

HEPSIBA DEVARA

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**Batch : 51**

## 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. At the top, there are tabs for "Welcome", "day.py", "AI.py", and "7.2.py". The "7.2.py" tab is active. Below the tabs, the code is displayed:

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

A red arrow points to the line "result = num + 10 num = '5'". In the bottom half of the screen, an error message is shown:

```
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
```

Below the error message, the code continues:

```
3 print(result)
4
```

#### 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 :**

A screenshot of the Visual Studio Code interface. The code editor shows a Python script with the following code:

```
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
```

An error message box is displayed, stating:

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

The terminal tab is selected at the bottom, showing the error message again.

**Output:**

A screenshot of the Visual Studio Code interface. The code editor shows the same Python script, but the loop boundary has been corrected:

```
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])
```

The terminal tab is selected at the bottom, showing the corrected output:

```
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' '57115'
--- 'C:\Users\girug\Downloads\AI\7.2.py'
10
20
30
PS C:\Users\girug\Downloads\AI>
```

The status bar at the bottom right indicates: 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 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 indicates 'Ln 79, Col 1 Spaces: 4 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.