AI – ASSISTANT – CODING – LAB – 6. 4

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Batch : 42

Task 1: Student Performance Evaluation System

Scenario

You are building a simple academic management module for a university system where student performance needs to be evaluated automatically.

Task Description

Create the skeleton of a Python class named Student with the attributes:

- name
- roll_number
- marks

Write only the class definition and attribute initialization.

Then, using GitHub Copilot, prompt the tool to complete:

- A method to display student details
- A method that checks whether the student's marks are above the class average and returns an appropriate message

Prompt :

Create a Python class named Student with attributes name, roll_number, and marks .

Add a method to display student details .

Add a method that checks whether the student's marks are above the class average .

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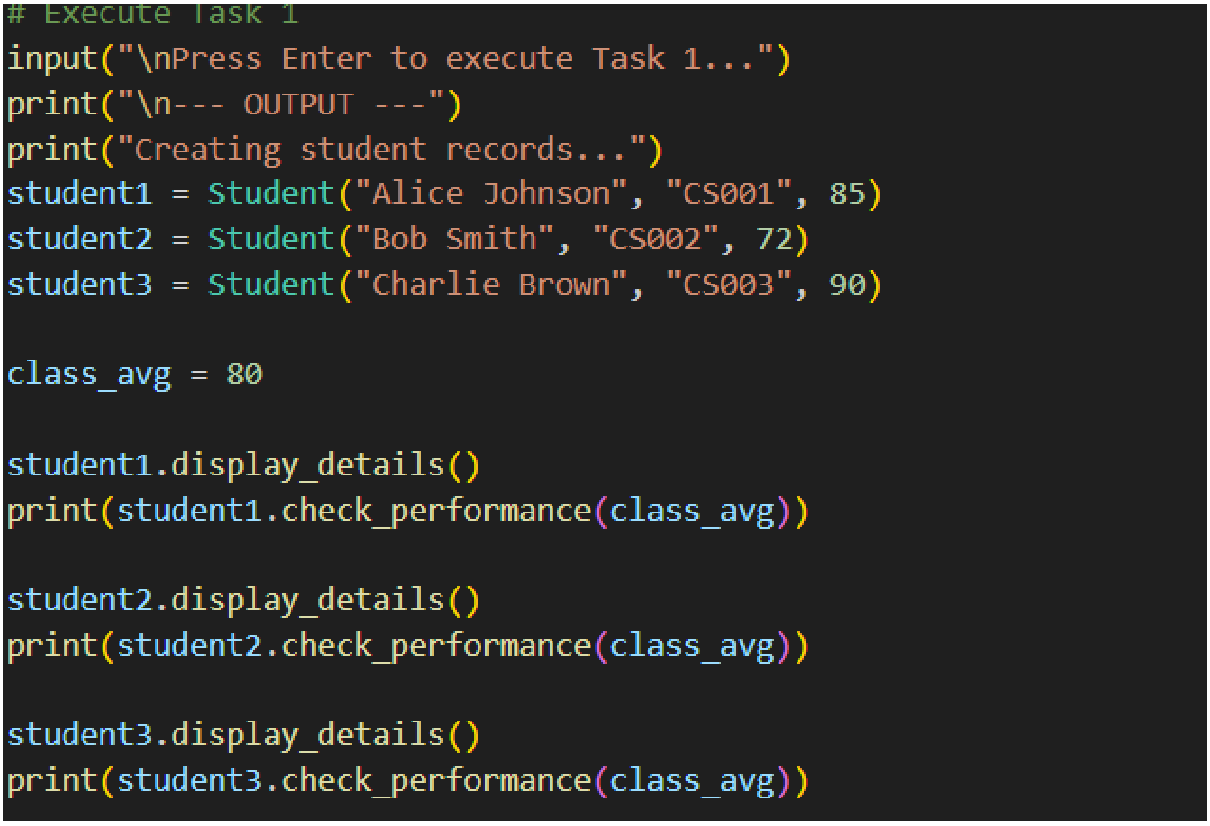
CODE :



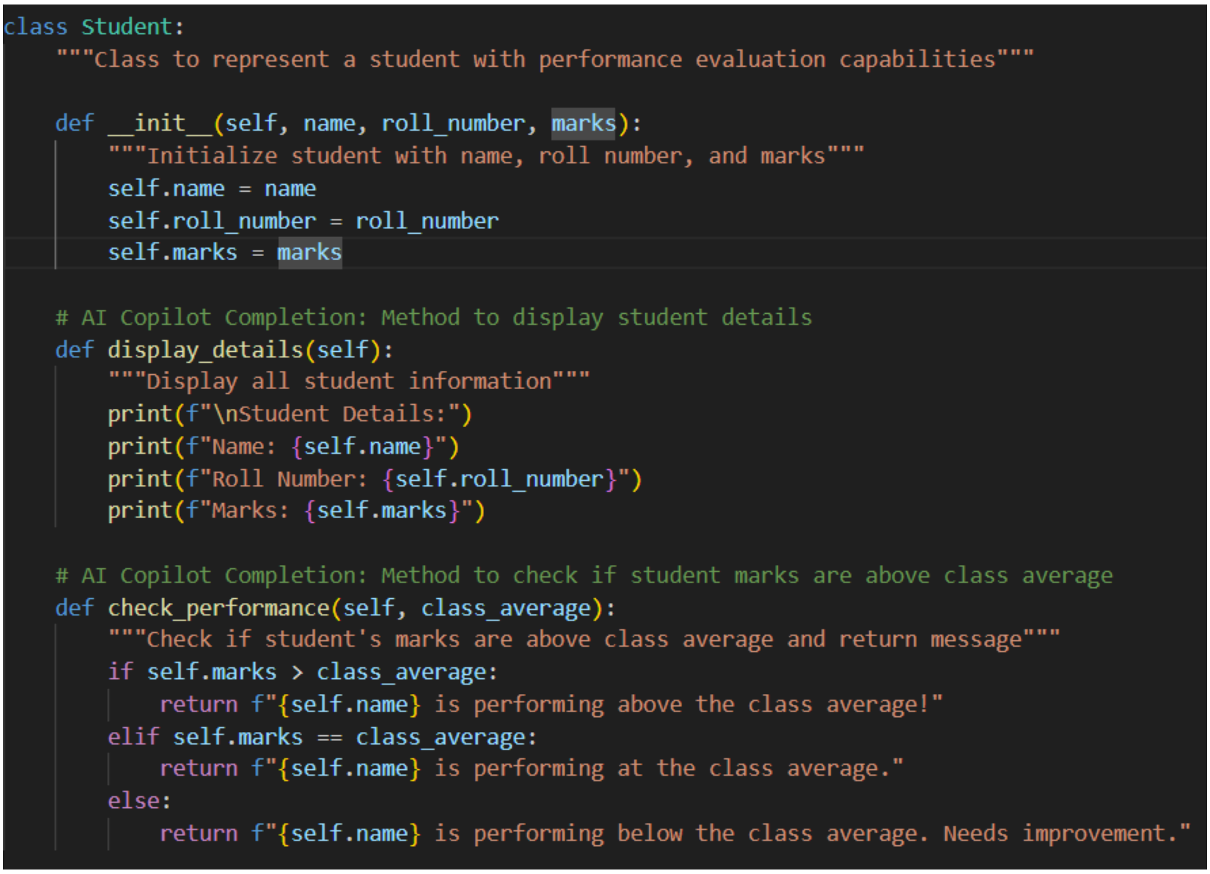
```
# Execute Task 1
input("\nPress Enter to execute Task 1...")
print("\n--- OUTPUT ---")
print("Creating student records...")
student1 = Student("Alice Johnson", "CS001", 85)
student2 = Student("Bob Smith", "CS002", 72)
student3 = Student("Charlie Brown", "CS003", 90)

class_avg = 80

student1.display_details()
print(student1.check_performance(class_avg))

student2.display_details()
print(student2.check_performance(class_avg))

student3.display_details()
print(student3.check_performance(class_avg))
```



```
class Student:
    """Class to represent a student with performance evaluation capabilities"""

    def __init__(self, name, roll_number, marks):
        """Initialize student with name, roll number, and marks"""
        self.name = name
        self.roll_number = roll_number
        self.marks = marks

    # AI Copilot Completion: Method to display student details
    def display_details(self):
        """Display all student information"""
        print(f"\nStudent Details:")
        print(f"Name: {self.name}")
        print(f"Roll Number: {self.roll_number}")
        print(f"Marks: {self.marks}")

    # AI Copilot Completion: Method to check if student marks are above class average
    def check_performance(self, class_average):
        """Check if student's marks are above class average and return message"""
        if self.marks > class_average:
            return f"{self.name} is performing above the class average!"
        elif self.marks == class_average:
            return f"{self.name} is performing at the class average."
        else:
            return f"{self.name} is performing below the class average. Needs improvement."
```

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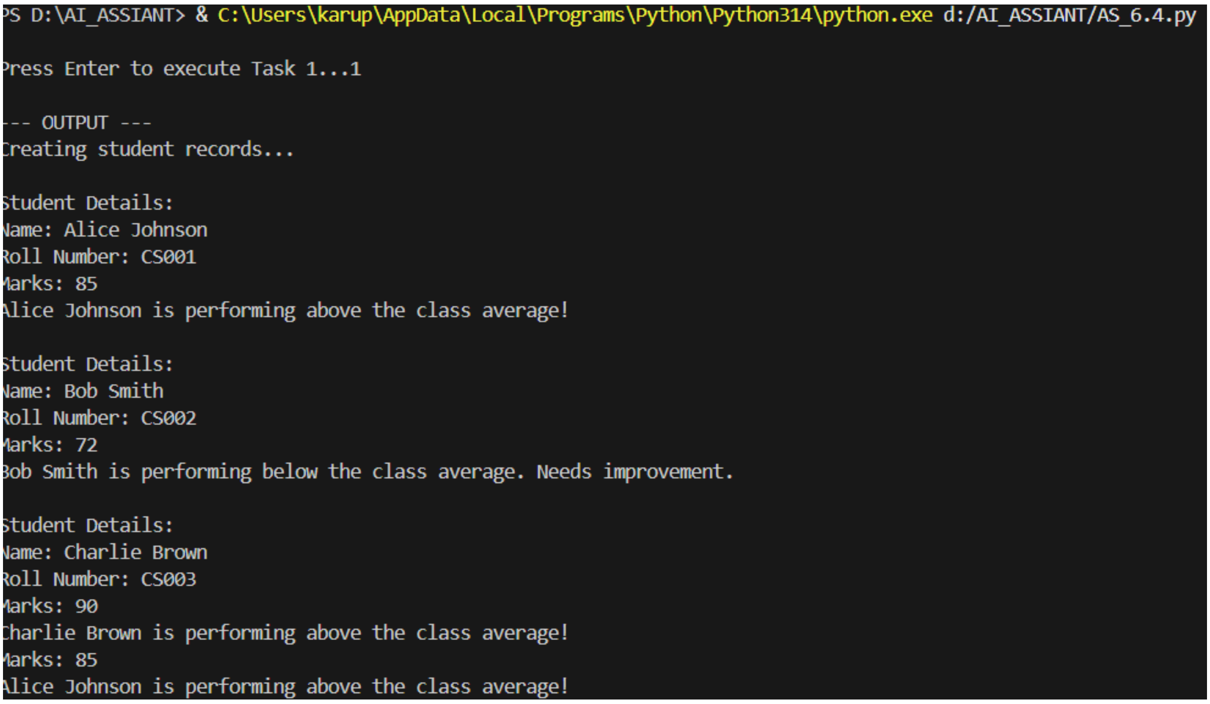
Output :



```
PS D:\AI_ASSIANT> & C:\Users\karup\AppData\Local\Programs\Python\Python314\python.exe d:/AI_ASSIANT/AS_6.4.py

Press Enter to execute Task 1...1

--- OUTPUT ---
Creating student records...

Student Details:
Name: Alice Johnson
Roll Number: CS001
Marks: 85
Alice Johnson is performing above the class average!

Student Details:
Name: Bob Smith
Roll Number: CS002
Marks: 72
Bob Smith is performing below the class average. Needs improvement.

Student Details:
Name: Charlie Brown
Roll Number: CS003
Marks: 90
Charlie Brown is performing above the class average!
Marks: 85
Alice Johnson is performing above the class average!
```

Justification :

This task demonstrates the application of object-oriented programming concepts such as classes, objects, constructors, and methods to model student data. AI-assisted code generation helps in structuring the program efficiently and implementing performance evaluation logic based on class averages, improving maintainability and readability of the code.

Task 2: Data Processing in a Monitoring System

Scenario

You are working on a basic data monitoring script where sensor readings

are collected as numbers. Only even readings need further processing.

Task Description

Write the initial part of a for loop to iterate over a list of integers

representing sensor readings.

Add a comment prompt instructing GitHub Copilot to:

• Identify even numbers

• Calculate their square

• Print the result in a readable format

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Allow Copilot to complete the remaining loop logic.

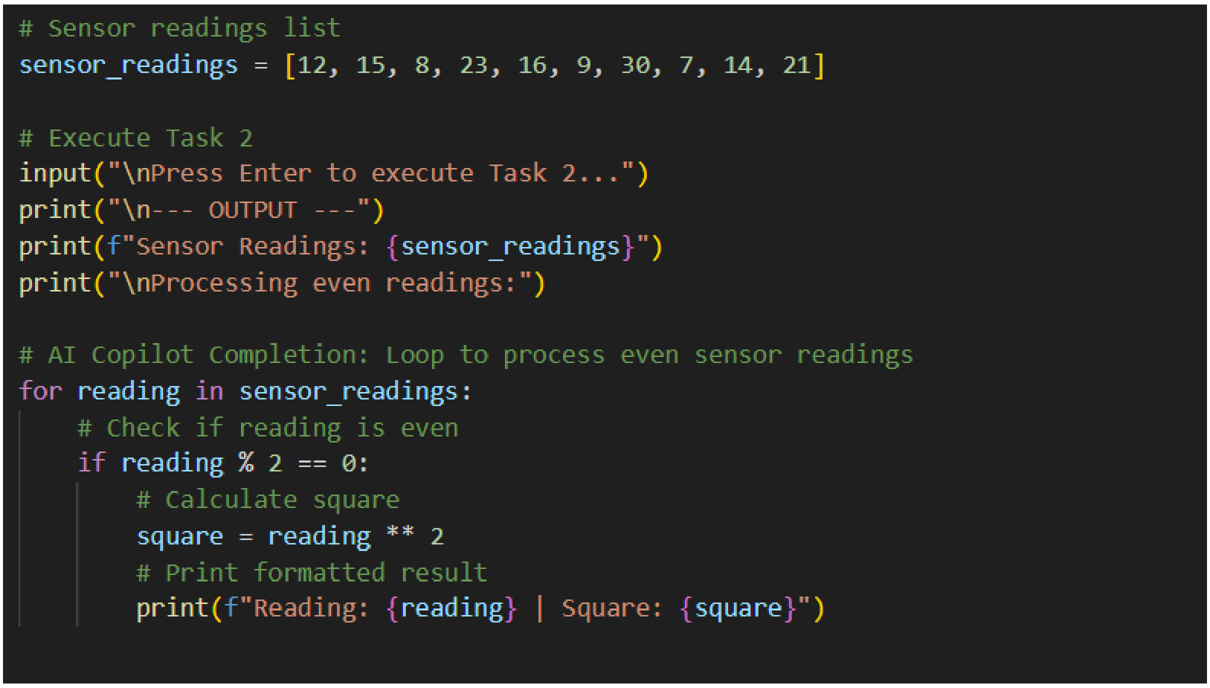
Prompt :

Write a for loop to iterate over a list of sensor readings .

Identify even numbers using modulus operator .

Calculate the square of even numbers and print in readable format .

Code :

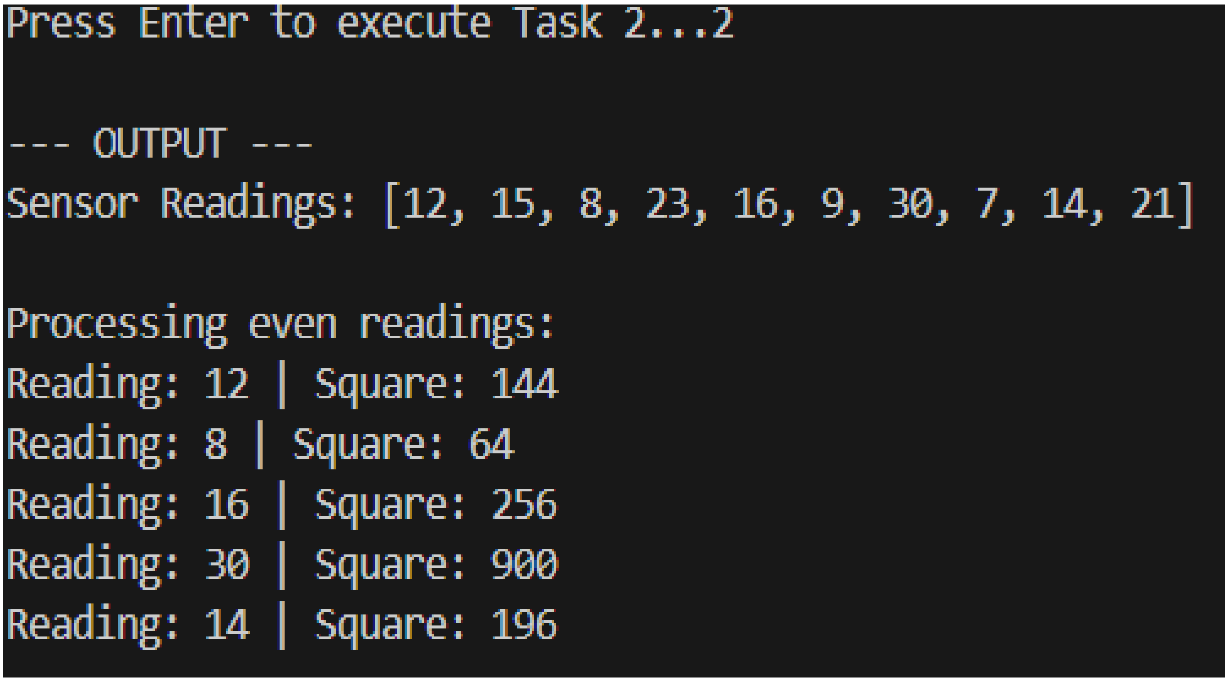


```
# Sensor readings list
sensor_readings = [12, 15, 8, 23, 16, 9, 30, 7, 14, 21]

# Execute Task 2
input("\nPress Enter to execute Task 2...")
print("\n--- OUTPUT ---")
print(f"Sensor Readings: {sensor_readings}")
print("\nProcessing even readings:")

# AI Copilot Completion: Loop to process even sensor readings
for reading in sensor_readings:
    # Check if reading is even
    if reading % 2 == 0:
        # Calculate square
        square = reading ** 2
        # Print formatted result
        print(f"Reading: {reading} | Square: {square}")
```

Output :



```
Press Enter to execute Task 2...2

--- OUTPUT ---
Sensor Readings: [12, 15, 8, 23, 16, 9, 30, 7, 14, 21]

Processing even readings:
Reading: 12 | Square: 144
Reading: 8 | Square: 64
Reading: 16 | Square: 256
Reading: 30 | Square: 900
Reading: 14 | Square: 196
```

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Justification :

This task shows how looping structures and conditional checks are used to analyze sensor readings systematically. AI-generated code reduces manual effort in writing repetitive logic for filtering values and performing calculations, ensuring faster development and accurate data processing.

Task 3: Banking Transaction Simulation

Scenario

You are developing a basic banking module that handles deposits and

withdrawals for customers.

Task Description

Create the structure of a Python class named BankAccount with

attributes:

- account_holder
- balance

Use GitHub Copilot to complete methods for:

- Depositing money
- Withdrawing money
- Preventing withdrawals when the balance is insufficient

Guide Copilot using method names and short comments.

Prompt :

Create a class BankAccount with attributes account_holder and balance .

Add a method to deposit money into the account .

Add a method to withdraw money with balance validation .

Prevent withdrawals when balance is insufficient .

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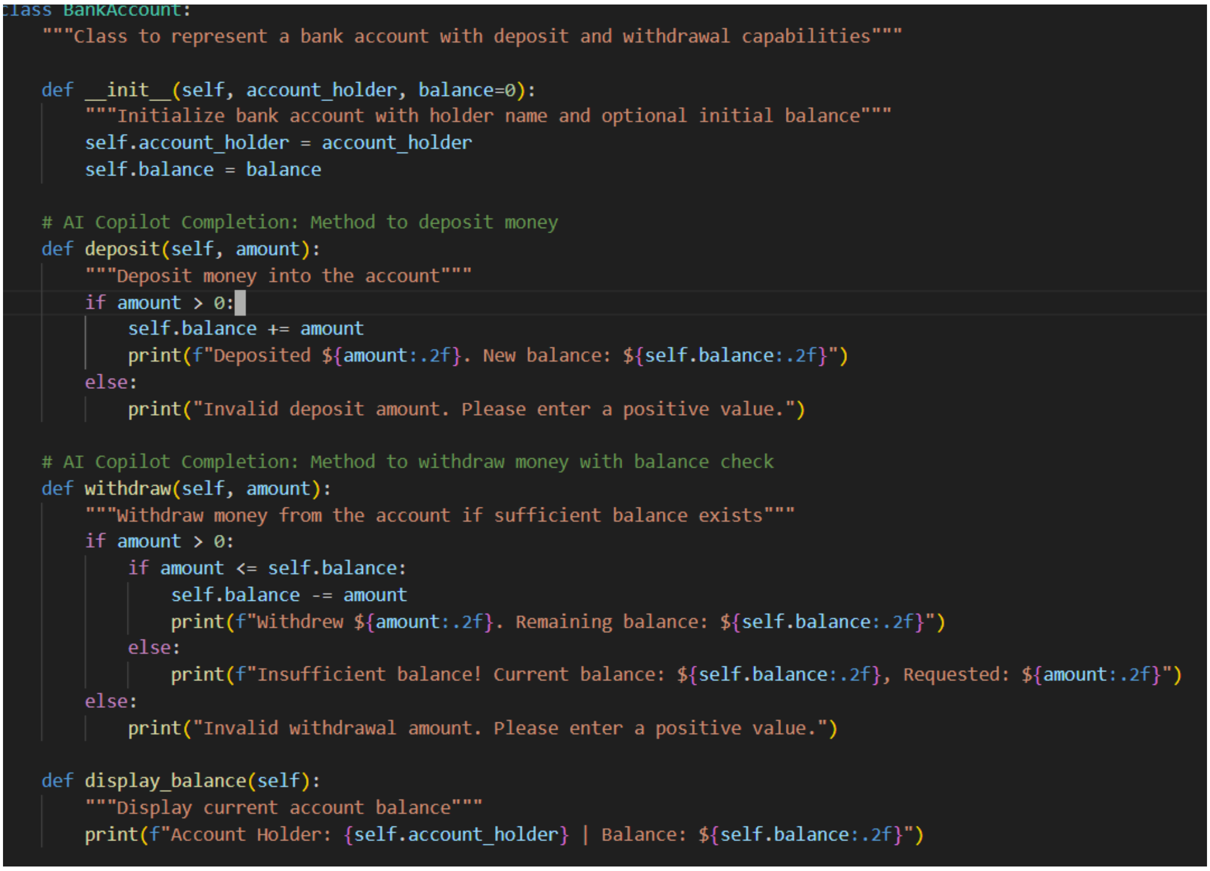
Code :



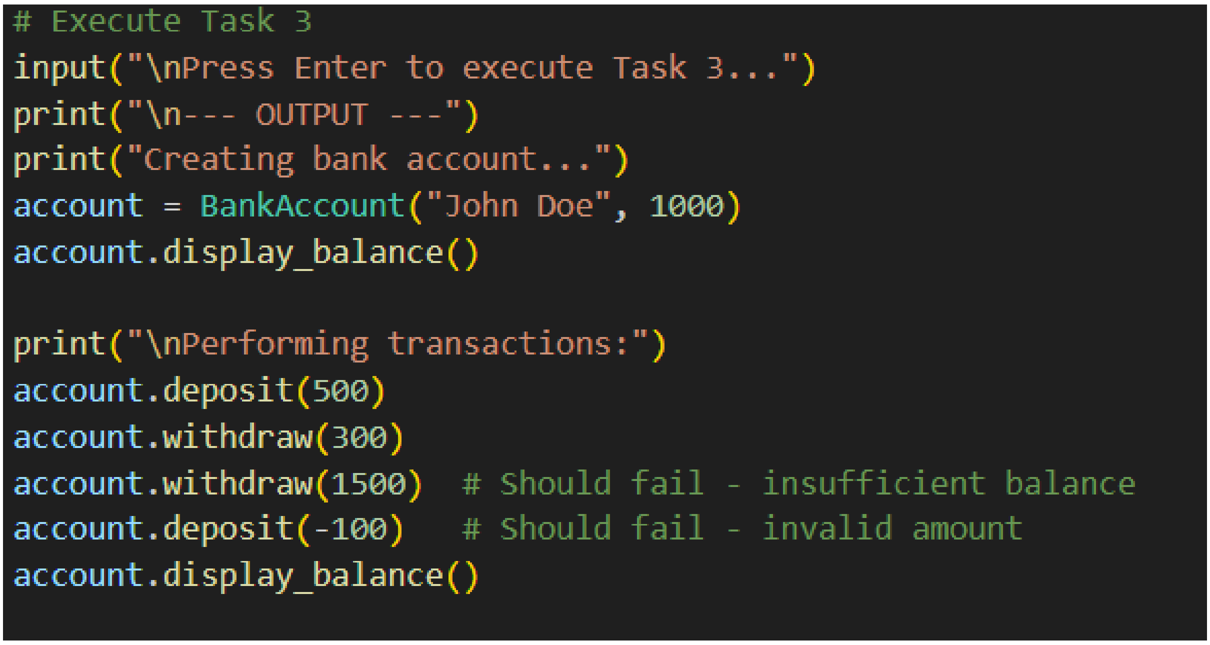
```python
class BankAccount:
    """Class to represent a bank account with deposit and withdrawal capabilities"""

    def __init__(self, account_holder, balance=0):
        """Initialize bank account with holder name and optional initial balance"""
        self.account_holder = account_holder
        self.balance = balance

    # AI Copilot Completion: Method to deposit money
    def deposit(self, amount):
        """Deposit money into the account"""
        if amount > 0:
            self.balance += amount
            print(f"Deposited ${amount:.2f}. New balance: ${self.balance:.2f}")
        else:
            print("Invalid deposit amount. Please enter a positive value.")

    # AI Copilot Completion: Method to withdraw money with balance check
    def withdraw(self, amount):
        """Withdraw money from the account if sufficient balance exists"""
        if amount > 0:
            if amount <= self.balance:
                self.balance -= amount
                print(f"Withdrew ${amount:.2f}. Remaining balance: ${self.balance:.2f}")
            else:
                print(f"Insufficient balance! Current balance: ${self.balance:.2f}, Requested: ${amount:.2f}")
        else:
            print("Invalid withdrawal amount. Please enter a positive value.")

    def display_balance(self):
        """Display current account balance"""
        print(f"Account Holder: {self.account_holder} | Balance: ${self.balance:.2f}")
```



```python
# Execute Task 3
input("\nPress Enter to execute Task 3...")
print("\n--- OUTPUT ---")
print("Creating bank account...")
account = BankAccount("John Doe", 1000)
account.display_balance()

print("\nPerforming transactions:")
account.deposit(500)
account.withdraw(300)
account.withdraw(1500)  # Should fail - insufficient balance
account.deposit(-100)   # Should fail - invalid amount
account.display_balance()
```

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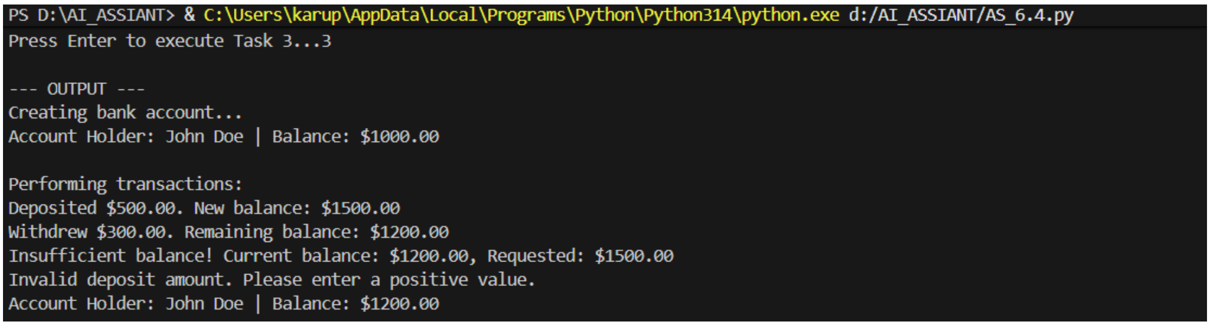
Output :



```
PS D:\AI_ASSIANT> & C:\Users\karup\AppData\Local\Programs\Python\Python314\python.exe d:/AI_ASSIANT/AS_6.4.py
Press Enter to execute Task 3...3

--- OUTPUT ---
Creating bank account...
Account Holder: John Doe | Balance: $1000.00

Performing transactions:
Deposited $500.00. New balance: $1500.00
Withdrew $300.00. Remaining balance: $1200.00
Insufficient balance! Current balance: $1200.00, Requested: $1500.00
Invalid deposit amount. Please enter a positive value.
Account Holder: John Doe | Balance: $1200.00
```

Justification :

This task represents real-world banking operations by implementing secure deposit and withdrawal functionality using proper validation rules. AI-assisted coding supports the correct use of conditions and class methods to prevent invalid transactions, making the system reliable and user-safe.

Task 4: Student Scholarship Eligibility Check

Scenario

A university wants to identify students eligible for a merit-based

scholarship based on their scores.

Task Description

Define a list of dictionaries where each dictionary represents a student

with:

- name

- score

Write the initialization and list structure yourself.

Then, prompt GitHub Copilot to generate a while loop that:

- Iterates through the list

- Prints the names of students who scored more than 75

Use comments to guide Copilot's code completion.

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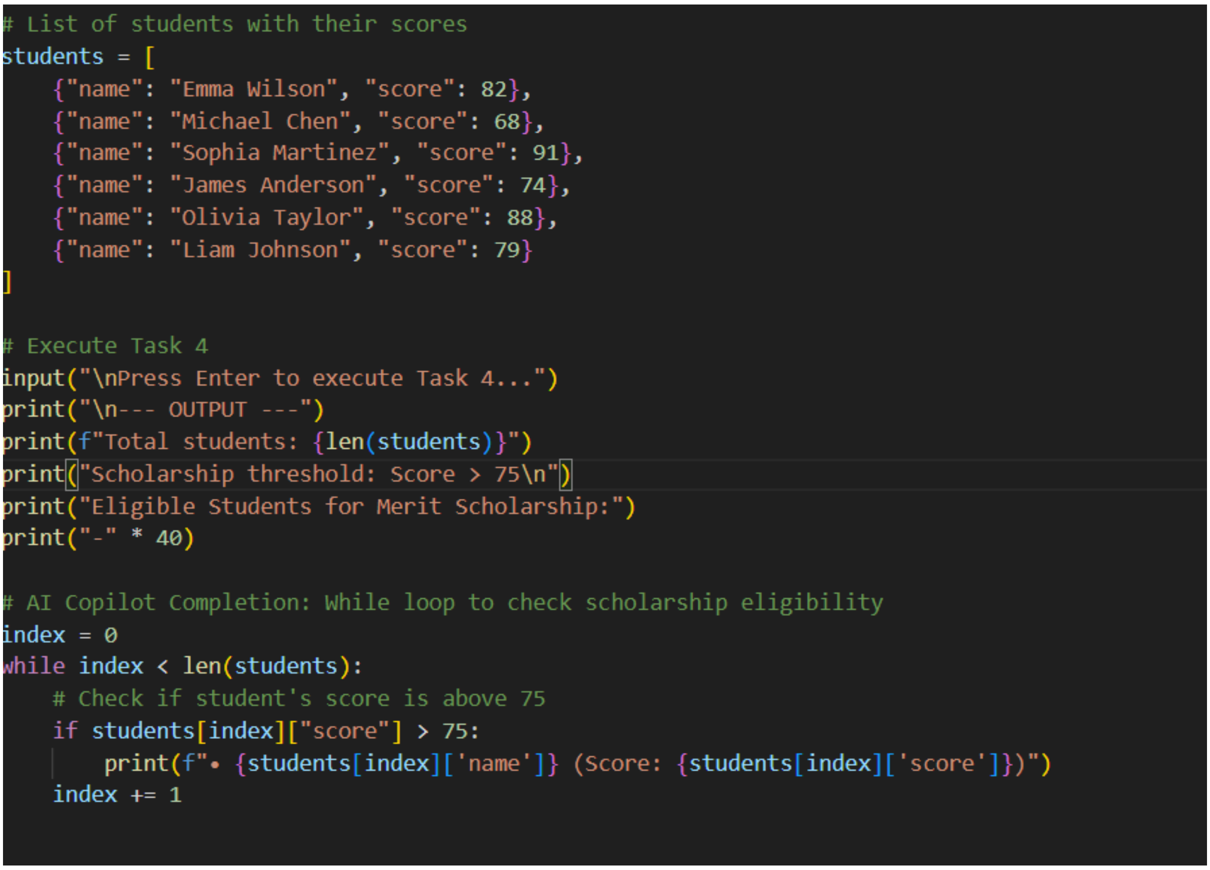
Prompt :

Create a list of dictionaries with student name and score .

Write a while loop to iterate through the student list .

Print names of students who scored more than 75 .

Code :

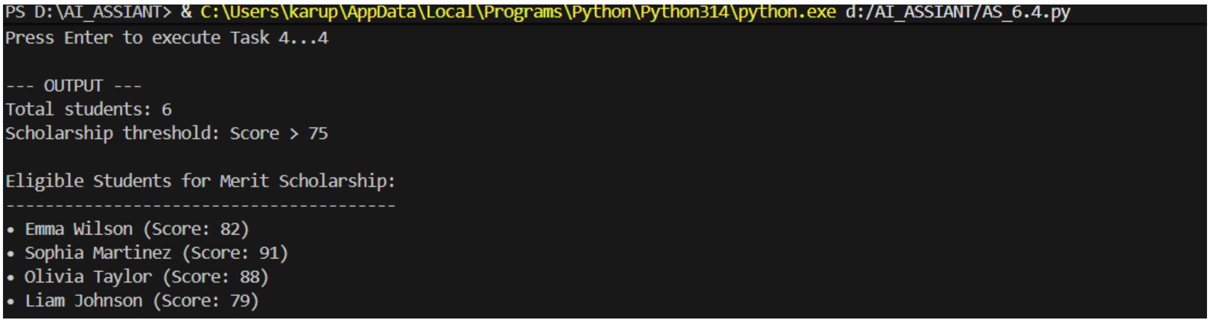


```python
# List of students with their scores
students = [
    {"name": "Emma Wilson", "score": 82},
    {"name": "Michael Chen", "score": 68},
    {"name": "Sophia Martinez", "score": 91},
    {"name": "James Anderson", "score": 74},
    {"name": "Olivia Taylor", "score": 88},
    {"name": "Liam Johnson", "score": 79}
]

# Execute Task 4
input("\nPress Enter to execute Task 4...")
print("\n--- OUTPUT ---")
print(f"Total students: {len(students)}")
print("Scholarship threshold: Score > 75\n")
print("Eligible Students for Merit Scholarship:")
print("-" * 40)

# AI Copilot Completion: While loop to check scholarship eligibility
index = 0
while index < len(students):
    # Check if student's score is above 75
    if students[index]["score"] > 75:
        print(f"• {students[index]['name']} (Score: {students[index]['score']})")
    index += 1
```

Output :



```
PS D:\AI_ASSIANT> & C:\Users\karup\AppData\Local\Programs\Python\Python314\python.exe d:/AI_ASSIANT/AS_6.4.py
Press Enter to execute Task 4...4

--- OUTPUT ---
Total students: 6
Scholarship threshold: Score > 75

Eligible Students for Merit Scholarship:
----------------------------------------
• Emma Wilson (Score: 82)
• Sophia Martinez (Score: 91)
• Olivia Taylor (Score: 88)
• Liam Johnson (Score: 79)
```

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Justification :

This task emphasizes the use of iterative control structures and list handling to process multiple student records. AI-based code completion helps automate the evaluation of eligibility criteria, making the decision-making process efficient and consistent.

Task 5: Online Shopping Cart Module

Scenario

You are designing a simplified shopping cart system for an e-commerce

website that supports item management and discount calculation.

Task Description

Begin writing a Python class named ShoppingCart with:

• An empty list to store items (each item may include name, price,

quantity)

Use GitHub Copilot to generate methods that:

• Add items to the cart

• Remove items from the cart

• Calculate the total bill using a loop

• Apply conditional discounts (e.g., discount if total exceeds a

certain amount)

Use meaningful comments and method names to guide Copilot.

Prompt :

Create a class ShoppingCart with an empty list to store items .

Add a method to add items to the cart with name, price, quantity.

Add a method to remove items from the cart by name .

Add a method to calculate total bill using a loop .

Add a method to apply conditional discounts based on total amount .

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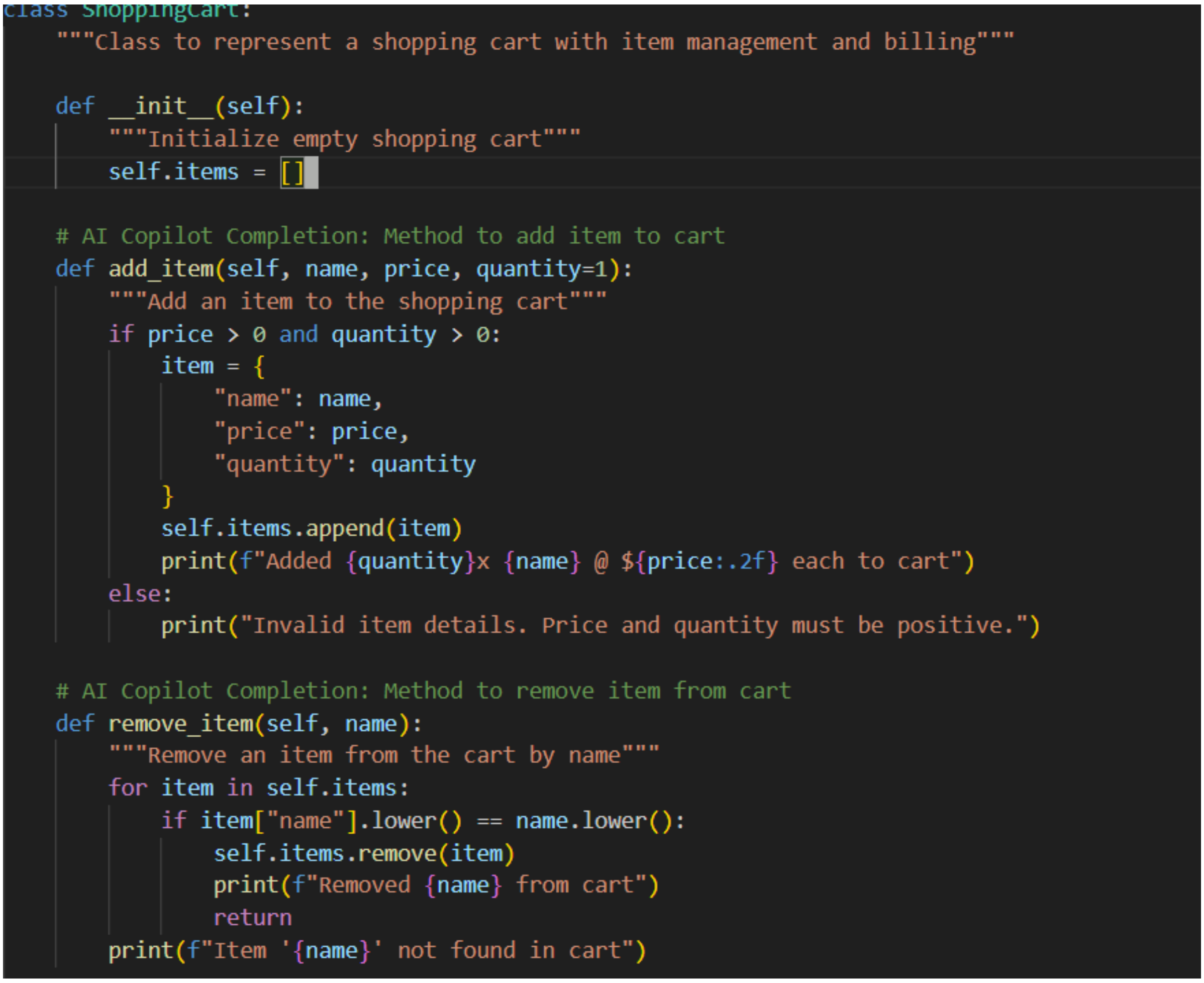
Code :



```python
class ShoppingCart:
    """Class to represent a shopping cart with item management and billing"""

    def __init__(self):
        """Initialize empty shopping cart"""
        self.items = []

    # AI Copilot Completion: Method to add item to cart
    def add_item(self, name, price, quantity=1):
        """Add an item to the shopping cart"""
        if price > 0 and quantity > 0:
            item = {
                "name": name,
                "price": price,
                "quantity": quantity
            }
            self.items.append(item)
            print(f"Added {quantity}x {name} @ ${price:.2f} each to cart")
        else:
            print("Invalid item details. Price and quantity must be positive.")

    # AI Copilot Completion: Method to remove item from cart
    def remove_item(self, name):
        """Remove an item from the cart by name"""
        for item in self.items:
            if item["name"].lower() == name.lower():
                self.items.remove(item)
                print(f"Removed {name} from cart")
                return
        print(f"Item '{name}' not found in cart")
```

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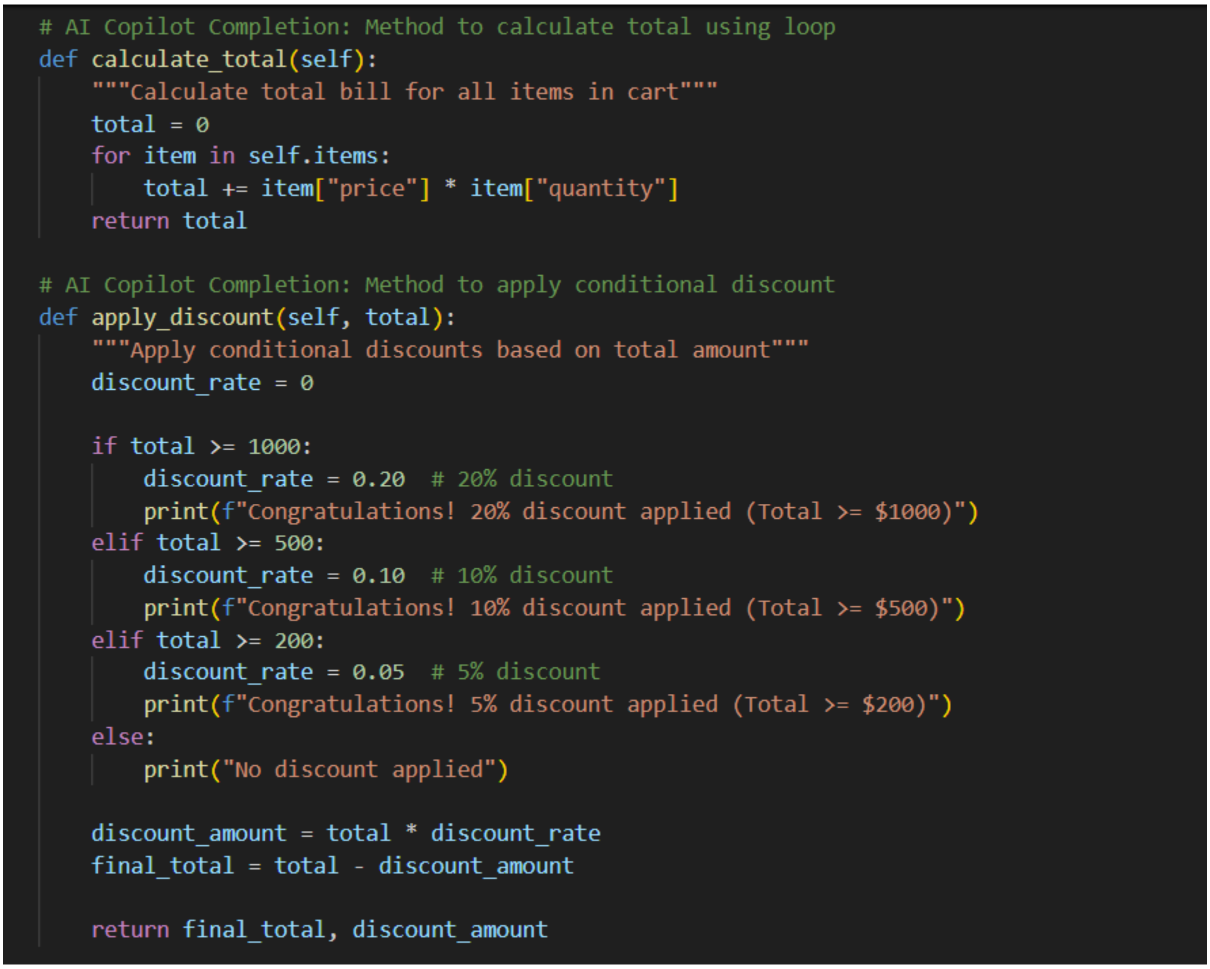


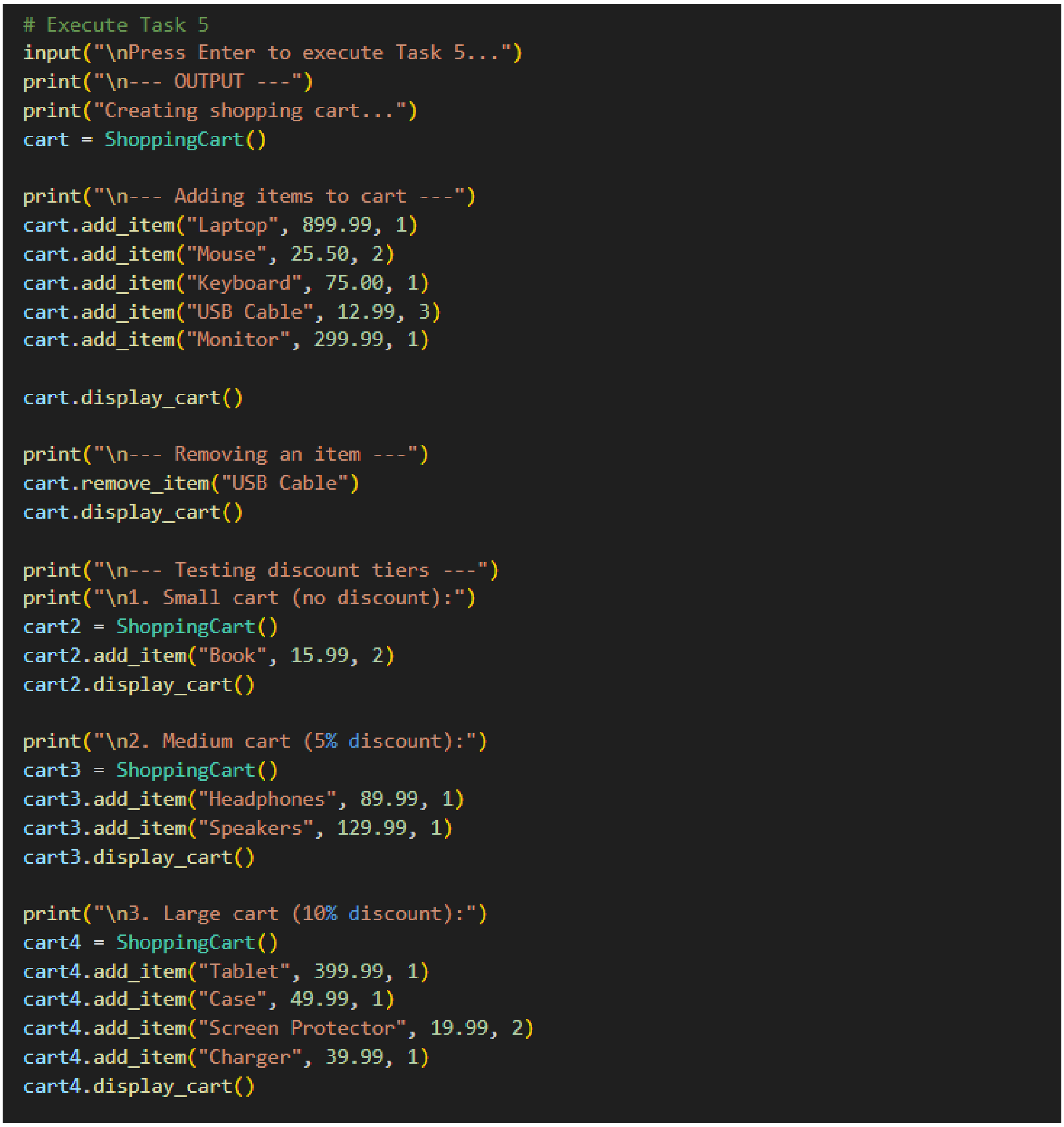
```python
# AI Copilot Completion: Method to calculate total using loop
def calculate_total(self):
    """Calculate total bill for all items in cart"""
    total = 0
    for item in self.items:
        total += item["price"] * item["quantity"]
    return total

# AI Copilot Completion: Method to apply conditional discount
def apply_discount(self, total):
    """Apply conditional discounts based on total amount"""
    discount_rate = 0

    if total >= 1000:
        discount_rate = 0.20  # 20% discount
        print(f"Congratulations! 20% discount applied (Total >= $1000)")
    elif total >= 500:
        discount_rate = 0.10  # 10% discount
        print(f"Congratulations! 10% discount applied (Total >= $500)")
    elif total >= 200:
        discount_rate = 0.05  # 5% discount
        print(f"Congratulations! 5% discount applied (Total >= $200)")
    else:
        print("No discount applied")

    discount_amount = total * discount_rate
    final_total = total - discount_amount

    return final_total, discount_amount
```



```python
# Execute Task 5
input("\nPress Enter to execute Task 5...")
print("\n--- OUTPUT ---")
print("Creating shopping cart...")
cart = ShoppingCart()

print("\n--- Adding items to cart ---")
cart.add_item("Laptop", 899.99, 1)
cart.add_item("Mouse", 25.50, 2)
cart.add_item("Keyboard", 75.00, 1)
cart.add_item("USB Cable", 12.99, 3)
cart.add_item("Monitor", 299.99, 1)

cart.display_cart()

print("\n--- Removing an item ---")
cart.remove_item("USB Cable")
cart.display_cart()

print("\n--- Testing discount tiers ---")
print("\n1. Small cart (no discount):")
cart2 = ShoppingCart()
cart2.add_item("Book", 15.99, 2)
cart2.display_cart()

print("\n2. Medium cart (5% discount):")
cart3 = ShoppingCart()
cart3.add_item("Headphones", 89.99, 1)
cart3.add_item("Speakers", 129.99, 1)
cart3.display_cart()

print("\n3. Large cart (10% discount):")
cart4 = ShoppingCart()
cart4.add_item("Tablet", 399.99, 1)
cart4.add_item("Case", 49.99, 1)
cart4.add_item("Screen Protector", 19.99, 2)
cart4.add_item("Charger", 39.99, 1)
cart4.display_cart()
```

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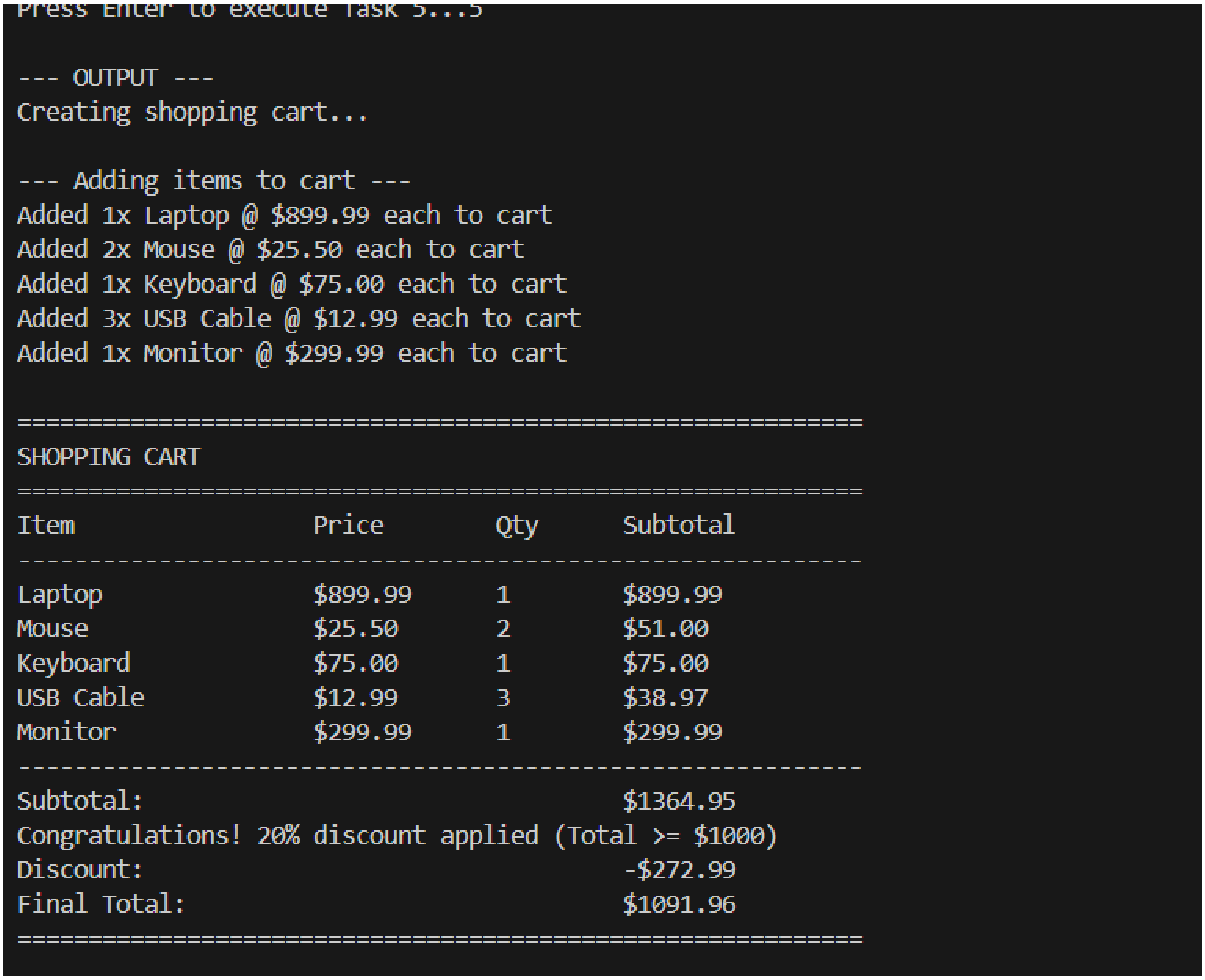
Output :



```
Press Enter to execute Task 5...5

--- OUTPUT ---
Creating shopping cart...

--- Adding items to cart ---
Added 1x Laptop @ $899.99 each to cart
Added 2x Mouse @ $25.50 each to cart
Added 1x Keyboard @ $75.00 each to cart
Added 3x USB Cable @ $12.99 each to cart
Added 1x Monitor @ $299.99 each to cart

============================================================
SHOPPING CART
============================================================
Item                 Price        Qty      Subtotal
------------------------------------------------------------
Laptop               $899.99      1        $899.99
Mouse                $25.50       2        $51.00
Keyboard             $75.00       1        $75.00
USB Cable            $12.99       3        $38.97
Monitor              $299.99      1        $299.99
------------------------------------------------------------
Subtotal:                                  $1364.95
Congratulations! 20% discount applied (Total >= $1000)
Discount:                                  -$272.99
Final Total:                               $1091.96
============================================================
```

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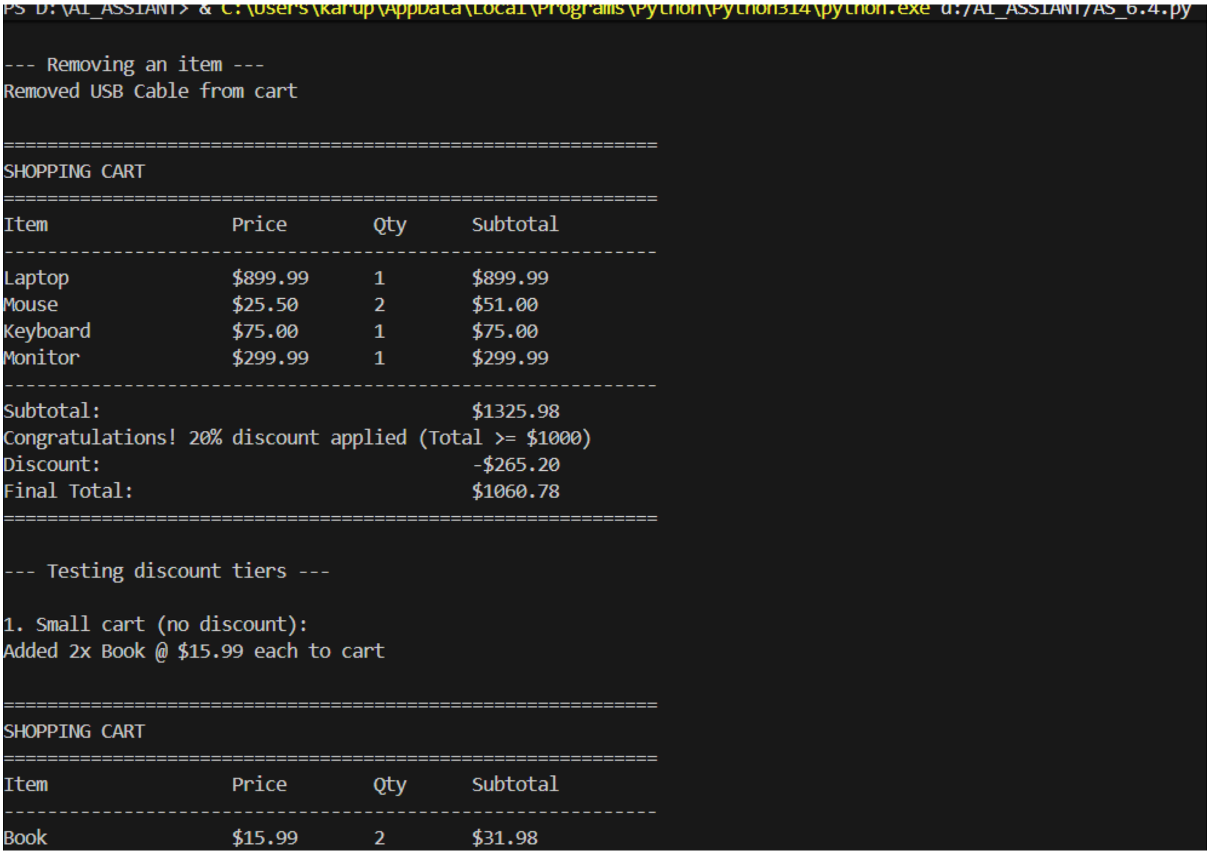
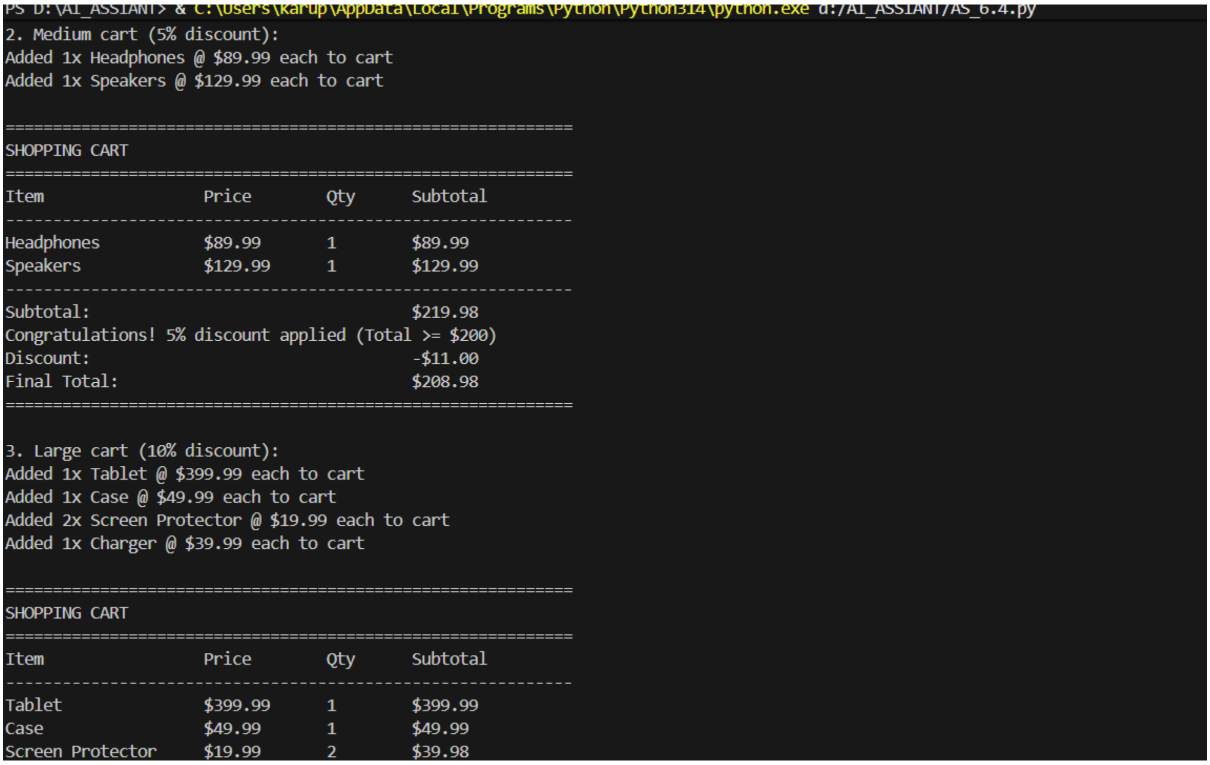


```
PS D:\AI_ASSIANT> & C:\Users\karup\AppData\Local\Programs\Python\Python314\python.exe d:/AI_ASSIANT/AS_6.4.py

--- Removing an item ---
Removed USB Cable from cart

============================================================
SHOPPING CART
============================================================
Item                 Price        Qty      Subtotal
------------------------------------------------------------
Laptop               $899.99      1        $899.99
Mouse                $25.50       2        $51.00
Keyboard             $75.00       1        $75.00
Monitor              $299.99      1        $299.99
------------------------------------------------------------
Subtotal:                                  $1325.98
Congratulations! 20% discount applied (Total >= $1000)
Discount:                                  -$265.20
Final Total:                               $1060.78
============================================================

--- Testing discount tiers ---

1. Small cart (no discount):
Added 2x Book @ $15.99 each to cart

============================================================
SHOPPING CART
============================================================
Item                 Price        Qty      Subtotal
------------------------------------------------------------
Book                 $15.99       2        $31.98
```



```
PS D:\AI_ASSIANT> & C:\Users\karup\AppData\Local\Programs\Python\Python314\python.exe d:/AI_ASSIANT/AS_6.4.py
2. Medium cart (5% discount):
Added 1x Headphones @ $89.99 each to cart
Added 1x Speakers @ $129.99 each to cart

============================================================
SHOPPING CART
============================================================
Item                 Price        Qty      Subtotal
------------------------------------------------------------
Headphones           $89.99       1        $89.99
Speakers             $129.99      1        $129.99
------------------------------------------------------------
Subtotal:                                  $219.98
Congratulations! 5% discount applied (Total >= $200)
Discount:                                  -$11.00
Final Total:                               $208.98
============================================================

3. Large cart (10% discount):
Added 1x Tablet @ $399.99 each to cart
Added 1x Case @ $49.99 each to cart
Added 2x Screen Protector @ $19.99 each to cart
Added 1x Charger @ $39.99 each to cart

============================================================
SHOPPING CART
============================================================
Item                 Price        Qty      Subtotal
------------------------------------------------------------
Tablet               $399.99      1        $399.99
Case                 $49.99       1        $49.99
Screen Protector     $19.99       2        $39.98
```

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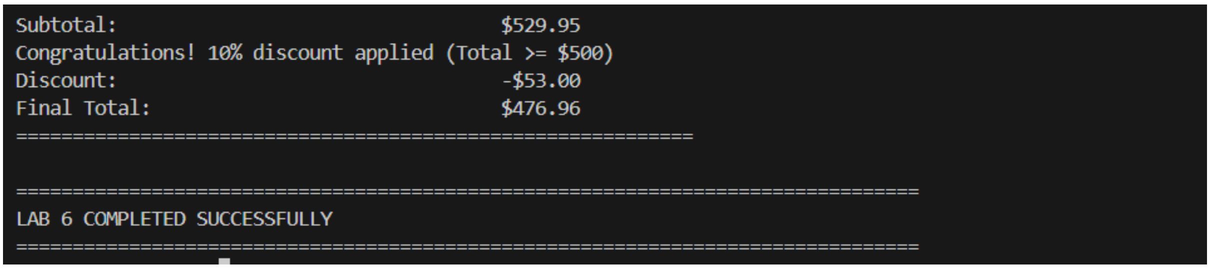

```
Subtotal:                                  $529.95
Congratulations! 10% discount applied (Total >= $500)
Discount:                                  -$53.00
Final Total:                               $476.96
============================================================

================================================================================
LAB 6 COMPLETED SUCCESSFULLY
================================================================================
```

Justification :

This task demonstrates how multiple programming concepts are combined to build a functional shopping cart system. AI-generated code simplifies the implementation of product handling, price calculation, and discount application, resulting in a scalable and realistic e-commerce simulation.