

AI-Assisted Coding

Assignment-6.3

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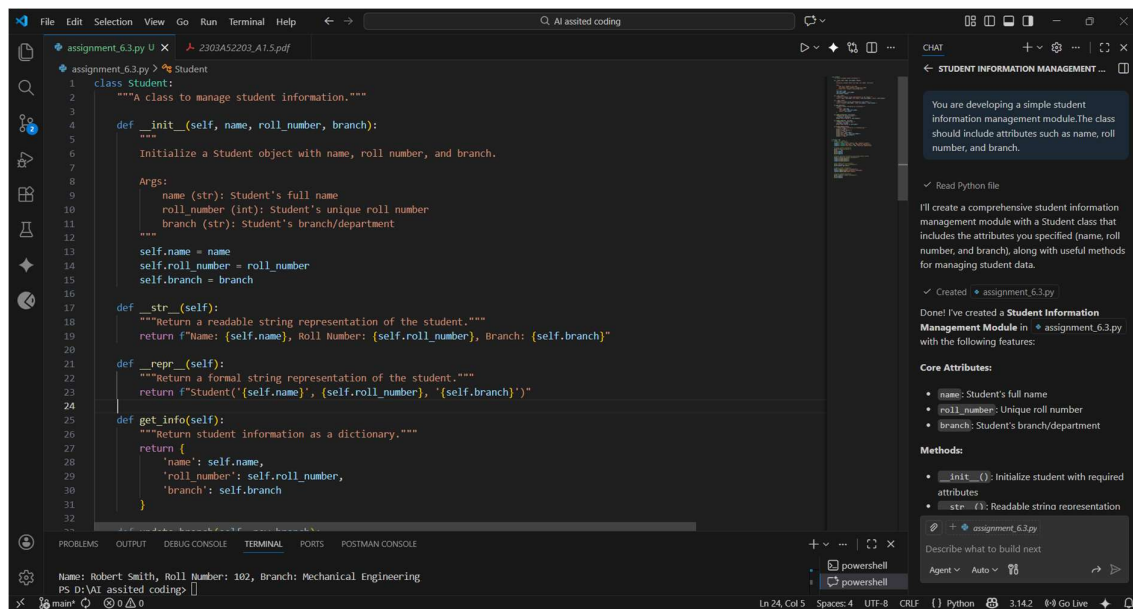
Rollno: 2303A52203

Batch: 45

Task1: Classes (Student Class)

=>Use an AI tool (GitHub Copilot) to complete a Student class.

=>The class should include attributes such as name, roll number, and branch.



The screenshot shows a Visual Studio Code editor with a Python file named `assignment_63.py`. The code defines a `Student` class with the following methods:

```
1 class Student:
2     """A class to manage student information."""
3
4     def __init__(self, name, roll_number, branch):
5         """
6         Initialize a Student object with name, roll number, and branch.
7
8         Args:
9             name (str): Student's full name
10            roll_number (int): Student's unique roll number
11            branch (str): Student's branch/department
12
13            """
14            self.name = name
15            self.roll_number = roll_number
16            self.branch = branch
17
18            def __str__(self):
19                """Return a readable string representation of the student."""
20                return f"Name: {self.name}, Roll Number: {self.roll_number}, Branch: {self.branch}"
21
22            def __repr__(self):
23                """Return a formal string representation of the student."""
24                return f"Student('{self.name}', {self.roll_number}, '{self.branch}')"
25
26            def get_info(self):
27                """Return student information as a dictionary."""
28                return {
29                    'name': self.name,
30                    'roll_number': self.roll_number,
31                    'branch': self.branch
32                }
```

On the right side, the GitHub Copilot chat window is open, titled "STUDENT INFORMATION MANAGEMENT ...". It contains the following text:

You are developing a simple student information management module. The class should include attributes such as name, roll number, and branch.

✓ Read Python file

I'll create a comprehensive student information management module with a `Student` class that includes the attributes you specified (name, roll number, and branch), along with useful methods for managing student data.

✓ Created `assignment_63.py`

Done! I've created a **Student Information Management Module** in `assignment_63.py` with the following features:

Core Attributes:

- `name`: Student's full name
- `roll_number`: Unique roll number
- `branch`: Student's branch/department

Methods:

- `__init__()`: Initialize student with required attributes
- `__str__()`: Readable string representation

Describe what to build next

Agent Auto powershell

At the bottom, the terminal shows the command `PS D:\AI assisted coding>` and the output `Name: Robert Smith, Roll Number: 102, Branch: Mechanical Engineering`.

=>Add a method `display_details()` to print student information.

The screenshot shows the VS Code editor with the `assignment_6.3.py` file open. The `Student` class is defined with three methods: `update_branch`, `update_name`, and `display_details`. The `display_details` method is implemented to print student information in a formatted way. The example usage section creates three student objects and prints their information.

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1 class Student:
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```

```
def update_branch(self, new_branch):
    """Update the student's branch."""
    self.branch = new_branch
    print(f"Branch updated to {self.branch}")

def update_name(self, new_name):
    """Update the student's name."""
    self.name = new_name
    print(f"Name updated to {self.name}")

def display_details(self):
    """Print student information in a formatted way."""
    print(f"{'-'*50}")
    print(f"Student Details:")
    print(f"{'-'*50}")
    print(f"Name: {self.name}")
    print(f"Roll Number: {self.roll_number}")
    print(f"Branch: {self.branch}")
    print(f"{'-'*50}")

# Example usage
if __name__ == "__main__":
    # Create student objects
    student1 = Student("Alice Johnson", 101, "Computer Science")
    student2 = Student("Bob Smith", 102, "Mechanical Engineering")
    student3 = Student("Carol White", 103, "Electrical Engineering")

    # Display student information
    print("Student Information:")
    student1.display_details()
    student2.display_details()
    student3.display_details()
```

Output in the terminal:

```
Name: Robert Smith, Roll Number: 102, Branch: Mechanical Engineering
PS D:\AI assisted coding>
```

=>Execute the code and verify the output.

The screenshot shows the VS Code editor with the `assignment_6.3.py` file open. The `display_details` method is implemented. The example usage section creates three student objects and prints their information. The terminal shows the output of the code execution.

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```

```
# create student objects
student1 = Student("Alice Johnson", 101, "Computer Science")
student2 = Student("Bob Smith", 102, "Mechanical Engineering")
student3 = Student("Carol White", 103, "Electrical Engineering")

# Display student information
print("Student Information:")
print("-" * 50)
print(student1)
print(student2)
print(student3)

# Display detailed information using display_details method
print("\n\nDetailed Student Information:")
student1.display_details()
student2.display_details()
student3.display_details()
```

Output in the terminal:

```
PS D:\AI assisted coding> cd "d:\AI assisted coding" ; python assignment_6.3.py
Student Information:
Name: Alice Johnson, Roll Number: 101, Branch: Computer Science
Name: Bob Smith, Roll Number: 102, Branch: Mechanical Engineering
Name: Carol White, Roll Number: 103, Branch: Electrical Engineering

Detailed Student Information:
Student Details:
Name: Alice Johnson
Roll Number: 101
Branch: Computer Science
```

=>Analyze the code generated by the AI tool for correctness and clarity.

The screenshot shows a VS Code editor with a Python file named `assignment_6.3.py`. The code defines a `Student` class with attributes `name`, `roll_number`, and `branch`. It includes methods for creating students, displaying their information, and displaying detailed information using a `display_details` method. The terminal output shows the execution of the script, which creates three student objects and displays their information in a formatted manner.

```
# Create student objects
student1 = Student("Alice Johnson", 101, "Computer Science")
student2 = Student("Bob Smith", 102, "Mechanical Engineering")
student3 = Student("Carol White", 103, "Electrical Engineering")

# Display student information
print("Student Information:")
print("-" * 50)
print(student1)
print(student2)
print(student3)

# Display detailed information using display_details method
print("\nDetailed Student Information:")
student1.display_details()
student2.display_details()
student3.display_details()
```

Terminal Output:

```
PS D:\AI assisted coding> cd "d:\AI assisted coding" ; python assignment_6.3.py
Updating Student Information:
Branch updated to Information Technology

Student 1 Info (Dictionary):
{'name': 'Alice Johnson', 'roll_number': 101, 'branch': 'Computer Science'}

Updating Student Information:
Branch updated to Information Technology

Updating Student Information:
Branch updated to Information Technology
Name updated to Robert Smith

Updated Student Information:
Name: Alice Johnson, Roll Number: 101, Branch: Information Technology
Name: Robert Smith, Roll Number: 102, Branch: Mechanical Engineering
```

Task Description #2: Loops (Multiples of a Number)

=>generate a funtion to print first 10 multiple of a given number

The screenshot shows a VS Code editor with a Python file named `assignment_6.3.py`. The code defines a `print_multiples` function that takes a number and a count as arguments and prints the first `count` multiples of the number. The terminal output shows the execution of the script, which prints the first 10 multiples of 7.

```
def print_multiples(number, count=10):
    """Print the first 'count' multiples of 'number'."""
    if count <= 0:
        print("Count must be a positive integer.")
        return
    print(f"First {count} multiples of {number}:")
    for i in range(1, count + 1):
        print(f"{number} x {i} = {number * i}")

# Example usage
if __name__ == "__main__":
    # Create student objects
    student1 = Student("Alice Johnson", 101, "Computer Science")
    student2 = Student("Bob Smith", 102, "Mechanical Engineering")

    # Print multiples of 7
    print_multiples(7)
```

Terminal Output:

```
PS D:\AI assisted coding> cd "d:\AI assisted coding" ; python assignment_6.3.py
Name: Robert Smith, Roll Number: 102, Branch: Mechanical Engineering

Demo: First 10 multiples of 7

First 10 multiples of 7:
7 x 1 = 7
7 x 2 = 14
7 x 3 = 21
7 x 4 = 28
7 x 5 = 35
7 x 6 = 42
7 x 7 = 49
7 x 8 = 56
7 x 9 = 63
7 x 10 = 70
```

=>Ask the AI to generate the same functionality using another controlled looping structure (e.g.,while instead of for).

```
61
62
63 def generate_multiples(number, count=10):
64     """Generate and return list of first 'count' multiples using a for loop."""
65     multiples = []
66     for i in range(1, count + 1):
67         multiples.append(number * i)
68     return multiples
69
70
71 def generate_multiples_while(number, count=10):
72     """Generate multiples using a while loop."""
73     multiples = []
74     i = 1
75     while i <= count:
76         multiples.append(number * i)
77         i += 1
78     return multiples
79
80
81 def print_multiples_compact(number, count=10):
82     """Print multiples using list comprehension (compact way)."""
83     multiples = [number * i for i in range(1, count + 1)]
84     print(f"First {count} multiples of {number} (using list comprehension):")
85     for multiple in multiples:
```

PS D:\AI assisted coding> cd "d:\AI assisted coding" ; python assignment_6.3.py

Demo: Generate multiples using for loop (return as list)
Multiples of 5: [5, 10, 15, 20, 25, 30, 35, 40, 45, 50]

Demo: Generate multiples using while loop
Multiples of 3: [3, 6, 9, 12, 15, 18, 21, 24, 27, 30]

First 10 multiples of 6 (using list comprehension):
6 12 18 24 30 36 42 48 54 60

PS D:\AI assisted coding>

CHAT

STUDENT INFORMATION MANAGEMENT MODULE DEVELOPMENT

✓ Edited • assignment_6.3.py +9 -0

✓ cd "d:\AI assisted coding" ; python assignment_6.3.py

✓ cd "d:\AI assisted coding" ; python assignment_6.3.py

✓ Fixing the demo call issue

Next I'll add a demo call to `print_multiples()` in `__main__` and run the script to show output.

✓ Edited • assignment_6.3.py +4 -0

✓ cd "d:\AI assisted coding" ; python assignment_6.3.py

✓ Completed: Add `print_multiples` function (1/2)

Done — I added `print_multiples(number, count=10)` to `assignment_6.3.py`, added a demo call (`print_multiples(7)`), and ran the script. Output verified showing the first 10 multiples of 7. Would you like a version that returns the multiples as a list instead of printing?

Claude Haiku 4.5 - 1x

use loop to generate multiples

✓ Read lines 50 to 70 of file

I'll add additional functions demonstrating different loop approaches to generate multiples:

✓ Edited • assignment_6.3.py +29 -2

Now update the demo section to showcase all these loop approaches:

assignment_6.3.py

Describe what to build next

Agent Auto

Task Description #3: Conditional Statements (Age Classification)

You are building a basic classification system based on age. nested if-elif-else conditional statements to classify age groups(e.g., child, teenager, adult, senior).

```
140 #you are building a basic classification system based on age. nested if-elif-else conditional statements to classify age groups(e.g., child, teenager, adult, senior).
141 class AgeClassifier:
142     """A class to classify age groups."""
143
144     @staticmethod
145     def classify_age(age):
146         """
147         Classify the age into different groups.
148
149         Args:
150             age (int): The age to classify.
151
152         Returns:
153             str: The age group classification.
154         """
155         if age < 0:
156             return "Invalid age"
157         elif age <= 12:
158             return "Child"
159         elif age <= 19:
160             return "Teenager"
161         elif age <= 59:
162             return "Adult"
163         else:
```

PS D:\AI assisted coding> & c:\Users\vaish\AppData\Local\Programs\Python\Python314\python.exe "d:\AI assisted coding\assignment_6.3.py"

First 10 multiples of 6 (using list comprehension):
6 12 18 24 30 36 42 48 54 60

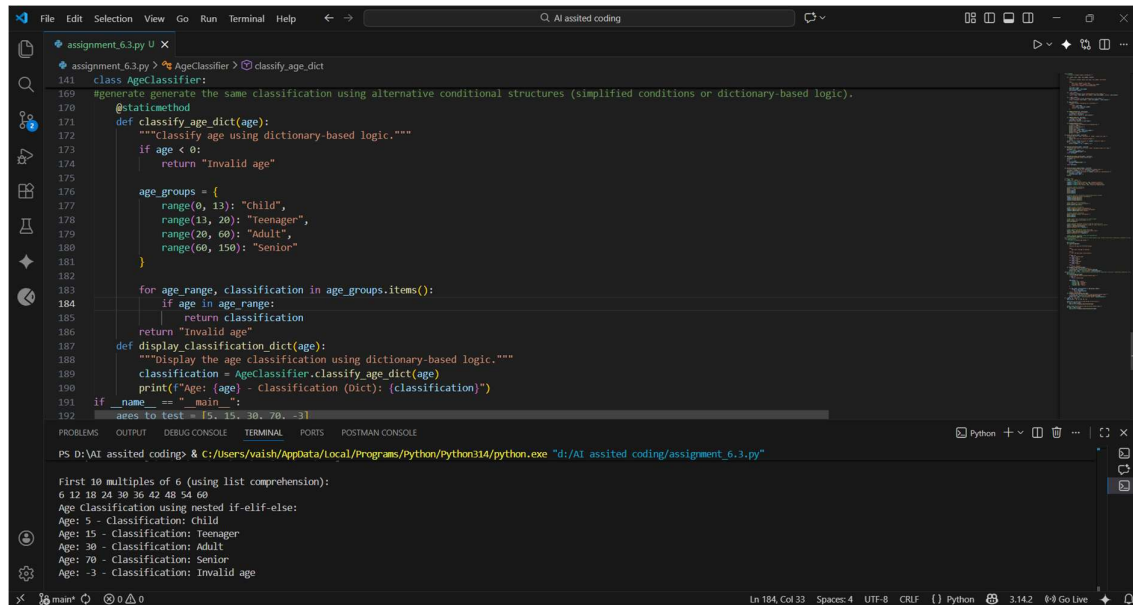
Age Classification using nested if-elif-else:
Age: 5 - Classification: Child
Age: 15 - Classification: Teenager
Age: 30 - Classification: Adult
Age: 70 - Classification: Senior
Age: -3 - Classification: Invalid age

CHAT

Describe what to build next

Agent Auto

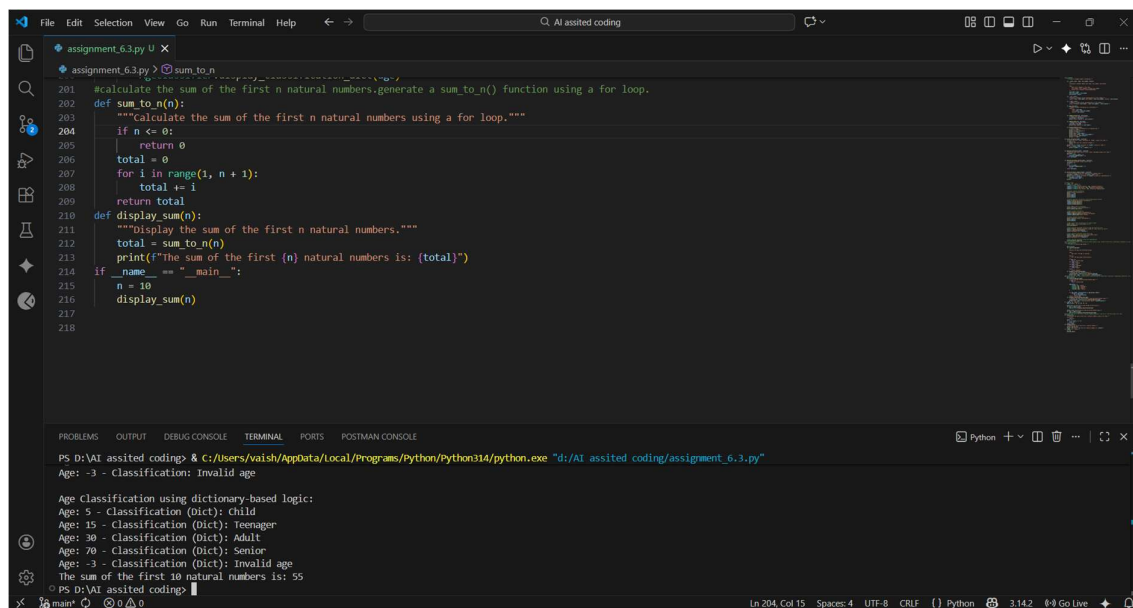
#generate generate the same classification using alternative conditional structures (simplified conditions or dictionary-based logic).



```
141 class AgeClassifier:
142     #generate generate the same classification using alternative conditional structures (simplified conditions or dictionary-based logic).
143     @staticmethod
144     def classify_age_dict(age):
145         """classify age using dictionary-based logic."""
146         if age < 0:
147             return "Invalid age"
148
149         age_groups = {
150             range(0, 13): "child",
151             range(13, 20): "teenager",
152             range(20, 60): "Adult",
153             range(60, 150): "Senior"
154         }
155
156         for age_range, classification in age_groups.items():
157             if age in age_range:
158                 return classification
159         return "Invalid age"
160
161     @classmethod
162     def display_classification_dict(age):
163         """display the age classification using dictionary-based logic."""
164         classification = AgeClassifier.classify_age_dict(age)
165         print(f"Age: {age} - Classification (Dict): {classification}")
166
167 if __name__ == "__main__":
168     ages_to_test = [5, 15, 30, 70, -3]
169
170     First 10 multiples of 6 (using list comprehension):
171     6 12 18 24 30 36 42 48 54 60
172     Age classification using nested if-elif-else:
173     Age: 5 - Classification: Child
174     Age: 15 - Classification: Teenager
175     Age: 30 - Classification: Adult
176     Age: 70 - Classification: Senior
177     Age: -3 - Classification: Invalid age
```

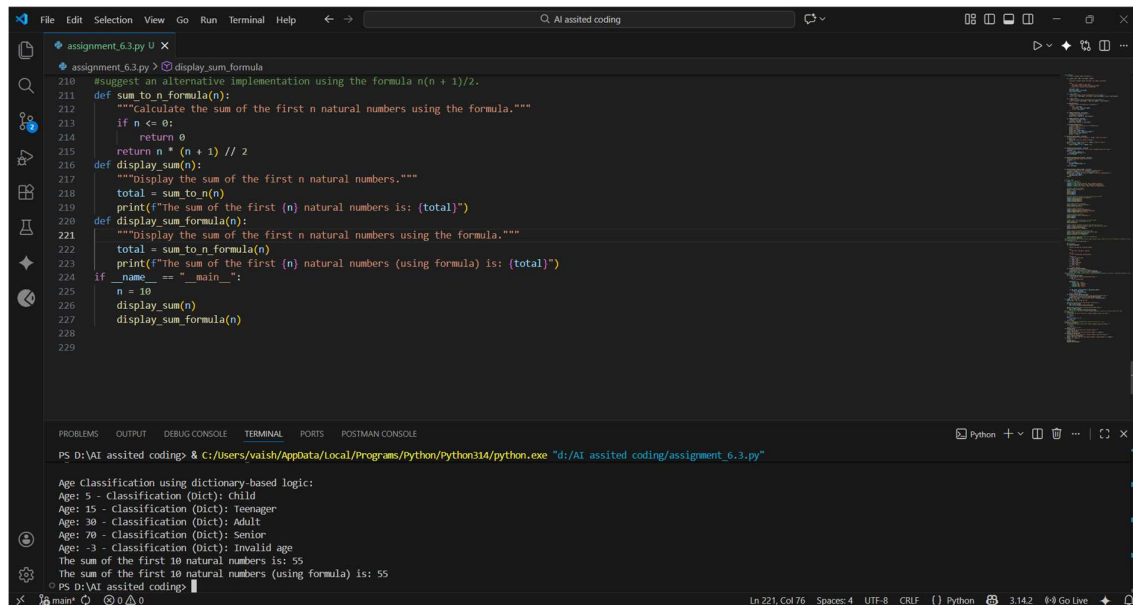
Task Description #4: For and While Loops (Sum of First n Numbers)

generate a sum_to_n() function using a for loop.



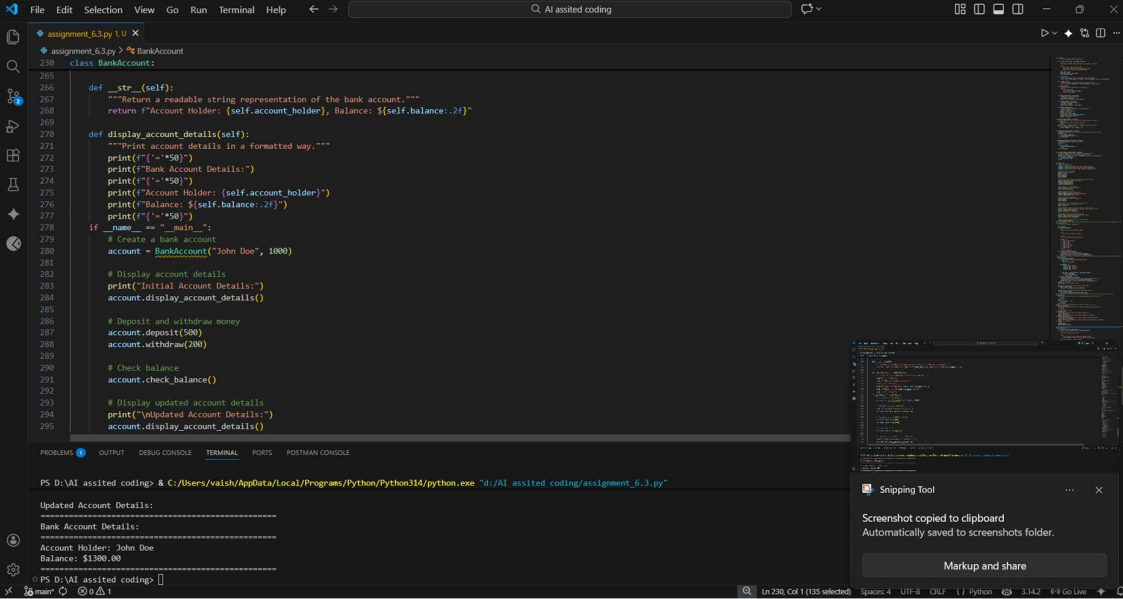
```
201 #calculate the sum of the first n natural numbers,generate a sum_to_n() function using a for loop.
202 def sum_to_n(n):
203     """calculate the sum of the first n natural numbers using a for loop."""
204     if n <= 0:
205         return 0
206     total = 0
207     for i in range(1, n + 1):
208         total += i
209     return total
210
211 def display_sum(n):
212     """display the sum of the first n natural numbers."""
213     total = sum_to_n(n)
214     print(f"The sum of the first {n} natural numbers is: {total}")
215
216 if __name__ == "__main__":
217     n = 10
218     display_sum(n)
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#suggest an alternative implementation using the formula $n(n + 1)/2$.



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assignment_6.3.py X
assignment_6.3.py > display_sum_formula
#suggest an alternative implementation using the formula n(n + 1)/2.
210
211 def sum_to_n_formula(n):
212     """Calculate the sum of the first n natural numbers using the formula."""
213     if n <= 0:
214         return 0
215     return n * (n + 1) // 2
216
217 def display_sum(n):
218     """Display the sum of the first n natural numbers."""
219     total = sum_to_n(n)
220     print(f"The sum of the first {n} natural numbers is: {total}")
221
222 def display_sum_formula(n):
223     """Display the sum of the first n natural numbers using the formula."""
224     total = sum_to_n_formula(n)
225     print(f"The sum of the first {n} natural numbers (using formula) is: {total}")
226
227 if __name__ == "__main__":
228     n = 10
229     display_sum(n)
230     display_sum_formula(n)
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```

#Add meaningful comments and explain the working of the code



```
238 class BankAccount:
239
240     def __str__(self):
241         """Return a readable string representation of the bank account."""
242         return f"Account Holder: {self.account_holder}, Balance: ${self.balance:.2f}"
243
244     def display_account_details(self):
245         """Print account details in a formatted way."""
246         print("\nBank Account Details:")
247         print(f"Account Holder: {self.account_holder}")
248         print(f"Balance: ${self.balance:.2f}")
249
250 if __name__ == "__main__":
251     # Create a bank account
252     account = BankAccount("John Doe", 1000)
253
254     # Display account details
255     print("Initial Account Details:")
256     account.display_account_details()
257
258     # Deposit and withdraw money
259     account.deposit(500)
260     account.withdraw(200)
261
262     # Check balance
263     account.check_balance()
264
265     # Display updated account details
266     print("\nUpdated Account Details:")
267     account.display_account_details()
```

PS D:\AI assisted coding> & C:\Users\vaish\AppData\Local\Programs\Python\Python314\python.exe "d:\AI assisted coding\assignment_6.3.py"

Updated Account Details:

Bank Account Details:

Account Holder: John Doe

Balance: \$1300.00