ASSIGNMENT-10.1

Name: B.Bhargava Chary

H.No: 2303A51747

Batch-24

Task Description #1 – Syntax and Logic Errors

Task: Use AI to identify and fix syntax and logic errors in a faulty Python script.

Sample Input Code:

# Calculate average score of a student def

calc_average(marks):

total = 0 for m

in marks:

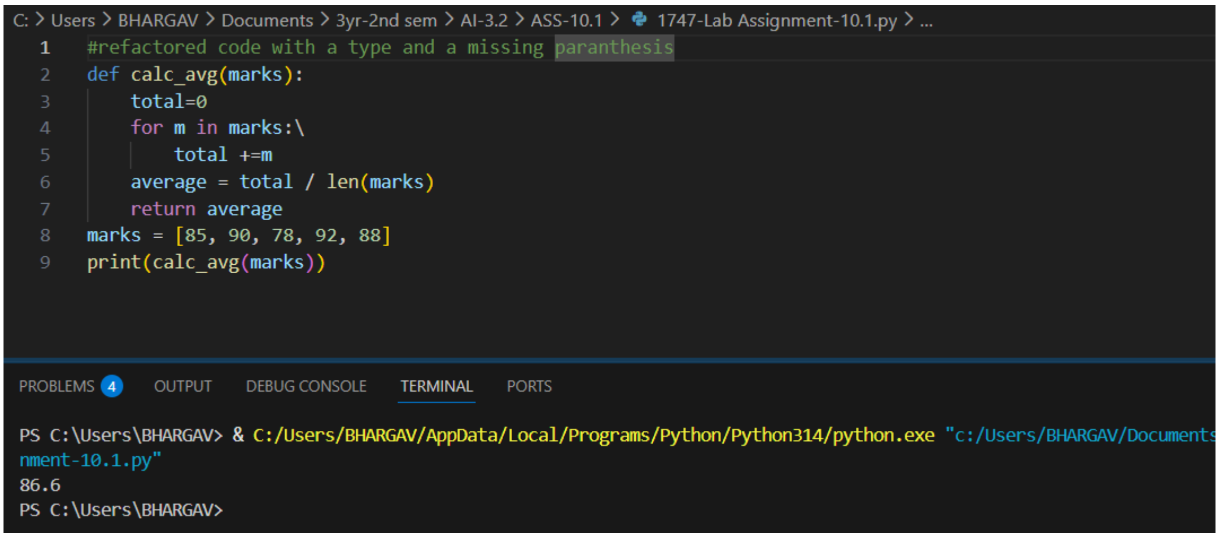
total += m average = total / len(marks) return

avrage # Typo here marks = [85, 90, 78, 92]

print("Average Score is ", calc_average(marks)

Expected Output:

• Corrected and runnable Python code with explanations of the fixes.



C: > Users > BHARGAV > Documents > 3yr-2nd sem > AI-3.2 > ASS-10.1 > 1747-Lab Assignment-10.1.py > ...

```python
#refactored code with a type and a missing paranthesis
def calc_avg(marks):
    total=0
    for m in marks:\
        total +=m
    average = total / len(marks)
    return average
marks = [85, 90, 78, 92, 88]
print(calc_avg(marks))
```

```
PS C:\Users\BHARGAV> & C:/Users/BHARGAV/AppData/Local/Programs/Python/Python314/python.exe "c:/Users/BHARGAV/Documents
nment-10.1.py"
86.6
PS C:\Users\BHARGAV>
```

Task Description #2 – PEP 8 Compliance

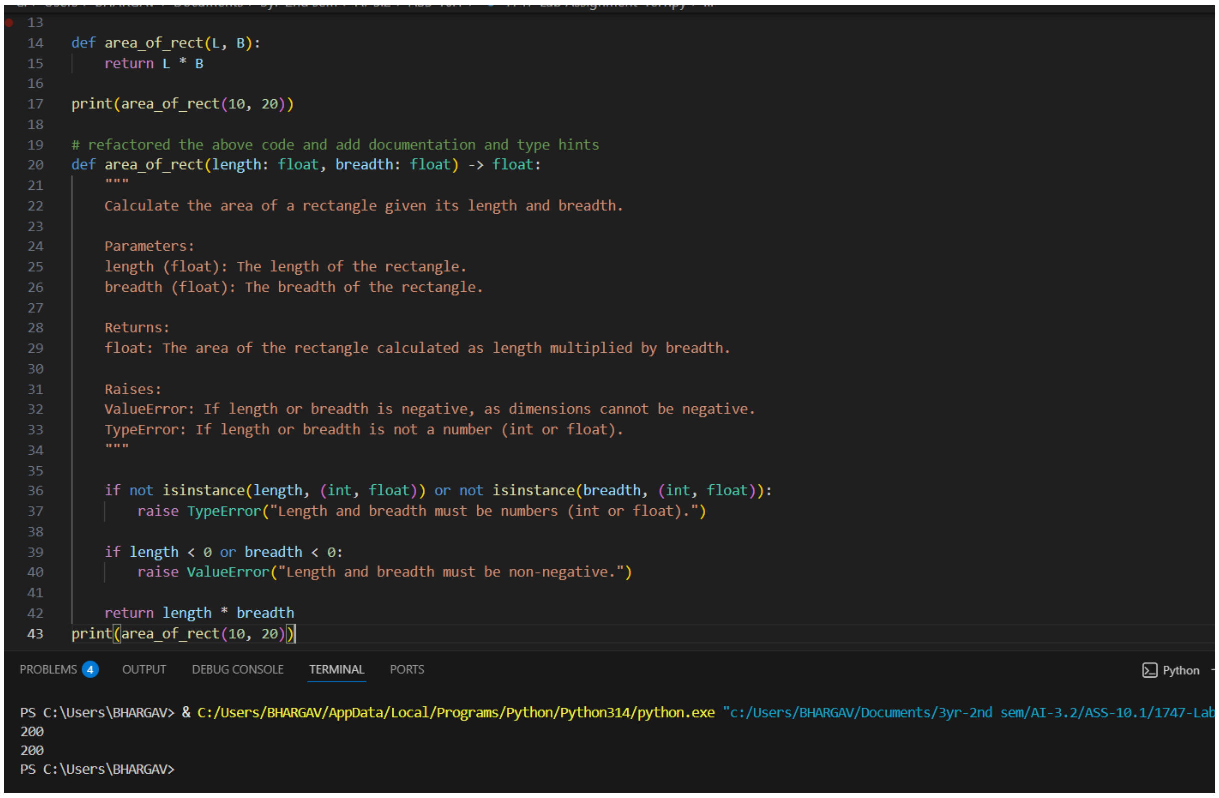
Task: Use AI to refactor Python code to follow PEP 8 style guidelines.

Sample Input Code:

def area_of_rect(L,B) : return L*B print(area_of_rect(10,20))

Expected Output:

• Well-formatted PEP 8-compliant Python code.



```python

def area_of_rect(L, B):
    return L * B

print(area_of_rect(10, 20))

# refactored the above code and add documentation and type hints
def area_of_rect(length: float, breadth: float) -> float:
    """
    Calculate the area of a rectangle given its length and breadth.

    Parameters:
    length (float): The length of the rectangle.
    breadth (float): The breadth of the rectangle.

    Returns:
    float: The area of the rectangle calculated as length multiplied by breadth.

    Raises:
    ValueError: If length or breadth is negative, as dimensions cannot be negative.
    TypeError: If length or breadth is not a number (int or float).
    """

    if not isinstance(length, (int, float)) or not isinstance(breadth, (int, float)):
        raise TypeError("Length and breadth must be numbers (int or float).")

    if length < 0 or breadth < 0:
        raise ValueError("Length and breadth must be non-negative.")

    return length * breadth
print(area_of_rect(10, 20))
```

PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL PORTS Python

```
PS C:\Users\BHARGAV> & C:/Users/BHARGAV/AppData/Local/Programs/Python/Python314/python.exe "c:/Users/BHARGAV/Documents/3yr-2nd sem/AI-3.2/ASS-10.1/1747-Lab
200
200
PS C:\Users\BHARGAV>
```

Task Description #3 – Readability Enhancement

Task: Use AI to make code more readable without changing its

logic.

Sample Input Code:

def c(x,y):

return x*y/100

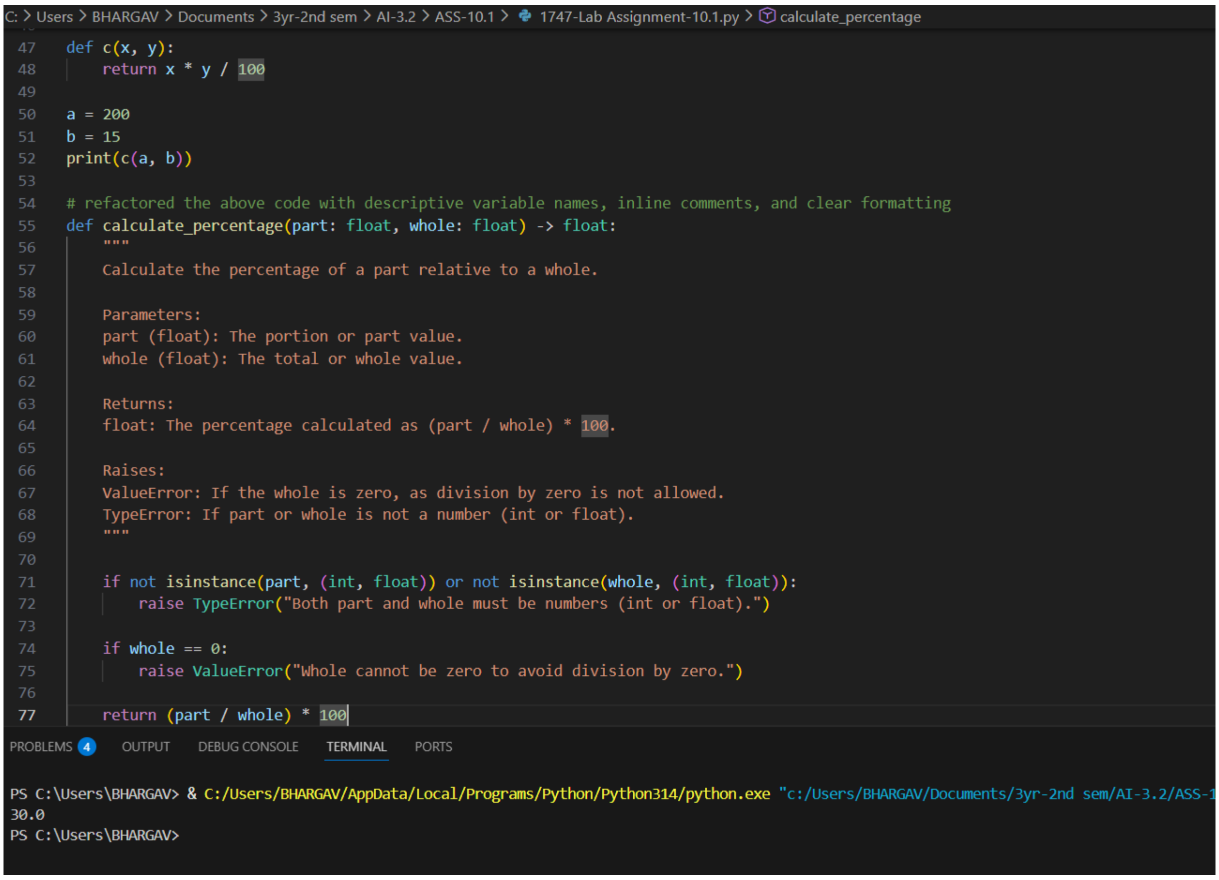
a=200 b=15

print(c(a,b))

Expected Output:

• Python code with descriptive variable names, inline comments,

and clear formatting.


C: > Users > BHARGAV > Documents > 3yr-2nd sem > AI-3.2 > ASS-10.1 > 1747-Lab Assignment-10.1.py > calculate_percentage
PROBLEMS 4
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS

```python
def c(x, y):
    return x * y / 100

a = 200
b = 15
print(c(a, b))

# refactored the above code with descriptive variable names, inline comments, and clear formatting
def calculate_percentage(part: float, whole: float) -> float:
    """
    Calculate the percentage of a part relative to a whole.

    Parameters:
    part (float): The portion or part value.
    whole (float): The total or whole value.

    Returns:
    float: The percentage calculated as (part / whole) * 100.

    Raises:
    ValueError: If the whole is zero, as division by zero is not allowed.
    TypeError: If part or whole is not a number (int or float).
    """

    if not isinstance(part, (int, float)) or not isinstance(whole, (int, float)):
        raise TypeError("Both part and whole must be numbers (int or float).")

    if whole == 0:
        raise ValueError("Whole cannot be zero to avoid division by zero.")

    return (part / whole) * 100
```

```
PS C:\Users\BHARGAV> & C:/Users/BHARGAV/AppData/Local/Programs/Python/Python314/python.exe "c:/Users/BHARGAV/Documents/3yr-2nd sem/AI-3.2/ASS-1
30.0
PS C:\Users\BHARGAV>
```

Task Description #4 – Refactoring for Maintainability

Task: Use AI to break repetitive or long code into reusable

functions. Sample Input Code:

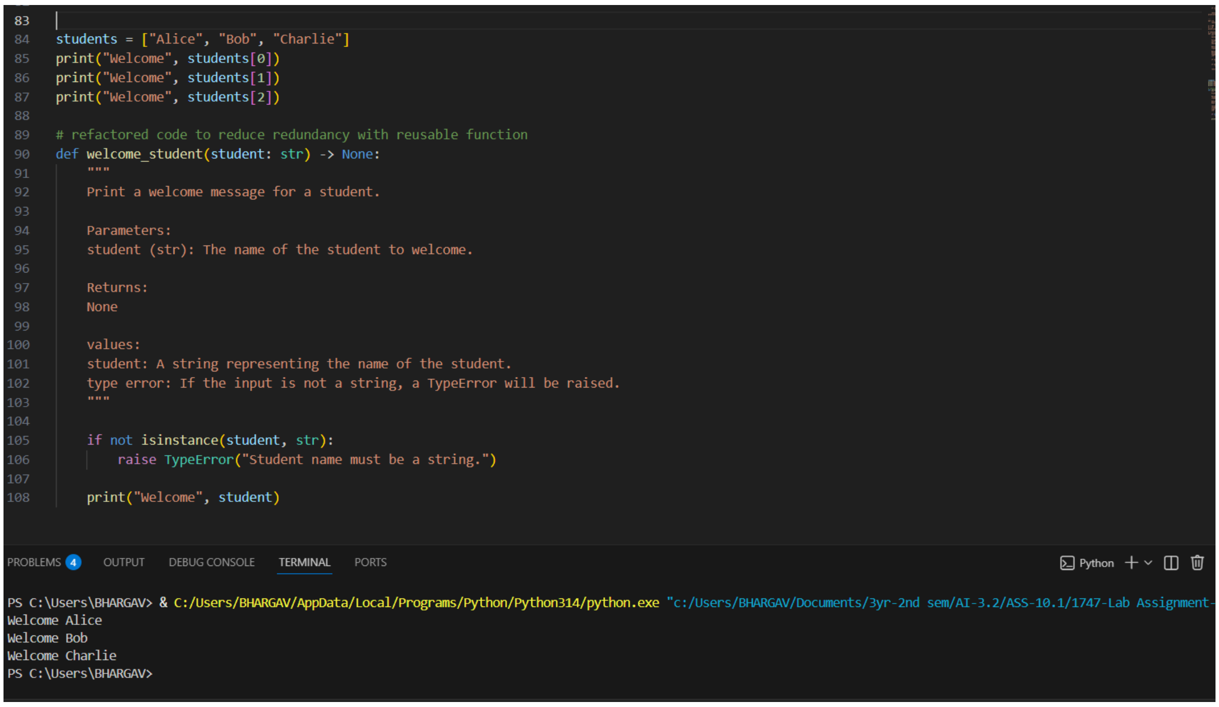
students = ["Alice", "Bob", "Charlie"]

print("Welcome", students[0]) print("Welcome",

students[1]) print("Welcome", students[2])

Expected Output:

• Modular code with reusable functions.



```python

students = ["Alice", "Bob", "Charlie"]
print("Welcome", students[0])
print("Welcome", students[1])
print("Welcome", students[2])

# refactored code to reduce redundancy with reusable function
def welcome_student(student: str) -> None:
    """
    Print a welcome message for a student.

    Parameters:
    student (str): The name of the student to welcome.

    Returns:
    None

    values:
    student: A string representing the name of the student.
    type error: If the input is not a string, a TypeError will be raised.
    """

    if not isinstance(student, str):
        raise TypeError("Student name must be a string.")

    print("Welcome", student)
```

```
PS C:\Users\BHARGAV> & C:/Users/BHARGAV/AppData/Local/Programs/Python/Python314/python.exe "c:/Users/BHARGAV/Documents/3yr-2nd sem/AI-3.2/ASS-10.1/1747-Lab Assignment-
Welcome Alice
Welcome Bob
Welcome Charlie
PS C:\Users\BHARGAV>
```

Task Description #5 – Performance Optimization

Task: Use AI to make the code run faster.

Sample Input Code: # Find squares

of numbers nums = [i for i in

range(1,1000000)] squares = [] for

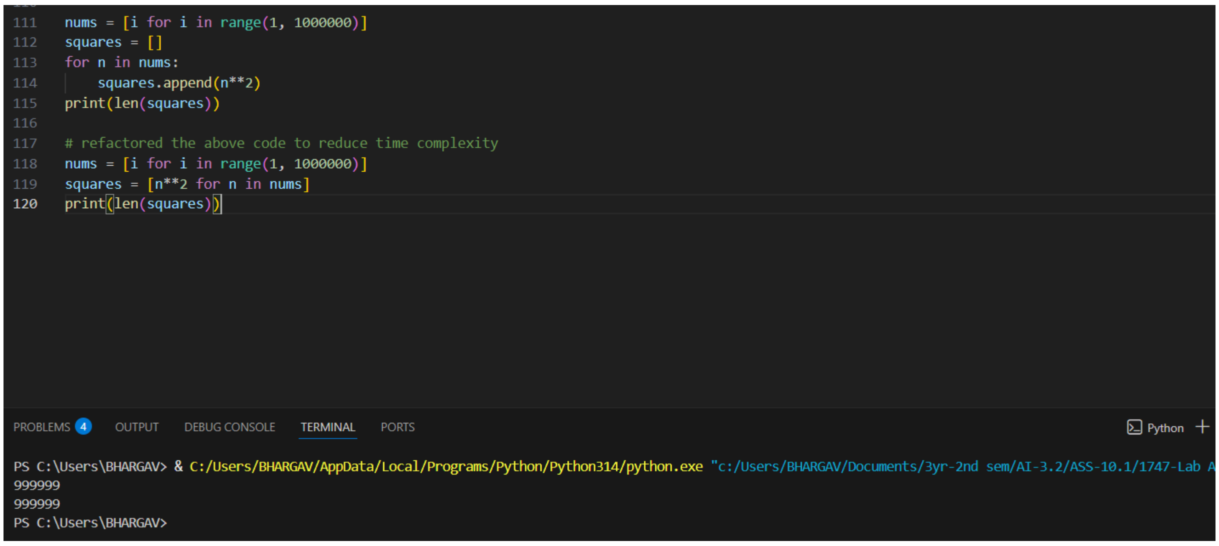
n in nums:

squares.append(n**2)

print(len(squares))

Expected Output:

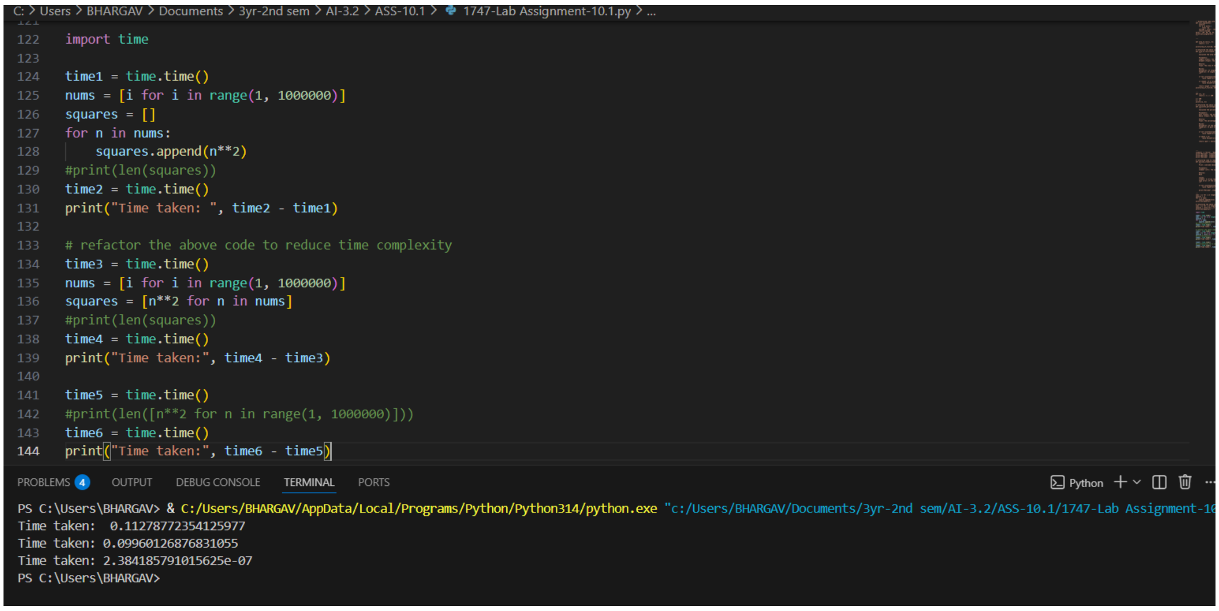
• Optimized code using list comprehensions or vectorized operations.



```python
nums = [i for i in range(1, 1000000)]
squares = []
for n in nums:
    squares.append(n**2)
print(len(squares))

# refactored the above code to reduce time complexity
nums = [i for i in range(1, 1000000)]
squares = [n**2 for n in nums]
print(len(squares))
```

```
PS C:\Users\BHARGAV> & C:/Users/BHARGAV/AppData/Local/Programs/Python/Python314/python.exe "c:/Users/BHARGAV/Documents/3yr-2nd sem/AI-3.2/ASS-10.1/1747-Lab A
999999
999999
PS C:\Users\BHARGAV>
```



C: > Users > BHARGAV > Documents > 3yr-2nd sem > AI-3.2 > ASS-10.1 > 1747-Lab Assignment-10.1.py > ...

```python
import time

time1 = time.time()
nums = [i for i in range(1, 1000000)]
squares = []
for n in nums:
    squares.append(n**2)
#print(len(squares))
time2 = time.time()
print("Time taken: ", time2 - time1)

# refactor the above code to reduce time complexity
time3 = time.time()
nums = [i for i in range(1, 1000000)]
squares = [n**2 for n in nums]
#print(len(squares))
time4 = time.time()
print("Time taken:", time4 - time3)

time5 = time.time()
#print(len([n**2 for n in range(1, 1000000)]))
time6 = time.time()
print("Time taken:", time6 - time5)
```

```
PS C:\Users\BHARGAV> & C:/Users/BHARGAV/AppData/Local/Programs/Python/Python314/python.exe "c:/Users/BHARGAV/Documents/3yr-2nd sem/AI-3.2/ASS-10.1/1747-Lab Assignment-10
Time taken:  0.11278772354125977
Time taken: 0.09960126876831055
Time taken: 2.384185791015625e-07
PS C:\Users\BHARGAV>
```

Task Description #6 – Complexity Reduction

Task: Use AI to simplify overly complex logic.

Sample Input Code:

def grade(score): if

score >= 90: return

"A" else:

if score >= 80: return

"B"

else:

if score >= 70: return

"C"

else: if score

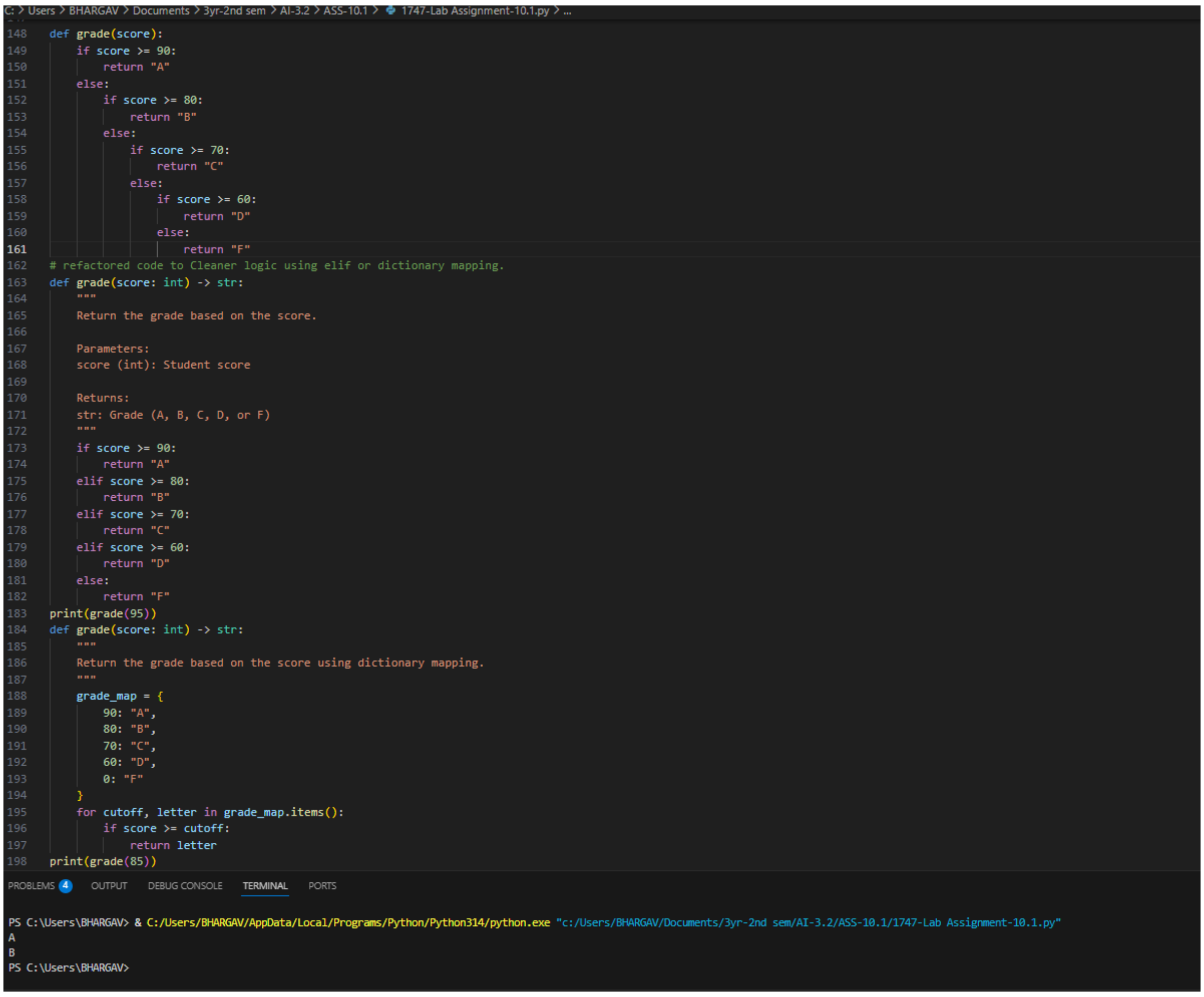
>= 60: return

"D" else:

return "F"

Expected Output:

• Cleaner logic using elif or dictionary mapping.


C: > Users > BHARGAV > Documents > 3yr-2nd sem > AI-3.2 > ASS-10.1 > 1747-Lab Assignment-10.1.py > ...

```python
def grade(score):
    if score >= 90:
        return "A"
    else:
        if score >= 80:
            return "B"
        else:
            if score >= 70:
                return "C"
            else:
                if score >= 60:
                    return "D"
                else:
                    return "F"
# refactored code to Cleaner logic using elif or dictionary mapping.
def grade(score: int) -> str:
    """
    Return the grade based on the score.

    Parameters:
    score (int): Student score

    Returns:
    str: Grade (A, B, C, D, or F)
    """
    if score >= 90:
        return "A"
    elif score >= 80:
        return "B"
    elif score >= 70:
        return "C"
    elif score >= 60:
        return "D"
    else:
        return "F"
print(grade(95))
def grade(score: int) -> str:
    """
    Return the grade based on the score using dictionary mapping.
    """
    grade_map = {
        90: "A",
        80: "B",
        70: "C",
        60: "D",
        0: "F"
    }
    for cutoff, letter in grade_map.items():
        if score >= cutoff:
            return letter
print(grade(85))
```

```
PS C:\Users\BHARGAV> & C:/Users/BHARGAV/AppData/Local/Programs/Python/Python314/python.exe "c:/Users/BHARGAV/Documents/3yr-2nd sem/AI-3.2/ASS-10.1/1747-Lab Assignment-10.1.py"
A
B
PS C:\Users\BHARGAV>
```