SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE		**DEPARTMENT OF COMPUTER SCIENCE ENGINEERING**	
ProgramName:M. Tech	**AssignmentType: Lab**		**AcademicYear:**2025-2026
CourseCoordinatorName	Venkataramana Veeramsetty		
CourseCode		**CourseTitle**	AI Assisted Problem Solving Using Python
Year/Sem	II/I	**Regulation**	R24
DateandDay of Assignment	Week5 - Monday	**Time(s)**	
Duration	2 Hours	**Applicableto Batches**	
AssignmentNumber:10.1(Presentassignmentnumber)/**24**(Totalnumberofassignments)			

Q.No.	**Question**	***ExpectedTime to complete***
1		Week5 - Monday

Lab 10 – Code Review and Quality: Using AI to Improve Code Quality and Readability

Lab Objectives

- Use AI for automated code review and quality enhancement.
- Identify and fix syntax, logical, performance, and security issues in Python code.
- Improve readability and maintainability through structured refactoring and comments.
- Apply prompt engineering for targeted improvements.
- Evaluate AI-generated suggestions against PEP 8 standards and software engineering best practices

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Task Description #1 – Refactor Nested Conditionals

Task: Provide AI with the following nested conditional code and ask it to simplify and refactor for readability.

Python script.

```
def discount(price, category):
    if category == "student":
        if price > 1000:
            return price * 0.9
        else:
            return price * 0.95
    else:
        if price > 2000:
            return price * 0.85
    else:
        return price
```

Expected Output:

- Refactored code using cleaner logic, possibly a dictionary or separate helper functions.

Task Description #2 – Optimize Redundant Loops

Task: Give AI this messy loop and ask it to refactor and optimize.

Python script

```
def find_common(a, b):
    res = []
    for i in a:
        for j in b:
            if i == j:
                res.append(i)
    return res
```

Expected Output:

Cleaner version using Python sets (set(a) & set(b))

Task Description #3 – Improve Class Design

Task: Provide this class with poor readability and ask AI to improve:

- Naming conventions
- Encapsulation
- Readability & maintainability

Python Script

```
class emp:
    def __init__(self,n,s):
        self.n=n
        self.s=s
    def inc(self,p):
        self.s=self.s+(self.s*p/100)
    def pr(self):
        print("emp:",self.n,"salary:",self.s)
```

Expected Output:

- Employee class with meaningful methods (increase_salary, display_info), formatted output, and added docstrings.

Task Description #4 – Modularize Long Function

Task: Give AI this long unstructured function and let it modularize into smaller helper functions.

Python Script

```
def process_scores(scores):
    total = 0
    for s in scores:
        total += s
    avg = total / len(scores)

    highest = scores[0]
    for s in scores:
        if s > highest:
            highest = s

    lowest = scores[0]
    for s in scores:
        if s < lowest:
            lowest = s

    print("Average:", avg)
    print("Highest:", highest)
    print("Lowest:", lowest)
```

Expected Output:

- Split into functions: calculate_average, find_highest, find_lowest.
- Clean main process_scores() using helper functions.

Task Description #5 – Code Review on Error Handling

Task: Provide AI with this faulty code and ask it to improve error handling, naming, and readability.

Python Script

```
def div(a,b):
    return a/b
print(div(10,0))
```

Expected Output:

- Function with proper error handling using `try-except`.
- Better naming (`divide_numbers`).
- AI-generated docstring explaining error handling.

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.

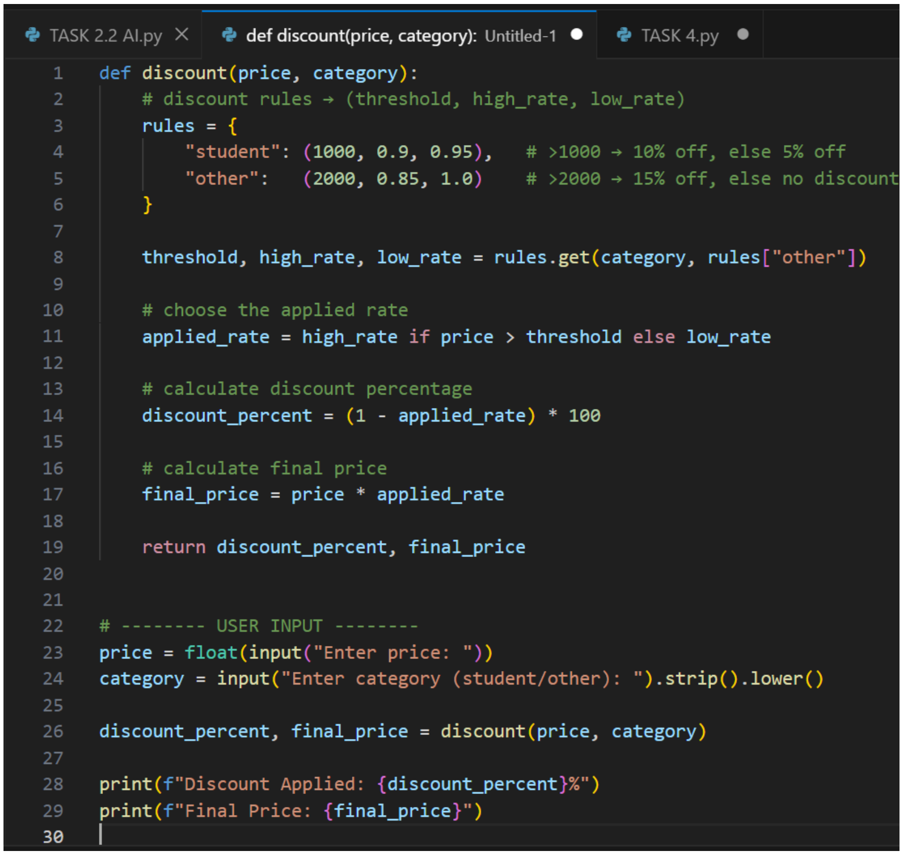
Task Description #1 – Refactor Nested Conditionals

Task: Provide AI with the following nested conditional code and ask it to simplify and refactor for readability.

Python script.

```
def discount(price, category):
    if category == "student":
        if price > 1000:
            return price * 0.9
        else:
            return price * 0.95
    else:
        if price > 2000:
            return price * 0.85
        else:
            return price
```

PROMPT: Refactor the following nested conditional code to make it cleaner and more readable. You may use simplified logic, dictionaries, or helper functions.

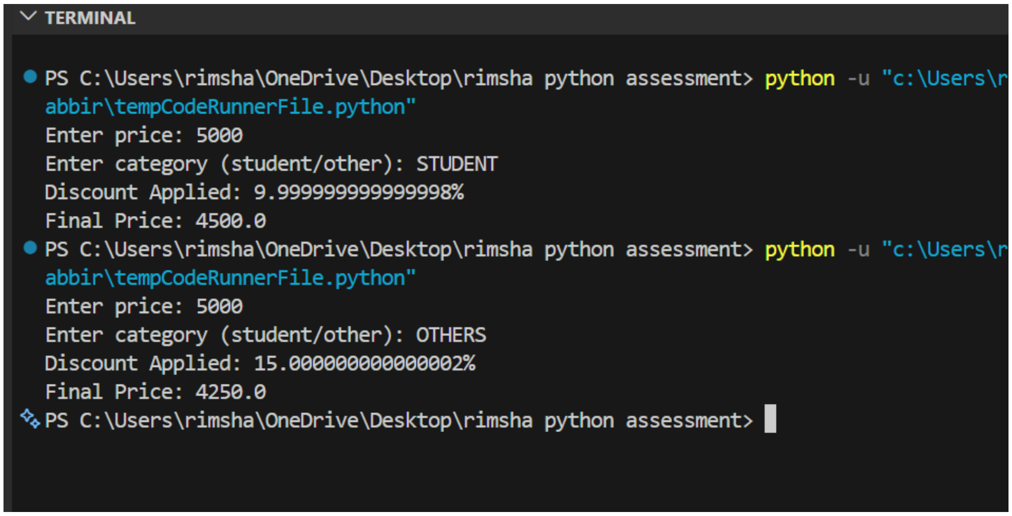


```
def discount(price, category):
    # discount rules → (threshold, high_rate, low_rate)
    rules = {
        "student": (1000, 0.9, 0.95),   # >1000 → 10% off, else 5% off
        "other":   (2000, 0.85, 1.0)    # >2000 → 15% off, else no discount
    }

    threshold, high_rate, low_rate = rules.get(category, rules["other"])

    # choose the applied rate
    applied_rate = high_rate if price > threshold else low_rate

    # calculate discount percentage
    discount_percent = (1 - applied_rate) * 100

    # calculate final price
    final_price = price * applied_rate

    return discount_percent, final_price


# -------- USER INPUT --------
price = float(input("Enter price: "))
category = input("Enter category (student/other): ").strip().lower()

discount_percent, final_price = discount(price, category)

print(f"Discount Applied: {discount_percent}%")
print(f"Final Price: {final_price}")
```

Expected Output:

- Refactored code using cleaner logic, possibly a dictionary or separate helper functions.

PRACTICAL OUTPUT:



```
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment> python -u "c:\Users\r
abbir\tempCodeRunnerFile.python"
Enter price: 5000
Enter category (student/other): STUDENT
Discount Applied: 9.999999999999998%
Final Price: 4500.0
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment> python -u "c:\Users\r
abbir\tempCodeRunnerFile.python"
Enter price: 5000
Enter category (student/other): OTHERS
Discount Applied: 15.000000000000002%
Final Price: 4250.0
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment> 
```

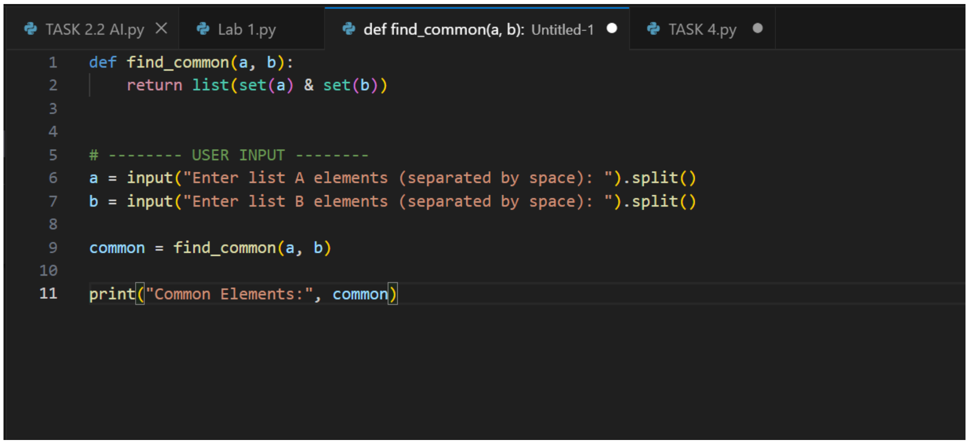
Task Description #2 – Optimize Redundant Loops

Task: Give AI this messy loop and ask it to refactor and optimize.

Python script

```
def find_common(a, b):
    res = []
    for i in a:
        for j in b:
            if i == j:
                res.append(i)
    return res
```

PROMPT: Write a Python program where the user enters two lists. Then optimize the function find_common(a, b) that currently uses nested loops. Refactor it to a cleaner and faster version using sets (set(a) & set(b)). Show both the original and optimized outputs.

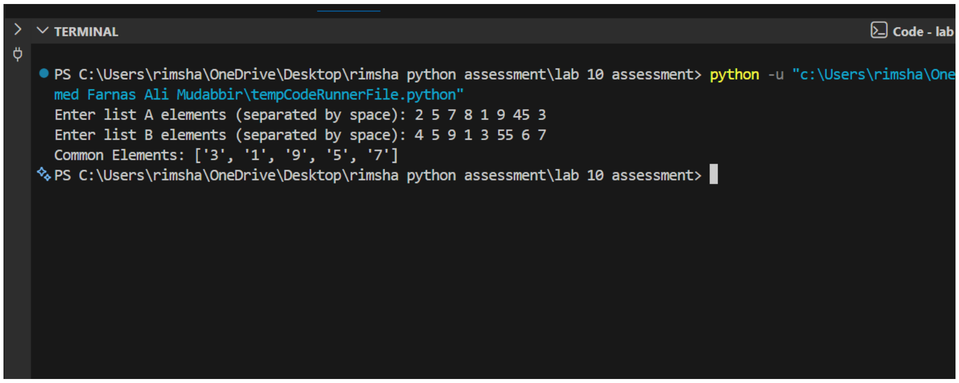


```python
def find_common(a, b):
    return list(set(a) & set(b))


# -------- USER INPUT --------
a = input("Enter list A elements (separated by space): ").split()
b = input("Enter list B elements (separated by space): ").split()

common = find_common(a, b)

print("Common Elements:", common)
```

Expected Output:

Cleaner version using Python sets (set(a) & set(b))

PRACTICAL OUTPUT:



```
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment> python -u "c:\Users\rimsha\One
med Farnas Ali Mudabbir\tempCodeRunnerFile.python"
Enter list A elements (separated by space): 2 5 7 8 1 9 45 3
Enter list B elements (separated by space): 4 5 9 1 3 55 6 7
Common Elements: ['3', '1', '9', '5', '7']
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment>
```

Task Description #3 – Improve Class Design

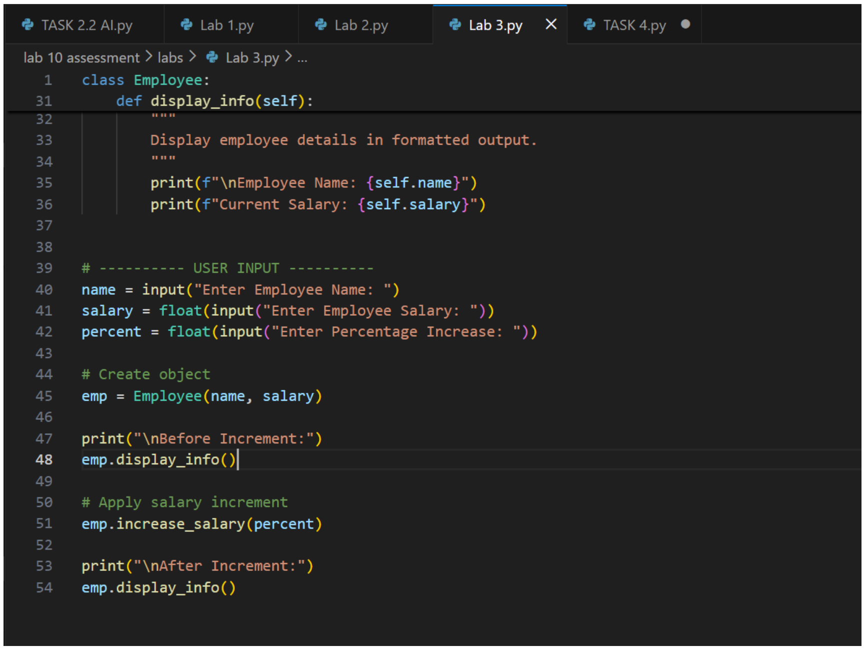
Task: Provide this class with poor readability and ask AI to improve:

- Naming conventions
- Encapsulation
- Readability & maintainability

Python Script

```
class emp:
    def __init__(self,n,s):
        self.n=n
        self.s=s
    def inc(self,p):
        self.s=self.s+(self.s*p/100)
    def pr(self):
        print("emp:",self.n,"salary:",self.s)
```

PROMPT: Write a Python program where the user enters an employee name and salary. Use this poorly written class and improve it:

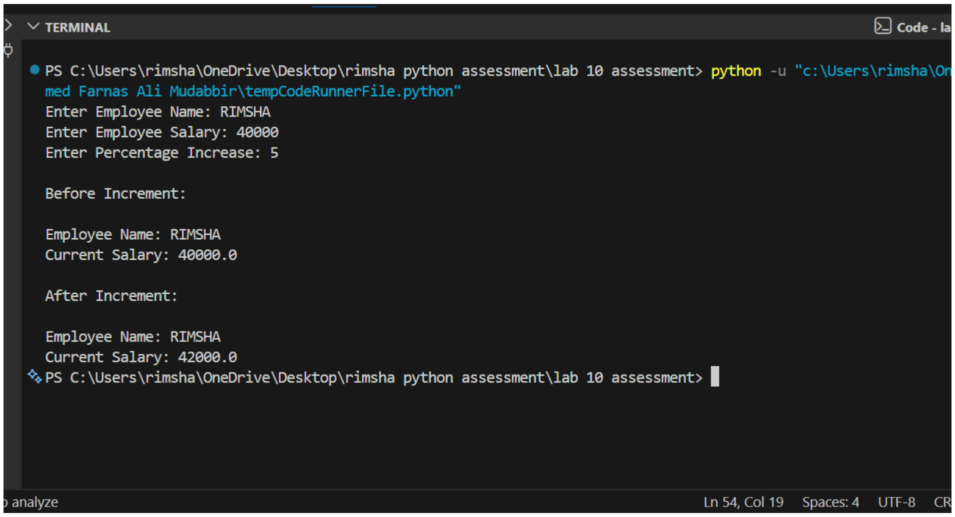


```
class Employee:
    def display_info(self):
        """
        Display employee details in formatted output.
        """
        print(f"\nEmployee Name: {self.name}")
        print(f"Current Salary: {self.salary}")


# ---------- USER INPUT ----------
name = input("Enter Employee Name: ")
salary = float(input("Enter Employee Salary: "))
percent = float(input("Enter Percentage Increase: "))

# Create object
emp = Employee(name, salary)

print("\nBefore Increment:")
emp.display_info()

# Apply salary increment
emp.increase_salary(percent)

print("\nAfter Increment:")
emp.display_info()
```

Expected Output:

Employee class with meaningful methods (increase_salary, display_info), formatted output, and added docstrings

PRACTICAL OUTPUT:



```
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment> python -u "c:\Users\rimsha\On
med Farnas Ali Mudabbir\tempCodeRunnerFile.python"
Enter Employee Name: RIMSHA
Enter Employee Salary: 40000
Enter Percentage Increase: 5

Before Increment:

Employee Name: RIMSHA
Current Salary: 40000.0

After Increment:

Employee Name: RIMSHA
Current Salary: 42000.0
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment>
```

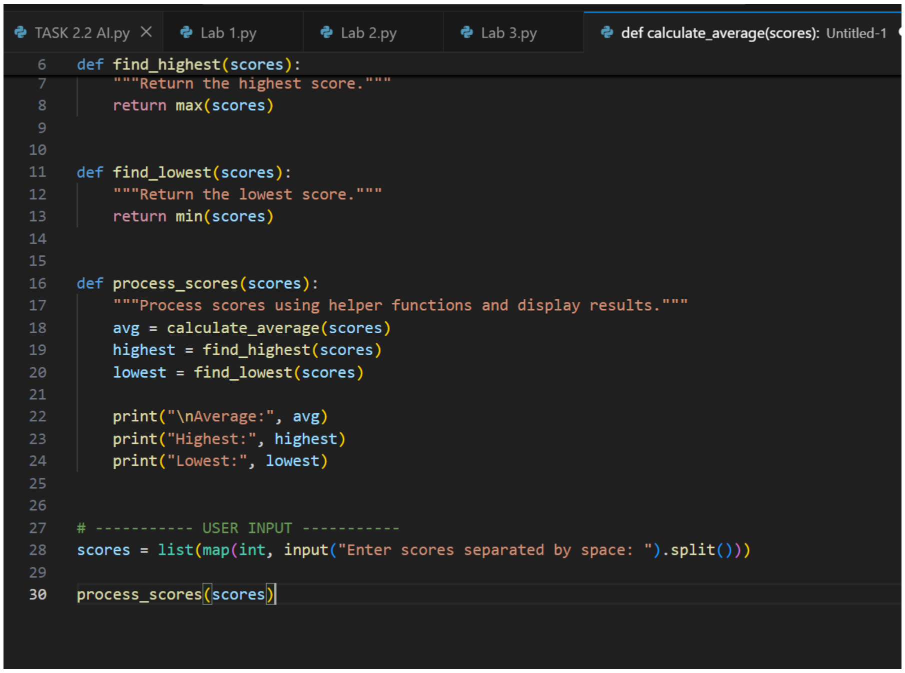
Task Description #4 – Modularize Long Function

Task: Give AI this long unstructured function and let it modularize into smaller helper functions.

Python Script

```
def process_scores(scores):
    total = 0
    for s in scores:
        total += s
    avg = total / len(scores)

    highest = scores[0]
    for s in scores:
        if s > highest:
            highest = s

    lowest = scores[0]
    for s in scores:
        if s < lowest:
            lowest = s

    print("Average:", avg)
    print("Highest:", highest)
    print("Lowest:", lowest)
```

PROMPT: Take user input for a list of scores and refactor the process_scores() function by splitting it into helper functions: calculate_average(), find_highest(), and find_lowest(). Then rewrite the main function using these helpers.



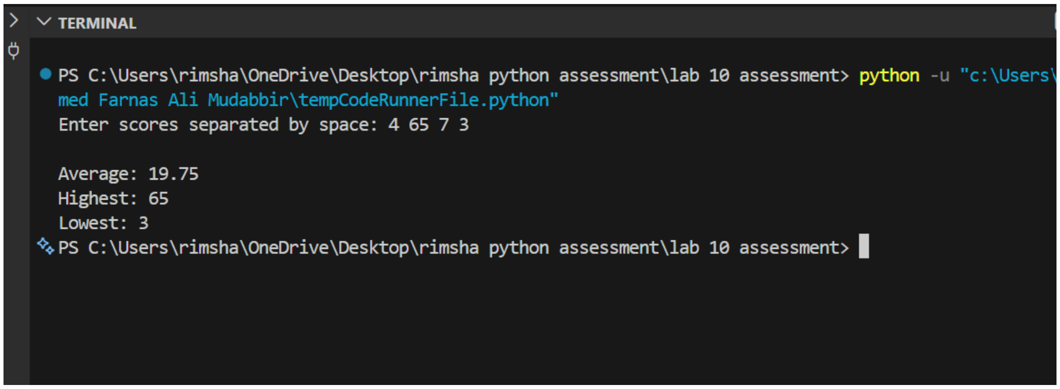
```python
def find_highest(scores):
    """Return the highest score."""
    return max(scores)


def find_lowest(scores):
    """Return the lowest score."""
    return min(scores)


def process_scores(scores):
    """Process scores using helper functions and display results."""
    avg = calculate_average(scores)
    highest = find_highest(scores)
    lowest = find_lowest(scores)

    print("\nAverage:", avg)
    print("Highest:", highest)
    print("Lowest:", lowest)


# ---------- USER INPUT ----------
scores = list(map(int, input("Enter scores separated by space: ").split()))

process_scores(scores)
```

Expected Output:

- Split into functions: calculate_average, find_highest, find_lowest.

Clean main process_scores() using helper functions.

PRACTICAL OUTPUT:



```
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment> python -u "c:\Users\
med Farnas Ali Mudabbir\tempCodeRunnerFile.python"
Enter scores separated by space: 4 65 7 3

Average: 19.75
Highest: 65
Lowest: 3
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment>
```

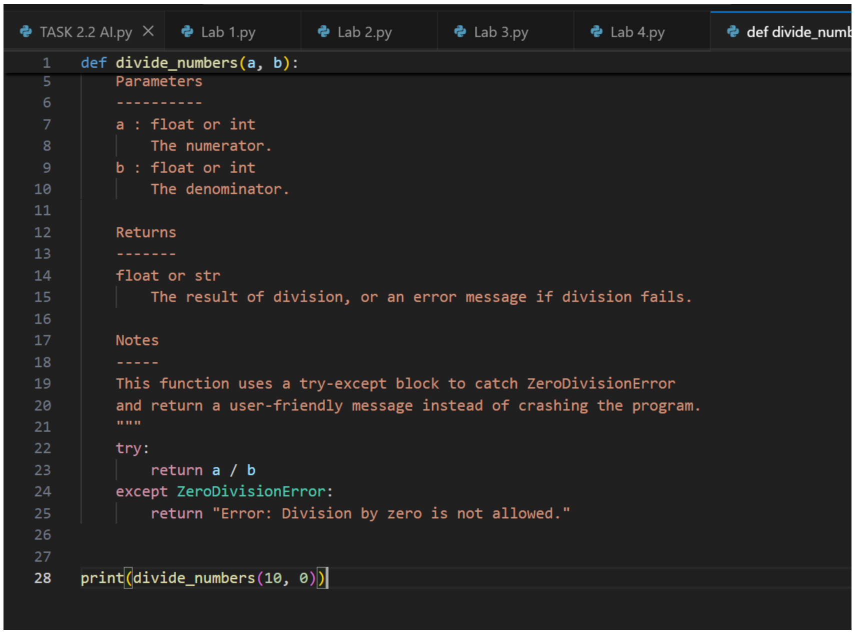
Task Description #5 – Code Review on Error Handling

Task: Provide AI with this faulty code and ask it to improve error handling, naming, and readability.

Python Script

```
def div(a,b):
    return a/b
print(div(10,0))
```

PROMPT: Improve this code by adding error handling, better naming, and a docstring

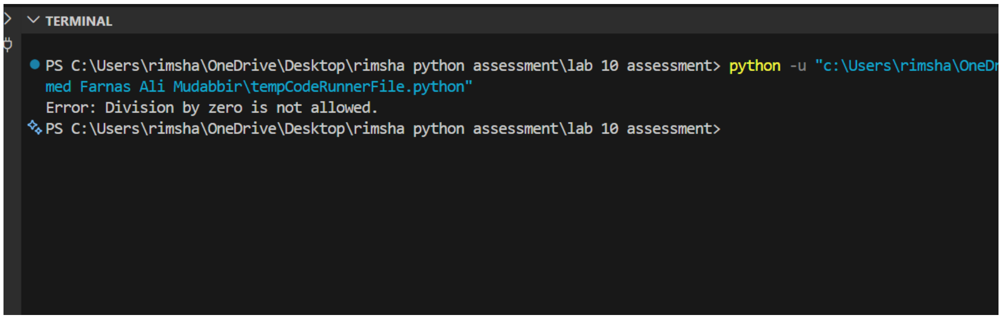


```
def divide_numbers(a, b):
    Parameters
    ----------
    a : float or int
        The numerator.
    b : float or int
        The denominator.

    Returns
    -------
    float or str
        The result of division, or an error message if division fails.

    Notes
    -----
    This function uses a try-except block to catch ZeroDivisionError
    and return a user-friendly message instead of crashing the program.
    """
    try:
        return a / b
    except ZeroDivisionError:
        return "Error: Division by zero is not allowed."


print(divide_numbers(10, 0))
```

Expected Output:

- Function with proper error handling using `try-except`.
- Better naming (`divide_numbers`).
- AI-generated docstring explaining error handling.

PRACTICAL OUTPUT:



```
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment> python -u "c:\Users\rimsha\OneDr
med Farnas Ali Mudabbir\tempCodeRunnerFile.python"
Error: Division by zero is not allowed.
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment>
```

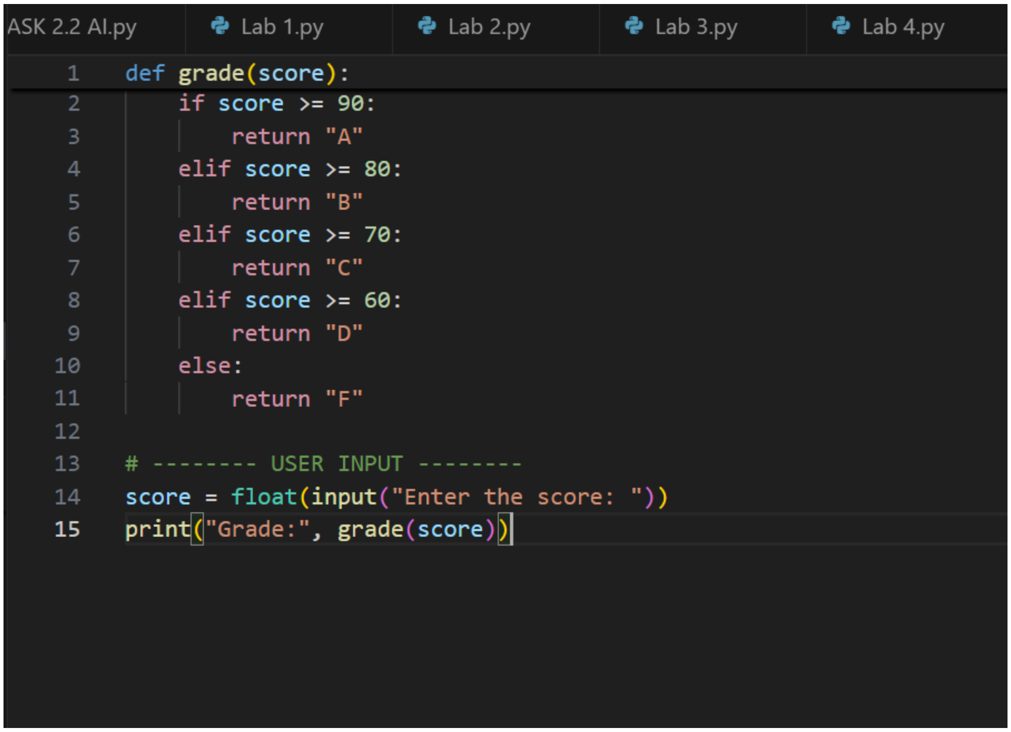
Task Description #6 – Complexity Reduction

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"
```

PROMPT: Write a Python program that takes **user input for score** and simplifies the nested grade() function. Replace the deep nested if-else structure with cleaner logic using **elif** or a **dictionary**.

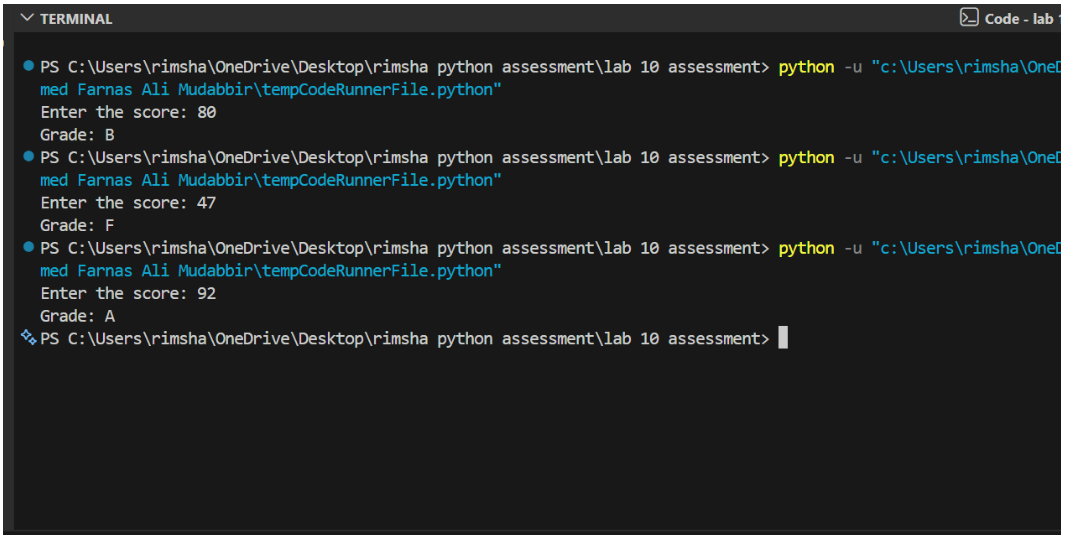


```python
def grade(score):
    if score >= 90:
        return "A"
    elif score >= 80:
        return "B"
    elif score >= 70:
        return "C"
    elif score >= 60:
        return "D"
    else:
        return "F"

# -------- USER INPUT --------
score = float(input("Enter the score: "))
print("Grade:", grade(score))
```

Expected Output:

- Cleaner logic using elif or dictionary mapping.
-

PRACTICAL OUTPUT:



```
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment> python -u "c:\Users\rimsha\OneD
med Farnas Ali Mudabbir\tempCodeRunnerFile.python"
Enter the score: 80
Grade: B
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment> python -u "c:\Users\rimsha\OneD
med Farnas Ali Mudabbir\tempCodeRunnerFile.python"
Enter the score: 47
Grade: F
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment> python -u "c:\Users\rimsha\OneD
med Farnas Ali Mudabbir\tempCodeRunnerFile.python"
Enter the score: 92
Grade: A
PS C:\Users\rimsha\OneDrive\Desktop\rimsha python assessment\lab 10 assessment>
```