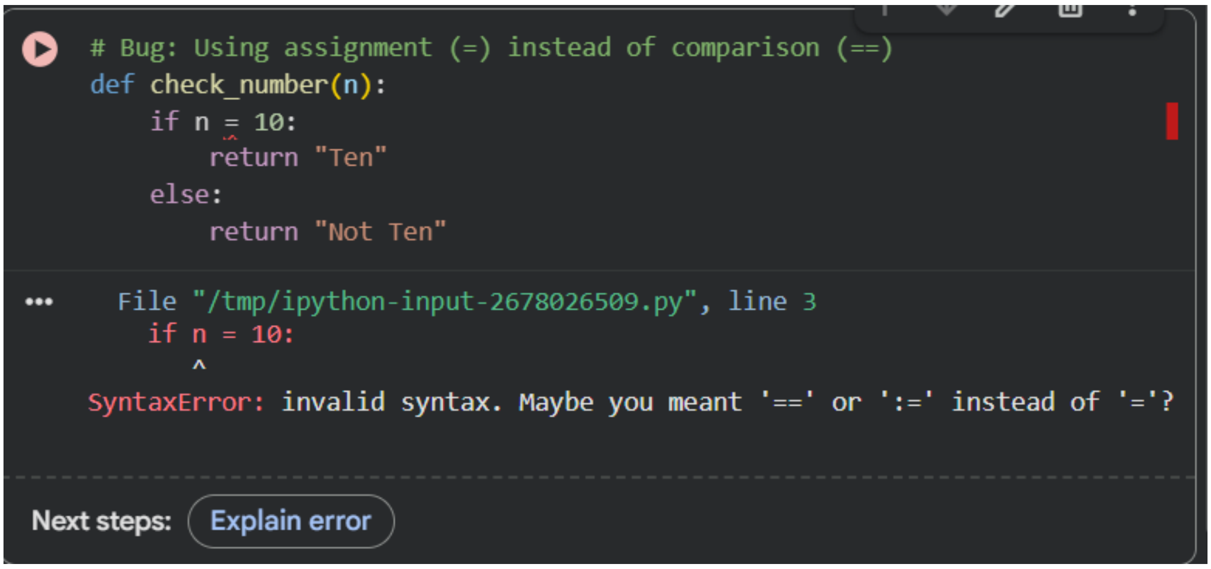
```
Hello, AI Debugging Lab!
```

Explanation

- In Python 3, print is a function, so parentheses are mandatory.
- Indentation was also corrected.

Task 2: Logic Error – Incorrect Condition in If Statement

Buggy Code



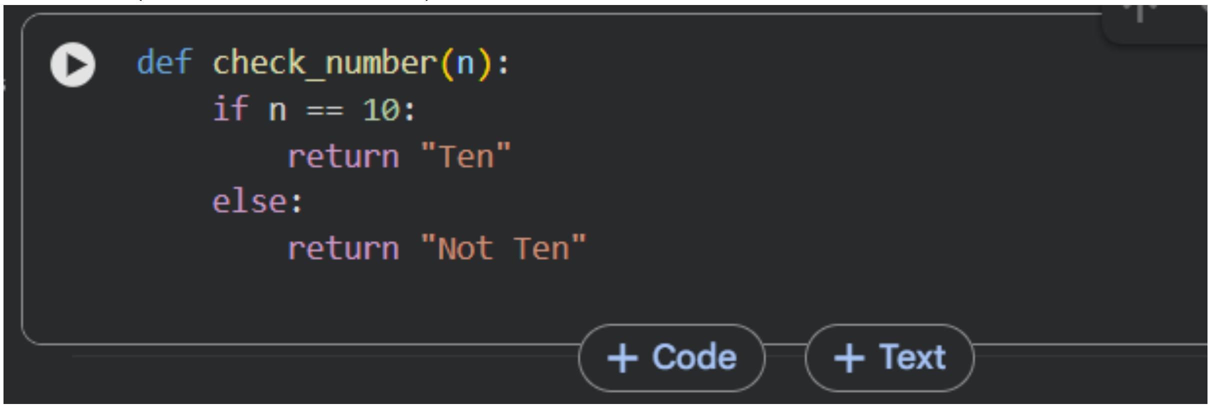
```
# Bug: Using assignment (=) instead of comparison (==)
def check_number(n):
    if n = 10:
        return "Ten"
    else:
        return "Not Ten"
```

```
  File "/tmp/ipython-input-2678026509.py", line 3
    if n = 10:
       ^
SyntaxError: invalid syntax. Maybe you meant '==' or ':=' instead of '='?
```

Why This Causes a Bug

- = is used for assignment, not comparison.
- Conditions require ==.

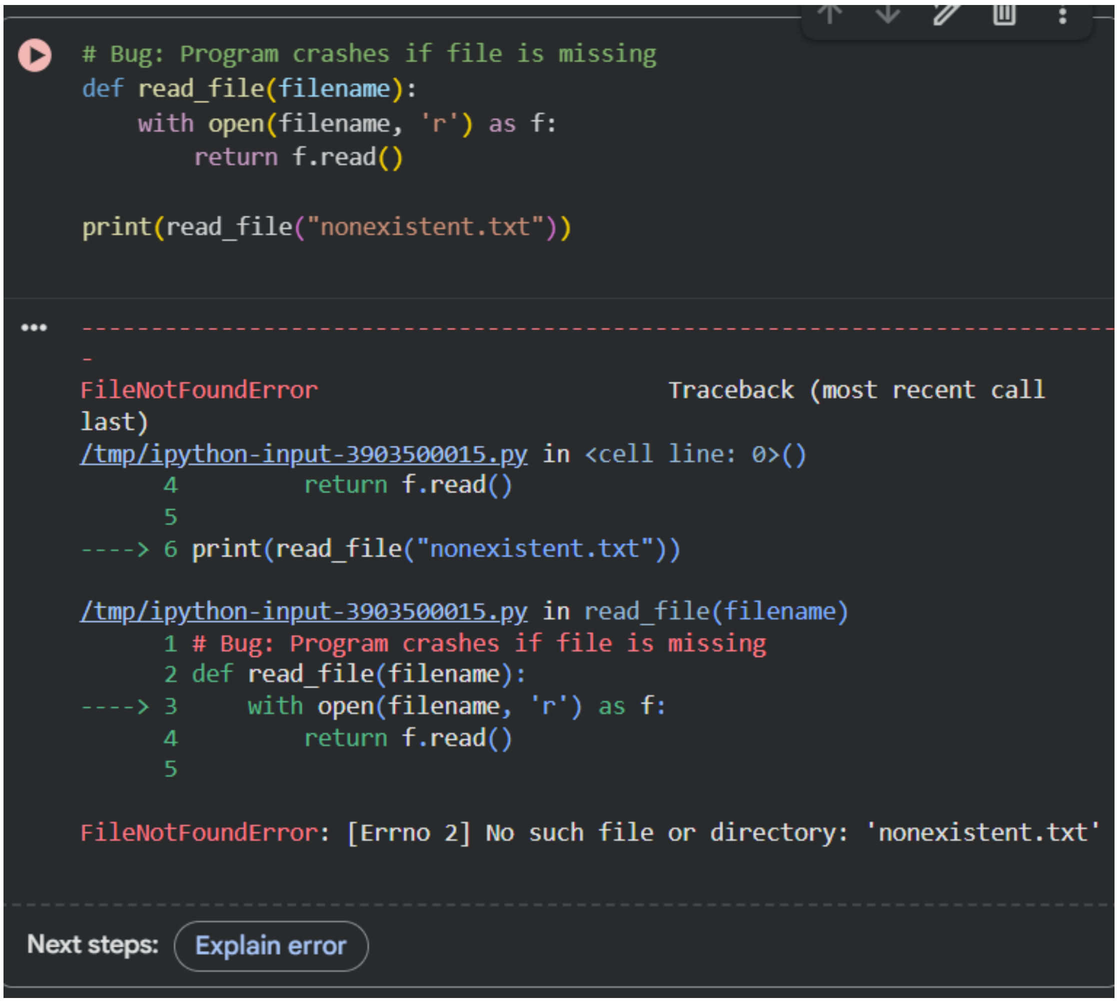
AI Fix (Corrected Code)   :



```python
def check_number(n):
    if n == 10:
        return "Ten"
    else:
        return "Not Ten"
```

Task 3: Runtime Error – File Not Found

Buggy Code



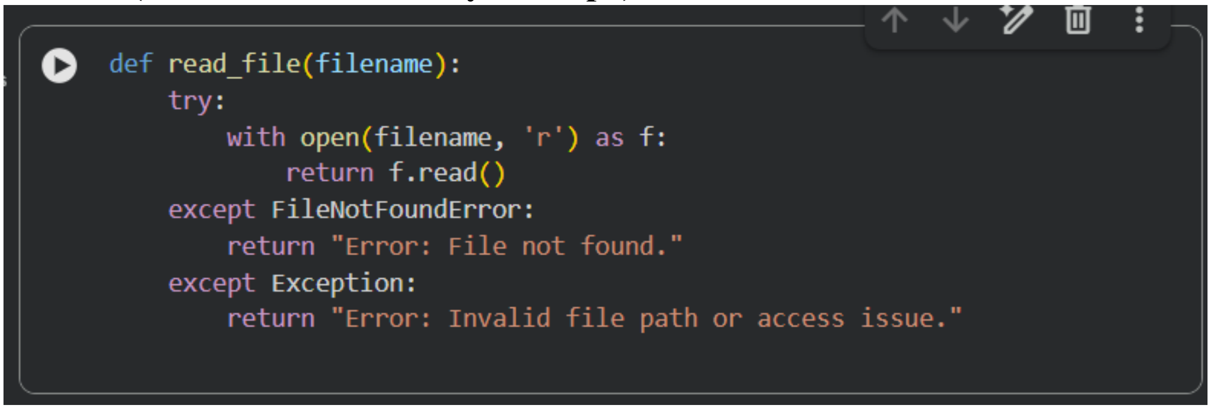
```python
# Bug: Program crashes if file is missing
def read_file(filename):
    with open(filename, 'r') as f:
        return f.read()

print(read_file("nonexistent.txt"))
```

```
---------------------------------------------------------------------------
-
FileNotFoundError                         Traceback (most recent call
last)
/tmp/ipython-input-3903500015.py in <cell line: 0>()
      4         return f.read()
      5 
----> 6 print(read_file("nonexistent.txt"))

/tmp/ipython-input-3903500015.py in read_file(filename)
      1 # Bug: Program crashes if file is missing
      2 def read_file(filename):
----> 3     with open(filename, 'r') as f:
      4         return f.read()
      5 

FileNotFoundError: [Errno 2] No such file or directory: 'nonexistent.txt'
```

Observed Error

- FileNotFoundError occurs when file does not exist.

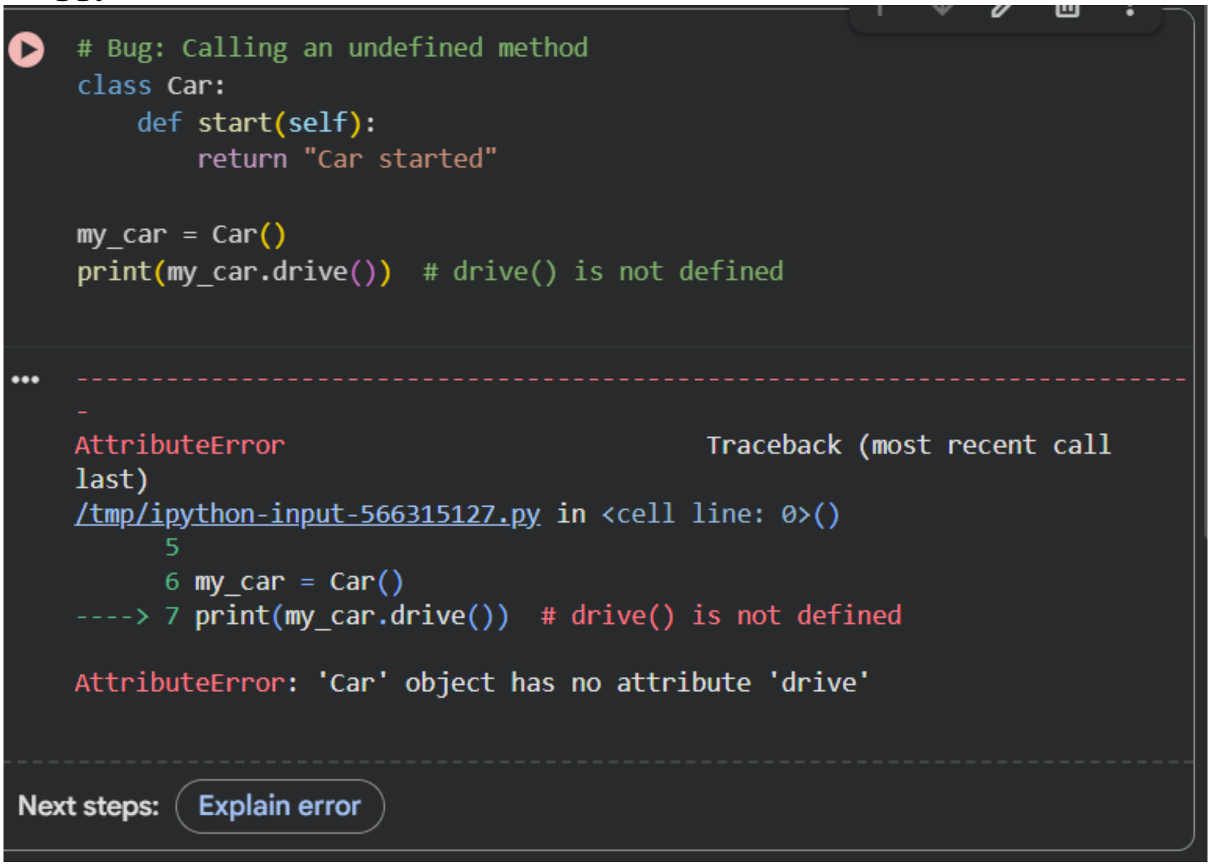
AI Fix (Safe Code with Try-Except):



```python
def read_file(filename):
    try:
        with open(filename, 'r') as f:
            return f.read()
    except FileNotFoundError:
        return "Error: File not found."
    except Exception:
        return "Error: Invalid file path or access issue."
```

Task 4: Calling a Non-Existent Method

Buggy Code:



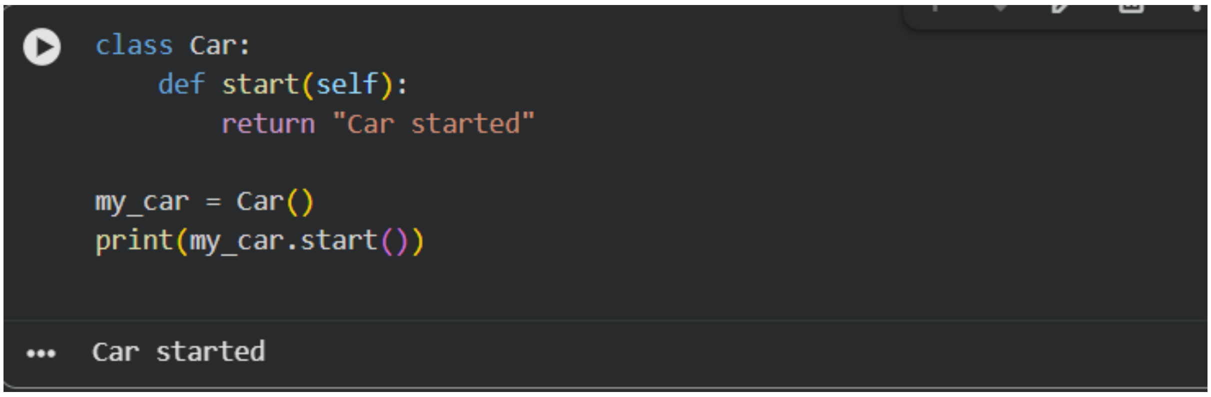
```python
# Bug: Calling an undefined method
class Car:
    def start(self):
        return "Car started"

my_car = Car()
print(my_car.drive())  # drive() is not defined
```

```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last)
/tmp/ipython-input-566315127.py in <cell line: 0>()
      5 
      6 my_car = Car()
----> 7 print(my_car.drive())  # drive() is not defined

AttributeError: 'Car' object has no attribute 'drive'
```

Problem

- drive() method does not exist, so AttributeError occurs.

AI Fix: Correct the Method Call:

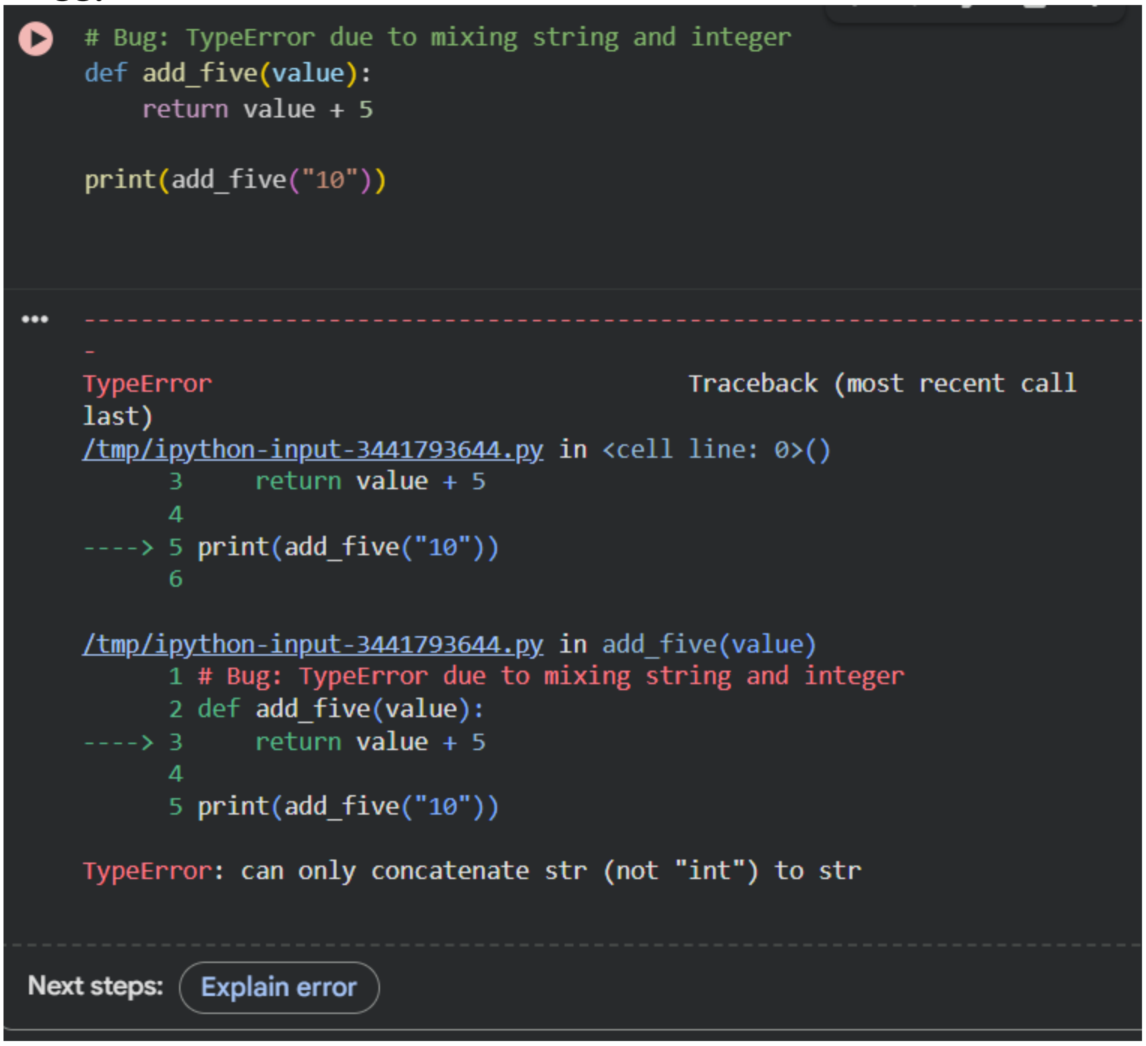


```
class Car:
    def start(self):
        return "Car started"

my_car = Car()
print(my_car.start())
```

```
Car started
```

Task 5: TypeError – Mixing Strings and Integers in Addition

Buggy Code:



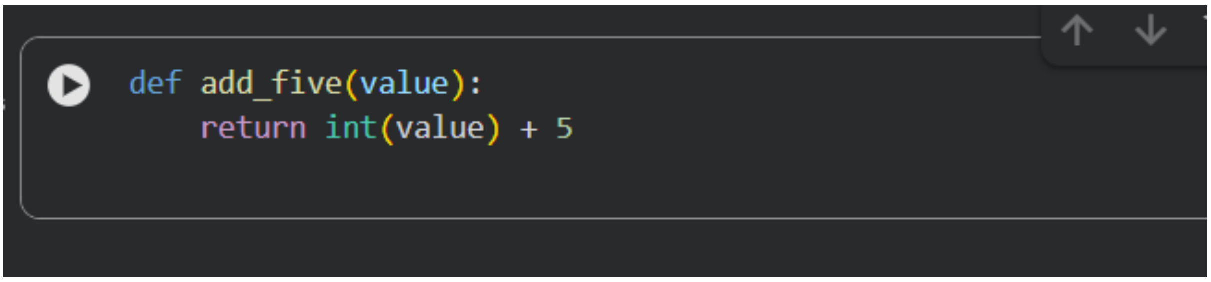
```
# Bug: TypeError due to mixing string and integer
def add_five(value):
    return value + 5

print(add_five("10"))
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
/tmp/ipython-input-3441793644.py in <cell line: 0>()
      3     return value + 5
      4 
----> 5 print(add_five("10"))
      6 

/tmp/ipython-input-3441793644.py in add_five(value)
      1 # Bug: TypeError due to mixing string and integer
      2 def add_five(value):
----> 3     return value + 5
      4 
      5 print(add_five("10"))

TypeError: can only concatenate str (not "int") to str
```

Observed Error

- TypeError occurs because "10" is a string and cannot be added to integer 5.

AI Correction: String Concatenation:



```python
def add_five(value):
    return int(value) + 5
```

Final Conclusion

This lab demonstrated how AI tools help in debugging different types of errors:

- Syntax Errors (missing parentheses, indentation)
- Logic Errors (wrong operators in conditions)
- Runtime Errors (missing files, invalid paths)
- Attribute Errors (undefined method calls)
- Type Errors (mixing incompatible data types)

AI-assisted debugging improves productivity, but human understanding is necessary to validate fixes and write reliable code.