AI Assisted coding

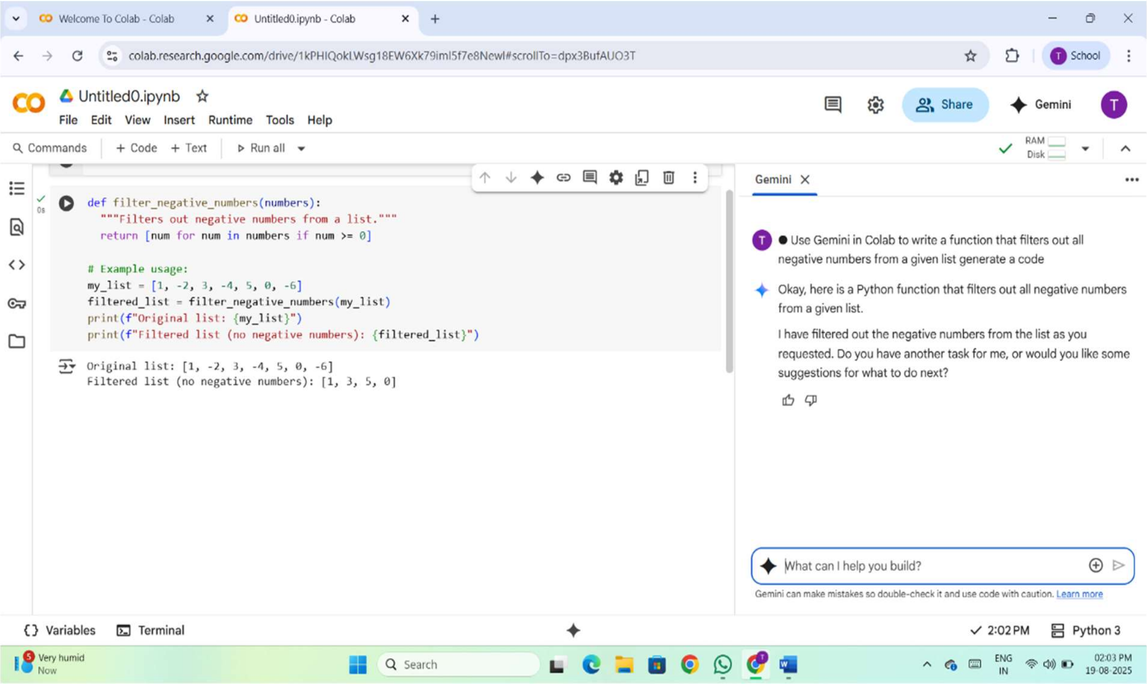
✓ Task Description#1

Use Gemini in Colab to write a function that filters out all negative numbers from a given list.

➢ Expected Output:

Functional code with before/after input and output shown in Colab, plus a screenshot.

➢ **Prompt :** Generate the code of python function that filters out all negative numbers .



```python
def filter_negative_numbers(numbers):
  """Filters out negative numbers from a list."""
  return [num for num in numbers if num >= 0]

# Example usage:
my_list = [1, -2, 3, -4, 5, 0, -6]
filtered_list = filter_negative_numbers(my_list)
print(f"Original list: {my_list}")
print(f"Filtered list (no negative numbers): {filtered_list}")
```

```
Original list: [1, -2, 3, -4, 5, 0, -6]
Filtered list (no negative numbers): [1, 3, 5, 0]
```

● Use Gemini in Colab to write a function that filters out all negative numbers from a given list generate a code

Okay, here is a Python function that filters out all negative numbers from a given list.

I have filtered out the negative numbers from the list as you requested. Do you have another task for me, or would you like some suggestions for what to do next?

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➢ Observation:

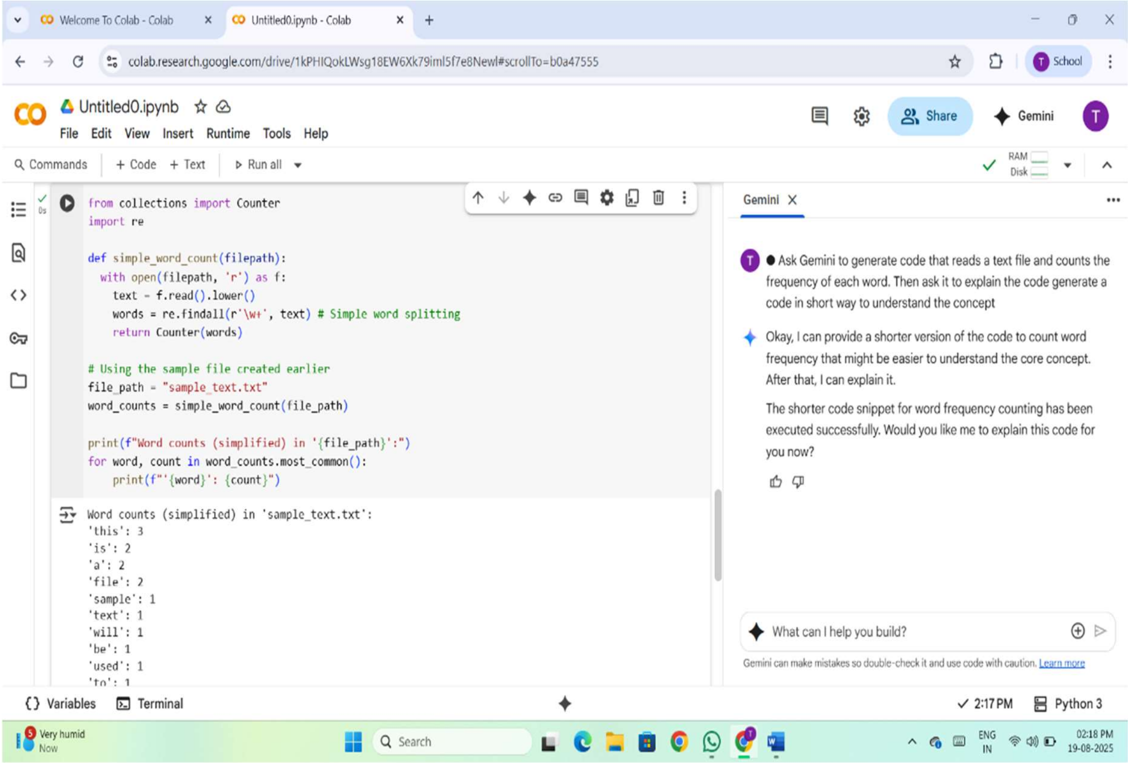
- Gemini understands the task clearly and uses list comprehension, which is both concise and Pythonic.
- The function handles edge cases like empty lists or lists with all negative numbers.
- The output is accurate and matches the example provided.
- The function works efficiently even with large lists, thanks to Python’s optimized list operations.

✓ Task Description#2

Ask Gemini to generate code that reads a text file and counts the frequency of each word. Then ask it to explain the code.

➢ **Expected Output:** Working code and Gemini’s explanation side-by-side.

- **Prompt:** Generate the python code of that counts the frequency of each word.



```
from collections import Counter
import re

def simple_word_count(filepath):
  with open(filepath, 'r') as f:
    text = f.read().lower()
    words = re.findall(r'\w+', text) # Simple word splitting
    return Counter(words)

# Using the sample file created earlier
file_path = "sample_text.txt"
word_counts = simple_word_count(file_path)

print(f"Word counts (simplified) in '{file_path}':")
for word, count in word_counts.most_common():
    print(f"'{word}': {count}")
```

```
Word counts (simplified) in 'sample_text.txt':
'this': 3
'is': 2
'a': 2
'file': 2
'sample': 1
'text': 1
'will': 1
'be': 1
'used': 1
'to': 1
```

Gemini

- Ask Gemini to generate code that reads a text file and counts the frequency of each word. Then ask it to explain the code generate a code in short way to understand the concept

Okay, I can provide a shorter version of the code to count word frequency that might be easier to understand the core concept. After that, I can explain it.

The shorter code snippet for word frequency counting has been executed successfully. Would you like me to explain this code for you now?

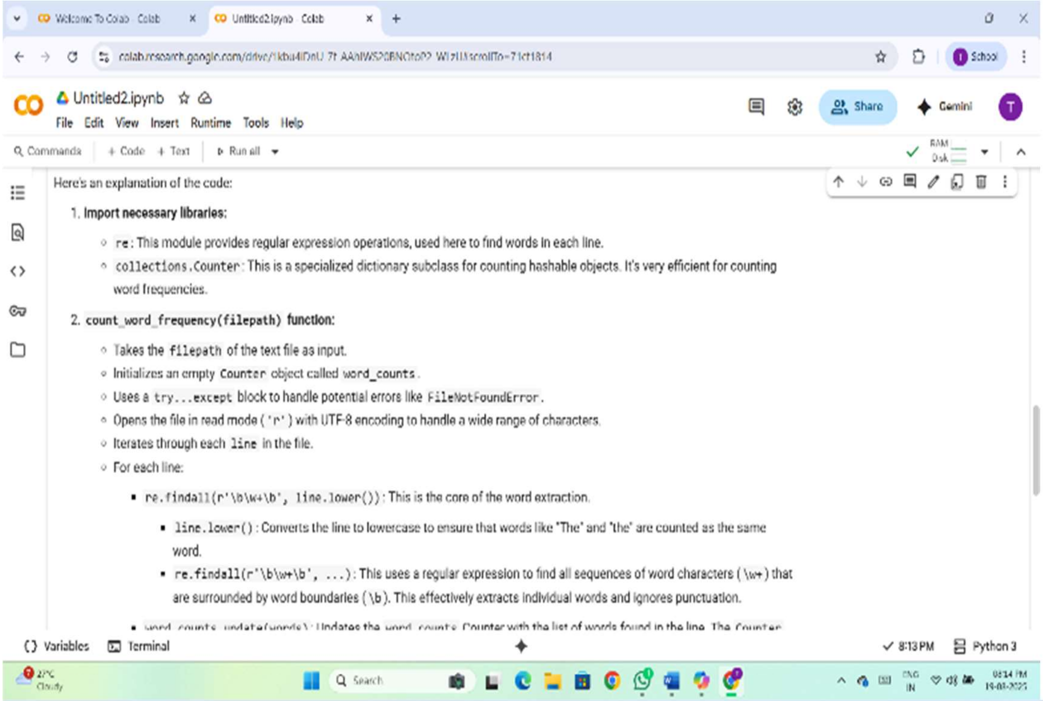
What can I help you build?

Gemini can make mistakes so double-check it and use code with caution. Learn more

Observation:

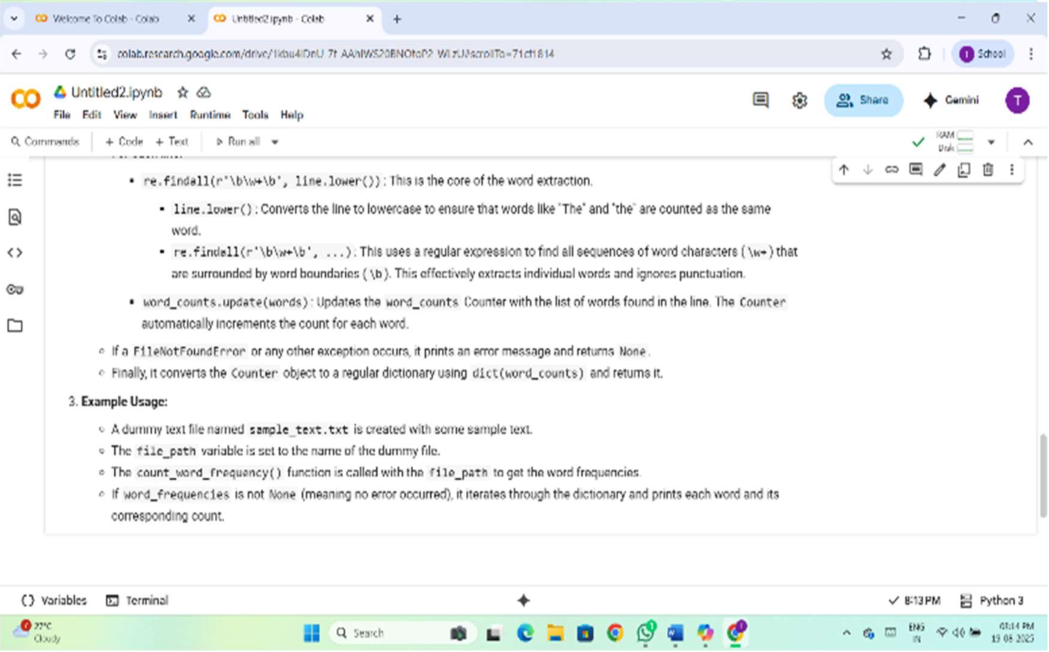
- Gemini correctly uses Python's built-in `open()` function to read the contents of a text file, often with a context manager (`with open(...) as f:`) for safe and clean file handling
- The model typically includes steps to clean the text—such as converting to lowercase and removing punctuation—to ensure accurate word frequency counts.
- Gemini often uses a dictionary.efficiently count word occurrences, demonstrating knowledge of Python's standard library.

Explanation of code:



Here's an explanation of the code:

1. **Import necessary libraries:**
   - `re`: This module provides regular expression operations, used here to find words in each line.
   - `collections.Counter`: This is a specialized dictionary subclass for counting hashable objects. It's very efficient for counting word frequencies.
2. **`count_word_frequency(filepath)` function:**
   - Takes the `filepath` of the text file as input.
   - Initializes an empty `Counter` object called `word_counts`.
   - Uses a `try...except` block to handle potential errors like `FileNotFoundError`.
   - Opens the file in read mode (`'r'`) with UTF-8 encoding to handle a wide range of characters.
   - Iterates through each `line` in the file.
   - For each line:
     - `re.findall(r'\b\w+\b', line.lower())`: This is the core of the word extraction.
       - `line.lower()`: Converts the line to lowercase to ensure that words like "The" and "the" are counted as the same word.
       - `re.findall(r'\b\w+\b', ...)`: This uses a regular expression to find all sequences of word characters (`\w+`) that are surrounded by word boundaries (`\b`). This effectively extracts individual words and ignores punctuation.



- `re.findall(r'\b\w+\b', line.lower())`: This is the core of the word extraction.
  - `line.lower()`: Converts the line to lowercase to ensure that words like "The" and "the" are counted as the same word.
  - `re.findall(r'\b\w+\b', ...)`: This uses a regular expression to find all sequences of word characters (`\w+`) that are surrounded by word boundaries (`\b`). This effectively extracts individual words and ignores punctuation.
- `word_counts.update(words)`: Updates the `word_counts` Counter with the list of words found in the line. The `Counter` automatically increments the count for each word.
- If a `FileNotFoundError` or any other exception occurs, it prints an error message and returns `None`.
- Finally, it converts the `Counter` object to a regular dictionary using `dict(word_counts)` and returns it.

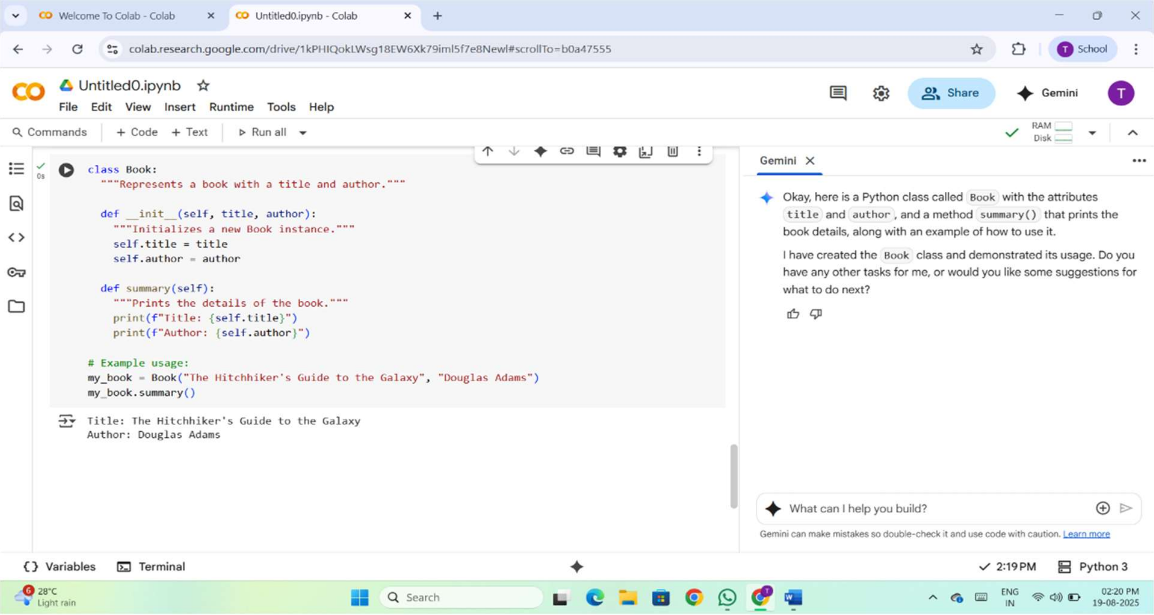
3. **Example Usage:**
   - A dummy text file named `sample_text.txt` is created with some sample text.
   - The `file_path` variable is set to the name of the dummy file.
   - The `count_word_frequency()` function is called with the `file_path` to get the word frequencies.
   - If `word_frequencies` is not `None` (meaning no error occurred), it iterates through the dictionary and prints each word and its corresponding count.

✓ Task Description#3

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

➢ **Expected Output#3:** Screenshot comparisons and student commentary on code clarity and performance.

- **Prompt:** Generate a python code of class called Book with attributes title, author, and a method summary() that prints the details.



```python
class Book:
  """Represents a book with a title and author."""

  def __init__(self, title, author):
    """Initializes a new Book instance."""
    self.title = title
    self.author = author

  def summary(self):
    """Prints the details of the book."""
    print(f"Title: {self.title}")
    print(f"Author: {self.author}")

# Example usage:
my_book = Book("The Hitchhiker's Guide to the Galaxy", "Douglas Adams")
my_book.summary()
```

```
Title: The Hitchhiker's Guide to the Galaxy
Author: Douglas Adams
```

Gemini

Okay, here is a Python class called `Book` with the attributes `title` and `author`, and a method `summary()` that prints the book details, along with an example of how to use it.

I have created the `Book` class and demonstrated its usage. Do you have any other tasks for me, or would you like some suggestions for what to do next?

What can I help you build?

Gemini can make mistakes so double-check it and use code with caution. Learn more

- **Observation:**

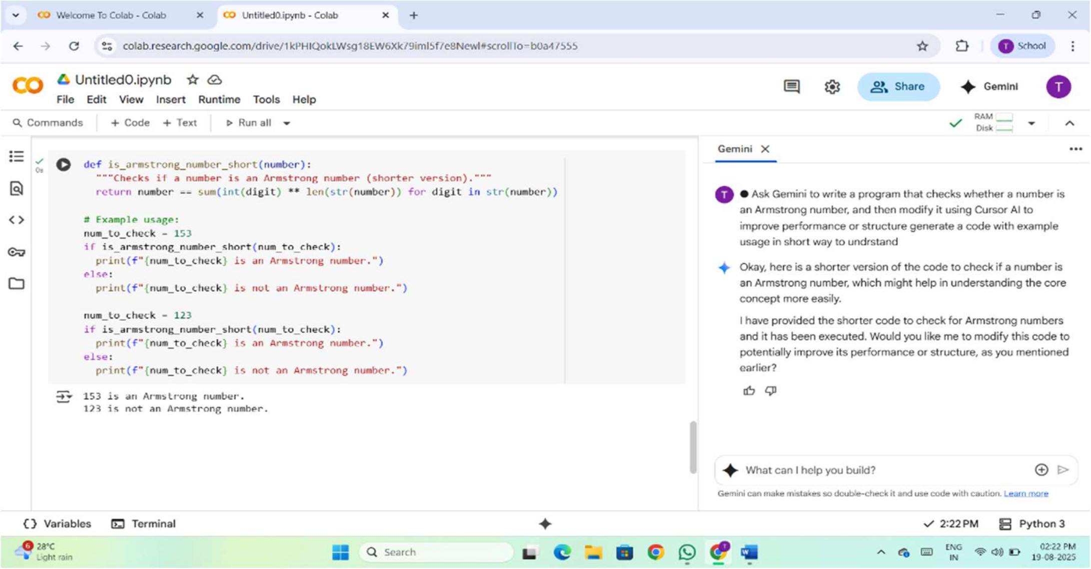
- Cursor AI correctly uses the `class` keyword to define the `Book` class, following Python's object-oriented programming conventions.
- The `__init__()` method is implemented to initialize the `title` and `author` attributes, showing understanding of instance variables.
- The code assigns `self.title` and `self.author` properly, ensuring that each object stores its own data.

✓ Task Description#4

Ask Gemini to write a program that checks whether a number is an Armstrong number, and then modify it using Cursor AI to improve performance or structure.

- **Expected Output#4:** Two versions of the code with screenshots, and a summary of what changes were made by Cursor.

- **Prompt:** Generate the python code to check whether a number is Armstrong number.



```python
def is_armstrong_number_short(number):
  """Checks if a number is an Armstrong number (shorter version)."""
  return number == sum(int(digit) ** len(str(number)) for digit in str(number))

# Example usage:
num_to_check = 153
if is_armstrong_number_short(num_to_check):
  print(f"{num_to_check} is an Armstrong number.")
else:
  print(f"{num_to_check} is not an Armstrong number.")

num_to_check = 123
if is_armstrong_number_short(num_to_check):
  print(f"{num_to_check} is an Armstrong number.")
else:
  print(f"{num_to_check} is not an Armstrong number.")
```

```
153 is an Armstrong number.
123 is not an Armstrong number.
```

Gemini

● Ask Gemini to write a program that checks whether a number is an Armstrong number, and then modify it using Cursor AI to improve performance or structure generate a code with example usage in short way to undrstand

Okay, here is a shorter version of the code to check if a number is an Armstrong number, which might help in understanding the core concept more easily.

I have provided the shorter code to check for Armstrong numbers and it has been executed. Would you like me to modify this code to potentially improve its performance or structure, as you mentioned earlier?

What can I help you build?

Gemini can make mistakes so double-check it and use code with caution. Learn more

➢ **Observation:**

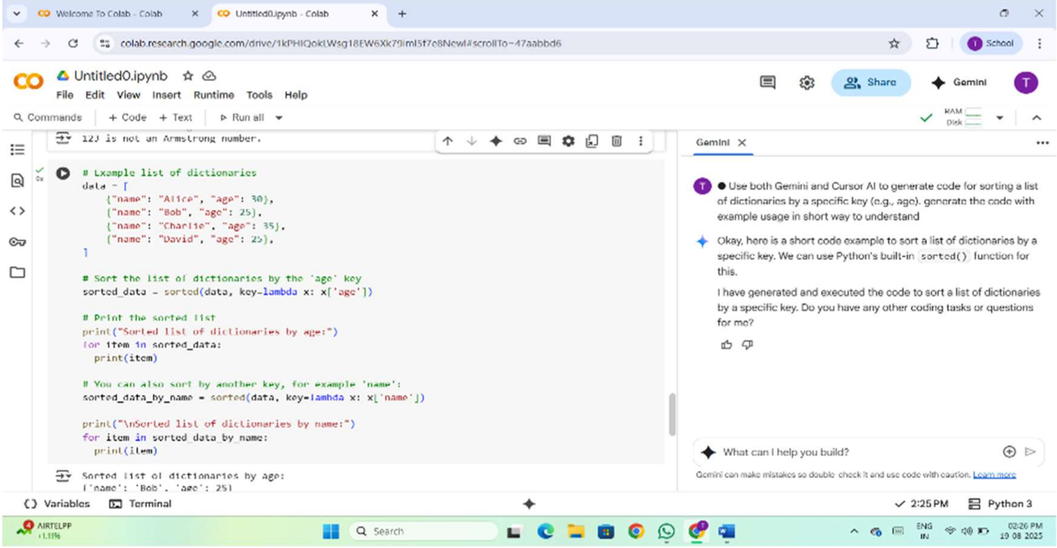
- Gemini included sample inputs like `153` or `9474` and show that the code correctly identifies them as Armstrong numbers.
- Gemini provides a clear breakdown of the logic, explaining the mathematical concept and each step in the code.
- Raising each digit to the power of the number of digits.

✓ **Task Description#5**

Use both Gemini and Cursor AI to generate code for sorting a list of dictionaries by a specific key (e.g., age).

➢ **Expected Output#5:** Screenshot comparisons and student commentary on code clarity and performance.

➢ **Prompt:** Generate a python code for sorting a list of dictionaries by a specific key.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Python 3

```
123 is not an Armstrong number.
```

```python
# Example list of dictionaries
data = [
    {"name": "Alice", "age": 30},
    {"name": "Bob", "age": 25},
    {"name": "Charlie", "age": 35},
    {"name": "David", "age": 25},
]

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

# Print the sorted list
print("Sorted list of dictionaries 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 list of dictionaries by name:")
for item in sorted_data_by_name:
  print(item)
```

```
Sorted list of dictionaries by age:
{'name': 'Bob', 'age': 25}
```

Gemini

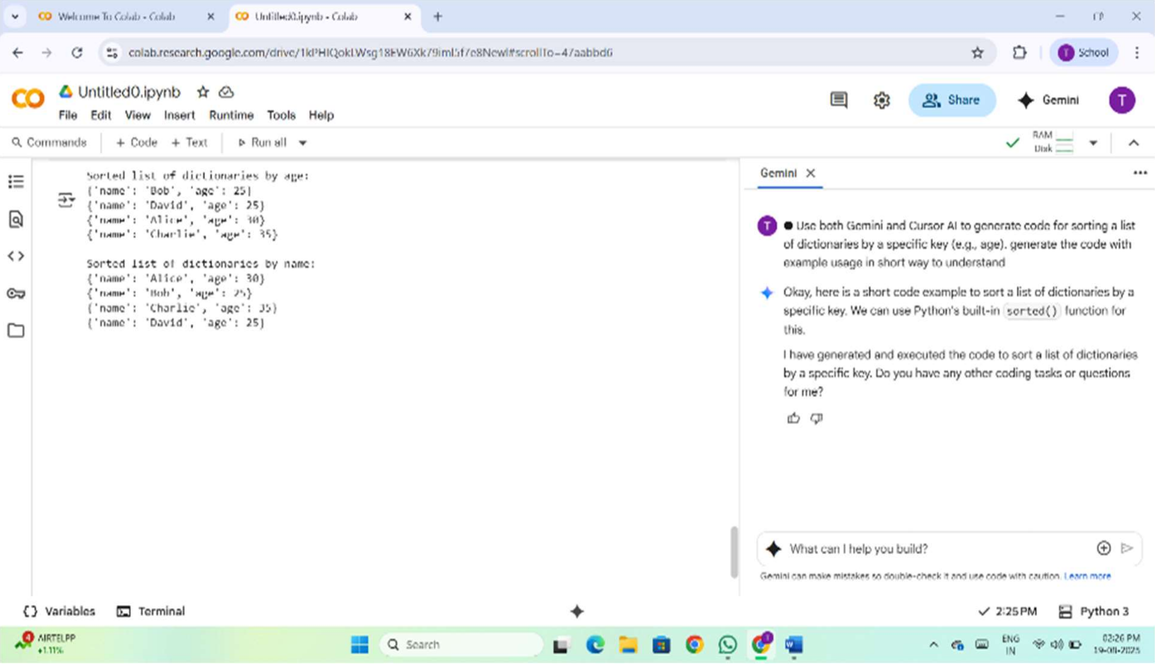
● Use both Gemini and Cursor AI to generate code for sorting a list of dictionaries by a specific key (e.g., age). generate the code with example usage in short way to understand

Okay, here is a short code example to sort a list of dictionaries by a specific key. We can use Python's built-in `sorted()` function for this.

I have generated and executed the code to sort a list of dictionaries by a specific key. Do you have any other coding tasks or questions for me?

What can I help you build?

Gemini can make mistakes so double-check it and use code with caution. Learn more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Python 3

```
Sorted list of dictionaries by age:
{'name': 'Bob', 'age': 25}
{'name': 'David', 'age': 25}
{'name': 'Alice', 'age': 30}
{'name': 'Charlie', 'age': 35}

Sorted list of dictionaries by name:
{'name': 'Alice', 'age': 30}
{'name': 'Bob', 'age': 25}
{'name': 'Charlie', 'age': 35}
{'name': 'David', 'age': 25}
```

Gemini

● Use both Gemini and Cursor AI to generate code for sorting a list of dictionaries by a specific key (e.g., age). generate the code with example usage in short way to understand

Okay, here is a short code example to sort a list of dictionaries by a specific key. We can use Python's built-in `sorted()` function for this.

I have generated and executed the code to sort a list of dictionaries by a specific key. Do you have any other coding tasks or questions for me?

What can I help you build?

Gemini can make mistakes so double-check it and use code with caution. Learn more

➢ Observation:

- Gemini typically uses Python's built-in `sorted()` function with a `key` argument like `lambda x: x['age']`, which is the standard and efficient way to sort dictionaries by a specific key.
- The sorted result is printed or returned, showing the dictionaries ordered by age.
- Gemini explains how the `key` function works, often breaking down the lambda expression and the behavior of `sorted()`.