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Batch : 52

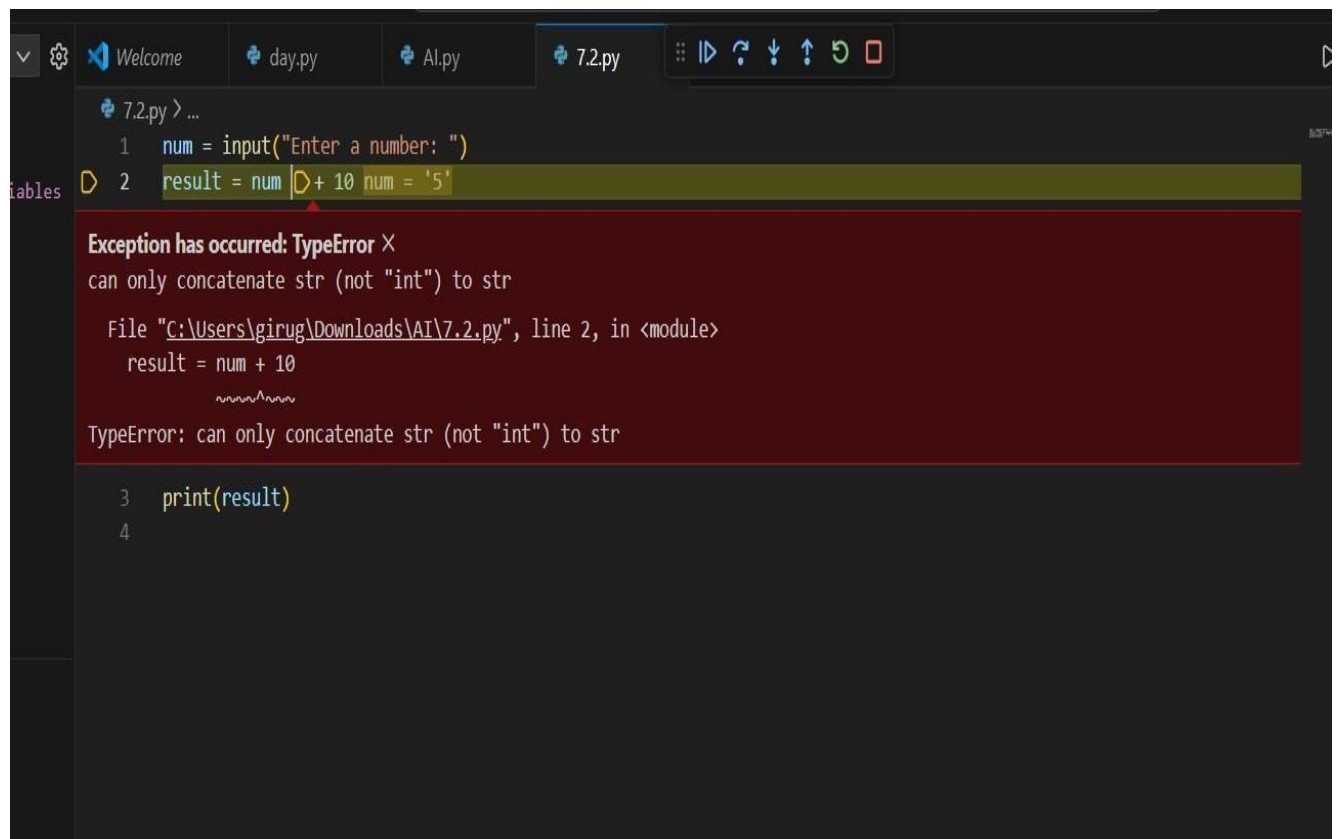
## Lab 7: Error Debugging with AI: Systematic approaches to finding and fixing bugs

### Task 1 – Runtime Error Due to Invalid Input Type

#### Prompt:

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

#### Code :

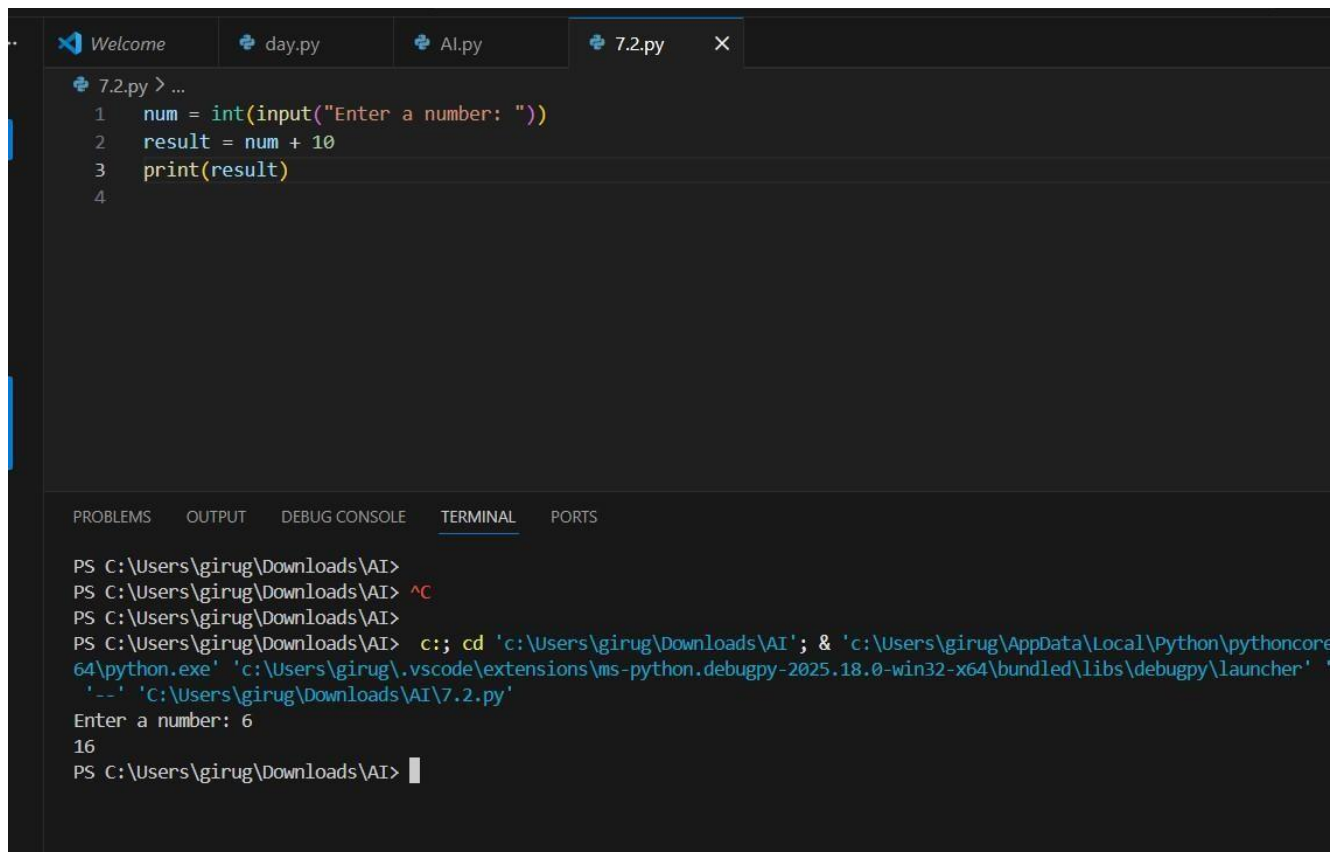
A screenshot of a Python IDE window. The top bar shows several tabs: 'Welcome', 'day.py', 'AI.py', and '7.2.py'. The '7.2.py' tab is active. Below the tabs, the code editor shows two lines of Python code: 

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

 The second line is highlighted. A red arrow points to the '+' operator in the expression 'num + 10'. Below the code editor, a red error message box is displayed. It contains the text: 'Exception has occurred: TypeError X', 'can only concatenate str (not "int") to str', 'File "C:\Users\girug\Downloads\AI\7.2.py", line 2, in <module>', 'result = num + 10', and 'TypeError: can only concatenate str (not "int") to str'. The code editor continues with lines 3 and 4: 

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

#### Output:



The image shows a Visual Studio Code editor window with a dark theme. The top bar displays four tabs: 'Welcome', 'day.py', 'AI.py', and '7.2.py'. The '7.2.py' tab is active, showing a Python script with four lines of code:

```
1 num = int(input("Enter a number: "))
2 result = num + 10
3 print(result)
4
```

Below the editor, the 'TERMINAL' panel is open, showing the command prompt output. The prompt is 'PS C:\Users\girug\Downloads\AI>'. The user has entered '^C' to clear the screen. Then, the user has entered a command to run the script: 'c::; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore64\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''. The output shows 'Enter a number: 6' and '16'.

**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-3.14-64\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-3.14-64\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-3.14-64\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> 
```

Ln 30, Col 15

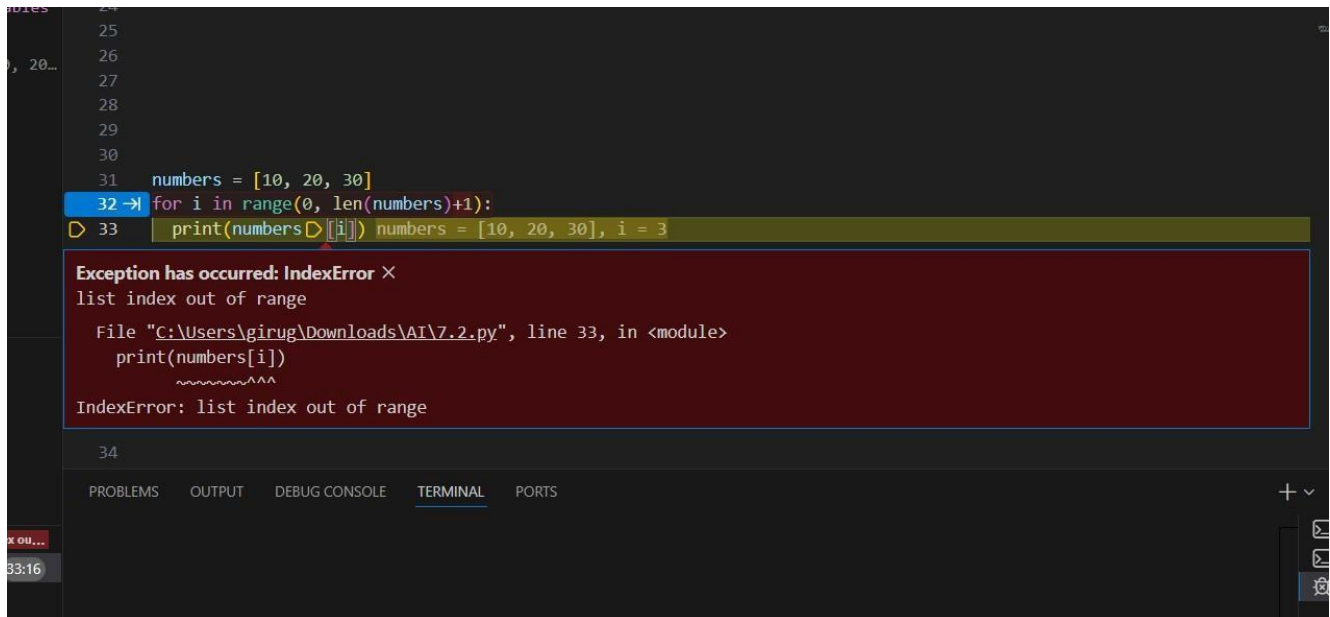
## Justification:

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 IDE with a dark theme. The editor displays 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 exception dialog box is open, displaying the following error message:

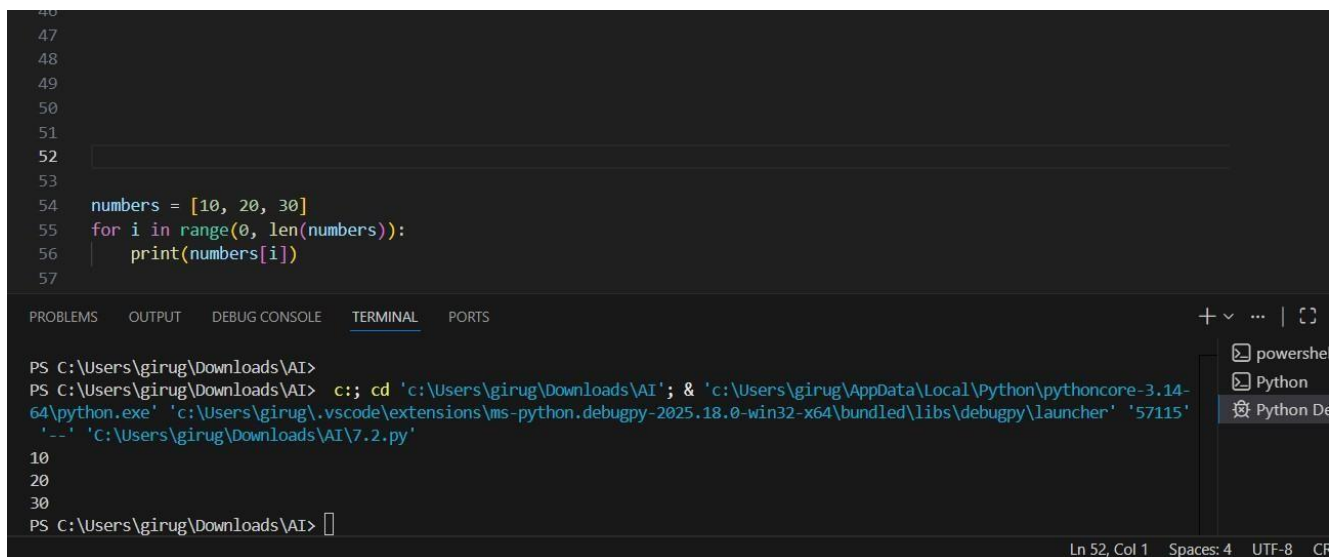
```
Exception has occurred: IndexError ×
list index out of range

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

The bottom of the IDE shows the 'TERMINAL' tab with the following output:

```
34
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
33:16
```

#### Output:



The screenshot shows a Python IDE with a dark theme. The editor displays the following code:

```
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
```

The bottom of the IDE shows the 'TERMINAL' tab with the following 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\bundle\libs\debugpy\launcher' '57115'
'-' 'c:\Users\girug\Downloads\AI\7.2.py'
10
20
30
PS C:\Users\girug\Downloads\AI>
```

#### 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 :**

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

**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

**Output:**

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

PROBLEMS OUTPUT DEBUG CONSOLE **TERMINAL** PORTS

```
'--' 'C:\Users\girug\Downloads\AI\7.2.py'
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\bundle\libs\debugpy\launcher' '63589'
'--' 'C:\Users\girug\Downloads\AI\7.2.py'
0
PS C:\Users\girug\Downloads\AI> 
```

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 = "C"
85 else:
86     grade = "B"
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'
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'
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.