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Batch : 52

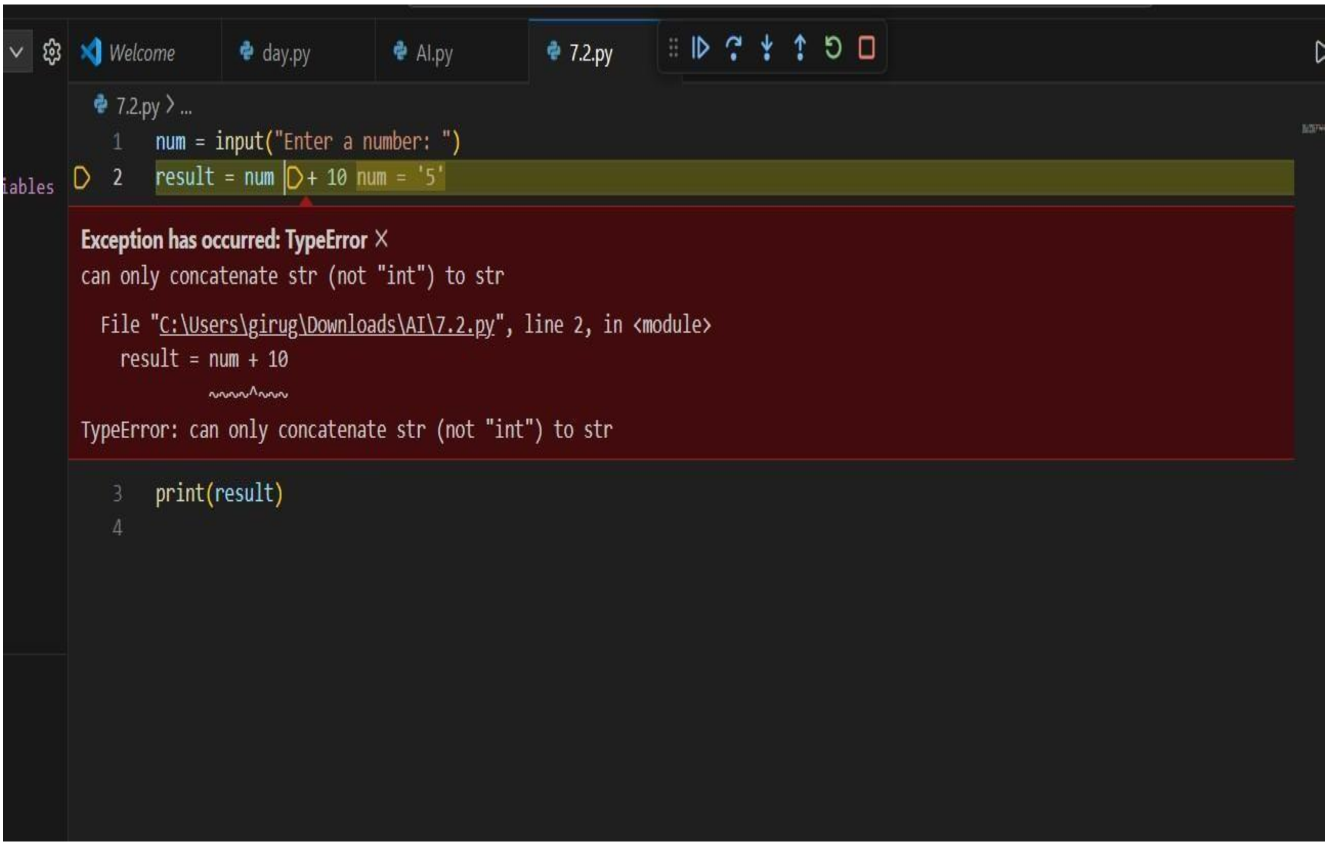
Lab 7: Error Debugging with AI: Systematic approaches to finding and fixing bugs

Task 1 – Runtime Error Due to Invalid Input Type

Prompt:

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

Code :

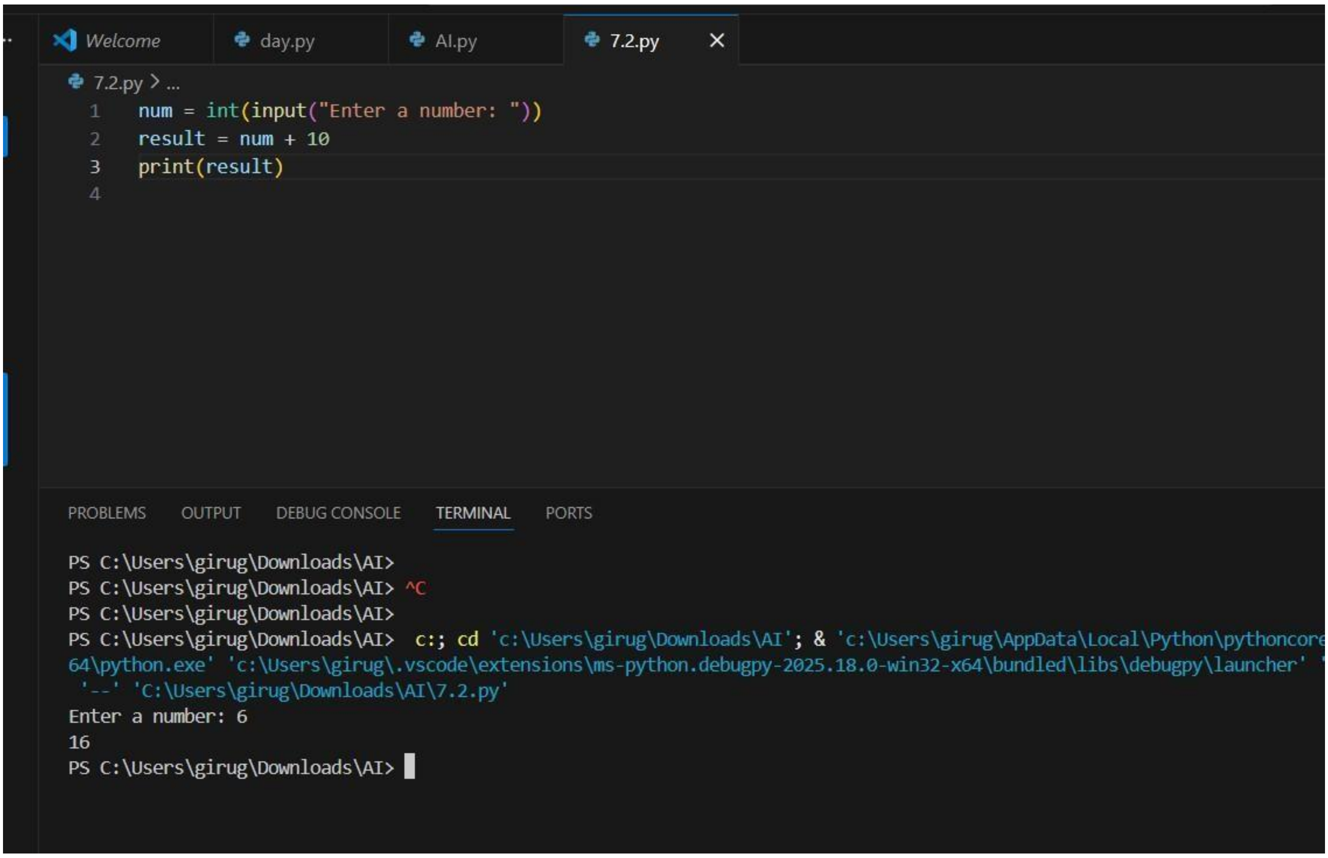


```
num = input("Enter a number: ")
result = num + 10 num = '5'
```

```
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
```

```
print(result)
```

Output:



```python
num = int(input("Enter a number: "))
result = num + 10
print(result)
```

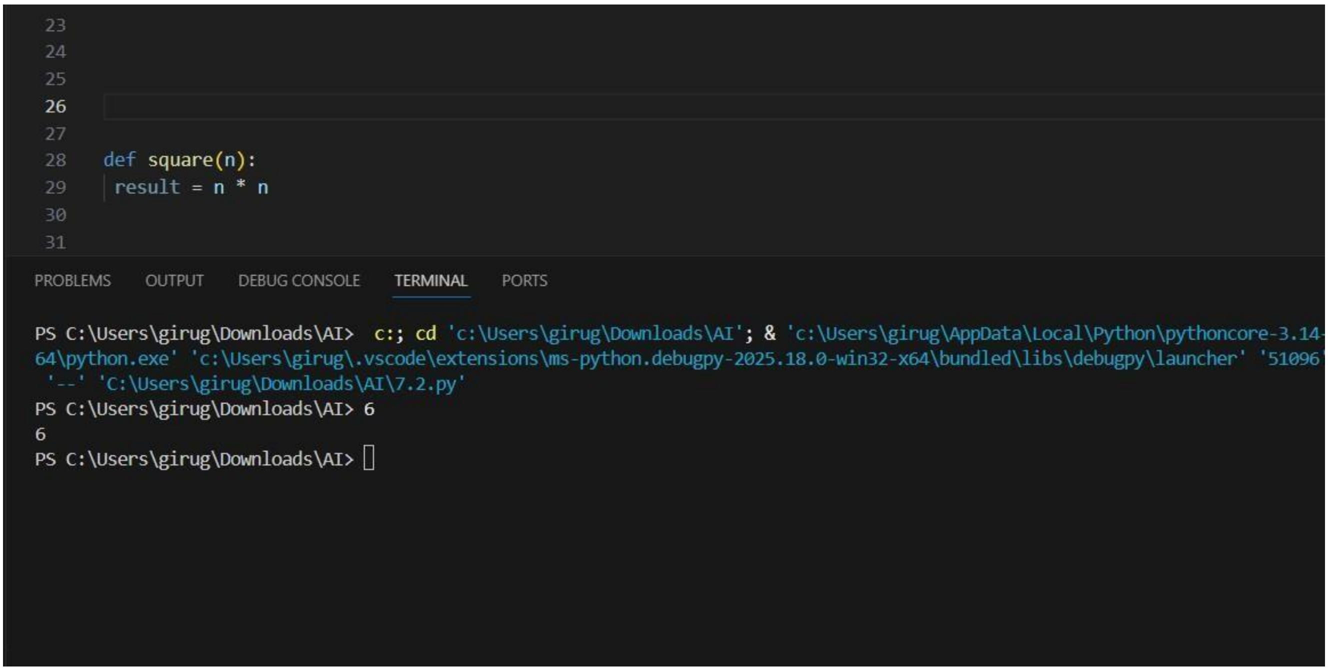
```
PS C:\Users\girug\Downloads\AI>
PS C:\Users\girug\Downloads\AI> ^C
PS C:\Users\girug\Downloads\AI>
PS C:\Users\girug\Downloads\AI>  c:; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore
64\python.exe' 'c:\Users\girug\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher'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

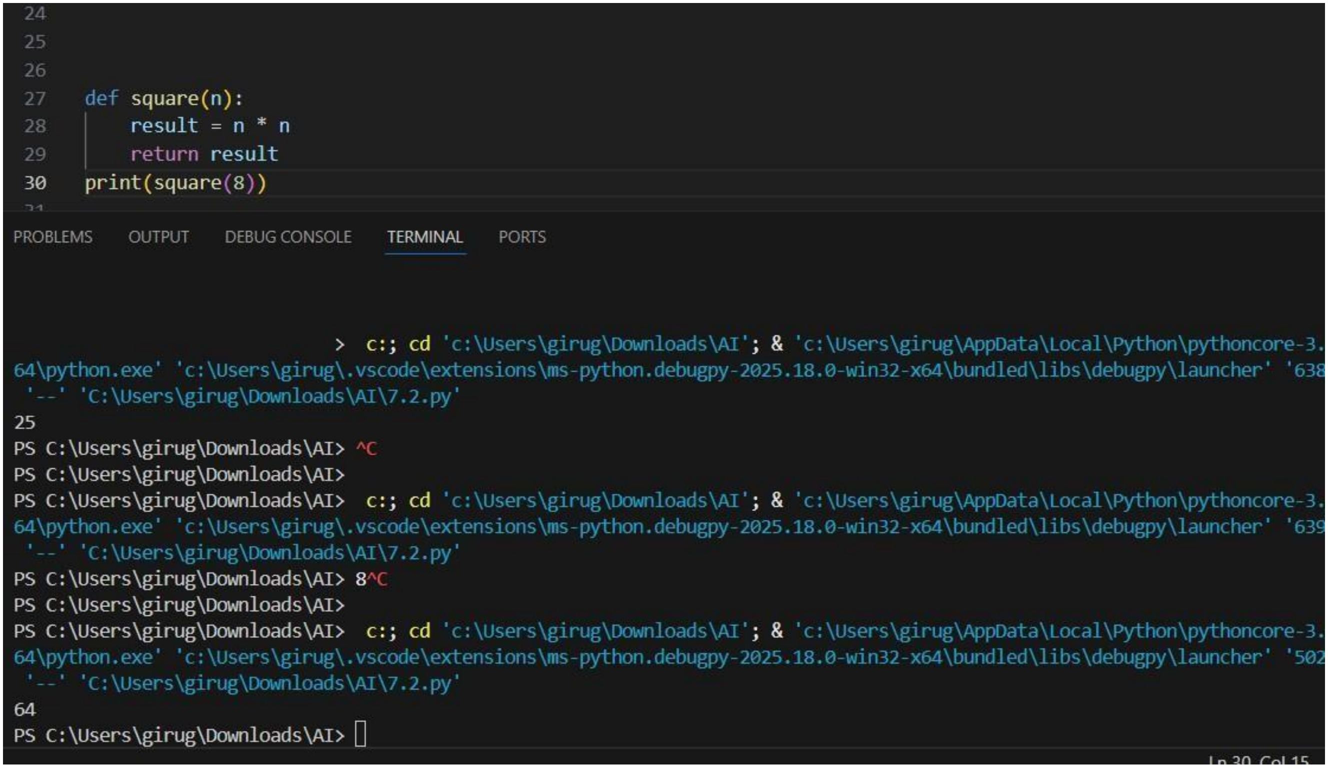
Code :



```python
def square(n):
 result = n * n
```

```
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:



```python
def square(n):
    result = n * n
    return result
print(square(8))
```

```
                                > c:; cd 'c:\Users\girug\Downloads\AI'; & 'c:\Users\girug\AppData\Local\Python\pythoncore-3.
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.
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.
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> 
```

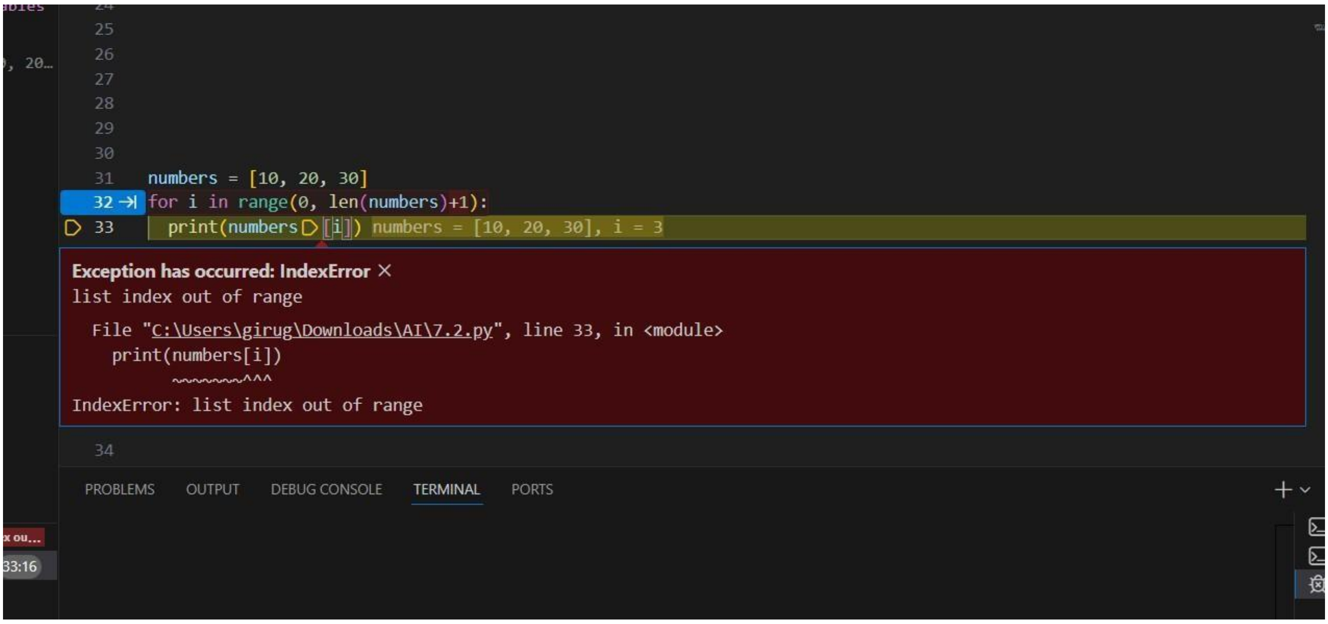
Justification:

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.

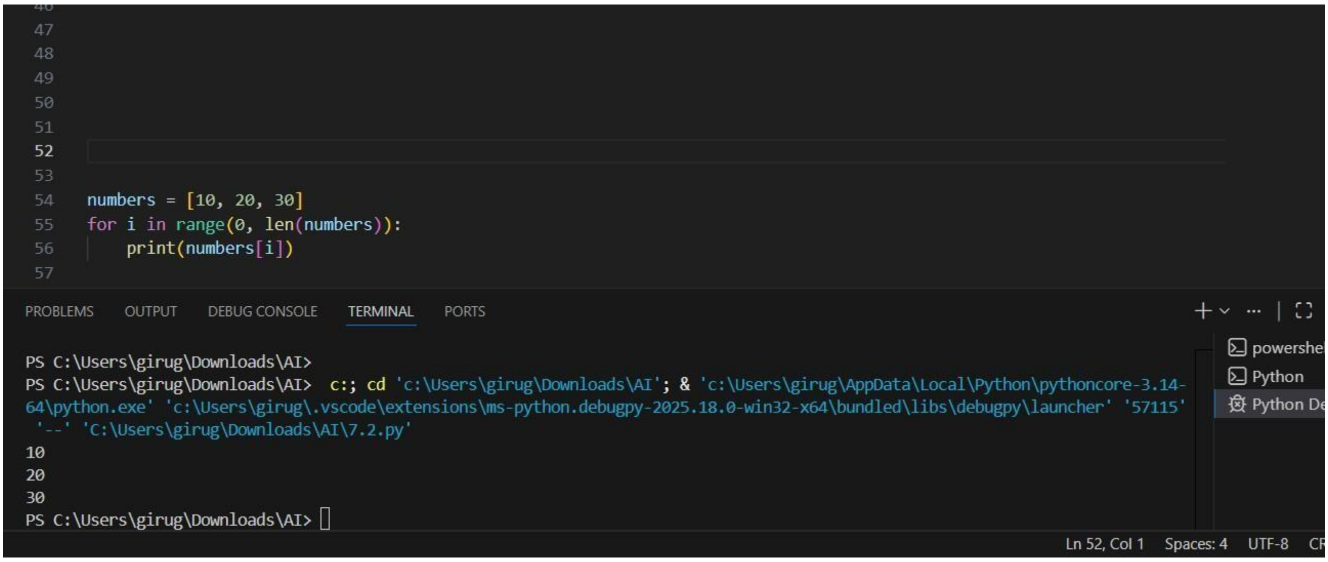
Code :



```
numbers = [10, 20, 30]
for i in range(0, len(numbers)+1):
    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
```

Output:



```
numbers = [10, 20, 30]
for i in range(0, len(numbers)):
    print(numbers[i])
```

```
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> 
```

Justification:

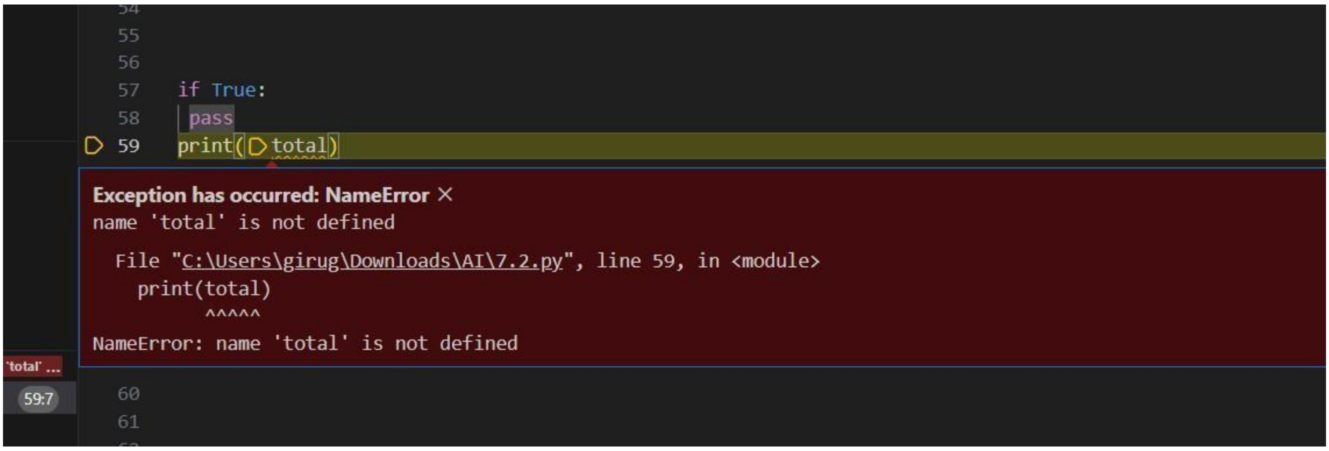
The loop incorrectly iterated one step beyond the valid index range using len(numbers) + 1, causing an IndexError. AI fixed the boundary to range(len(numbers)), ensuring safe access of all existing list elements. This correction is justified because valid indices only go from 0 to len(numbers)-1.

Task 4 – Uninitialized Variable Usage

Prompt :

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

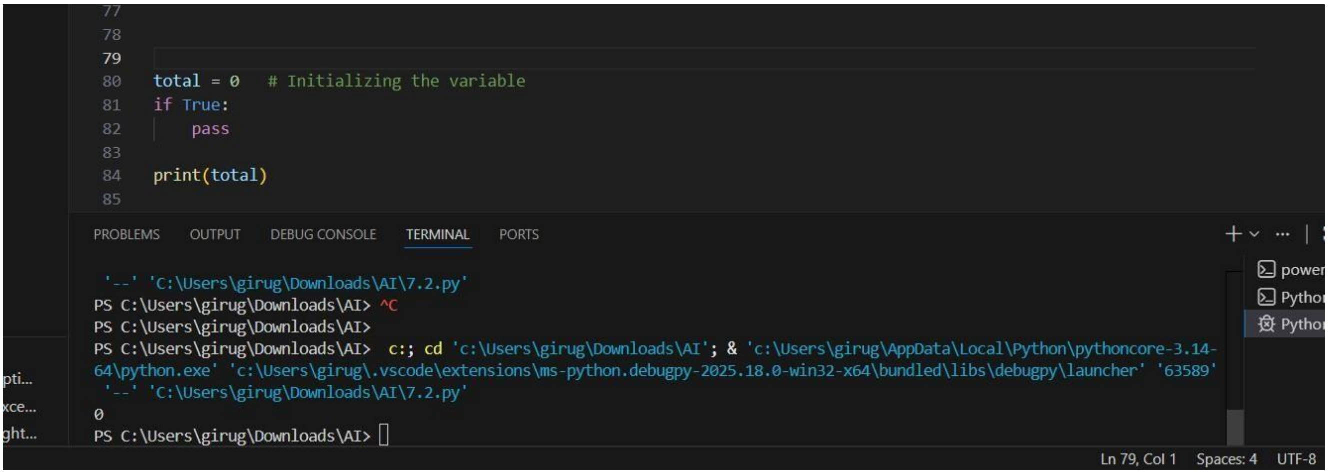
Code :



```
if True:
    pass
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:



```
total = 0   # Initializing the variable
if True:
    pass

print(total)
```

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

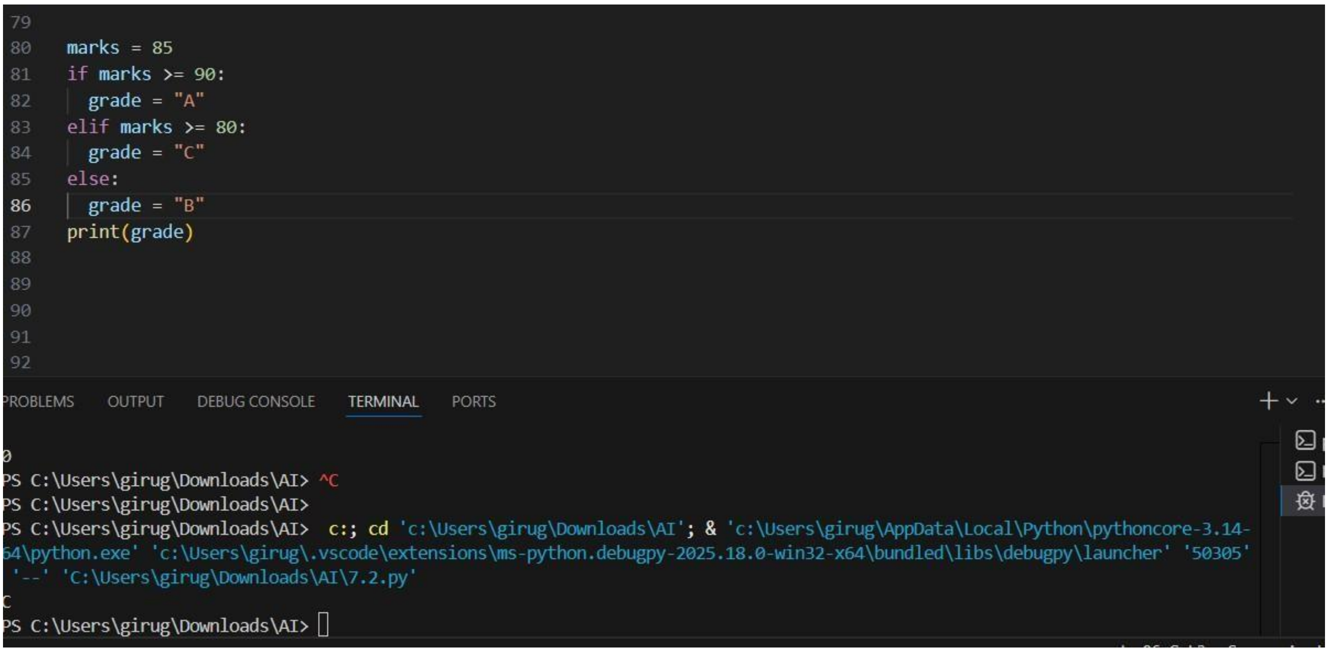
Justification:

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 :

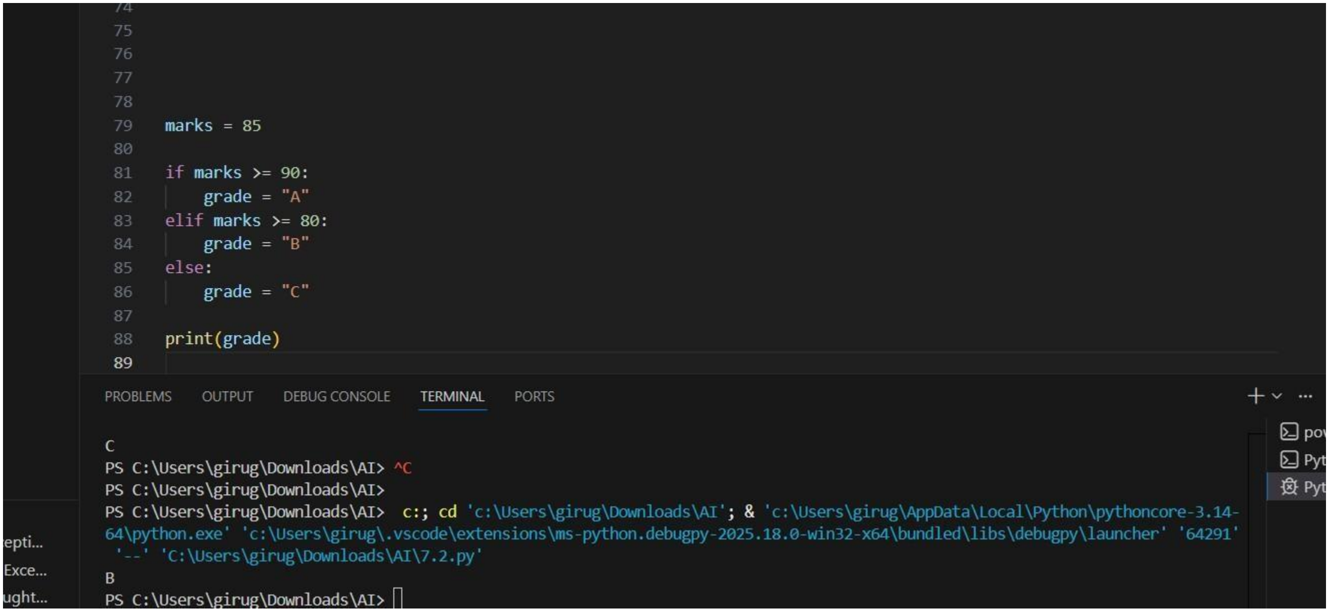


```python

marks = 85
if marks >= 90:
    grade = "A"
elif marks >= 80:
    grade = "C"
else:
    grade = "B"
print(grade)
```

```
0
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:



```python
marks = 85

if marks >= 90:
    grade = "A"
elif marks >= 80:
    grade = "B"
else:
    grade = "C"

print(grade)
```

```
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.