

### 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 the Visual Studio Code interface with the following details:

- File Explorer:** Shows multiple Python files in the 'ass5' folder, including 'task1.py' which is currently selected.
- Code Editor:** Displays the content of 'task1.py':

```
def greet():
    print "Hello, AI Debugging Lab!"
    greet()
```
- Terminal:** Shows the command line output:

```
(.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!
```
- Status Bar:** Shows the current file is 'task1.py', the line count is 13, and the character count is 131.

**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 the Visual Studio Code interface. The left sidebar displays a tree view of files and folders, including '.env', 'ass5.py', 'assignment 7.1.py', 'task1.py', and 'task2.py'. The main editor area shows the 'task2.py' file with the following content:

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

# Assert Test Cases
assert check_number(10) == "Ten"
assert check_number(5) == "Not Ten"
assert check_number(-10) == "Not Ten"

print("Task 2 tests passed!")
```

The status bar at the bottom indicates the file is saved and has 13 columns. The terminal tab at the bottom shows the command prompt running within a PowerShell window, displaying the command `python task2.py` and the output `Task 2 tests passed!`.

### 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, invalidpath.

#### Expected Output #3:

- Safe file handling with exception management.

#### Output Screenshot:

The screenshot shows the Visual Studio Code interface. The left sidebar includes the Explorer, Search, Problems, and Terminal sections. The main area shows the code editor with the following Python script:

```

def read_file(filename):
    # 1) Handle invalid input like empty string or only spaces
    if not isinstance(filename, str) or filename.strip() == "":
        return "Error: Invalid file path."

    # 2) Safe file handling
    try:
        with open(filename, "r") as f:
            return f.read()

    except FileNotFoundError:
        return f"Error: File '{filename}' not found."

    except OSError:
        return f"Error: Invalid file path '{filename}'.

# Assert Test Cases
assert read_file("") == "Error: Invalid file path."
assert read_file(" ") == "Error: Invalid file path."
assert read_file("non_existent_file.txt") == "Error: File 'non_existent_file.txt' not found."
print("All tests passed!")

```

The terminal at the bottom shows the command `vo/Desktop/AI Coding/ass5.py/assignment 7.1.py/task3.py` and the output "All tests passed!".

**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:

```

File Edit Selection View Go Run ... < > Q AI Coding
EXPLORER task1.py ...assignment 7.1.py task2.py ...assignment 7.1.py task3.py ...assignment 7.1.py task4.py ...assignment 7.1.py
OPEN EDITORS ass5.py > assignment 7.1.py > task4.py > ...
AI CODING .venv
ass5.py
assignment 7.1.py
task1.py
task2.py
task3.py
task4.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
x 0 △ 0
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
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
● (.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/task4.py"
vo/Desktop/AI Coding/ass5.py\assignment 7.1.py/task4.py"
Car is driving
Task 4 tests passed!
● (.venv) PS C:\Users\Lenovo\Desktop\AI Coding>
Ln 20, Col 1 Spaces: 4 UTF-8 CRLF () Python .venv (3.12.10)
+ v ... | x
powershell
powershell
powershell

```

**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 inAddition)

**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:

The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer (Left):** Shows a tree view of files and folders. The current folder is 'AI CODING'. It contains a '.venv' folder, an 'ass5.py' folder, and several 'taskX.py' files (task1.py, task2.py, task3.py, task4.py, task5.py). There are also numerous 'assX.py' files (ass1.py to ass6.3) and some configuration files like '.env'.
- Code Editor (Center):** The active file is 'task5.py'. The code defines a function 'add\_five\_cast' that takes a string argument and returns an integer by casting it to int. It includes assert statements for values 10, 0, and 25, all resulting in 15, 5, and 30 respectively. A final print statement confirms successful casting.
- Terminal (Bottom):** The terminal shows three PowerShell sessions. The first session runs 'python.exe' on 'task5.py', outputting 'Task 5 (casting) tests passed!'. The second session runs 'python.exe' on 'task5.py' again, and the third session shows the current directory as 'C:\Users\Lenovo\Desktop\AI Coding'.

**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.