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Batch : 52

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

Task 1 – Runtime Error Due to Invalid Input Type

Prompt:

Write a Python function to determine whether a given number is prime.

Code :

The screenshot shows a code editor interface with a dark theme. The top navigation bar includes tabs for "Welcome", "day.py", "AI.py", and "7.2.py". The "7.2.py" tab is active, showing the following code:

```
1 num = input("Enter a number: ")
2 result = num + 10 num = '5'
```

An error message is displayed below the code editor:

```
Exception has occurred: TypeError
can only concatenate str (not "int") to str
File "C:\Users\girug\Downloads\AI\7.2.py", line 2, in <module>
    result = num + 10
           ~~~~~^~~~~~
TypeError: can only concatenate str (not "int") to str
```

The code editor interface also includes a status bar at the bottom.

Output:

The screenshot shows a VS Code interface with the following details:

- File Explorer:** Shows files: Welcome, day.py, AI.py, 7.2.py (selected), and an unnamed file.
- Code Editor:** Displays the content of 7.2.py:

```
7.2.py > ...
1 num = int(input("Enter a number: "))
2 result = num + 10
3 print(result)
4
```
- Terminal:** Shows the command-line output:

```
PS C:\Users\girug\Downloads\AI>
PS C:\Users\girug\Downloads\AI> ^C
PS C:\Users\girug\Downloads\AI>
PS C:\Users\girug\Downloads\AI> c:; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore\64\python.exe' 'c:\Users\girug\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '--' 'C:\Users\girug\Downloads\AI\7.2.py'
Enter a number: 6
16
PS C:\Users\girug\Downloads\AI>
```

Justification: The program failed because `input()` returns data as a string, and adding a string to an integer is invalid in Python. The AI corrected this by converting the input to an integer using `int()`, ensuring the arithmetic operation works properly. This type conversion is necessary to match the expected numeric behavior of the program.

Task 2 – Incorrect Function Return Value Prompt:

Generate a function to calculate the sum of elements in a list.

Code :

```
23
24
25
26
27
28 def square(n):
29     result = n * n
30
31
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\girug\Downloads\AI> c;; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore-3.14-64\python.exe' 'c:\Users\girug\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '51096' '--' 'C:\Users\girug\Downloads\AI\7.2.py'
PS C:\Users\girug\Downloads\AI> 6
6
PS C:\Users\girug\Downloads\AI> []
```

Output:

```
24
25
26
27 def square(n):
28     result = n * n
29     return result
30 print(square(8))
31
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
> c;; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore-3.14\python.exe' 'c:\Users\girug\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '638' '--' 'C:\Users\girug\Downloads\AI\7.2.py'
25
PS C:\Users\girug\Downloads\AI> ^C
PS C:\Users\girug\Downloads\AI>
PS C:\Users\girug\Downloads\AI> c;; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore-3.14\python.exe' 'c:\Users\girug\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '639' '--' 'C:\Users\girug\Downloads\AI\7.2.py'
PS C:\Users\girug\Downloads\AI> 8^C
PS C:\Users\girug\Downloads\AI>
PS C:\Users\girug\Downloads\AI> c;; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore-3.14\python.exe' 'c:\Users\girug\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '502' '--' 'C:\Users\girug\Downloads\AI\7.2.py'
64
PS C:\Users\girug\Downloads\AI> []
```

Justification:

Although the function computed the square internally, it never returned the result, causing the output to be lost. The AI identified the missing return statement and added it, allowing the function to properly send the computed value back to the caller. Returning values is essential for functional correctness and reusability.

Task 3 – IndexError in List Traversal

Write a Python function that takes an alphanumeric string and returns only the digits.

Code :

The screenshot shows a Python script in a code editor. Line 32 contains a for loop that prints each element of a list. Line 33 is the print statement. A tooltip indicates that the list index is 3. An error message box is displayed, stating "Exception has occurred: IndexError × list index out of range". The stack trace shows the error occurred in line 33 of "7.2.py". The terminal tab is selected at the bottom.

```
24
25
26
27
28
29
30
31     numbers = [10, 20, 30]
32 →| for i in range(0, len(numbers)+1):
33 |     print(numbers[i]) numbers = [10, 20, 30], i = 3

Exception has occurred: IndexError ×
list index out of range
File "C:\Users\girug\Downloads\AI\7.2.py", line 33, in <module>
    print(numbers[i])
            ^
IndexError: list index out of range

34
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

Output:

The screenshot shows the same Python script after the error was fixed. The for loop now uses range(len(numbers)). The terminal tab shows the script being run and the output of the printed digits: 10, 20, 30. The status bar at the bottom right indicates the file is 52 lines long, 1 column wide, in UTF-8 encoding.

```
46
47
48
49
50
51
52
53
54 numbers = [10, 20, 30]
55 for i in range(0, len(numbers)):
56     print(numbers[i])
57

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS + v ... | []

PS C:\Users\girug\Downloads\AI> c:; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore-3.14-64\python.exe' 'c:\Users\girug\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '57115' '--' 'C:\Users\girug\Downloads\AI\7.2.py'
10
20
30
PS C:\Users\girug\Downloads\AI>
```

Ln 52, Col 1 Spaces: 4 UTF-8 CR

Justification:

The loop incorrectly iterated one step beyond the valid index range using `len(numbers) + 1`, causing an `IndexError`. AI fixed the boundary to `range(len(numbers))`, ensuring safe access of all existing list elements. This correction is justified because valid indices only go from 0 to `len(numbers)-1`.

Task 4 – Uninitialized Variable Usage

Prompt :

Write a Python function to count the number of vowels in a given string.

Code :

A screenshot of a code editor showing a Python script. The code is as follows:

```
54
55
56
57 if True:
58 | pass
59 print(D total)
```

An error message is displayed in a red box:

Exception has occurred: NameError ×
name 'total' is not defined
File "C:\Users\girug\Downloads\AI\7.2.py", line 59, in <module>
 print(total)
 ^^^^
NameError: name 'total' is not defined

The code editor interface shows the file path C:\Users\girug\Downloads\AI\7.2.py, line 59, and a status bar indicating Ln 59, Col 1, Spaces: 4, and UTF-8.

Output:

A screenshot of a code editor showing the output of the AI-generated code. The terminal tab shows the following output:

```
77
78
79
80 total = 0 # Initializing the variable
81 if True:
82 | pass
83
84 print(total)
85
```

```
'--' 'C:\Users\girug\Downloads\AI\7.2.py'
PS C:\Users\girug\Downloads\AI> ^
PS C:\Users\girug\Downloads\AI>
PS C:\Users\girug\Downloads\AI> c::; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore-3.14-64\python.exe' 'c:\Users\girug\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '63589'
'--' 'C:\Users\girug\Downloads\AI\7.2.py'
0
PS C:\Users\girug\Downloads\AI> []
```

The status bar at the bottom indicates Ln 79, Col 1, Spaces: 4, and UTF-8.

Justification:

The program attempted to print a variable (total) before it had been assigned any value, resulting in a runtime error. AI resolved this by initializing the variable to 0 before use, ensuring the program has a valid reference. Proper initialization prevents undefined behavior and is a fundamental programming requirement. **Task 5 – Logical Error**

in Student Grading System Prompt :

write a Python function that takes three numbers and returns the minimum value without using min().

Code :

```
79
80     marks = 85
81     if marks >= 90:
82         grade = "A"
83     elif marks >= 80:
84         grade = "B"
85     else:
86         grade = "C"
87     print(grade)
88
89
90
91
92
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\girug\Downloads\AI> ^C
PS C:\Users\girug\Downloads\AI>
PS C:\Users\girug\Downloads\AI> c::; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore-3.14-64\python.exe' 'c:\Users\girug\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '50305' '--' 'c:\Users\girug\Downloads\AI\7.2.py'
C
PS C:\Users\girug\Downloads\AI>
```

Output:

```
74
75
76
77
78
79     marks = 85
80
81     if marks >= 90:
82         grade = "A"
83     elif marks >= 80:
84         grade = "B"
85     else:
86         grade = "C"
87
88     print(grade)
89
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
C
PS C:\Users\girug\Downloads\AI> ^C
PS C:\Users\girug\Downloads\AI>
PS C:\Users\girug\Downloads\AI> c::; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore-3.14-64\python.exe' 'c:\Users\girug\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '64291' '--' 'C:\Users\girug\Downloads\AI\7.2.py'
B
PS C:\Users\girug\Downloads\AI>
```

Justification:

The conditions for assigning grades were incorrectly ordered, making the program assign a wrong grade for certain mark ranges. AI fixed this by arranging the conditions in a logically descending order (A → B → C), ensuring accurate evaluation. Correct conditional structure is essential for producing correct program decisions.