ASSIGNMENT-9.4

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Batch 41

Task 1: Auto-Generating Function Documentation in a Shared Codebase

PROMPT: *Generate python code to create a simple calculator that can perform basic arithmetic operations such as addition, subtraction, multiplication, and division. The calculator should take user input for the operation and the numbers to be calculated.*

CODE:

Lab-9.py > ...

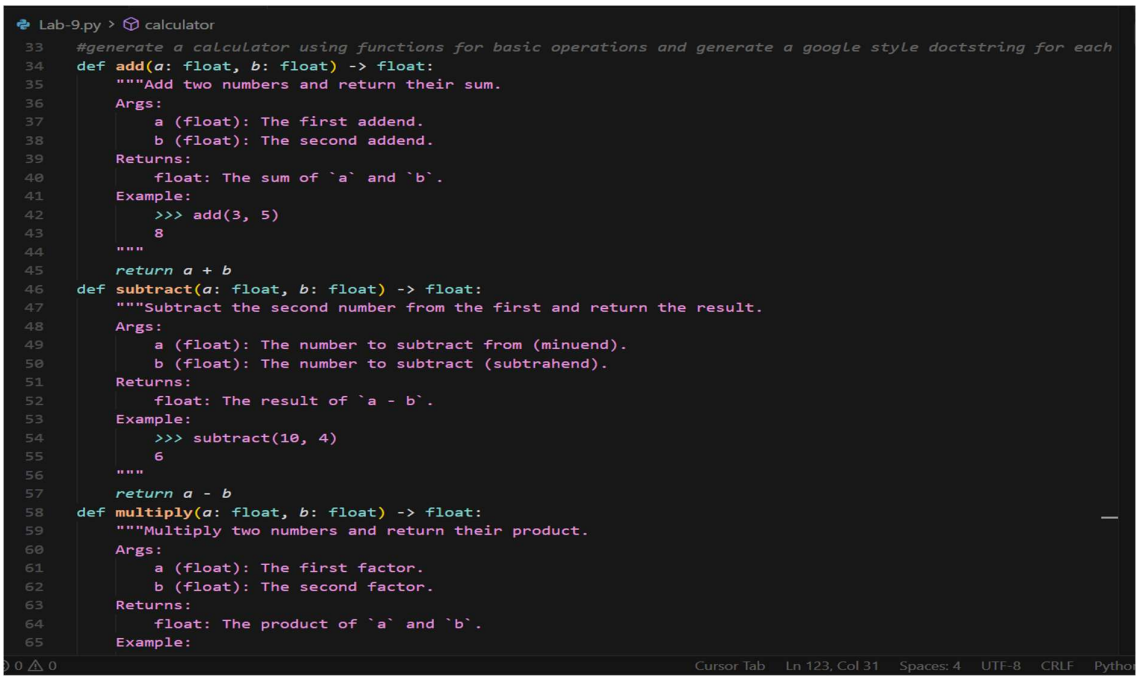
```python
#Generate python code to create a simple calculator that can perform basic arithmetic operations such as ad
def calculator():
    print("Simple Calculator")
    print("Select operation:")
    print("1. Addition (+)")
    print("2. Subtraction (-)")
    print("3. Multiplication (*)")
    print("4. Division (/)")
    choice = input("Enter choice (1/2/3/4): ")
    if choice not in ['1', '2', '3', '4']:
        print("Invalid choice")
        return
    num1 = float(input("Enter first number: "))
    num2 = float(input("Enter second number: "))
    if choice == '1':
        result = num1 + num2
        print(f"{num1} + {num2} = {result}")
    elif choice == '2':
        result = num1 - num2
        print(f"{num1} - {num2} = {result}")
    elif choice == '3':
        result = num1 * num2
        print(f"{num1} * {num2} = {result}")
    elif choice == '4':
        if num2 == 0:
            print("Error: Division by zero is not allowed.")
        else:
            result = num1 / num2
            print(f"{num1} / {num2} = {result}")
# Run the calculator
calculator()
```

OUTPUT:

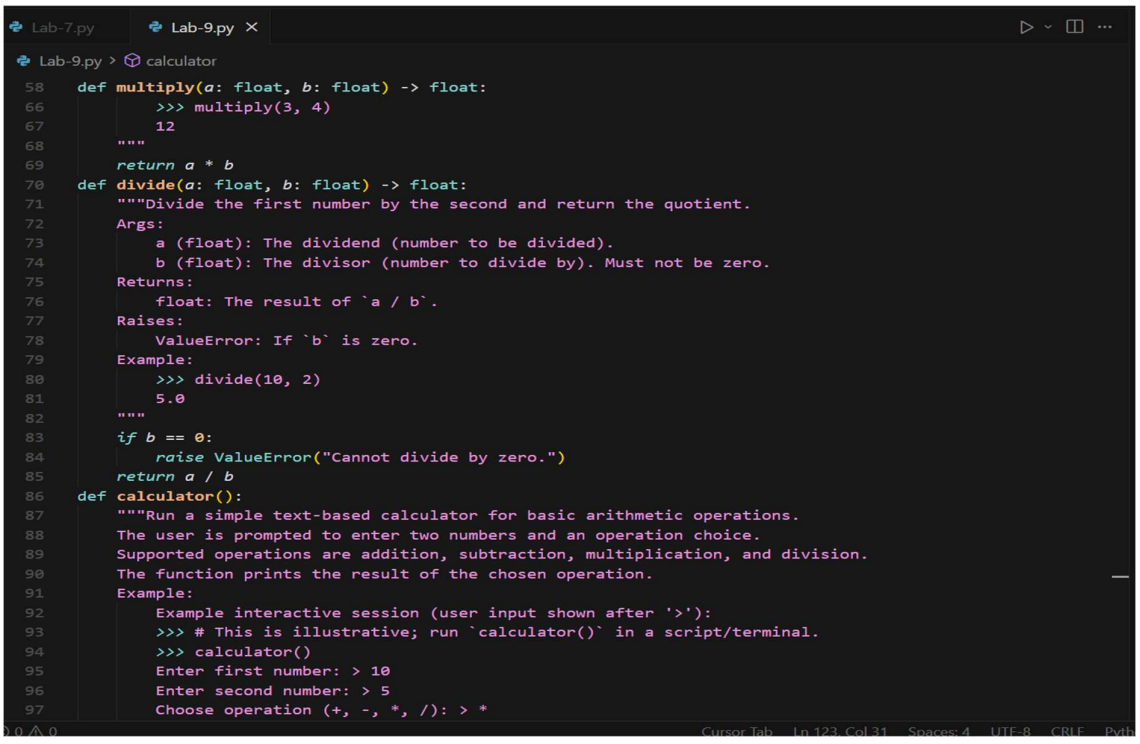
```
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING> & "C:\Users\Pranitha Rao\AppData\Local\
Microsoft\WindowsApps\python3.13.exe" "c:/Users/Pranitha Rao/OneDrive/Desktop/AI ASSISTED CODING/Lab-
9.py"
Simple Calculator
Select operation:
1. Addition (+)
2. Subtraction (-)
3. Multiplication (*)
4. Division (/)
Enter choice (1/2/3/4): 1
Enter first number: 5
Enter second number: 7
5.0 + 7.0 = 12.0
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING>
```

DOCSTRING PROMPT: generate a calculator using functions for basic operations and generate a google style doctstring for each function.each doctstring should include a brief description about the function,parametres,return value and an example of how to use the function.

CODE:



```
Lab-9.py > calculator
#generate a calculator using functions for basic operations and generate a google style doctstring for each
def add(a: float, b: float) -> float:
    """Add two numbers and return their sum.
    Args:
        a (float): The first addend.
        b (float): The second addend.
    Returns:
        float: The sum of `a` and `b`.
    Example:
        >>> add(3, 5)
        8
    """
    return a + b
def subtract(a: float, b: float) -> float:
    """Subtract the second number from the first and return the result.
    Args:
        a (float): The number to subtract from (minuend).
        b (float): The number to subtract (subtrahend).
    Returns:
        float: The result of `a - b`.
    Example:
        >>> subtract(10, 4)
        6
    """
    return a - b
def multiply(a: float, b: float) -> float:
    """Multiply two numbers and return their product.
    Args:
        a (float): The first factor.
        b (float): The second factor.
    Returns:
        float: The product of `a` and `b`.
    Example:
```



```
Lab-7.py   Lab-9.py
Lab-9.py > calculator
def multiply(a: float, b: float) -> float:
        >>> multiply(3, 4)
        12
    """
    return a * b
def divide(a: float, b: float) -> float:
    """Divide the first number by the second and return the quotient.
    Args:
        a (float): The dividend (number to be divided).
        b (float): The divisor (number to divide by). Must not be zero.
    Returns:
        float: The result of `a / b`.
    Raises:
        ValueError: If `b` is zero.
    Example:
        >>> divide(10, 2)
        5.0
    """
    if b == 0:
        raise ValueError("Cannot divide by zero.")
    return a / b
def calculator():
    """Run a simple text-based calculator for basic arithmetic operations.
    The user is prompted to enter two numbers and an operation choice.
    Supported operations are addition, subtraction, multiplication, and division.
    The function prints the result of the chosen operation.
    Example:
        Example interactive session (user input shown after '>'):
        >>> # This is illustrative; run `calculator()` in a script/terminal.
        >>> calculator()
        Enter first number: > 10
        Enter second number: > 5
        Choose operation (+, -, *, /): > *
```

```python
def calculator():
        Enter second number: > 5
        Choose operation (+, -, *, /): > *
        Result: 50
    """
    print("Simple Calculator")
    try:
        a = float(input("Enter first number: "))
        b = float(input("Enter second number: "))
    except ValueError:
        print("Invalid input. Please enter numeric values.")
        return
    op = input("Choose operation (+, -, *, /): ")
    if op == "+":
        result = add(a, b)
    elif op == "-":
        result = subtract(a, b)
    elif op == "*":
        result = multiply(a, b)
    elif op == "/":
        try:
            result = divide(a, b)
        except ValueError as e:
            print(e)
            return
    else:
        print("Invalid operation.")
        return
    print(f"Result: {result}")
if __name__ == "__main__":
    calculator()
```

OUTPUT:

```
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING> & "C:\Users\Pranitha Rao\AppData\Local\
Microsoft\WindowsApps\python3.13.exe" "c:/Users/Pranitha Rao/OneDrive/Desktop/AI ASSISTED CODING/Lab-
9.py"
Simple Calculator
Enter first number: 2
Enter second number: 4
Choose operation (+, -, *, /): *
Result: 8.0
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING>
```

JUSTIFICATION: The shared codebase contained several utility functions without proper documentation, making it difficult for new team members to understand their purpose and usage. To solve this problem, an AI-assisted coding tool was used to automatically generate Google-style docstrings for each function. These docstrings clearly describe the function behavior, parameters with data types, return values, and example usage. This approach improved code readability, reduced the learning curve for new developers, and enhanced the overall maintainability and usability of the codebase.

Task 2: Enhancing Readability Through AI-Generated Inline Comments

PROMPT: Write a Python program to search for a number in a list using loops and conditional statements.

CODE:

```python
#Write a Python program to search for a number in a list using loops and conditional statements.
# Sample list
numbers = [10, 20, 30, 40, 50]
# Take input from user
target = int(input("Enter a number to search: "))
found = False  # flag to check if number is found
# Loop through the list
for num in numbers:
    if num == target:
        found = True
        break
# Print result
if found:
    print(target, "is present in the list.")
else:
    print(target, "is NOT present in the list.")
```

OUTPUT:

DOCSTRING PROMPT: Write a Python program that searches for a value using loops and if conditions.Add a Google-style docstring to explain what the program does, its inputs, and its output.

CODE:

```python
#Write a Python program that searches for a value using loops and if conditions.Add a Google-style docstring
def search_value(numbers, target):
    #Search for a target value in a list of numbers using a loop.
    #This function goes through each number in the list and checks
    #(using an if condition) whether it is equal to the target value.
    #If it finds the target, it returns the index at which it was found.
    #If it does not find the target, it returns -1.
    #Args:
        #numbers (list[int]): List of integers to search through.
        #target (int): The value to search for in the list.
    #Returns:
        #int: The index of the target value if found; -1 otherwise.
    for index in range(len(numbers)):
        if numbers[index] == target:
            return index
    return -1
# Example usage
if __name__ == "__main__":
    nums = [10, 20, 30, 40, 50]
    value_to_find = int(input("Enter a value to search for: "))
    result_index = search_value(nums, value_to_find)
    if result_index != -1:
        print(f"Value {value_to_find} found at index {result_index}.")
    else:
        print(f"Value {value_to_find} not found in the list.")
```

OUTPUT:

```
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING> & "C:\Users\Pranitha Rao\AppData\Local\
Microsoft\WindowsApps\python3.13.exe" "c:/Users/Pranitha Rao/OneDrive/Desktop/AI ASSISTED CODING/Lab-
9.py"
Enter a value to search for: 10
Value 10 found at index 0.
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING> & "C:\Users\Pranitha Rao\AppData\Local\
Microsoft\WindowsApps\python3.13.exe" "c:/Users/Pranitha Rao/OneDrive/Desktop/AI ASSISTED CODING/Lab-
9.py"
Enter a value to search for: 11
Value 11 not found in the list.
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING>
```

JUSTIFICATION: This program demonstrates how AI can improve code readability by adding meaningful inline comments and a clear docstring without cluttering the code. In the first part, inline comments explain only the important logic, such as using a flag and breaking the loop once the target is found, making the searching process easier to understand for future maintainers. In the second part, a Google-style docstring is used to clearly describe the purpose of the function, its inputs, and its return value. Overall, the program uses simple loops and conditional statements to search for a number in a list, while AI-generated comments focus on *why* the logic is used, helping others understand, debug, and extend the code more easily.

Task 3: Generating Module-Level Documentation for a Python Package

PROMPT: Write a simple Python program for a banking system.The program should allow the user to create an account, deposit money, withdraw money, check the balance, and view transaction history.Take input from the user and keep the code minimal and easy to understand.

CODE:

Lab-9. C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING\Lab-7.py

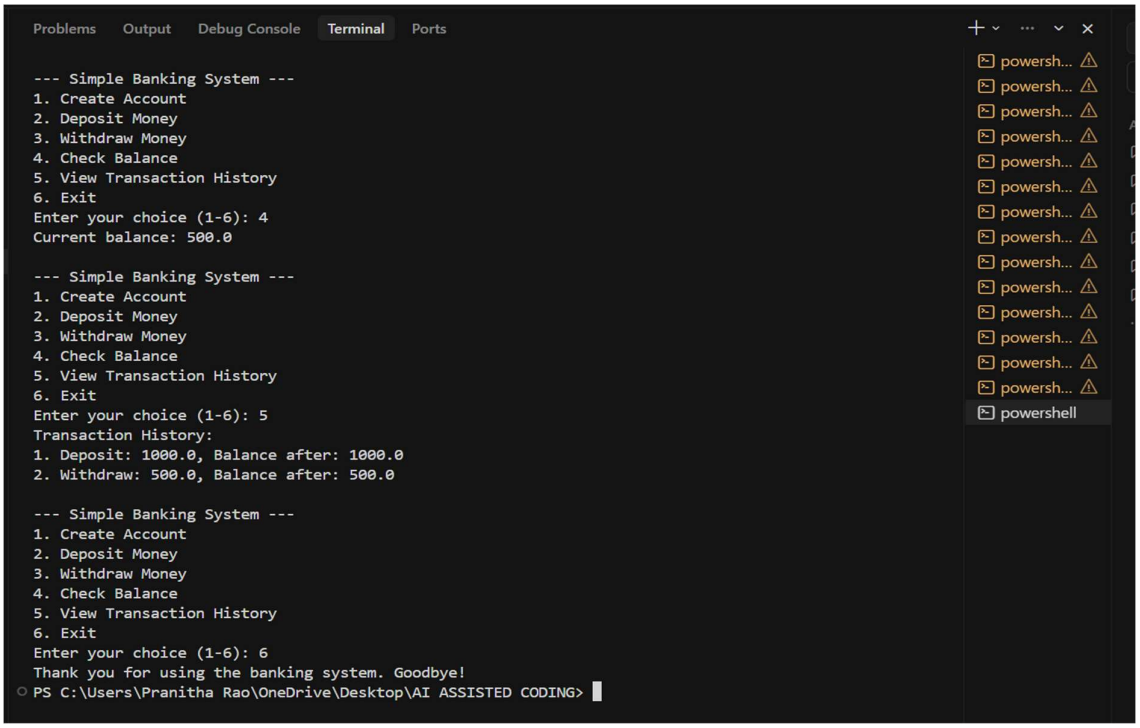
```python
#Write a simple Python program for a banking system.The program should allow the user to create an account,
# Simple Banking System
balance = 0.0
transactions = []  # Each item: (type, amount, new_balance)
account_created = False
def create_account():
    global account_created, balance, transactions
    if account_created:
        print("Account already exists.")
        return
    name = input("Enter your name: ")
    print(f"Account created for {name}.")
    balance = 0.0
    transactions = []
    account_created = True
def deposit():
    global balance
    if not account_created:
        print("Create an account first.")
        return
    try:
        amount = float(input("Enter amount to deposit: "))
        if amount <= 0:
            print("Amount must be positive.")
            return
        balance += amount
        transactions.append(("Deposit", amount, balance))
        print(f"Deposited {amount}. New balance: {balance}")
    except ValueError:
        print("Invalid amount.")
def withdraw():
    global balance
    if not account_created:
```

```python
def withdraw():
        print("Create an account first.")
        return
    try:
        amount = float(input("Enter amount to withdraw: "))
        if amount <= 0:
            print("Amount must be positive.")
            return
        if amount > balance:
            print("Insufficient funds.")
            return
        balance -= amount
        transactions.append(("Withdraw", amount, balance))
        print(f"Withdrew {amount}. New balance: {balance}")
    except ValueError:
        print("Invalid amount.")
def check_balance():
    if not account_created:
        print("Create an account first.")
        return
    print(f"Current balance: {balance}")
def view_transactions():
    if not account_created:
        print("Create an account first.")
        return
    if not transactions:
        print("No transactions yet.")
        return
    print("Transaction History:")
    for i, (t_type, amount, bal_after) in enumerate[Any](transactions, start=1):
        print(f"{i}. {t_type}: {amount}, Balance after: {bal_after}")
def show_menu():
    print("\n--- Simple Banking System ---")
```

```python
def show_menu():
    print("\n--- Simple Banking System ---")
    print("1. Create Account")
    print("2. Deposit Money")
    print("3. Withdraw Money")
    print("4. Check Balance")
    print("5. View Transaction History")
    print("6. Exit")
while True:
    show_menu()
    choice = input("Enter your choice (1-6): ")
    if choice == "1":
        create_account()
    elif choice == "2":
        deposit()
    elif choice == "3":
        withdraw()
    elif choice == "4":
        check_balance()
    elif choice == "5":
        view_transactions()
    elif choice == "6":
        print("Thank you for using the banking system. Goodbye!")
        break
    else:
        print("Invalid choice. Please enter a number from 1 to 6.")
```

OUTPUT:

```
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING> & "C:\Users\Pranitha Rao\AppData\Local\Microsoft\WindowsApps\python3.13.exe" "c:/Users/Pranitha Rao/OneDrive/Desktop/AI ASSISTED CODING/Lab-9.py"

--- Simple Banking System ---
1. Create Account
2. Deposit Money
3. Withdraw Money
4. Check Balance
5. View Transaction History
6. Exit
Enter your choice (1-6): 1
Enter your name: Pranitha
Account created for Pranitha.

--- Simple Banking System ---
1. Create Account
2. Deposit Money
3. Withdraw Money
4. Check Balance
5. View Transaction History
6. Exit
Enter your choice (1-6): 2
Enter amount to deposit: 1000
Deposited 1000.0. New balance: 1000.0

--- Simple Banking System ---
1. Create Account
2. Deposit Money
3. Withdraw Money
4. Check Balance
5. View Transaction History
6. Exit
Enter your choice (1-6): 3
Enter amount to withdraw: 500
Withdrew 500.0. New balance: 500.0
```



JUSTIFICATION: This program implements a simple banking system using Python functions and user input. It allows a user to create an account and then perform basic banking operations such as depositing money, withdrawing money, checking the current balance, and viewing transaction history. The program uses global variables to store the account balance and a list of transactions, and each function first checks whether an account has been created before performing any operation. A menu-driven loop lets the user choose actions repeatedly until they decide to exit. Overall, the code is minimal, easy to understand, and clearly shows how functions, conditionals, and loops work together in a real-world example.

Task 4: Converting Developer Comments into Structured Docstrings

PROMPT: *Create a basic Python program to manage student results.Accept marks for multiple exams from the user and use separate functions to find the total, average, grade, highest score, lowest score, and show the final report.Add detailed comments to explain the logic and keep the program simple.*

CODE:

Lab-7.py Lab-9.py

C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING\Lab-7.py

```
#Create a basic Python program to manage student results.Accept marks for multiple exams from the user and
def calculate_total(marks):
    """
    Calculate the total of all exam marks.
    Args:
        marks (list): List of marks obtained in different exams
    Returns:
        float: Sum of all marks
    """
    # Initialize total to zero
    total = 0
    # Loop through each mark and add it to the total
    for mark in marks:
        total += mark
    return total
def calculate_average(marks):
    """
    Calculate the average of all exam marks.
    Args:
        marks (list): List of marks obtained in different exams
    Returns:
        float: Average of all marks (rounded to 2 decimal places)
    """
    # Check if the list is empty to avoid division by zero
    if len(marks) == 0:
        return 0.0
    # Calculate total using the calculate_total function
    total = calculate_total(marks)
    # Calculate average by dividing total by number of exams
    average = total / len(marks)
    # Round to 2 decimal places for better readability
    return round(average, 2)
def calculate_grade(average):
```

Lab-7.py Lab-9.py

C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING\Lab-7.py

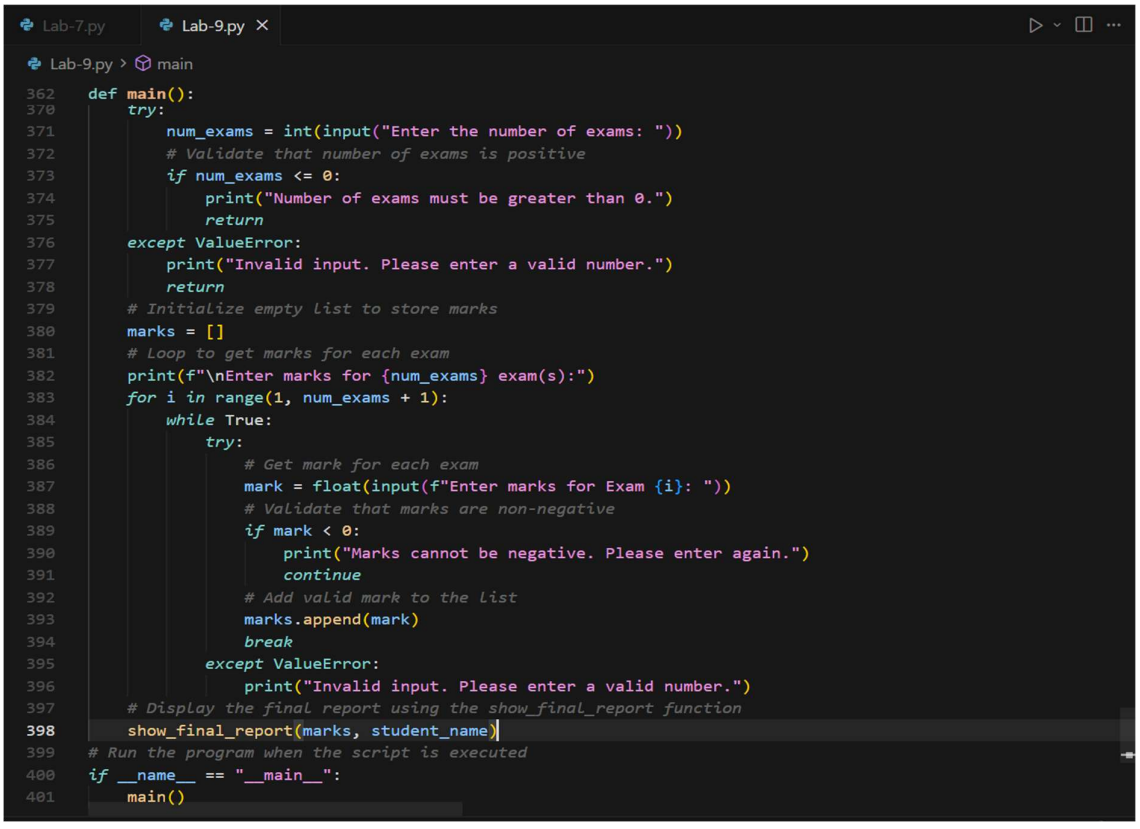
```
def calculate_grade(average):
    Determine the grade based on the average marks.
    Args:
        average (float): Average marks obtained
    Returns:
        str: Grade (A, B, C, D, or F)
    """
    # Use if-elif conditions to assign grades based on average marks
    if average >= 90:
        return "A"
    elif average >= 80:
        return "B"
    elif average >= 70:
        return "C"
    elif average >= 60:
        return "D"
    else:
        return "F"
def find_highest_score(marks):
    """
    Find the highest score among all exam marks.

    Args:
        marks (list): List of marks obtained in different exams

    Returns:
        float: Highest mark in the list
    """
    # Check if list is empty
    if len(marks) == 0:
        return 0.0
    # Initialize highest with the first mark
    highest = marks[0]
```

Lab-7.py Lab-9.py

C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING\Lab-7.py

```
def find_highest_score(marks):
    # Loop through remaining marks and update highest if a larger value is found
    for mark in marks[1:]:
        if mark > highest:
            highest = mark
    return highest
def find_lowest_score(marks):
    """
    Find the lowest score among all exam marks.
    Args:
        marks (list): List of marks obtained in different exams
    Returns:
        float: Lowest mark in the list
    """
    # Check if list is empty
    if len(marks) == 0:
        return 0.0
    # Initialize lowest with the first mark
    lowest = marks[0]
    # Loop through remaining marks and update lowest if a smaller value is found
    for mark in marks[1:]:
        if mark < lowest:
            lowest = mark
    return lowest
def show_final_report(marks, student_name):
    """
    Display a comprehensive report of student results.
    Args:
        marks (list): List of marks obtained in different exams
        student_name (str): Name of the student
    """
    # Calculate all required statistics using the respective functions
    total = calculate_total(marks)
```

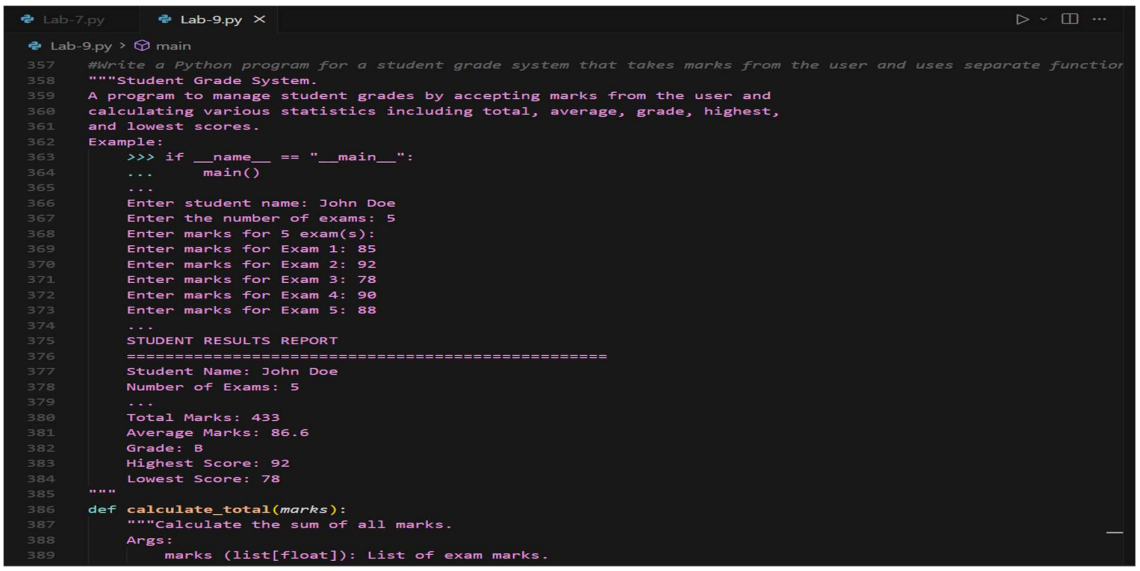
```
Lab-7.py   Lab-9.py
Lab-9.py > main
333  def show_final_report(marks, student_name):
341      total = calculate_total(marks)
342      average = calculate_average(marks)
343      grade = calculate_grade(average)
344      highest = find_highest_score(marks)
345      lowest = find_lowest_score(marks)
346      # Display the formatted report
347      print("\n" + "="*50)
348      print("STUDENT RESULTS REPORT")
349      print("="*50)
350      print(f"Student Name: {student_name}")
351      print(f"Number of Exams: {len(marks)}")
352      print(f"\nExam Marks:")
353      # Display each exam mark with its number
354      for i, mark in enumerate[Any](marks, start=1):
355          print(f"  Exam {i}: {mark}")
356      print(f"\nTotal Marks: {total}")
357      print(f"Average Marks: {average}")
358      print(f"Grade: {grade}")
359      print(f"Highest Score: {highest}")
360      print(f"Lowest Score: {lowest}")
361      print("="*50 + "\n")
362  def main():
363      """
364      Main function to run the student results management program.
365      Handles user input and coordinates all functions.
366      """
367      # Get student name from user
368      student_name = input("Enter student name: ")
369      # Get number of exams from user
370      try:
371          num_exams = int(input("Enter the number of exams: "))
372          # Validate that number of exams is positive
```



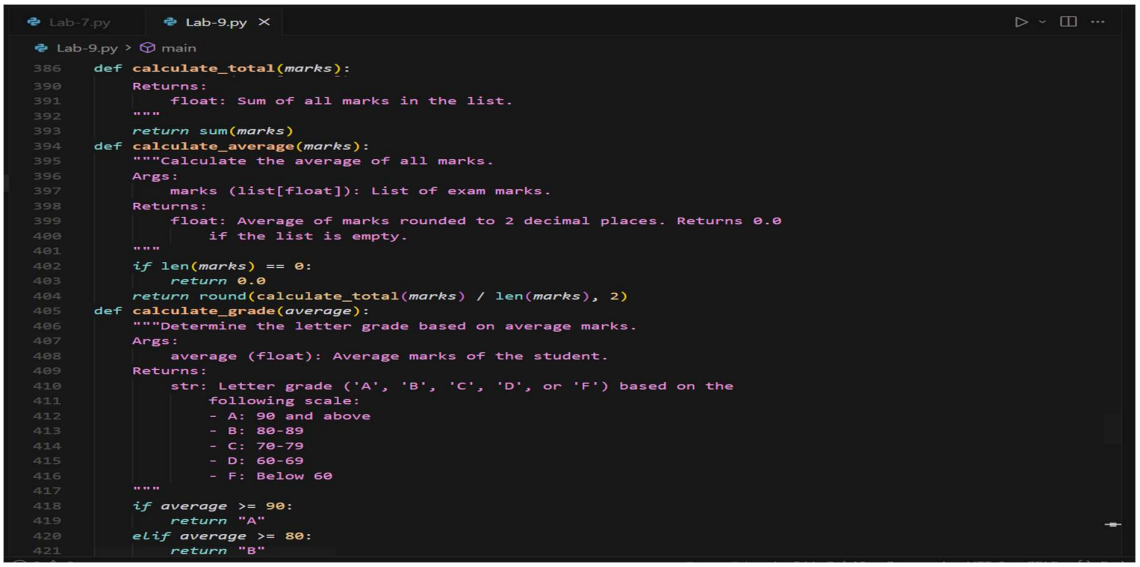
```
Lab-7.py   Lab-9.py
Lab-9.py > main
362  def main():
370      try:
371          num_exams = int(input("Enter the number of exams: "))
372          # Validate that number of exams is positive
373          if num_exams <= 0:
374              print("Number of exams must be greater than 0.")
375              return
376      except ValueError:
377          print("Invalid input. Please enter a valid number.")
378          return
379      # Initialize empty list to store marks
380      marks = []
381      # Loop to get marks for each exam
382      print(f"\nEnter marks for {num_exams} exam(s):")
383      for i in range(1, num_exams + 1):
384          while True:
385              try:
386                  # Get mark for each exam
387                  mark = float(input(f"Enter marks for Exam {i}: "))
388                  # Validate that marks are non-negative
389                  if mark < 0:
390                      print("Marks cannot be negative. Please enter again.")
391                      continue
392                  # Add valid mark to the list
393                  marks.append(mark)
394                  break
395              except ValueError:
396                  print("Invalid input. Please enter a valid number.")
397      # Display the final report using the show_final_report function
398      show_final_report(marks, student_name)
399  # Run the program when the script is executed
400  if __name__ == "__main__":
401      main()
```

DOCSTRING PROMPT: Write a Python program for a student grade system that takes marks from the user and uses separate functions to calculate total marks, average, grade, highest and lowest scores, and display a final report. Convert all explanatory comments into clear Google-style or NumPy-style docstrings, remove unnecessary inline comments, include a proper module-level docstring with an example, and keep the code minimal with standardized documentation.

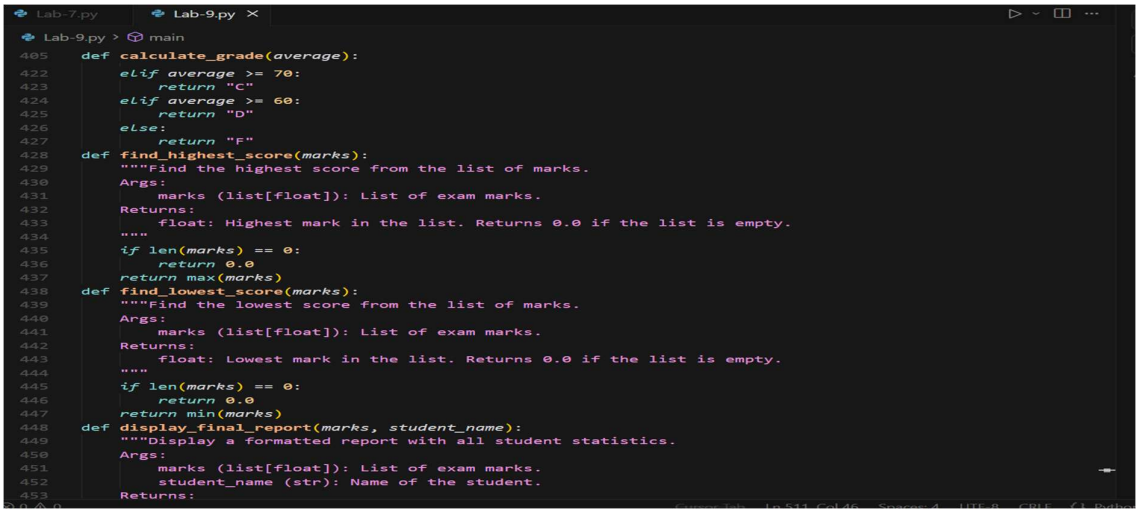
CODE:



```
Lab-7.py   Lab-9.py
Lab-9.py > main
#Write a Python program for a student grade system that takes marks from the user and uses separate functior
"""Student Grade System.
A program to manage student grades by accepting marks from the user and
calculating various statistics including total, average, grade, highest,
and lowest scores.
Example:
    >>> if __name__ == "__main__":
    ...     main()
    ...
    Enter student name: John Doe
    Enter the number of exams: 5
    Enter marks for 5 exam(s):
    Enter marks for Exam 1: 85
    Enter marks for Exam 2: 92
    Enter marks for Exam 3: 78
    Enter marks for Exam 4: 90
    Enter marks for Exam 5: 88
    ...
    STUDENT RESULTS REPORT
    ==================================================
    Student Name: John Doe
    Number of Exams: 5
    ...
    Total Marks: 433
    Average Marks: 86.6
    Grade: B
    Highest Score: 92
    Lowest Score: 78
"""
def calculate_total(marks):
    """Calculate the sum of all marks.
    Args:
        marks (list[float]): List of exam marks.
```



```
Lab-7.py   Lab-9.py
Lab-9.py > main
def calculate_total(marks):
    Returns:
        float: Sum of all marks in the list.
    """
    return sum(marks)
def calculate_average(marks):
    """Calculate the average of all marks.
    Args:
        marks (list[float]): List of exam marks.
    Returns:
        float: Average of marks rounded to 2 decimal places. Returns 0.0
            if the list is empty.
    """
    if len(marks) == 0:
        return 0.0
    return round(calculate_total(marks) / len(marks), 2)
def calculate_grade(average):
    """Determine the letter grade based on average marks.
    Args:
        average (float): Average marks of the student.
    Returns:
        str: Letter grade ('A', 'B', 'C', 'D', or 'F') based on the
            following scale:
            - A: 90 and above
            - B: 80-89
            - C: 70-79
            - D: 60-69
            - F: Below 60
    """
    if average >= 90:
        return "A"
    elif average >= 80:
        return "B"
```



```
Lab-7.py   Lab-9.py
Lab-9.py > main
def calculate_grade(average):
    elif average >= 70:
        return "C"
    elif average >= 60:
        return "D"
    else:
        return "F"
def find_highest_score(marks):
    """Find the highest score from the list of marks.
    Args:
        marks (list[float]): List of exam marks.
    Returns:
        float: Highest mark in the list. Returns 0.0 if the list is empty.
    """
    if len(marks) == 0:
        return 0.0
    return max(marks)
def find_lowest_score(marks):
    """Find the lowest score from the list of marks.
    Args:
        marks (list[float]): List of exam marks.
    Returns:
        float: Lowest mark in the list. Returns 0.0 if the list is empty.
    """
    if len(marks) == 0:
        return 0.0
    return min(marks)
def display_final_report(marks, student_name):
    """Display a formatted report with all student statistics.
    Args:
        marks (list[float]): List of exam marks.
        student_name (str): Name of the student.
    Returns:
```

```python
def display_final_report(marks, student_name):
        None: This function prints the report to stdout.
    """
    total = calculate_total(marks)
    average = calculate_average(marks)
    grade = calculate_grade(average)
    highest = find_highest_score(marks)
    lowest = find_lowest_score(marks)
    print("\n" + "=" * 50)
    print("STUDENT RESULTS REPORT")
    print("=" * 50)
    print(f"Student Name: {student_name}")
    print(f"Number of Exams: {len(marks)}")
    print(f"\nExam Marks:")
    for i, mark in enumerate[Any](marks, start=1):
        print(f"  Exam {i}: {mark}")
    print(f"\nTotal Marks: {total}")
    print(f"Average Marks: {average}")
    print(f"Grade: {grade}")
    print(f"Highest Score: {highest}")
    print(f"Lowest Score: {lowest}")
    print("=" * 50 + "\n")
def get_marks_from_user(num_exams):
    """Collect exam marks from the user via input.
    Args:
        num_exams (int): Number of exams to collect marks for.
    Returns:
        list[float]: List of valid exam marks entered by the user.
    """
    marks = []
    print(f"\nEnter marks for {num_exams} exam(s):")
    for i in range(1, num_exams + 1):
        while True:
```

```python
def get_marks_from_user(num_exams):
            try:
                mark = float(input(f"Enter marks for Exam {i}: "))
                if mark < 0:
                    print("Marks cannot be negative. Please enter again.")
                    continue
                marks.append(mark)
                break
            except ValueError:
                print("Invalid input. Please enter a valid number.")
    return marks
def main():
    """Main function to run the student grade system.
    Prompts user for student name and number of exams, collects marks,
    and displays the final report.
    """
    student_name = input("Enter student name: ")
    try:
        num_exams = int(input("Enter the number of exams: "))
        if num_exams <= 0:
            print("Number of exams must be greater than 0.")
            return
    except ValueError:
        print("Invalid input. Please enter a valid number.")
        return
    marks = get_marks_from_user(num_exams)
    display_final_report(marks, student_name)
if __name__ == "__main__":
    main()
```

OUTPUT:

```
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING> & "C:\Users\Pranitha Rao\AppData\Local\Microsoft\WindowsApps\python3.13.exe" "c:/Users/Pranitha Rao/OneDrive/Desktop/AI ASSISTED CODING/Lab-9.py"
Enter student name: Pranitha
Enter the number of exams: 5

Enter marks for 5 exam(s):
Enter marks for Exam 1: 80
Enter marks for Exam 2: 65
Enter marks for Exam 3: 77
Enter marks for Exam 4: 98
Enter marks for Exam 5: 36

==================================================
STUDENT RESULTS REPORT
==================================================
Student Name: Pranitha
Number of Exams: 5

Exam Marks:
  Exam 1: 80.0
  Exam 2: 65.0
  Exam 3: 77.0
  Exam 4: 98.0
STUDENT RESULTS REPORT
==================================================
Student Name: Pranitha
Number of Exams: 5

Exam Marks:
  Exam 1: 80.0
  Exam 2: 65.0
  Exam 3: 77.0
  Exam 4: 98.0
  Exam 5: 36.0
```

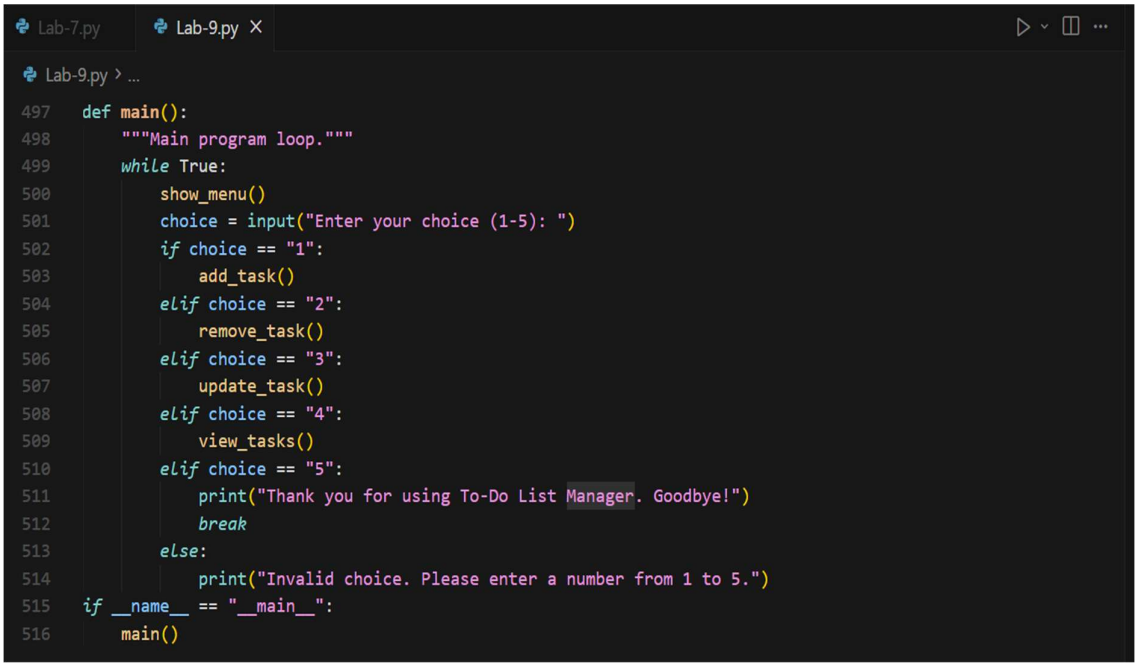
JUSTIFICATION: This code shows how long inline developer comments can be converted into clean, standardized Google-style docstrings to improve documentation quality. The student grade system accepts exam marks from the user and uses well-defined functions to calculate total marks, average, grade, highest score, and lowest score, then displays a final report. By moving explanations into structured docstrings, the function bodies become cleaner and easier to read, while the documentation clearly explains each function's purpose, inputs, and outputs. Overall, the code is more consistent, maintainable, and suitable for real-world or shared projects.

Task 5: Building a Mini Automatic Documentation Generator

PROMPT: Generate a python code in a .py file for a To-Do List Manager which includes multiple utility functions like add_task, remove_task, update_task. Take user inputs for the code. Generate a minimal code.

CODE:

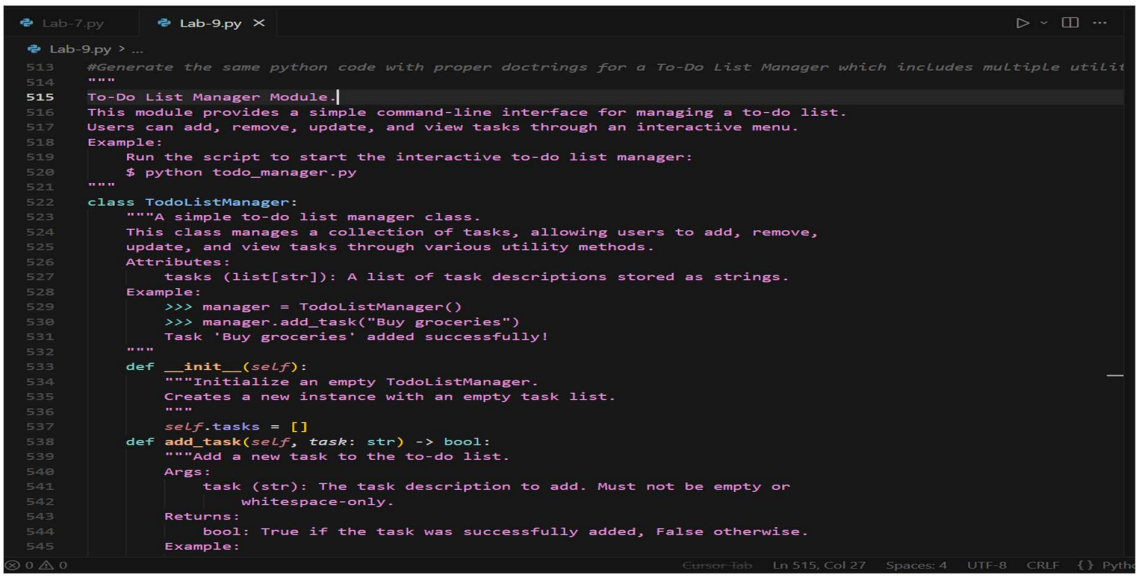
```
Lab-7.py   Lab-9.py
Lab-9.py > ...
460  def update_task():
466      try:
467          index = int(input("Enter task number to update: ")) - 1
468          if 0 <= index < len(tasks):
469              new_task = input("Enter new task description: ")
470              if new_task.strip():
471                  old_task = tasks[index]
472                  tasks[index] = new_task
473                  print(f"Task '{old_task}' updated to '{new_task}'!")
474              else:
475                  print("Task cannot be empty.")
476          else:
477              print("Invalid task number.")
478      except ValueError:
479          print("Invalid input. Please enter a number.")
480  def view_tasks():
481      """Display all tasks."""
482      if not tasks:
483          print("No tasks in the list.")
484          return
485      print("\n--- Your Tasks ---")
486      for i, task in enumerate[Any](tasks, start=1):
487          print(f"{i}. {task}")
488      print()
489  def show_menu():
490      """Display the main menu."""
491      print("\n--- To-Do List Manager ---")
492      print("1. Add Task")
493      print("2. Remove Task")
494      print("3. Update Task")
495      print("4. View Tasks")
496      print("5. Exit")
497  def main():
```



```
Lab-7.py   Lab-9.py
Lab-9.py > ...
497  def main():
498      """Main program loop."""
499      while True:
500          show_menu()
501          choice = input("Enter your choice (1-5): ")
502          if choice == "1":
503              add_task()
504          elif choice == "2":
505              remove_task()
506          elif choice == "3":
507              update_task()
508          elif choice == "4":
509              view_tasks()
510          elif choice == "5":
511              print("Thank you for using To-Do List Manager. Goodbye!")
512              break
513          else:
514              print("Invalid choice. Please enter a number from 1 to 5.")
515  if __name__ == "__main__":
516      main()
```

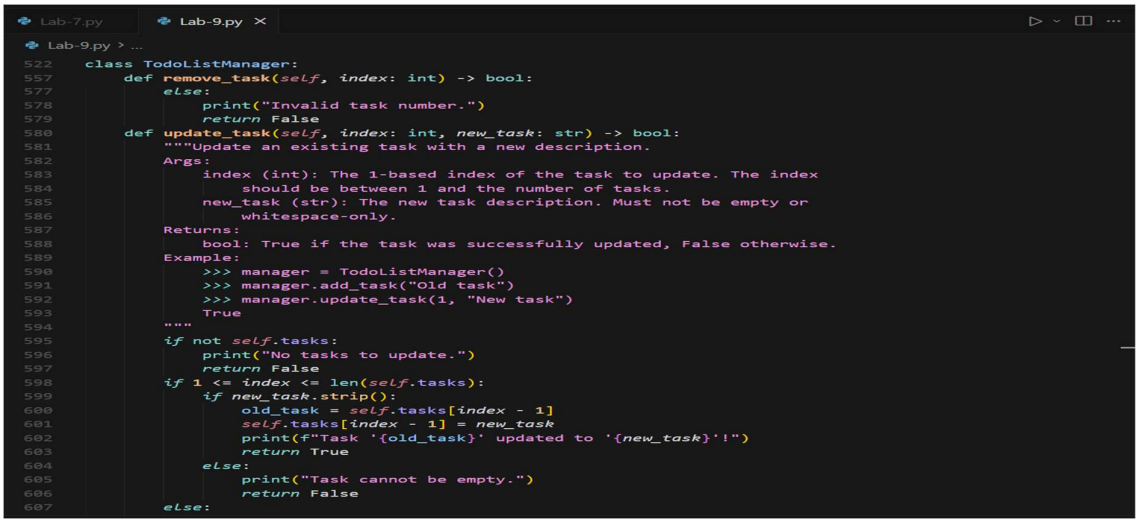
DOCSTRING PROMPT: Generate the same python code with proper doctrings for a To-Do List Manager which includes multiple utility functions like add_task, remove_task, update_task. Take user inputs for the code. The task is to detact functions and classes and insert placeholder google style docstrings fo reach detected function or class. The goal is documentation scaffolding. Generate a minimal and efficient code.

CODE:

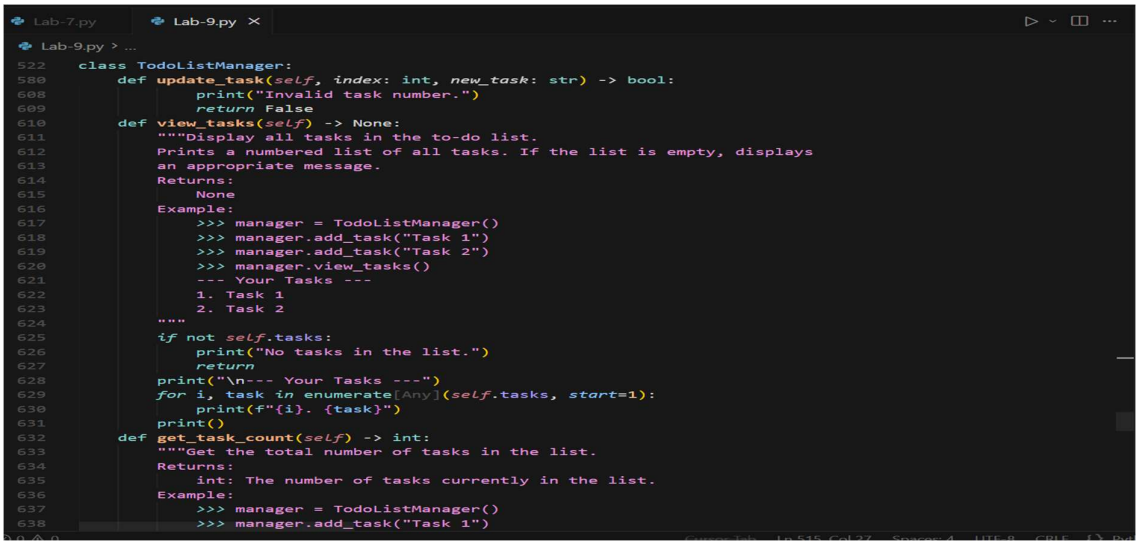


```
#Generate the same python code with proper doctrings for a To-Do List Manager which incLudes multiple utilit
"""
To-Do List Manager Module.
This module provides a simple command-line interface for managing a to-do list.
Users can add, remove, update, and view tasks through an interactive menu.
Example:
    Run the script to start the interactive to-do list manager:
    $ python todo_manager.py
"""
class TodoListManager:
    """A simple to-do list manager class.
    This class manages a collection of tasks, allowing users to add, remove,
    update, and view tasks through various utility methods.
    Attributes:
        tasks (list[str]): A list of task descriptions stored as strings.
    Example:
        >>> manager = TodoListManager()
        >>> manager.add_task("Buy groceries")
        Task 'Buy groceries' added successfully!
    """
    def __init__(self):
        """Initialize an empty TodoListManager.
        Creates a new instance with an empty task list.
        """
        self.tasks = []
    def add_task(self, task: str) -> bool:
        """Add a new task to the to-do list.
        Args:
            task (str): The task description to add. Must not be empty or
                whitespace-only.
        Returns:
            bool: True if the task was successfully added, False otherwise.
        Example:
```

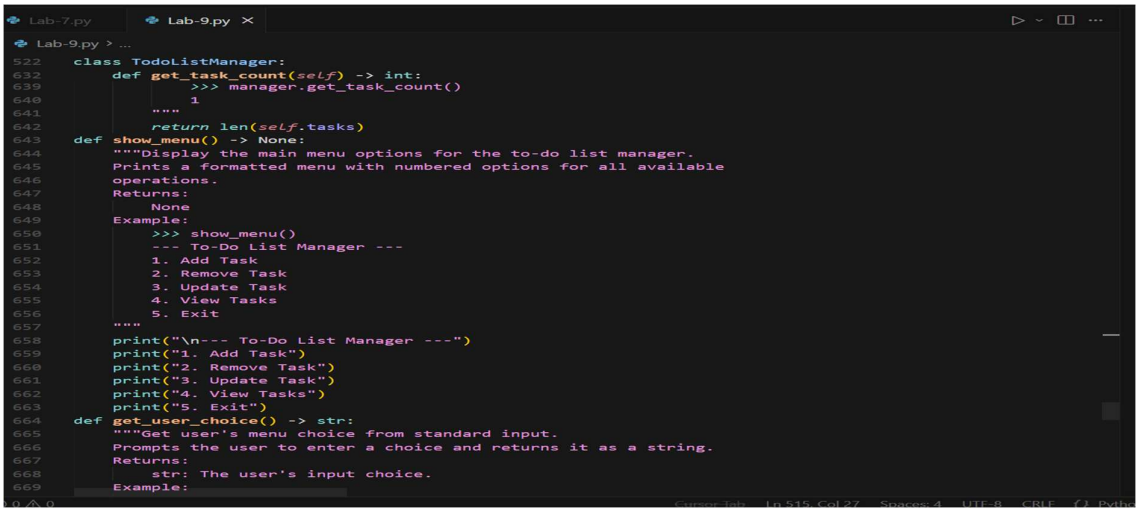
```
class TodoListManager:
    def add_task(self, task: str) -> bool:
            >>> manager = TodoListManager()
            >>> manager.add_task("Complete assignment")
            True
        """
        if task.strip():
            self.tasks.append(task)
            print(f"Task '{task}' added successfully!")
            return True
        else:
            print("Task cannot be empty.")
            return False
    def remove_task(self, index: int) -> bool:
        """Remove a task from the to-do list by its index.
        Args:
            index (int): The 1-based index of the task to remove. The index
                should be between 1 and the number of tasks.
        Returns:
            bool: True if the task was successfully removed, False otherwise.
        Example:
            >>> manager = TodoListManager()
            >>> manager.add_task("Task 1")
            >>> manager.remove_task(1)
            True
        """
        if not self.tasks:
            print("No tasks to remove.")
            return False
        if 1 <= index <= len(self.tasks):
            removed = self.tasks.pop(index - 1)
            print(f"Task '{removed}' removed successfully!")
            return True
```



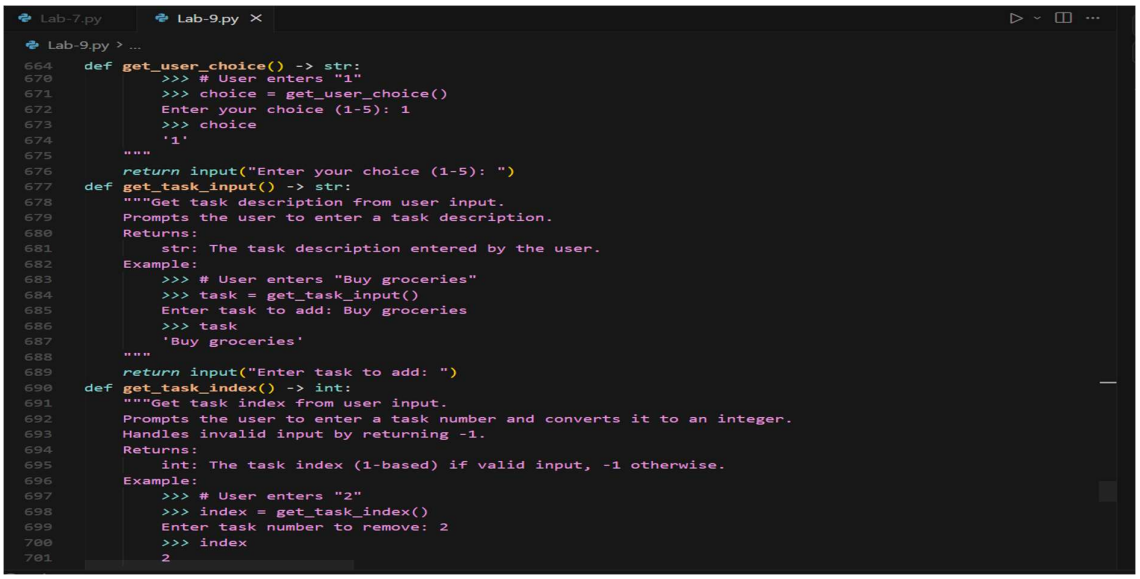
```
class TodoListManager:
    def remove_task(self, index: int) -> bool:
        else:
            print("Invalid task number.")
            return False
    def update_task(self, index: int, new_task: str) -> bool:
        """Update an existing task with a new description.
        Args:
            index (int): The 1-based index of the task to update. The index
                should be between 1 and the number of tasks.
            new_task (str): The new task description. Must not be empty or
                whitespace-only.
        Returns:
            bool: True if the task was successfully updated, False otherwise.
        Example:
            >>> manager = TodoListManager()
            >>> manager.add_task("Old task")
            >>> manager.update_task(1, "New task")
            True
        """
        if not self.tasks:
            print("No tasks to update.")
            return False
        if 1 <= index <= len(self.tasks):
            if new_task.strip():
                old_task = self.tasks[index - 1]
                self.tasks[index - 1] = new_task
                print(f"Task '{old_task}' updated to '{new_task}'!")
                return True
            else:
                print("Task cannot be empty.")
                return False
        else:
```



```
Lab-7.py   Lab-9.py
Lab-9.py > ...
522   class TodoListManager:
580       def update_task(self, index: int, new_task: str) -> bool:
608               print("Invalid task number.")
609               return False
610       def view_tasks(self) -> None:
611           """Display all tasks in the to-do list.
612           Prints a numbered list of all tasks. If the list is empty, displays
613           an appropriate message.
614           Returns:
615               None
616           Example:
617               >>> manager = TodoListManager()
618               >>> manager.add_task("Task 1")
619               >>> manager.add_task("Task 2")
620               >>> manager.view_tasks()
621               --- Your Tasks ---
622               1. Task 1
623               2. Task 2
624           """
625           if not self.tasks:
626               print("No tasks in the list.")
627               return
628           print("\n--- Your Tasks ---")
629           for i, task in enumerate[Any](self.tasks, start=1):
630               print(f"{i}. {task}")
631           print()
632       def get_task_count(self) -> int:
633           """Get the total number of tasks in the list.
634           Returns:
635               int: The number of tasks currently in the list.
636           Example:
637               >>> manager = TodoListManager()
638               >>> manager.add_task("Task 1")
```



```
Lab-7.py   Lab-9.py
Lab-9.py > ...
522   class TodoListManager:
632       def get_task_count(self) -> int:
639               >>> manager.get_task_count()
640               1
641           """
642           return len(self.tasks)
643   def show_menu() -> None:
644       """Display the main menu options for the to-do list manager.
645       Prints a formatted menu with numbered options for all available
646       operations.
647       Returns:
648           None
649       Example:
650           >>> show_menu()
651           --- To-Do List Manager ---
652           1. Add Task
653           2. Remove Task
654           3. Update Task
655           4. View Tasks
656           5. Exit
657       """
658       print("\n--- To-Do List Manager ---")
659       print("1. Add Task")
660       print("2. Remove Task")
661       print("3. Update Task")
662       print("4. View Tasks")
663       print("5. Exit")
664   def get_user_choice() -> str:
665       """Get user's menu choice from standard input.
666       Prompts the user to enter a choice and returns it as a string.
667       Returns:
668           str: The user's input choice.
669       Example:
```



```
Lab-7.py   Lab-9.py
Lab-9.py > ...
664   def get_user_choice() -> str:
670           >>> # User enters "1"
671           >>> choice = get_user_choice()
672           Enter your choice (1-5): 1
673           >>> choice
674           '1'
675       """
676       return input("Enter your choice (1-5): ")
677   def get_task_input() -> str:
678       """Get task description from user input.
679       Prompts the user to enter a task description.
680       Returns:
681           str: The task description entered by the user.
682       Example:
683           >>> # User enters "Buy groceries"
684           >>> task = get_task_input()
685           Enter task to add: Buy groceries
686           >>> task
687           'Buy groceries'
688       """
689       return input("Enter task to add: ")
690   def get_task_index() -> int:
691       """Get task index from user input.
692       Prompts the user to enter a task number and converts it to an integer.
693       Handles invalid input by returning -1.
694       Returns:
695           int: The task index (1-based) if valid input, -1 otherwise.
696       Example:
697           >>> # User enters "2"
698           >>> index = get_task_index()
699           Enter task number to remove: 2
700           >>> index
701           2
```

```python
def main() -> None:
        $ python todo_manager.py
    """
    manager = TodoListManager()
    while True:
        show_menu()
        choice = get_user_choice()
        if choice == "1":
            task = get_task_input()
            manager.add_task(task)
        elif choice == "2":
            if manager.tasks:
                manager.view_tasks()
            index = get_task_index()
            if index != -1:
                manager.remove_task(index)
        elif choice == "3":
            if manager.tasks:
                manager.view_tasks()
            index = get_update_index()
            if index != -1:
                new_task = get_new_task_description()
                manager.update_task(index, new_task)
        elif choice == "4":
            manager.view_tasks()
        elif choice == "5":
            print("Thank you for using To-Do List Manager. Goodbye!")
            break
        else:
            print("Invalid choice. Please enter a number from 1 to 5.")
if __name__ == "__main__":
    main()
```

OUTPUT:

```
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING> & "C:\Users\Pranitha Rao\AppData\Local\Microsoft\WindowsApps\python3.13.exe" "c:/Users/Pranitha Rao/OneDrive/Desktop/AI ASSISTED CODING/Lab-9.py"

--- To-Do List Manager ---
1. Add Task
2. Remove Task
3. Update Task
4. View Tasks
5. Exit
Enter your choice (1-5): 1
Enter task to add: Dance
Task 'Dance' added successfully!

--- To-Do List Manager ---
1. Add Task
2. Remove Task
3. Update Task
4. View Tasks
5. Exit
Enter your choice (1-5): 2

--- Your Tasks ---
1. Dance

Enter task number to remove: 3
Invalid task number.

--- To-Do List Manager ---
1. Add Task
2. Remove Task
3. Update Task
```

```
--- To-Do List Manager ---
1. Add Task
2. Remove Task
3. Update Task
4. View Tasks
5. Exit
Enter your choice (1-5): 4


--- Your Tasks ---
1. Dance


--- To-Do List Manager ---
1. Add Task
2. Remove Task
3. Update Task
4. View Tasks
5. Exit
Enter your choice (1-5): 5
Thank you for using To-Do List Manager. Goodbye!
PS C:\Users\Pranitha Rao\OneDrive\Desktop\AI ASSISTED CODING>
```

JUSTIFICATION: This example demonstrates how a simple to-do list program can be enhanced by automatically adding structured Google-style docstrings to functions and classes. The script manages tasks using a TodoListManager class and provides features like adding, removing, updating, and viewing tasks through user input. By replacing informal comments with clear docstrings, the code becomes easier to understand, more consistent, and suitable for shared or internal projects. Overall, it shows how AI-assisted documentation scaffolding can quickly improve code readability and maintainability without changing the program's core logic.