ASSIGNMENT – 2.4

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Batch-13

Task 1: Book Class Generation

❖ **Scenario:**

You are building a simple library management module.

❖ **Task:**

Use Cursor AI to generate a Python class Book with attributes title, author,and a summary() method.

❖ **Expected Output:**

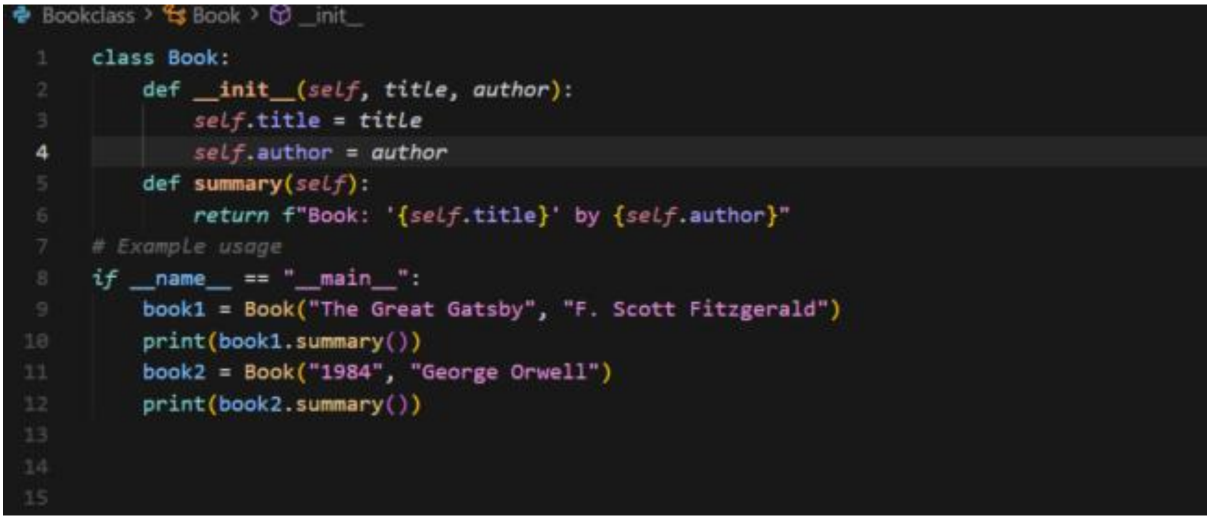
➢ Generated class

➢ Student commentary on code quality

PROMPT:

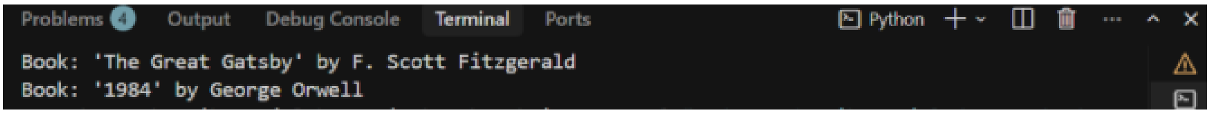
Generate a Python code withclass Book with attributes title, author,and a summary() method.

CODE:



```python
class Book:
    def __init__(self, title, author):
        self.title = title
        self.author = author
    def summary(self):
        return f"Book: '{self.title}' by {self.author}"
# Example usage
if __name__ == "__main__":
    book1 = Book("The Great Gatsby", "F. Scott Fitzgerald")
    print(book1.summary())
    book2 = Book("1984", "George Orwell")
    print(book2.summary())
```

OUTPUT:



```
Book: 'The Great Gatsby' by F. Scott Fitzgerald
Book: '1984' by George Orwell
```

JUSTIFICATION:

This program is used to store book details like title and author in a single unit.

The class helps create multiple book objects without rewriting code.

The summary function prints book information in a clear and fixed format.

The main block runs the program and shows the output for different books.

Task 2: Sorting Dictionaries with AI

❖ **Scenario:**

You need to sort user records by age.

❖ **Task:**

Use Gemini and Cursor AI to generate code that sorts a list of dictionaries by a key.

❖ **Expected Output:**

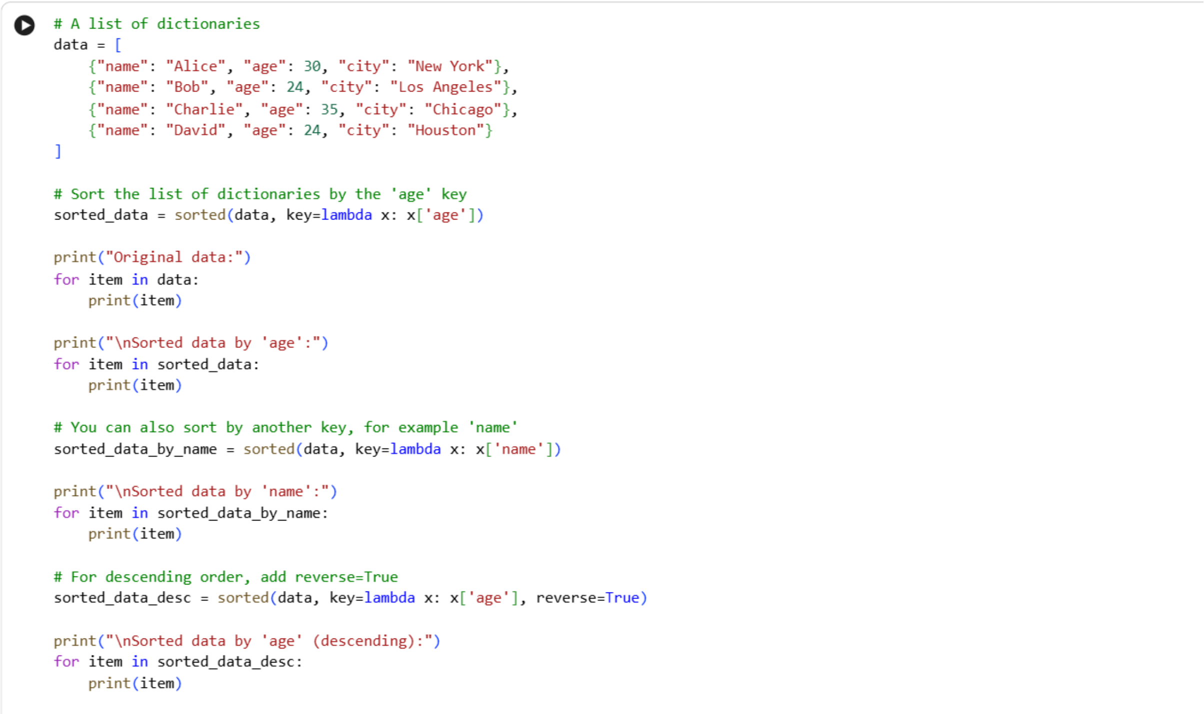
➢ Both AI outputs

➢ Comparison of clarity and performance

PROMPT:

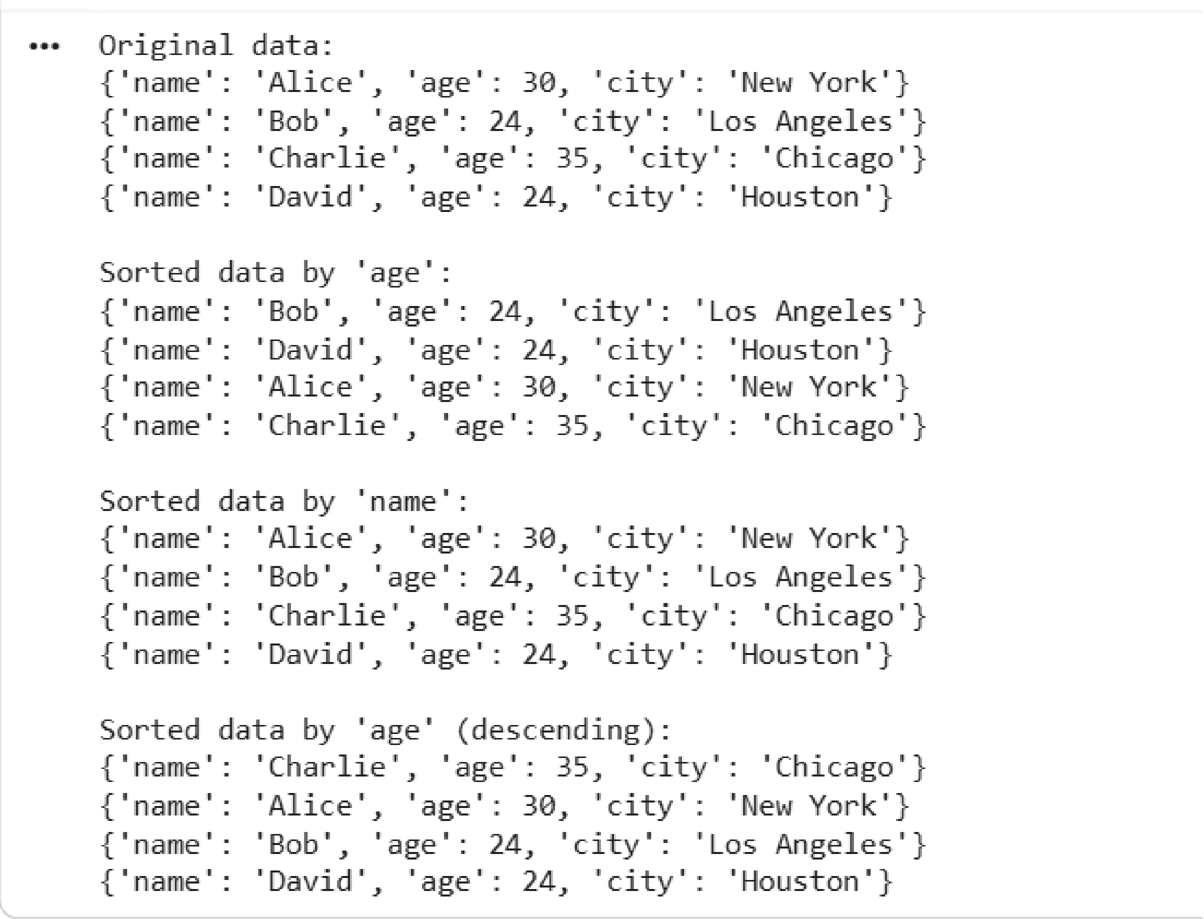
Generate code that sorts a list of dictionaries by a key.

CODE FROM GEMINI:



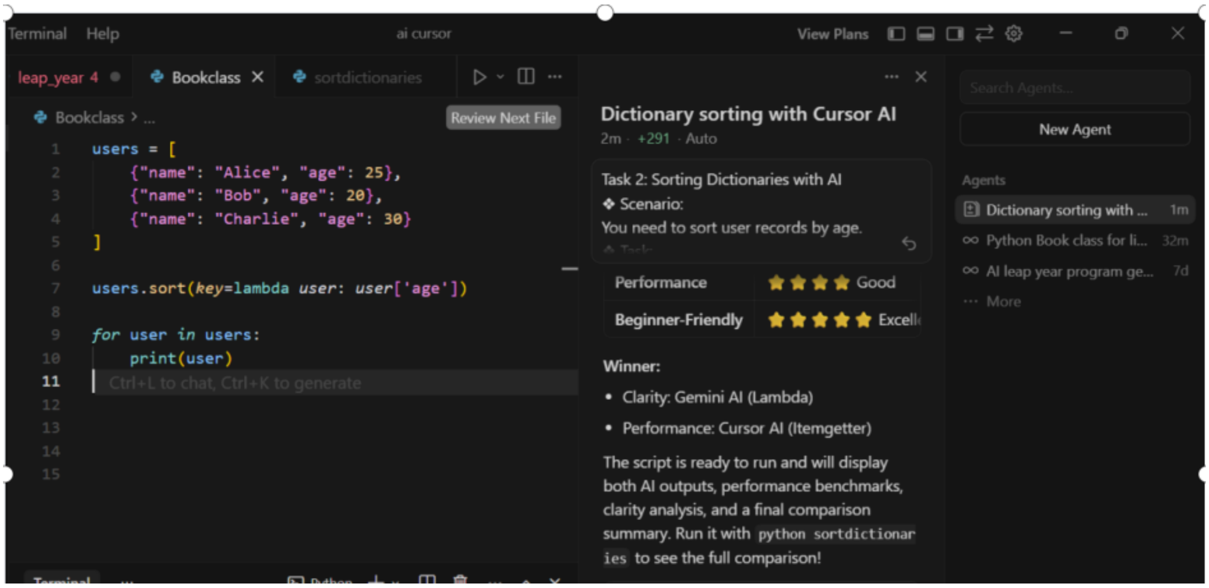
```python
# A list of dictionaries
data = [
    {"name": "Alice", "age": 30, "city": "New York"},
    {"name": "Bob", "age": 24, "city": "Los Angeles"},
    {"name": "Charlie", "age": 35, "city": "Chicago"},
    {"name": "David", "age": 24, "city": "Houston"}
]

# Sort the list of dictionaries by the 'age' key
sorted_data = sorted(data, key=lambda x: x['age'])

print("Original data:")
for item in data:
    print(item)

print("\nSorted data by 'age':")
for item in sorted_data:
    print(item)

# You can also sort by another key, for example 'name'
sorted_data_by_name = sorted(data, key=lambda x: x['name'])

print("\nSorted data by 'name':")
for item in sorted_data_by_name:
    print(item)

# For descending order, add reverse=True
sorted_data_desc = sorted(data, key=lambda x: x['age'], reverse=True)

print("\nSorted data by 'age' (descending):")
for item in sorted_data_desc:
    print(item)
```

OUTPUT:



```
Original data:
{'name': 'Alice', 'age': 30, 'city': 'New York'}
{'name': 'Bob', 'age': 24, 'city': 'Los Angeles'}
{'name': 'Charlie', 'age': 35, 'city': 'Chicago'}
{'name': 'David', 'age': 24, 'city': 'Houston'}

Sorted data by 'age':
{'name': 'Bob', 'age': 24, 'city': 'Los Angeles'}
{'name': 'David', 'age': 24, 'city': 'Houston'}
{'name': 'Alice', 'age': 30, 'city': 'New York'}
{'name': 'Charlie', 'age': 35, 'city': 'Chicago'}

Sorted data by 'name':
{'name': 'Alice', 'age': 30, 'city': 'New York'}
{'name': 'Bob', 'age': 24, 'city': 'Los Angeles'}
{'name': 'Charlie', 'age': 35, 'city': 'Chicago'}
{'name': 'David', 'age': 24, 'city': 'Houston'}

Sorted data by 'age' (descending):
{'name': 'Charlie', 'age': 35, 'city': 'Chicago'}
{'name': 'Alice', 'age': 30, 'city': 'New York'}
{'name': 'Bob', 'age': 24, 'city': 'Los Angeles'}
{'name': 'David', 'age': 24, 'city': 'Houston'}
```

CODE FROM CURSOR AI:



```
users = [
    {"name": "Alice", "age": 25},
    {"name": "Bob", "age": 20},
    {"name": "Charlie", "age": 30}
]

users.sort(key=lambda user: user['age'])

for user in users:
    print(user)
Ctrl+L to chat, Ctrl+K to generate
```

Dictionary sorting with Cursor AI

Task 2: Sorting Dictionaries with AI

❖ Scenario:

You need to sort user records by age.

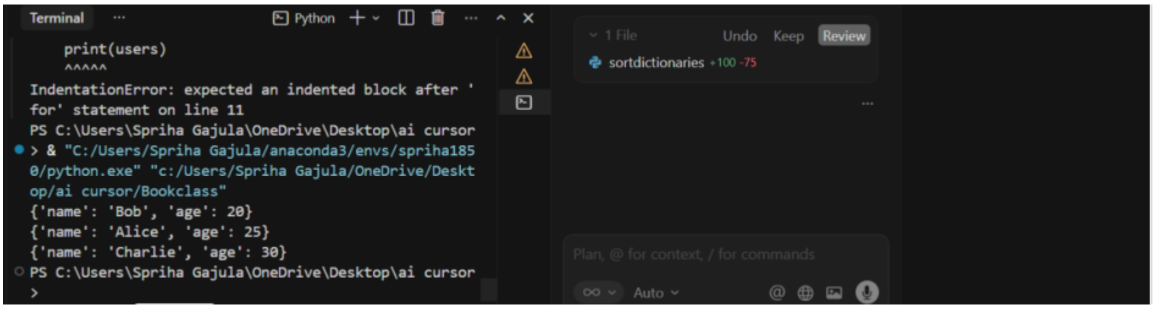
Performance	★★★★ Good
Beginner-Friendly	★★★★★ Excell

Winner:

- Clarity: Gemini AI (Lambda)
- Performance: Cursor AI (Itemgetter)

The script is ready to run and will display both AI outputs, performance benchmarks, clarity analysis, and a final comparison summary. Run it with `python sortdictionaries` to see the full comparison!

OUTPUT:


Terminal
Python
1 File
Undo
Keep
Review
sortdictionaries +100 -75
Plan, @ for context, / for commands
Auto

```
    print(users)
    ^^^^^
IndentationError: expected an indented block after '
for' statement on line 11
PS C:\Users\Spriha Gajula\OneDrive\Desktop\ai cursor
> & "C:/Users/Spriha Gajula/anaconda3/envs/spriha185
0/python.exe" "c:/Users/Spriha Gajula/OneDrive/Deskt
op/ai cursor/Bookclass"
{'name': 'Bob', 'age': 20}
{'name': 'Alice', 'age': 25}
{'name': 'Charlie', 'age': 30}
PS C:\Users\Spriha Gajula\OneDrive\Desktop\ai cursor
>
```

JUSTIFICATION:

Gemini AI provides simple and easy-to-understand code, making it suitable for beginners and quick learning.Cursor AI uses a function-based approach, which improves code reusability and maintainability.Both approaches have the same performance with time complexity of O(n log n).

Cursor AI includes basic error handling, making it safer for real-world applications.

Therefore, Gemini is ideal for learning, while Cursor AI is better for professional development

Task 3: Calculator Using Functions

❖ Scenario:

You are reviewing a basic calculator module.

❖ Task:

Ask Gemini to generate a calculator using functions and explain how it works.

❖ Expected Output:

➢ Calculator code

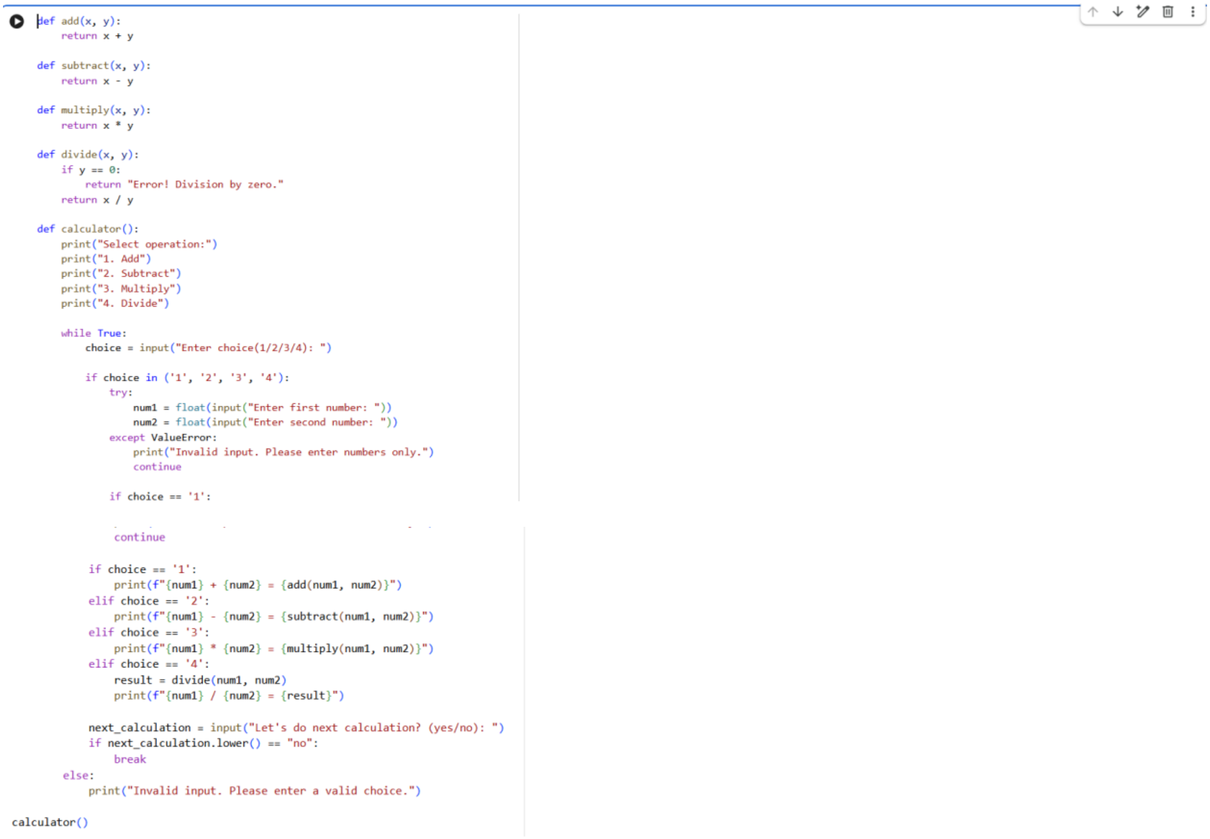
➢ AI explanation

➢ Screenshot

PROMPT:

Generate a calculator using functions.

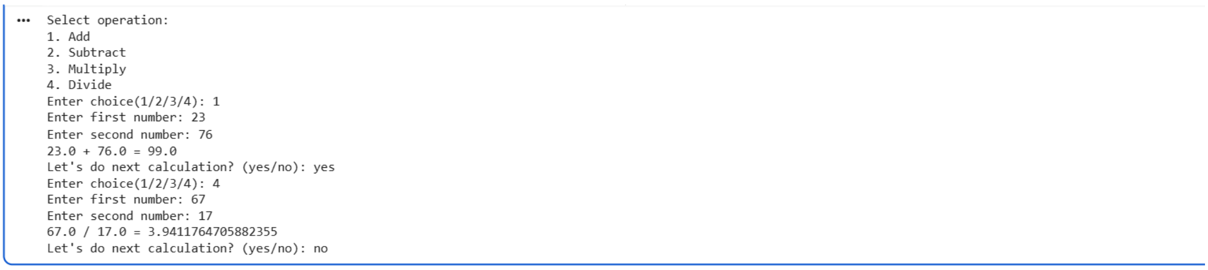
CODE:



```
def add(x, y):
    return x + y

def subtract(x, y):
    return x - y

def multiply(x, y):
    return x * y

def divide(x, y):
    if y == 0:
        return "Error! Division by zero."
    return x / y

def calculator():
    print("Select operation:")
    print("1. Add")
    print("2. Subtract")
    print("3. Multiply")
    print("4. Divide")

    while True:
        choice = input("Enter choice(1/2/3/4): ")

        if choice in ('1', '2', '3', '4'):
            try:
                num1 = float(input("Enter first number: "))
                num2 = float(input("Enter second number: "))
            except ValueError:
                print("Invalid input. Please enter numbers only.")
                continue

            if choice == '1':
```

```
                continue

            if choice == '1':
                print(f"{num1} + {num2} = {add(num1, num2)}")
            elif choice == '2':
                print(f"{num1} - {num2} = {subtract(num1, num2)}")
            elif choice == '3':
                print(f"{num1} * {num2} = {multiply(num1, num2)}")
            elif choice == '4':
                result = divide(num1, num2)
                print(f"{num1} / {num2} = {result}")

            next_calculation = input("Let's do next calculation? (yes/no): ")
            if next_calculation.lower() == "no":
                break
        else:
            print("Invalid input. Please enter a valid choice.")

calculator()
```

OUTPUT:



```
Select operation:
1. Add
2. Subtract
3. Multiply
4. Divide
Enter choice(1/2/3/4): 1
Enter first number: 23
Enter second number: 76
23.0 + 76.0 = 99.0
Let's do next calculation? (yes/no): yes
Enter choice(1/2/3/4): 4
Enter first number: 67
Enter second number: 17
67.0 / 17.0 = 3.9411764705882355
Let's do next calculation? (yes/no): no
```

JUSTIFICATION:

Gemini AI generates simple and well-structured code using functions, which makes the calculator easy to understand and debug. Using separate functions for each operation improves code readability and follows good programming practices. The inclusion of a division-by-zero check enhances reliability. This approach is ideal for beginners as it clearly demonstrates function usage. Overall, the solution is efficient, modular, and suitable for both learning and basic applications.

Task 4: Armstrong Number Optimization

❖ Scenario:

An existing solution is inefficient.

❖ Task:

Generate an Armstrong number program using Gemini, then improve it using Cursor AI.

❖ Expected Output:

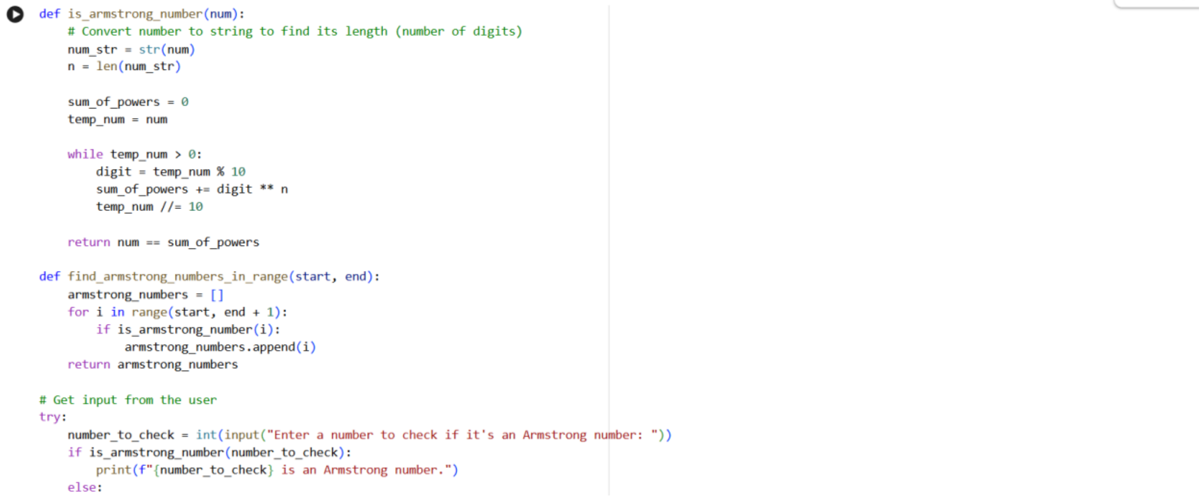
➢ Two versions

➢ Summary of improvements

PROMPT:

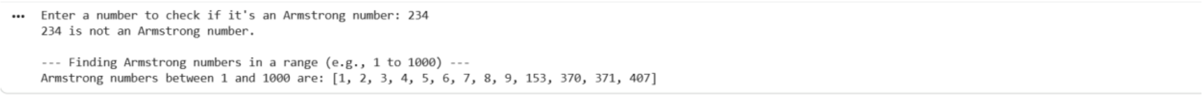
Generate an Armstrong number program using function

CODE USING GEMINI:



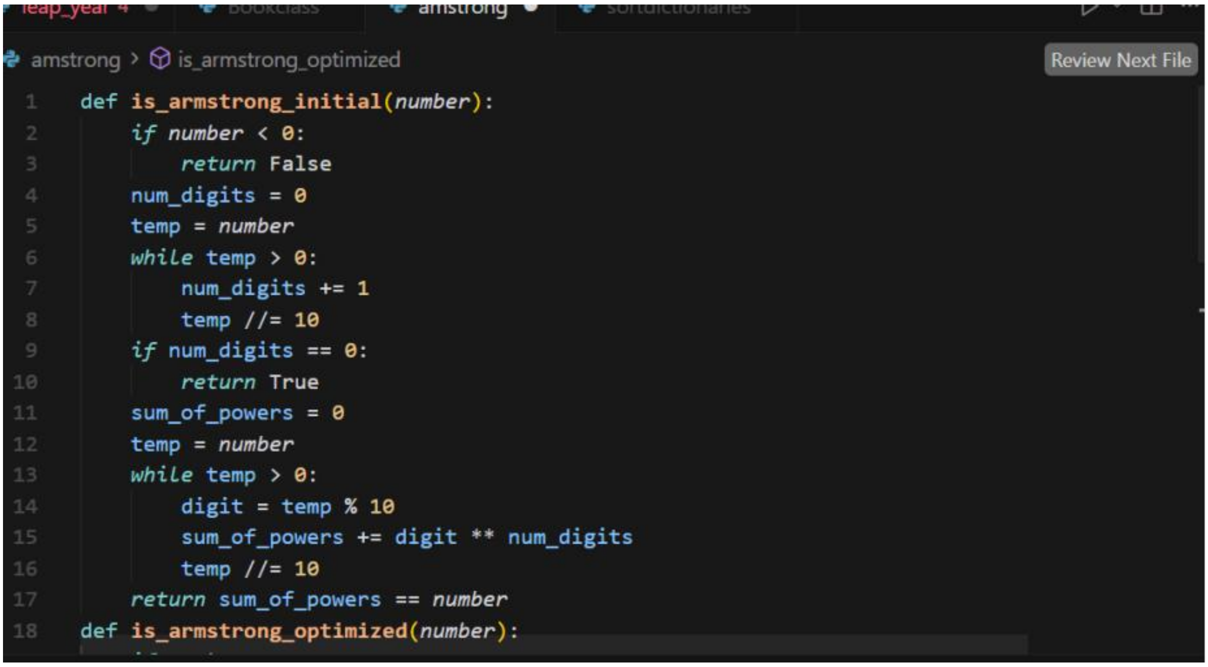
```
def is_armstrong_number(num):
    # Convert number to string to find its length (number of digits)
    num_str = str(num)
    n = len(num_str)

    sum_of_powers = 0
    temp_num = num

    while temp_num > 0:
        digit = temp_num % 10
        sum_of_powers += digit ** n
        temp_num //= 10

    return num == sum_of_powers

def find_armstrong_numbers_in_range(start, end):
    armstrong_numbers = []
    for i in range(start, end + 1):
        if is_armstrong_number(i):
            armstrong_numbers.append(i)
    return armstrong_numbers

# Get input from the user
try:
    number_to_check = int(input("Enter a number to check if it's an Armstrong number: "))
    if is_armstrong_number(number_to_check):
        print(f"{number_to_check} is an Armstrong number.")
    else:
```

OUTPUT:

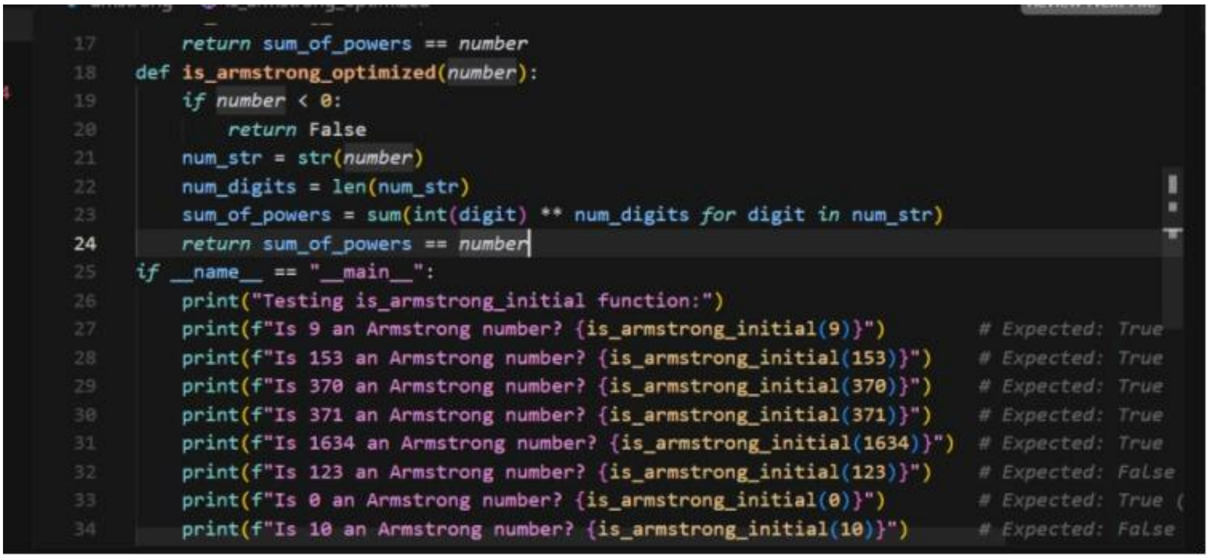


```
Enter a number to check if it's an Armstrong number: 234
234 is not an Armstrong number.

--- Finding Armstrong numbers in a range (e.g., 1 to 1000) ---
Armstrong numbers between 1 and 1000 are: [1, 2, 3, 4, 5, 6, 7, 8, 9, 153, 370, 371, 407]
```

IMPROVEMENT CODE OF CURSOR AI:

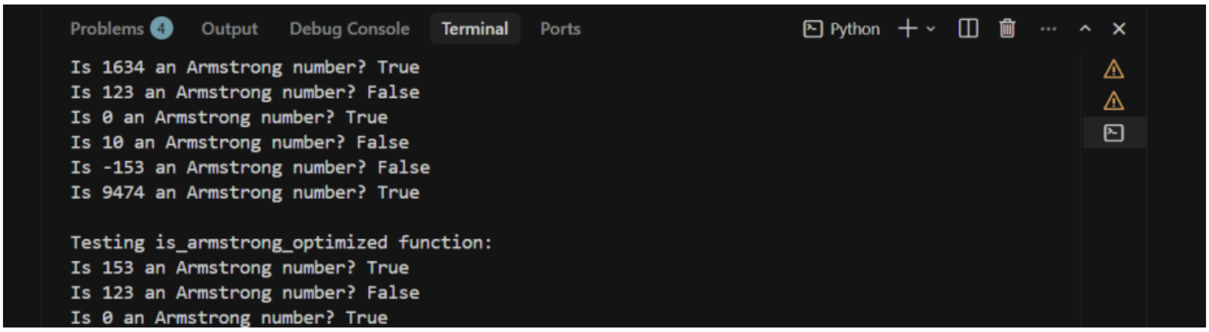


```python
def is_armstrong_initial(number):
    if number < 0:
        return False
    num_digits = 0
    temp = number
    while temp > 0:
        num_digits += 1
        temp //= 10
    if num_digits == 0:
        return True
    sum_of_powers = 0
    temp = number
    while temp > 0:
        digit = temp % 10
        sum_of_powers += digit ** num_digits
        temp //= 10
    return sum_of_powers == number
def is_armstrong_optimized(number):
```



```python
    return sum_of_powers == number
def is_armstrong_optimized(number):
    if number < 0:
        return False
    num_str = str(number)
    num_digits = len(num_str)
    sum_of_powers = sum(int(digit) ** num_digits for digit in num_str)
    return sum_of_powers == number
if __name__ == "__main__":
    print("Testing is_armstrong_initial function:")
    print(f"Is 9 an Armstrong number? {is_armstrong_initial(9)}")          # Expected: True
    print(f"Is 153 an Armstrong number? {is_armstrong_initial(153)}")      # Expected: True
    print(f"Is 370 an Armstrong number? {is_armstrong_initial(370)}")      # Expected: True
    print(f"Is 371 an Armstrong number? {is_armstrong_initial(371)}")      # Expected: True
    print(f"Is 1634 an Armstrong number? {is_armstrong_initial(1634)}")  # Expected: True
    print(f"Is 123 an Armstrong number? {is_armstrong_initial(123)}")      # Expected: False
    print(f"Is 0 an Armstrong number? {is_armstrong_initial(0)}")          # Expected: True (
    print(f"Is 10 an Armstrong number? {is_armstrong_initial(10)}")        # Expected: False
```

OUTPUT:



```
Is 1634 an Armstrong number? True
Is 123 an Armstrong number? False
Is 0 an Armstrong number? True
Is 10 an Armstrong number? False
Is -153 an Armstrong number? False
Is 9474 an Armstrong number? True

Testing is_armstrong_optimized function:
Is 153 an Armstrong number? True
Is 123 an Armstrong number? False
Is 0 an Armstrong number? True
```

JUSTIFICATION:

Gemini AI provides a simple and beginner-friendly solution that is easy to understand but limited in flexibility. Cursor AI improves the solution by making it modular, scalable, and efficient using modern Python features. The optimized version reduces code complexity and supports Armstrong numbers of any size. Using functions also improves readability and reuse. Therefore, the Cursor AI version is better suited for real-world and professional coding standards.