

### LabAssignment#7.1

Course Title : **AI Assistant Coding**

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### Lab 7: Error Debugging with AI: Systematic approaches to finding and fixing bugs

#### Task Description #1 (Syntax Errors – Missing Parentheses in Print Statement)

Task: Provide a Python snippet with a missing parenthesis in a print statement (e.g., print "Hello"). Use AI to detect and fix the syntax error.

# Bug: Missing parentheses in print statement

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

#### Requirements:

- Run the given code to observe the error.
- Apply AI suggestions to correct the syntax.
- Use at least 3 assert test cases to confirm the corrected code works.

#### Expected Output #1:

- Corrected code with proper syntax and AI explanation.

#### Output Screenshot:

The screenshot shows a code editor with a Python script named `task1.py`. The script defines a `greet()` function that prints "Hello, AI Debugging Lab!". The code is as follows:

```
1 def greet():  
2     return "Hello, AI Debugging Lab!"  
3  
4 # Output  
5 print(greet())  
6  
7 # Assert Test Cases  
8 assert greet() == "Hello, AI Debugging Lab!"  
9 assert isinstance(greet(), str)  
10 assert "AI" in greet()  
11  
12 print("Task 1 tests passed!")  
13
```

The output of the script is shown in the terminal at the bottom:

```
(.venv) PS C:\Users\Lenovo\Desktop\AI Coding> & "C:\Users\Lenovo\Desktop\AI Coding\.venv\Scripts\python.exe" "c:/Users/Lenovo/Desktop/AI Coding/ass5.py/assignment 7.1.py/task1.py"  
KeyboardInterrupt  
Hello, AI Debugging Lab!  
Task 1 tests passed!  
(.venv) PS C:\Users\Lenovo\Desktop\AI Coding>
```

**Explanation:** In Python 3, `print` is defined as a built-in function. A function call requires parentheses. Using the Python 2 `print` statement format violates Python 3 syntax rules, resulting in a `SyntaxError`. The correction is to use the functional form of `print()`.

### Task Description #2 (Incorrect condition in an If Statement)

**Task:** Supply a function where an `if`-condition mistakenly uses `=` instead of `==`. Let AI identify and fix the issue.

**# Bug:** Using assignment (`=`) instead of comparison (`==`)

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

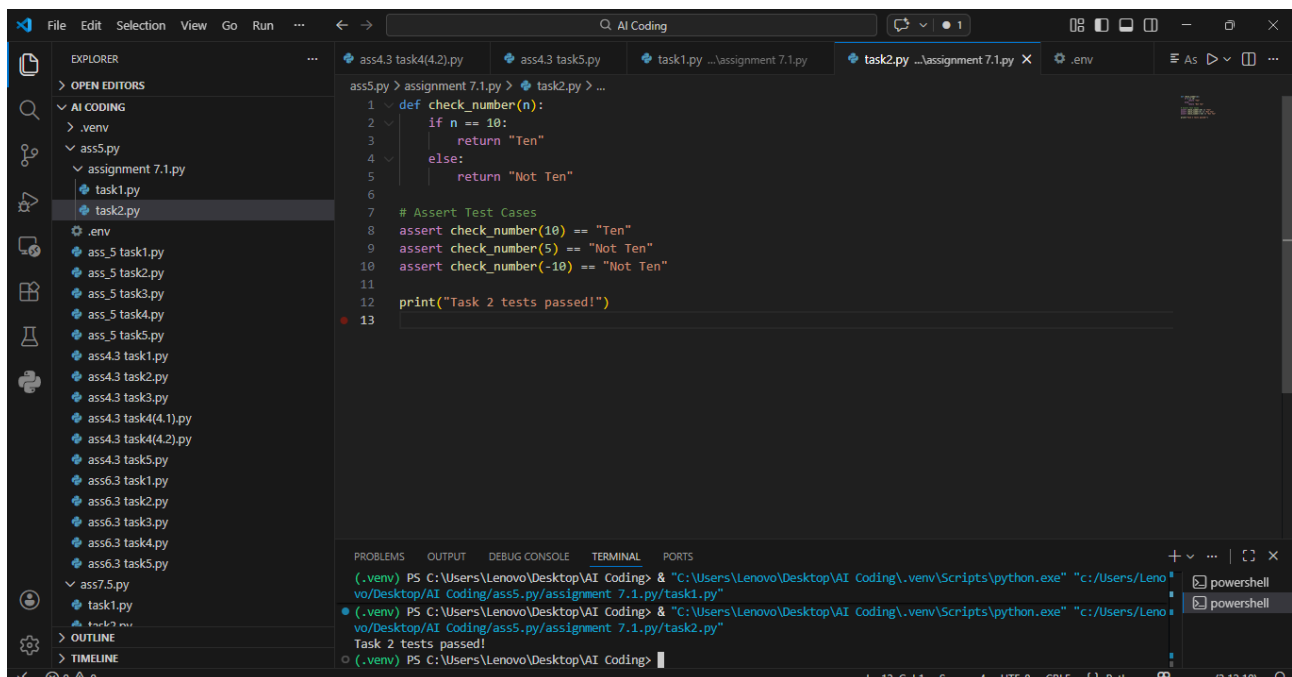
#### Requirements:

- Ask AI to explain why this causes a bug.
- Correct the code and verify with 3 assert test cases.

#### Expected Output #2:

- Corrected code using `==` with explanation and successful test execution.

#### Output Screenshot:



The screenshot shows a code editor with the following content:

```
1 def check_number(n):  
2     if n == 10:  
3         return "Ten"  
4     else:  
5         return "Not Ten"  
6  
7 # Assert Test Cases  
8 assert check_number(10) == "Ten"  
9 assert check_number(5) == "Not Ten"  
10 assert check_number(-10) == "Not Ten"  
11  
12 print("Task 2 tests passed!")  
13
```

The terminal output at the bottom shows the successful execution of the code:

```
(.venv) PS C:\Users\Lenovo\Desktop\AI Coding> & "C:\Users\Lenovo\Desktop\AI Coding\.venv\Scripts\python.exe" "c:/Users/Lenovo/Desktop/AI Coding/ass5.py/assignment 7.1.py/task1.py"  
(.venv) PS C:\Users\Lenovo\Desktop\AI Coding> & "C:\Users\Lenovo\Desktop\AI Coding\.venv\Scripts\python.exe" "c:/Users/Lenovo/Desktop/AI Coding/ass5.py/assignment 7.1.py/task2.py"  
Task 2 tests passed!  
(.venv) PS C:\Users\Lenovo\Desktop\AI Coding>
```

#### Explanation:

The operator `=` is an assignment operator used to store a value in a variable. Conditional statements require a boolean expression, which is formed using comparison operators such as `==`. Using `=` in an `if`-condition is syntactically invalid in Python and produces a `SyntaxError`. The correction is to replace `=` with `==`.

### Task Description #3 (Runtime Error – File Not Found)

**Task:** Provide code that attempts to open a non-existent file and crashes. Use AI to apply safe error handling.

**# 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"))
```

#### Requirements:

- Implement a try-except block suggested by AI.
- Add a user-friendly error message.
- Test with at least 3 scenarios: file exists, file missing, invalid path.

#### Expected Output #3:

- Safe file handling with exception management.

#### Output Screenshot:

```
1 def read_file(filename):
2     # 1) Handle invalid input like empty string or only spaces
3     if not isinstance(filename, str) or filename.strip() == "":
4         return "Error: Invalid file path."
5
6     # 2) Safe file handling
7     try:
8         with open(filename, "r") as f:
9             return f.read()
10
11     except FileNotFoundError:
12         return f"Error: File '{filename}' not found."
13
14     except OSError:
15         return f"Error: Invalid file path '{filename}'."
16
17 # Assert Test Cases
18 assert read_file("") == "Error: Invalid file path."
19 assert read_file(" ") == "Error: Invalid file path."
20 assert read_file("non_existent_file.txt") == "Error: File 'non_existent_file.txt' not found."
21 print("All tests passed!")
```

Terminal Output: vo/Desktop/AI Coding/ass5.py/assignment 7.1.py/task3.py  
All tests passed!  
(.venv) PS C:\Users\Lenovo\Desktop\AI Coding>

**EXPLANATION :** File operations depend on the existence and validity of the file path. When `open()` is executed with a missing file, Python raises a `File Not Found Error` at runtime. Exception handling using `try-except` prevents abrupt termination and enables controlled execution by returning a meaningful error message.

#### Task Description #4 (Calling a Non-Existent Method)

**Task:** Give a class where a non-existent method is called (e.g., `obj.undefined_method()`). Use AI to debug and fix.

#### # Bug: Calling an undefined method

```
class Car:
def start(self):
return "Car started"
my_car = Car()
print(my_car.drive()) # drive() is not defined
```

#### Requirements:

- Students must analyze whether to define the missing method or correct the method call.
- Use 3 assert tests to confirm the corrected class works.

#### Expected Output #4:

- Corrected class with clear AI explanation.

## Output Screenshot:

The screenshot shows a VS Code editor with a file explorer on the left and a code editor in the center. The file explorer shows a project structure with a folder named 'assignment 7.1.py' containing files 'task1.py', 'task2.py', 'task3.py', and 'task4.py'. The code editor shows the content of 'task4.py', which defines a 'Car' class with 'start' and 'drive' methods, creates an instance 'my\_car', and runs assertions to verify the methods' output. The terminal at the bottom shows the output of running the code: 'Car is driving' and 'Task 4 tests passed!'.

```

1 class Car:
2     def start(self):
3         return "Car started"
4
5     def drive(self):
6         return "Car is driving"
7
8 # Object
9 my_car = Car()
10
11 # Output
12 print(my_car.drive())
13
14 # Assert Test Cases
15 assert my_car.start() == "Car started"
16 assert my_car.drive() == "Car is driving"
17 assert isinstance(my_car.drive(), str)
18
19 print("Task 4 tests passed!")
20

```

```

(.venv) PS C:\Users\Lenovo\Desktop\VAI Coding> & "C:\Users\Lenovo\Desktop\VAI Coding\ass5.py\assignment 7.1.py\task4.py"
Car is driving
Task 4 tests passed!
(.venv) PS C:\Users\Lenovo\Desktop\VAI Coding>

```

**Explanation:** In object-oriented programming, a method must be defined within a class before it can be invoked by an object of that class. Calling an undefined method results in an `AttributeError` because the object does not contain the requested attribute. The correction requires either defining the missing method in the class or modifying the call to an existing method.

## Task Description #5 (TypeError – Mixing Strings and Integers in Addition)

**Task:** Provide code that adds an integer and string ("5" + 2) causing a `TypeError`. Use AI to resolve the bug.

*# Bug: TypeError due to mixing string and integer*

```

def add_five(value):
    return value + 5
print(add_five("10"))

```

### Requirements:

- Ask AI for two solutions: type casting and string concatenation.
- Validate with 3 assert test cases.

### Expected Output #5:

- Corrected code that runs successfully for multiple inputs.

## Output Screenshot:

```
File Edit Selection View Go Run ... AI Coding task2.py ...assignment 7.1.py task3.py ...assignment 7.1.py task4.py ...assignment 7.1.py task5.py ...assignment 7.1.py
```

```
EXPLORER  
OPEN EDITORS  
AI CODING  
.env  
ass5.py  
assignment 7.1.py  
task1.py  
task2.py  
task3.py  
task4.py  
task5.py  
.env  
ass_5 task1.py  
ass_5 task2.py  
ass_5 task3.py  
ass_5 task4.py  
ass_5 task5.py  
ass4.3 task1.py  
ass4.3 task2.py  
ass4.3 task3.py  
ass4.3 task4(4.1).py  
ass4.3 task4(4.2).py  
ass4.3 task5.py  
ass6.3 task1.py  
ass6.3 task2.py  
ass6.3 task3.py  
ass6.3 task4.py  
ass6.3 task5.py  
OUTLINE  
TIMELINE
```

```
ass5.py > assignment 7.1.py > task5.py > ...  
1 def add_five_cast(value):  
2     return int(value) + 5  
3  
4 # Assert Test Cases  
5 assert add_five_cast("10") == 15  
6 assert add_five_cast(0) == 5  
7 assert add_five_cast("25") == 30  
8  
9 print("Task 5 (casting) tests passed!")  
10
```

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS  
(.env) PS C:\Users\Lenovo\Desktop\AI Coding> & "C:\Users\Lenovo\Desktop\AI Coding\.env\Scripts\python.exe" "c:/Users/Leno  
(.env) PS C:\Users\Lenovo\Desktop\AI Coding> & "C:\Users\Lenovo\Desktop\AI Coding\.env\Scripts\python.exe" "c:/Users/Leno  
vo/Desktop/AI Coding/ass5.py/assignment 7.1.py/task5.py"  
Task 5 (casting) tests passed!  
(.env) PS C:\Users\Lenovo\Desktop\AI Coding>
```

Ln 10, Col 1 Spaces: 4 UTF-8 CRLF Python .env (3.12.10)

**EXPLANATION :** Python enforces strict type rules for arithmetic operations. Addition between a string and an integer is not supported because the operands are of incompatible types. This produces a `TypeError`. The correction is performed by explicit type conversion, either converting the string to an integer for numeric addition or converting the integer to a string for concatenation.