

ASSIGNMENT-02

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Batch:05

Q) Task 1: Word Frequency from Text File

❖ Scenario:

You are analyzing log files for keyword frequency.

❖ Task:

Use Gemini to generate Python code that reads a text file and counts word frequency, then explains the code.

❖ Expected Output:

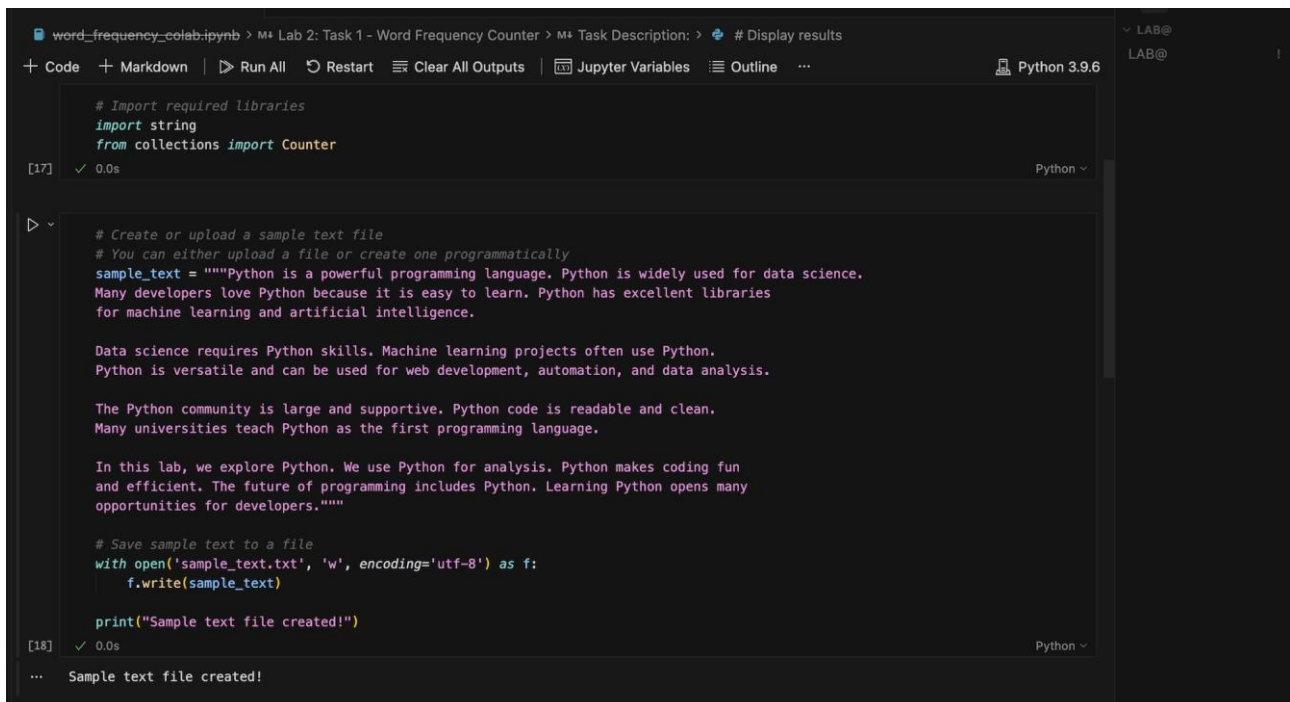
- Working code
- Explanation
- Screenshot

Solution:

PROMPT

Generate a Python program in Google Colab that reads a text file and counts the frequency of each word.

CODE:



```
word_frequency_colab.ipynb > M+ Lab 2: Task 1 - Word Frequency Counter > M+ Task Description: > # Display results
+ Code + Markdown | ▶ Run All ⏮ Restart ⏹ Clear All Outputs | 📄 Jupyter Variables 📖 Outline ... Python 3.9.6
# Import required libraries
import string
from collections import Counter

[17] ✓ 0.0s Python ~

# Create or upload a sample text file
# You can either upload a file or create one programmatically
sample_text = """Python is a powerful programming language. Python is widely used for data science.
Many developers love Python because it is easy to learn. Python has excellent libraries
for machine learning and artificial intelligence.

Data science requires Python skills. Machine learning projects often use Python.
Python is versatile and can be used for web development, automation, and data analysis.

The Python community is large and supportive. Python code is readable and clean.
Many universities teach Python as the first programming language.

In this lab, we explore Python. We use Python for analysis. Python makes coding fun
and efficient. The future of programming includes Python. Learning Python opens many
opportunities for developers."""

# Save sample text to a file
with open('sample_text.txt', 'w', encoding='utf-8') as f:
    f.write(sample_text)

print("Sample text file created!")

[18] ✓ 0.0s Python ~
... Sample text file created!
```

word_frequency_colab.ipynb > M+ Lab 2: Task 1 - Word Frequency Counter > M+ Task Description: > # Display results

+ Code + Markdown | ▶ Run All ↺ Restart ≡ Clear All Outputs | Jupyter Variables ≡ Outline ... Python 3.9.6

LAB@ LAB@

```
def count_word_frequency(filename):
    """
    Read a text file and count the frequency of each word.

    Args:
        filename (str): Path to the text file to analyze

    Returns:
        Counter: Counter object with words as keys and frequencies as values
    """
    try:
        # Open and read the file
        with open(filename, 'r', encoding='utf-8') as file:
            text = file.read()

        # Convert to lowercase and remove punctuation
        translator = str.maketrans('', '', string.punctuation)
        text = text.translate(translator).lower()

        # Split text into words
        words = text.split()

        # Count word frequencies using Counter
        word_freq = Counter[str](words)

        return word_freq

    except FileNotFoundError:
        print(f"Error: File '{filename}' not found.")
        return None
    except Exception as e:
        print(f"Error reading file: {e}")
        return None
```

[19] ✓ 0.0s Python ▾

```
# Execute the word frequency analysis
filename = 'sample_text.txt'
word_freq = count_word_frequency(filename)
```

[20] ✓ 0.0s Python ▾

⌵ ▶ ⏪ ⏩ ⏹ ... 🗑

```
# Display results
if word_freq:
    print("\n" + "="*50)
    print("WORD FREQUENCY ANALYSIS")
    print("="*50)

    # Display top 20 most common words
    print("\nTop 20 Most Frequent Words:")
    print("-"*50)
    print(f"{'Word':<20} {'Frequency':<15} {'Percentage':<15}")
    print("-"*50)

    total_words = sum(word_freq.values())

    for word, count in word_freq.most_common(20):
        percentage = (count / total_words) * 100
        print(f"{'word':<20} {'count':<15} {'percentage':.2f}%")

    print("-"*50)
    print(f"\nTotal unique words: {len(word_freq)}")
    print(f"Total words: {total_words}")
    print("="*50)
```

117 0.0s Python

OUTPUT:

```
...  
  
=====   
WORD FREQUENCY ANALYSIS   
=====   
  
Top 20 Most Frequent Words:   
-----   


| Word        | Frequency | Percentage |
|-------------|-----------|------------|
| python      | 15        | 13.64%     |
| is          | 6         | 5.45%      |
| and         | 6         | 5.45%      |
| for         | 5         | 4.55%      |
| programming | 3         | 2.73%      |
| data        | 3         | 2.73%      |
| many        | 3         | 2.73%      |
| learning    | 3         | 2.73%      |
| the         | 3         | 2.73%      |
| language    | 2         | 1.82%      |
| used        | 2         | 1.82%      |
| science     | 2         | 1.82%      |
| developers  | 2         | 1.82%      |
| machine     | 2         | 1.82%      |
| use         | 2         | 1.82%      |
| analysis    | 2         | 1.82%      |
| ...         |           |            |

  
Total unique words: 64  
Total words: 110  
=====   
  
Output is truncated. View as a scrollable element or open in a text editor. Adjust cell output settings...
```

CODE Explanation:

This Python program reads a text file and counts how many times each word appears. It removes punctuation and converts all words to lowercase so the counting is accurate. The text is then split into words, and the Counter function is used to find word frequencies. The program also handles errors like a missing file and displays the results in a clear format.

Q) Task 2: File Operations Using Cursor AI

❖ Scenario:

You are automating basic file operations.

❖ Task:

Use Cursor AI to generate a program that:

- Creates a text file
- Writes sample text
- Reads and displays the content

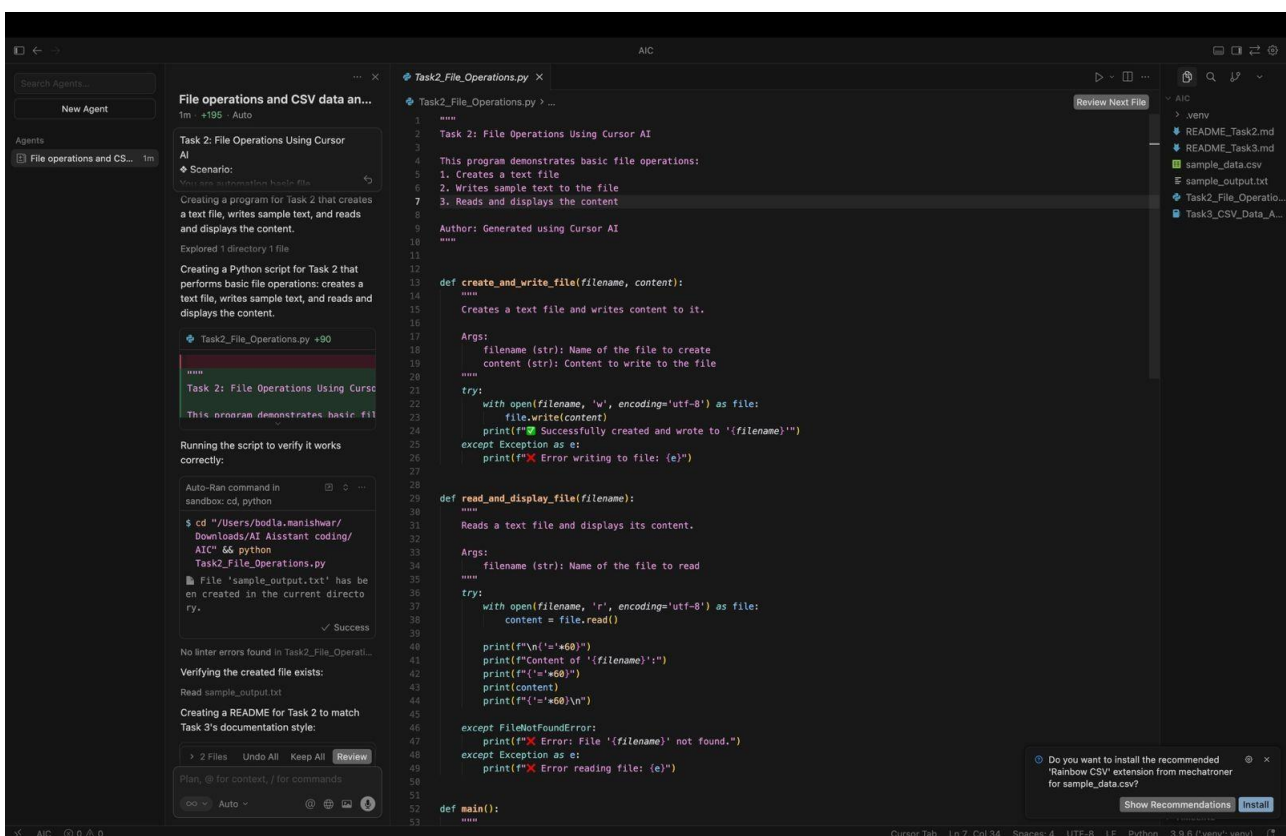
❖ Expected Output:

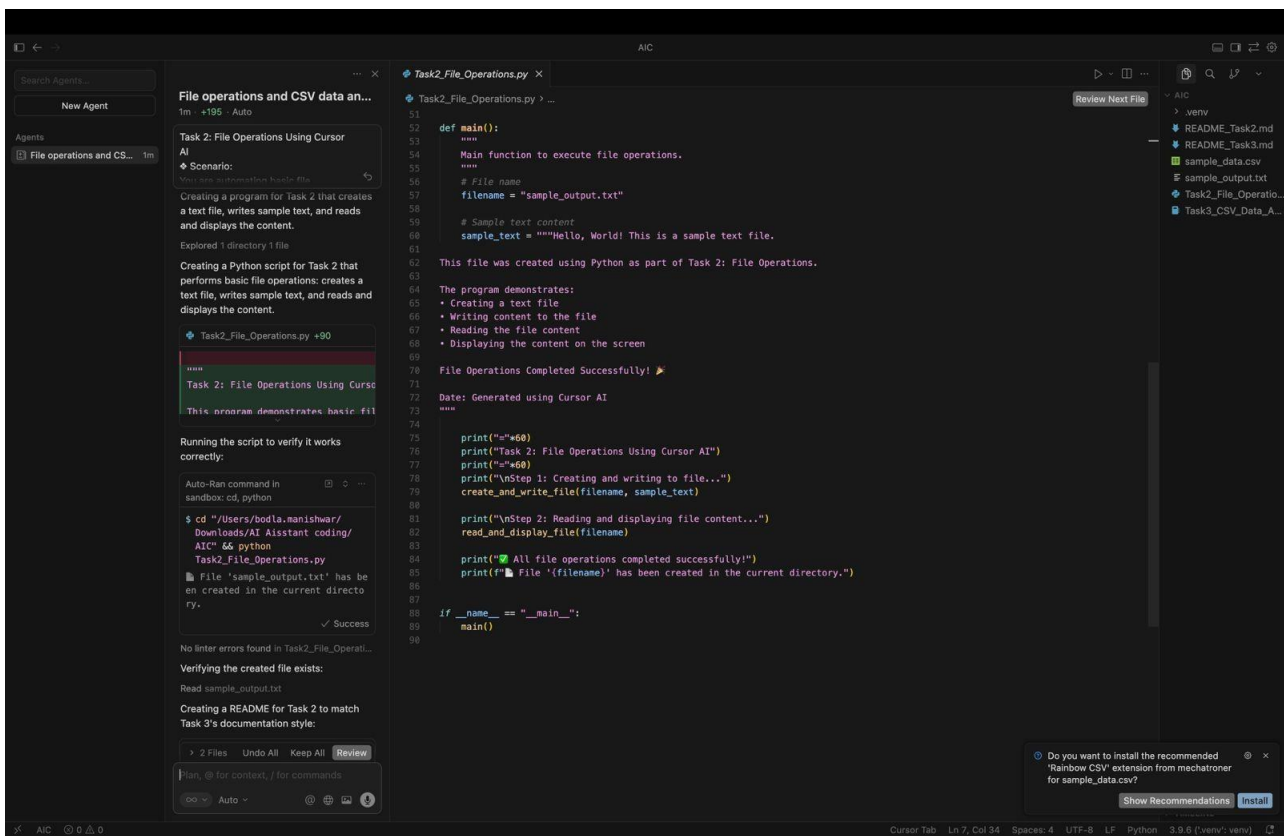
- Functional code
- Cursor AI screenshots

PROMPT:

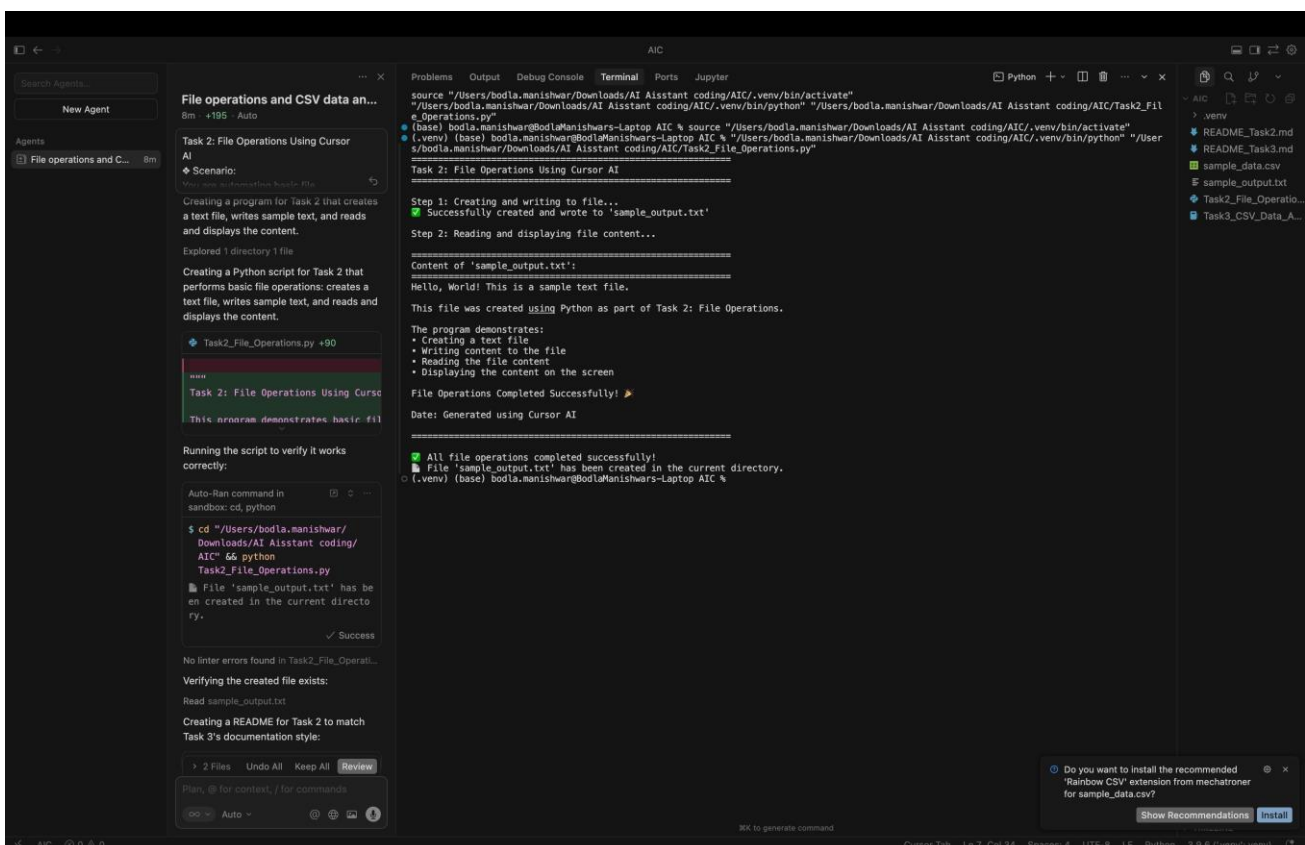
Generate a simple Python program that demonstrates basic file operations. The program should create a text file, write some sample text into it, then read the content from the file and display it on the screen.

CODE:





OUTPUT:



CODE EXPLANATION:

This Python program shows basic file handling by writing text to a file and then reading it. It uses separate functions for reading and writing to keep the code clear. Error handling is included to manage file-related issues. The main() function controls the program flow and runs only when the program is executed directly

Q)Task 3: CSV Data Analysis

❖ Scenario:

You are processing structured data from a CSV file.

❖ Task:

Use Gemini in Colab to read a CSV file and calculate mean, min, and max.

❖ Expected Output:

➤ Correct output

➤ Screenshot

PROMPT:

Write Python code in Google Colab to read a CSV file and calculate mean, minimum, and maximum values using pandas.

CODE:

The screenshot displays a Google Colab notebook interface. On the left, the 'Agents' panel shows a 'New Agent' button and a list of agents, including 'CSV file statistical an...'. The main notebook area is titled 'Task3_CSV_Data_Analysis.ipynb' and shows two code cells. The first cell, 'Step 1: Install Required Libraries', contains the code: `# Install required packages`, `!pip install --q google-generativeai pandas numpy`, and has been executed successfully. The second cell, 'Step 2: Import Libraries and Setup', contains the code: `import pandas as pd`, `import numpy as np`, `import google.generativeai as genai`, `import os`, `from IPython.display import display, HTML`, and `print("Libraries imported successfully!")`, which has also been executed successfully. The bottom of the notebook shows a warning about the 'google.generativeai' package being deprecated and a recommendation to switch to 'google.genai'.

Search Agents...

New Agent

Agents

CSV file statistical an... 14m

Task 3: CSV Data Analysis

Scenario: You are processing structured data from a CSV file.

Task: Use Gemini in Colab to read a CSV file and calculate mean, min, and max.

Expected Output: Correct output Screenshot

showing all results

Ready for Colab — can be uploaded and run directly

Expected Output: The notebook produces a final summary table like:

Column	Mean	Min	Max
Age	32.75	25	45
Salary	63750.00	50000	80000
Score	89.63	85	95

To Use:

1. Upload the notebook to Google Colab

2. Get your Gemini API key from Google AI Studio

3. Replace YOUR_API_KEY_HERE in the configuration cell

4. Run all cells — the notebook will calculate and display mean, min, and max values

The notebook is ready to use. Run it in Colab and take a screenshot of the final output showing the statistical analysis results.

~ 3 Files

Task3_CSV_Data_An... +14 -6

sample_data.csv +9 -1

README_Task3.md +93 -1

Reject, suggest, follow up?

Task3_CSV_Data_Analysis.ipynb •

Task3_CSV_Data_Analysis.ipynb > M4 Task 3: CSV Data Analysis with Gemini > M4 Step 7: Final Output Summary

+ Code + Markdown | ▶ Run All ↺ Restart ≡ Clear All Outputs | Jupyter Variables ≡ Outline ...

import google.generativeai as genai

Step 3: Configure Gemini API

Note: You need to get your Gemini API key from Google AI Studio

```
# Configure Gemini API
# Option 1: Set your API key here (replace with your actual key)
GEMINI_API_KEY = "YOUR_API_KEY_HERE"

# Option 2: Or use environment variable
# GEMINI_API_KEY = os.getenv("GEMINI_API_KEY")

# Configure the API
genai.configure(api_key=GEMINI_API_KEY)

print("Gemini API configured successfully!")
```

[3] ✓ 0.0s

Gemini API configured successfully!

Step 4: Upload CSV File

Upload your CSV file using the file uploader below, or use a sample CSV file.

Read the CSV file
csv_file = 'sample_data.csv' # Change this to your uploaded file name

If you uploaded a file, uncomment and use:
csv_file = list(uploaded.keys())[0]

df = pd.read_csv(csv_file)

print("CSV file loaded successfully!")
print(f"Shape: {df.shape}")
print(f"First few rows:")
display(df.head())

[7] ✓ 0.0s

CSV file loaded successfully!

Shape: (8, 4)

First few rows:

	Name	Age	Salary	Score
0	Alice	25	50000	85
1	Bob	30	60000	90
2	Charlie	35	70000	88
3	Diana	28	55000	92
4	Eve	32	65000	87

Step 5: Traditional Statistical Analysis (Baseline)

Search Agents...

New Agent

Agents

CSV file statistical an... 14m

Task 3: CSV Data Analysis

Scenario: You are processing structured data from a CSV file.

Task: Use Gemini in Colab to read a CSV file and calculate mean, min, and max.

Expected Output: Correct output Screenshot

Salary 63750.00 50000 80000

Score 89.63 85 95

To Use:

1. Upload the notebook to Google Colab

2. Get your Gemini API key from Google AI Studio

3. Replace YOUR_API_KEY_HERE in the configuration cell

4. Run all cells — the notebook will calculate and display mean, min, and max values

The notebook is ready to use. Run it in Colab and take a screenshot of the final output showing the statistical analysis results.

~ 3 Files

Task3_CSV_Data_An... +14 -6

sample_data.csv +9 -1

README_Task3.md +93 -1

Reject, suggest, follow up?

Task3_CSV_Data_Analysis.ipynb •

Task3_CSV_Data_Analysis.ipynb > M4 Task 3: CSV Data Analysis with Gemini > M4 Step 7: Final Output Summary

+ Code + Markdown | ▶ Run All ↺ Restart ≡ Clear All Outputs | Jupyter Variables ≡ Outline ...

Step 5: Traditional Statistical Analysis (Baseline)

First, let's calculate mean, min, and max using traditional methods for comparison.

Calculate statistics for numeric columns only
numeric_cols = df.select_dtypes(include=[np.number]).columns

print("=" * 60)
print("TRADITIONAL STATISTICAL ANALYSIS")
print("=" * 60)

stats_df = pd.DataFrame({
 'Column': numeric_cols,
 'Mean': [df[col].mean() for col in numeric_cols],
 'Min': [df[col].min() for col in numeric_cols],
 'Max': [df[col].max() for col in numeric_cols]
})

display(stats_df)

print("\nDetailed Statistics:")
print(df[numeric_cols].describe())

[8] ✓ 0.0s

TRADITIONAL STATISTICAL ANALYSIS

	Column	Mean	Min	Max
0	Age	32.750	25	45
1	Salary	63750.0000	50000	80000
2	Score	89.625	85	95

Detailed Statistics:

	Age	Salary	Score
count	8.000000	8.000000	8.000000
mean	32.750000	63750.000000	89.625000
std	6.408599	9895.886591	3.113909
min	25.000000	50000.000000	85.000000
25%	28.750000	57250.000000	87.750000
50%	31.000000	62500.000000	89.500000
75%	35.750000	76500.000000	91.250000
max	45.000000	80000.000000	95.000000

Do you want to install the recommended 'Rainbow CSV' extension from mechatroner for sample_data.csv?

Show Recommendations Install

Search Agents...

New Agent

Agents

CSV file statistical an... 16m

Task 3: CSV Data Analysis

Scenario:
You are processing structured data from a CSV file.

Task:
Use Gemini in Colab to read a CSV file and calculate mean, min, and max.

Expected Output:
Correct output
Screenshot

Auto

Salary 63750.00 50000 80000
Score 89.63 85 95

To Use:
1. Upload the notebook to Google Colab
2. Get your Gemini API key from Google AI Studio
3. Replace YOUR_API_KEY_HERE in the configuration cell
4. Run all cells — the notebook will calculate and display mean, min, and max values
The notebook is ready to use. Run it in Colab and take a screenshot of the final output showing the statistical analysis results.

3 Files
Task3_CSV_Data_An... +14 -6
sample_data.csv +0 -1
README_Task3.md +93 -1

Review

Reject, suggest, follow up?

Auto

Task3_CSV_Data_Analysis.ipynb

Task 3: CSV Data Analysis with Gemini > M4 Step 7: Final Output Summary

+ Code + Markdown Run All Restart Clear All Outputs Jupyter Variables Outline

venv (Python 3.9.6)

Step 6: Gemini-Powered Analysis

Now, let's use Gemini to analyze the CSV data and calculate statistics.

markdown

Prepare data for Gemini
Convert DataFrame to string format
data_preview = df.head(10).to_string()
data_summary = f"\nData shape: {df.shape}\n"
data_summary += f"\nColumns: {list(df.columns)}\n"
data_summary += f"\nNumeric columns: {list(df.numeric_cols)}\n"
print("Data prepared for Gemini analysis")

Python

Data prepared for Gemini analysis

Step 7: Final Output Summary

Mean, Min, Max Values:

markdown

Final comprehensive summary
print("-" * 70)
print("FINAL STATISTICAL ANALYSIS - MEAN, MIN, MAX")
print("-" * 70)
final_stats = pd.DataFrame({
 'Column': numeric_cols,
 'Mean': (round(df[col].mean(), 2) for col in numeric_cols),
 'Min': (df[col].min() for col in numeric_cols),
 'Max': (df[col].max() for col in numeric_cols)
})
Display with better formatting
displayHTML(final_stats.to_html(index=False, classes="table table-striped"))
print("\n" + "-" * 70)
print("Detailed Statistics:")
print("-" * 70)
display(df(numeric_cols).describe())
print("\n" + "-" * 70)
print("ANALYSIS COMPLETE!")
print("-" * 70)

Do you want to install the recommended 'Rainbow CSV' extension from mechatroner for sample_data.csv?
Show Recommendations Install

OUTPUT:

Search Agents...

New Agent

Agents

CSV file statistical an... 16m

Task 3: CSV Data Analysis

Scenario:
You are processing structured data from a CSV file.

Task:
Use Gemini in Colab to read a CSV file and calculate mean, min, and max.

Expected Output:
Correct output
Screenshot

Auto

Salary 63750.00 50000 80000
Score 89.63 85 95

To Use:
1. Upload the notebook to Google Colab
2. Get your Gemini API key from Google AI Studio
3. Replace YOUR_API_KEY_HERE in the configuration cell
4. Run all cells — the notebook will calculate and display mean, min, and max values
The notebook is ready to use. Run it in Colab and take a screenshot of the final output showing the statistical analysis results.

3 Files
Task3_CSV_Data_An... +14 -6
sample_data.csv +0 -1
README_Task3.md +93 -1

Review

Reject, suggest, follow up?

Auto

Task3_CSV_Data_Analysis.ipynb

Task 3: CSV Data Analysis with Gemini > M4 Step 7: Final Output Summary

+ Code + Markdown Run All Restart Clear All Outputs Jupyter Variables Outline

venv (Python 3.9.6)

=====

FINAL STATISTICAL ANALYSIS - MEAN, MIN, MAX

=====

Column Mean Min Max

Age 32.75 25 45

Salary 63750.00 60000 80000

Score 89.62 85 95

=====

Detailed Statistics:

=====

Age Salary Score

count 8.000000 8.000000 8.000000

mean 32.750000 63750.000000 89.625000

std 6.408699 9895.886591 3.113909

min 25.000000 50000.000000 85.000000

25% 28.750000 57250.000000 87.750000

50% 31.000000 62500.000000 89.500000

75% 35.750000 70500.000000 91.250000

max 45.000000 80000.000000 95.000000

=====

ANALYSIS COMPLETE!

=====

Do you want to install the recommended 'Rainbow CSV' extension from mechatroner for sample_data.csv?
Show Recommendations Install

CODE EXPLANATION:

This code performs statistical analysis on numeric columns of a DataFrame (df). First, it identifies all columns that contain numerical data using `select_dtypes(include=[np.number])`. Then, for each numeric column, it calculates the mean, minimum, and maximum values and stores them in a new DataFrame called `stats_df`. This DataFrame is displayed to show a clean summary of basic statistics.

Q)Task 4: Sorting Lists – Manual vs Built-in

❖ Scenario:

You are reviewing algorithm choices for efficiency.

❖ Task:

Use Gemini to generate:

- Bubble sort
- Python's built-in sort()
- Compare both implementations.

❖ Expected Output:

- Two versions of code
- Short comparison

PROMPT:

Generate Python code to sort a list using bubble sort and Python's built-in sort() method. Show both implementations clearly and provide a short comparison explaining their efficiency and usage.

CODE:

```
Task 4: Sorting Lists – Manual vs Built-in
❖ Scenario:
You are reviewing algorithm choices for efficiency.
❖ Task:
Use Gemini to generate:
➤ Bubble sort
➤ Python's built-in sort()
➤ Compare both implementations.
❖ Expected Output:
➤ Two versions of code
➤ Short comparison

Reviewing the existing task files to understand the project structure and format.
Explored 3 files
Creating Task 4: Implementing Bubble sort, comparing it with Python's built-in sort(), and adding a README.
Task4_Sorting_Comparison.py +243

Task 4: Sorting Lists – Manual vs E
This scenario compares two sorting a
README_Task4.md (new) +196

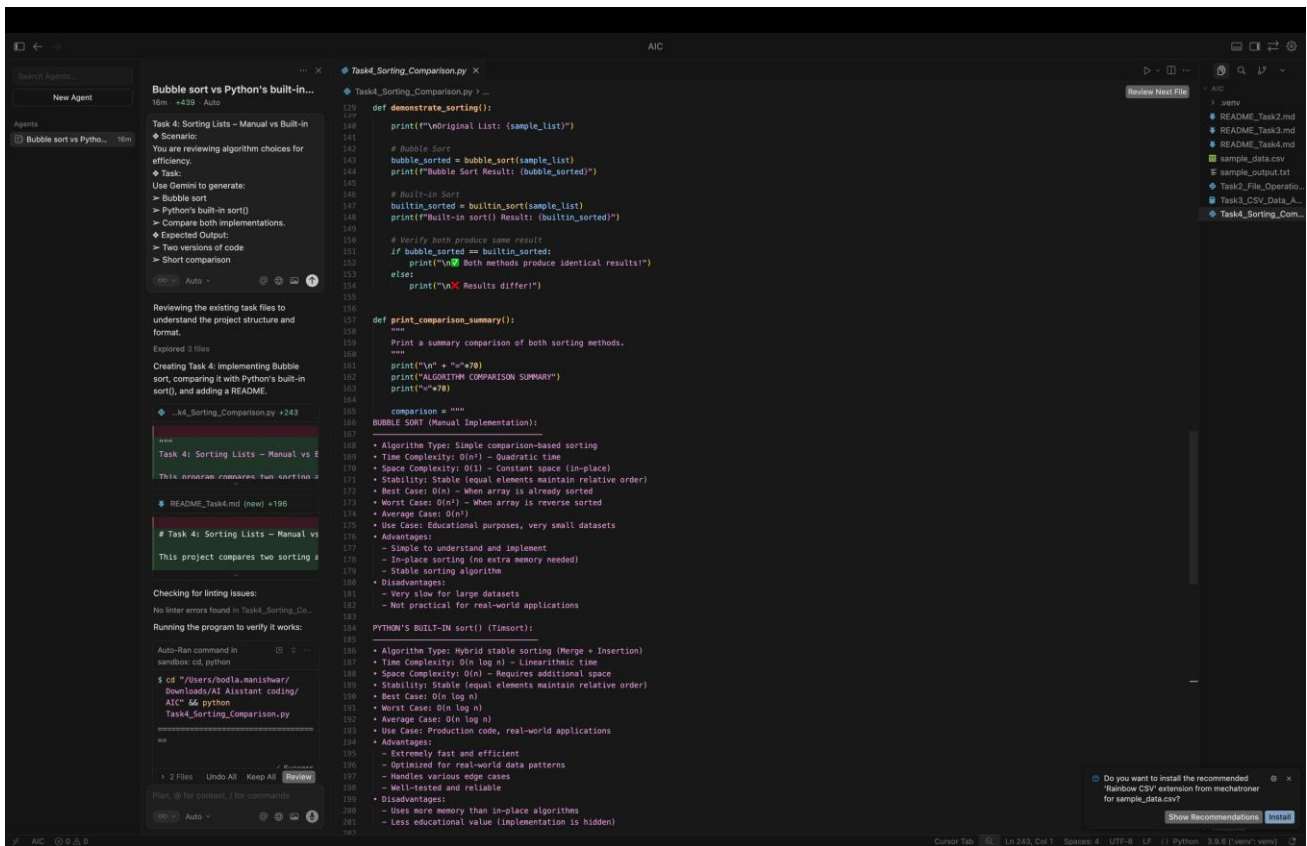
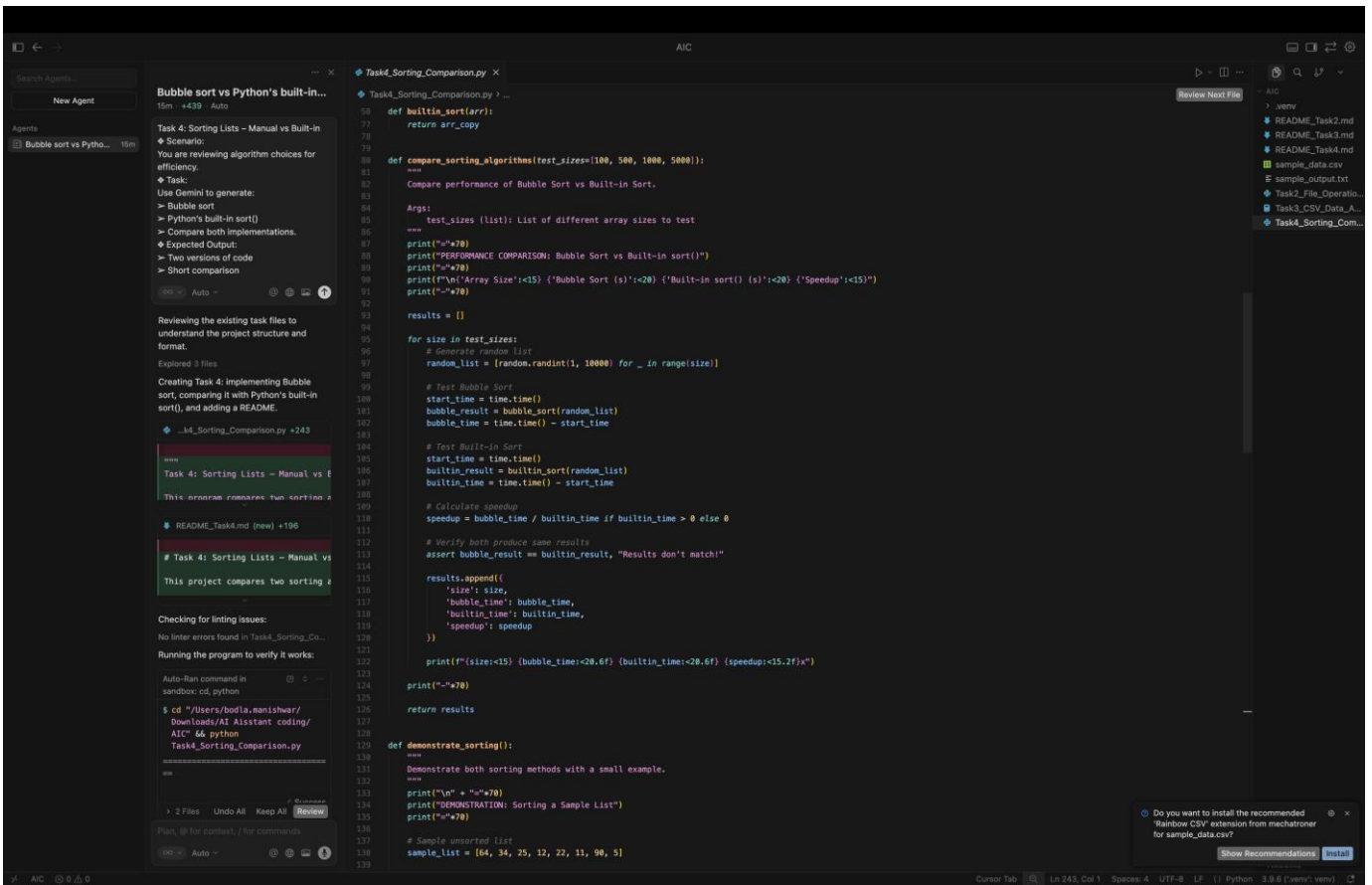
Task 4: Sorting Lists – Manual vs
This project compares two sorting a

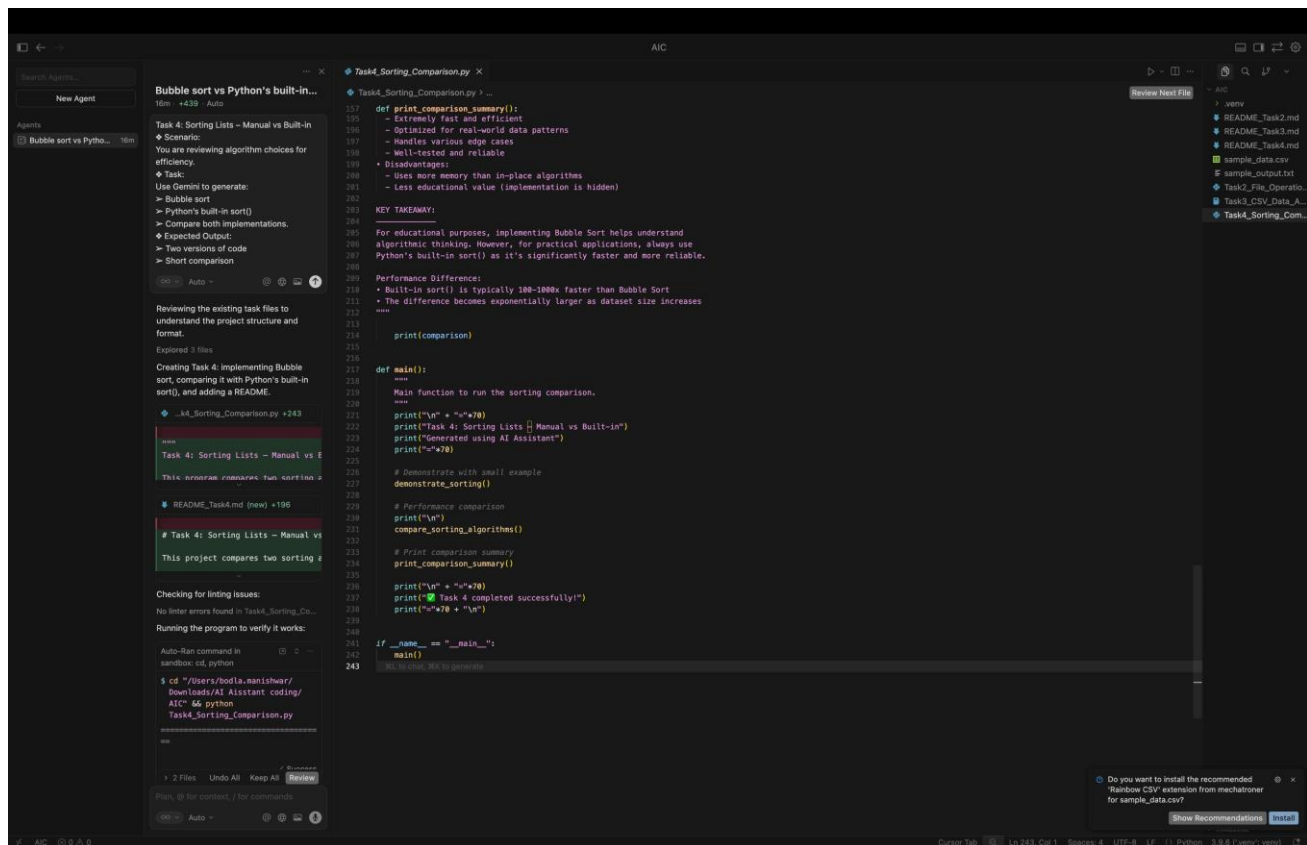
Checking for linting issues:
No linting errors found in Task4_Sorting_Co...

Running the program to verify it works:
Auto-Run command in
sandbox: cd, python
$ cd "/Users/boila.manishwar/
Downloads/AI Assistant coding/
AIC" && python
Task4_Sorting_Comparison.py

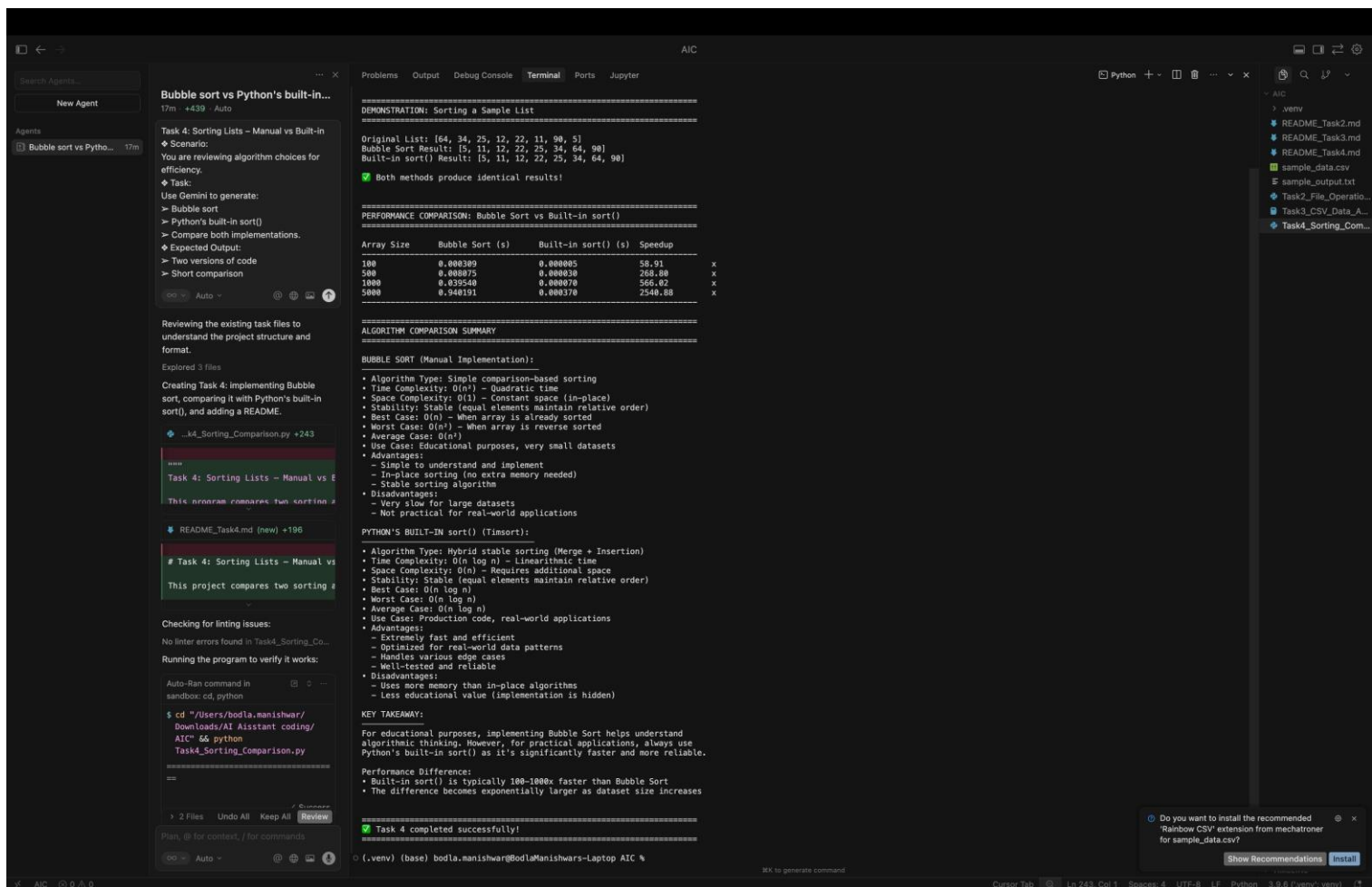
2 Files Undo All Keep All Review
Plan, @ for context, ! for comments
```

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Task4_Sorting_Comparison.py
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OUTPUT:



CODE EXPLANATION:

This program compares Bubble Sort with Python's built-in `sort()`. Bubble Sort is slow because it has $O(n^2)$ time complexity, while the built-in `sort()` is faster with $O(n \log n)$. By measuring execution time, the program shows that Python's built-in sort is more efficient and better for practical use.