ASSIGNMENT-2.3

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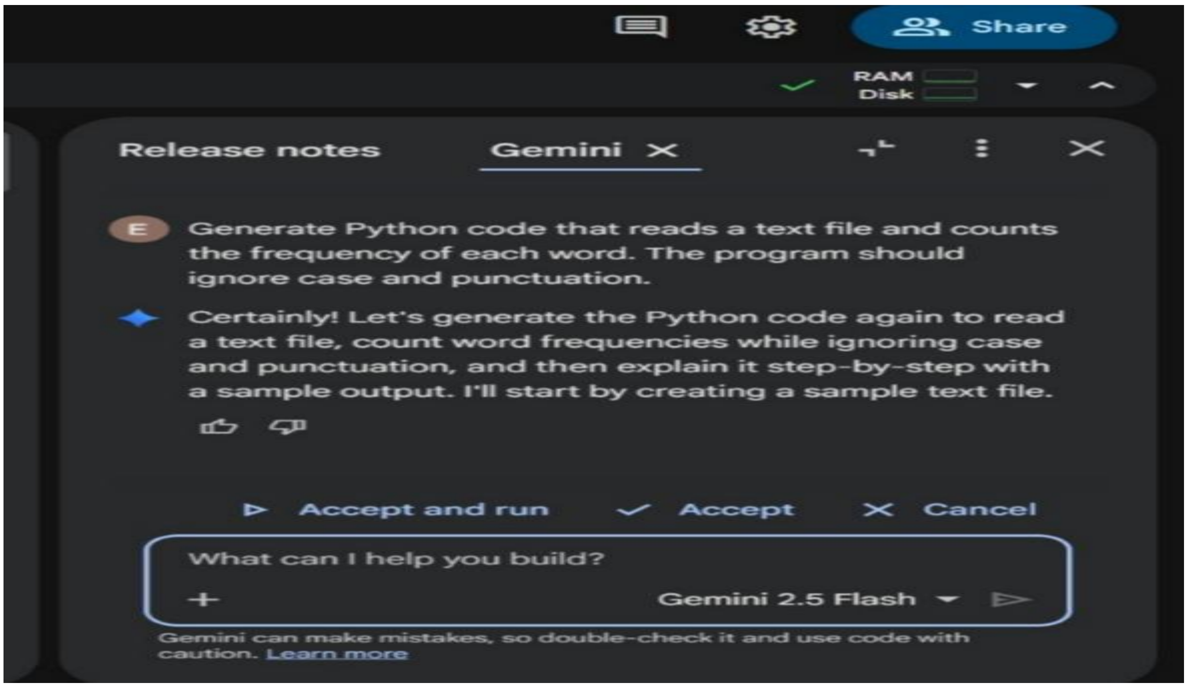
Batch:05

TASK:01

Word Frequency from Text File

PROMPT:



Generate Python code that reads a text file and counts the frequency of each word. The program should ignore case and punctuation.

Certainly! Let's generate the Python code again to read a text file, count word frequencies while ignoring case and punctuation, and then explain it step-by-step with a sample output. I'll start by creating a sample text file.

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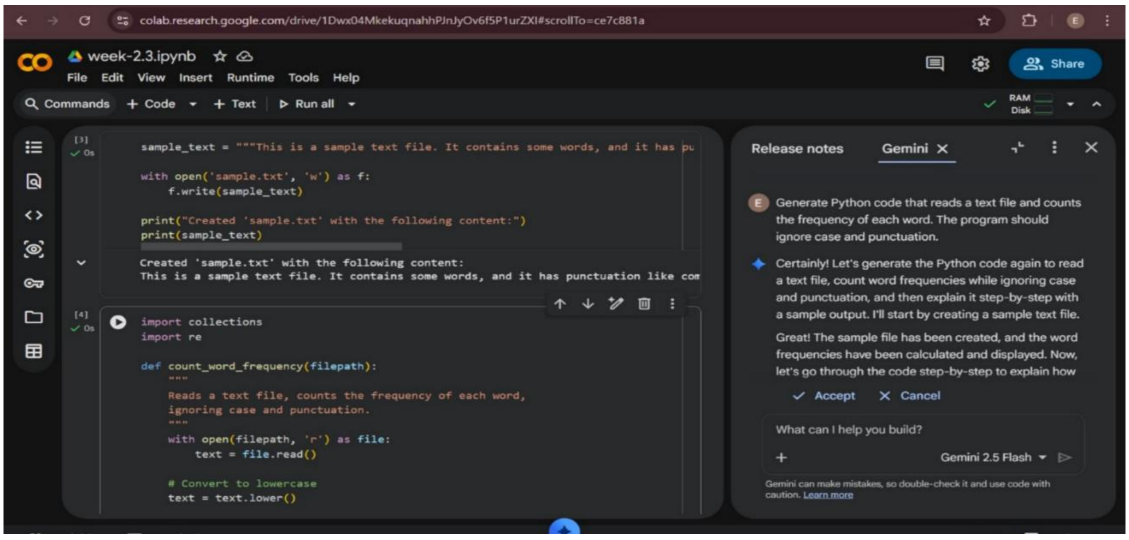
CODE:



```
sample_text = """This is a sample text file. It contains some words, and it has pu

with open('sample.txt', 'w') as f:
    f.write(sample_text)

print("Created 'sample.txt' with the following content:")
print(sample_text)
```

```
Created 'sample.txt' with the following content:
This is a sample text file. It contains some words, and it has punctuation like com
```

```
import collections
import re

def count_word_frequency(filepath):
    """
    Reads a text file, counts the frequency of each word,
    ignoring case and punctuation.
    """
    with open(filepath, 'r') as file:
        text = file.read()

    # Convert to lowercase
    text = text.lower()
```

Generate Python code that reads a text file and counts the frequency of each word. The program should ignore case and punctuation.

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Great! The sample file has been created, and the word frequencies have been calculated and displayed. Now, let's go through the code step-by-step to explain how

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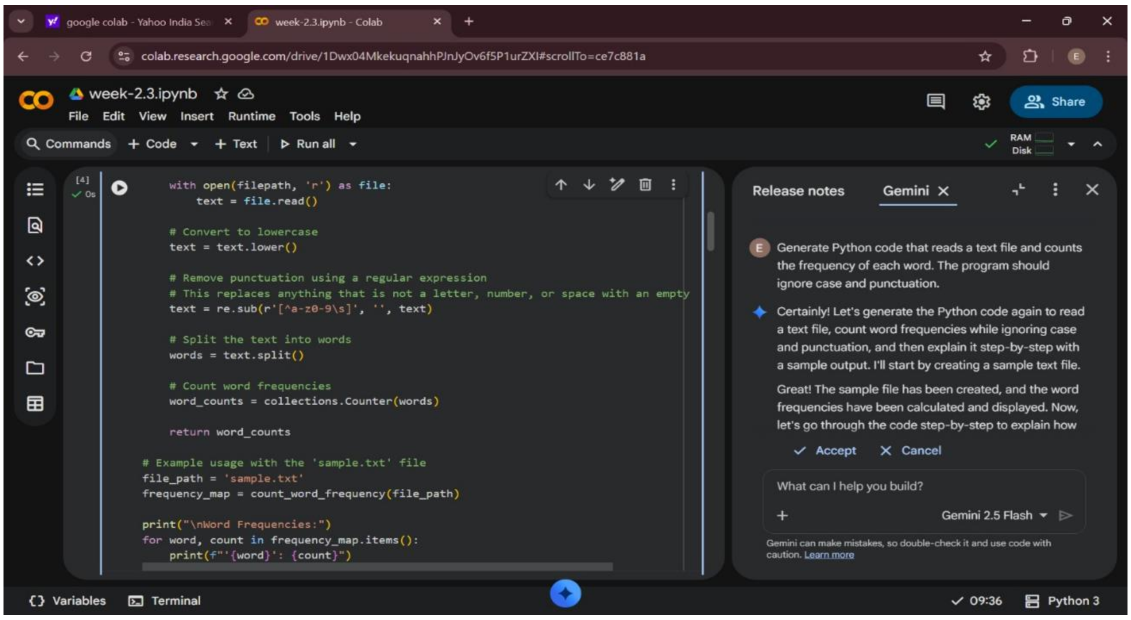

```
    with open(filepath, 'r') as file:
        text = file.read()

    # Convert to lowercase
    text = text.lower()

    # Remove punctuation using a regular expression
    # This replaces anything that is not a letter, number, or space with an empty
    text = re.sub(r'[^a-z0-9\s]', '', text)

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

    # Count word frequencies
    word_counts = collections.Counter(words)

    return word_counts

# Example usage with the 'sample.txt' file
file_path = 'sample.txt'
frequency_map = count_word_frequency(file_path)

print("\nWord Frequencies:")
for word, count in frequency_map.items():
    print(f"'{word}': {count}")
```

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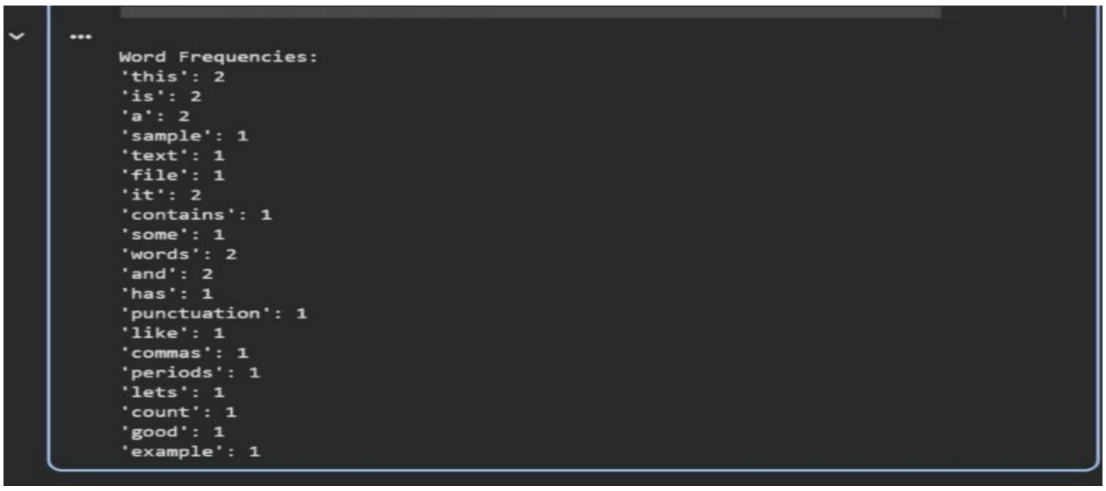
OUTPUT:



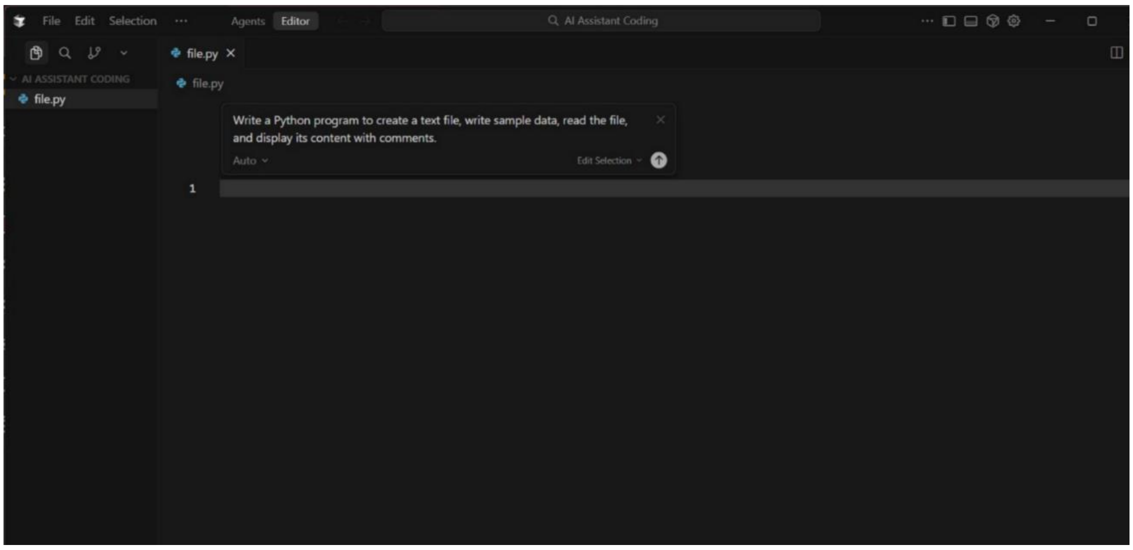
```
Word Frequencies:
'this': 2
'is': 2
'a': 2
'sample': 1
'text': 1
'file': 1
'it': 2
'contains': 1
'some': 1
'words': 2
'and': 2
'has': 1
'punctuation': 1
'like': 1
'commas': 1
'periods': 1
'lets': 1
'count': 1
'good': 1
'example': 1
```

EXPLANATION:

- The program reads the contents of a text file.
- It converts all text to lowercase to avoid case mismatch.
- Punctuation marks are removed to ensure accurate word counting.
- Each word is counted using a dictionary.
- The final output displays each word along with its frequency.

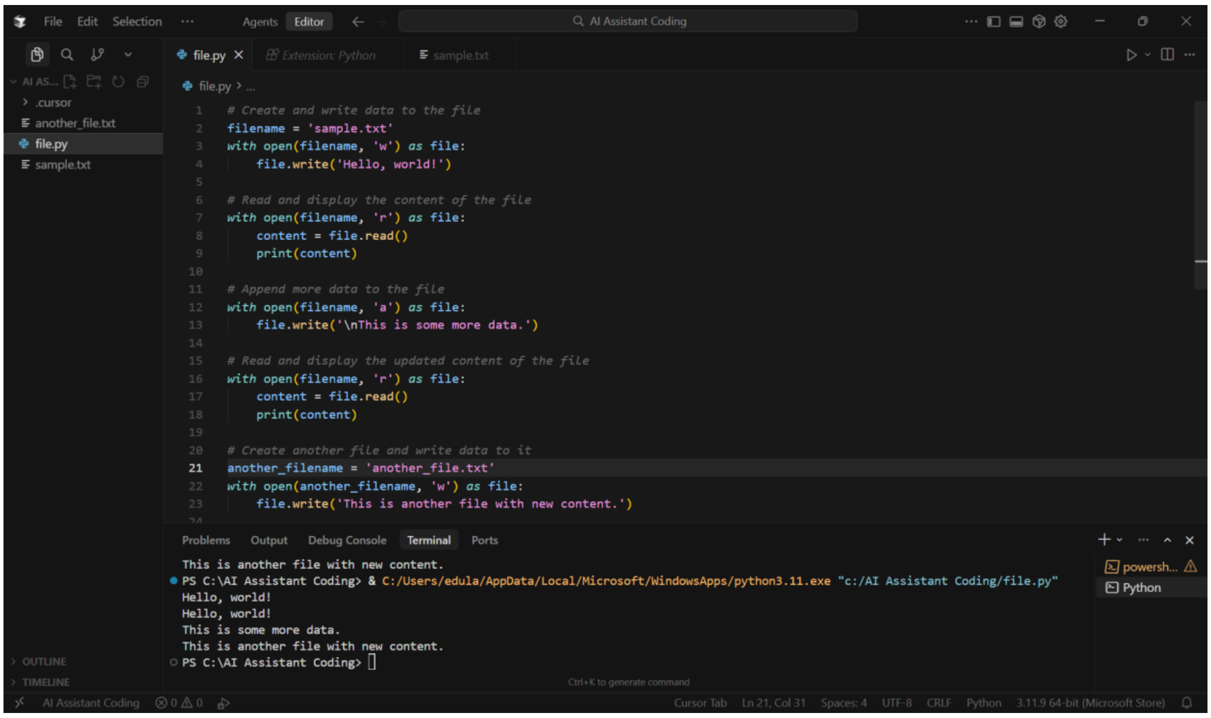
TASK-02:

PROMPT:



Write a Python program to create a text file, write sample data, read the file, and display its content with comments.

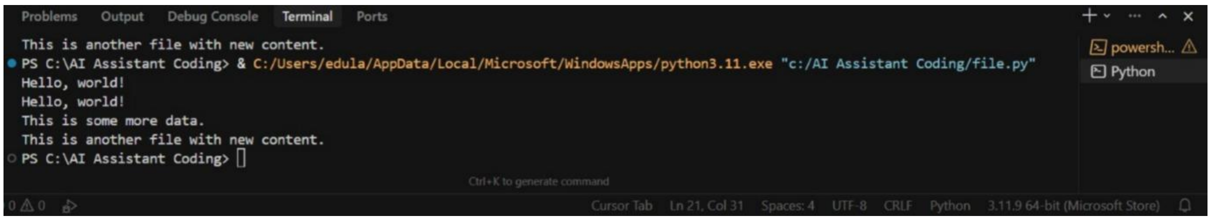
CODE:



```python
# Create and write data to the file
filename = 'sample.txt'
with open(filename, 'w') as file:
    file.write('Hello, world!')

# Read and display the content of the file
with open(filename, 'r') as file:
    content = file.read()
    print(content)

# Append more data to the file
with open(filename, 'a') as file:
    file.write('\nThis is some more data.')

# Read and display the updated content of the file
with open(filename, 'r') as file:
    content = file.read()
    print(content)

# Create another file and write data to it
another_filename = 'another_file.txt'
with open(another_filename, 'w') as file:
    file.write('This is another file with new content.')
```

```
This is another file with new content.
PS C:\AI Assistant Coding> & C:/Users/edula/AppData/Local/Microsoft/WindowsApps/python3.11.exe "c:/AI Assistant Coding/file.py"
Hello, world!
Hello, world!
This is some more data.
This is another file with new content.
PS C:\AI Assistant Coding>
```

OUTPUT:



```
This is another file with new content.
PS C:\AI Assistant Coding> & C:/Users/edula/AppData/Local/Microsoft/WindowsApps/python3.11.exe "c:/AI Assistant Coding/file.py"
Hello, world!
Hello, world!
This is some more data.
This is another file with new content.
PS C:\AI Assistant Coding>
```

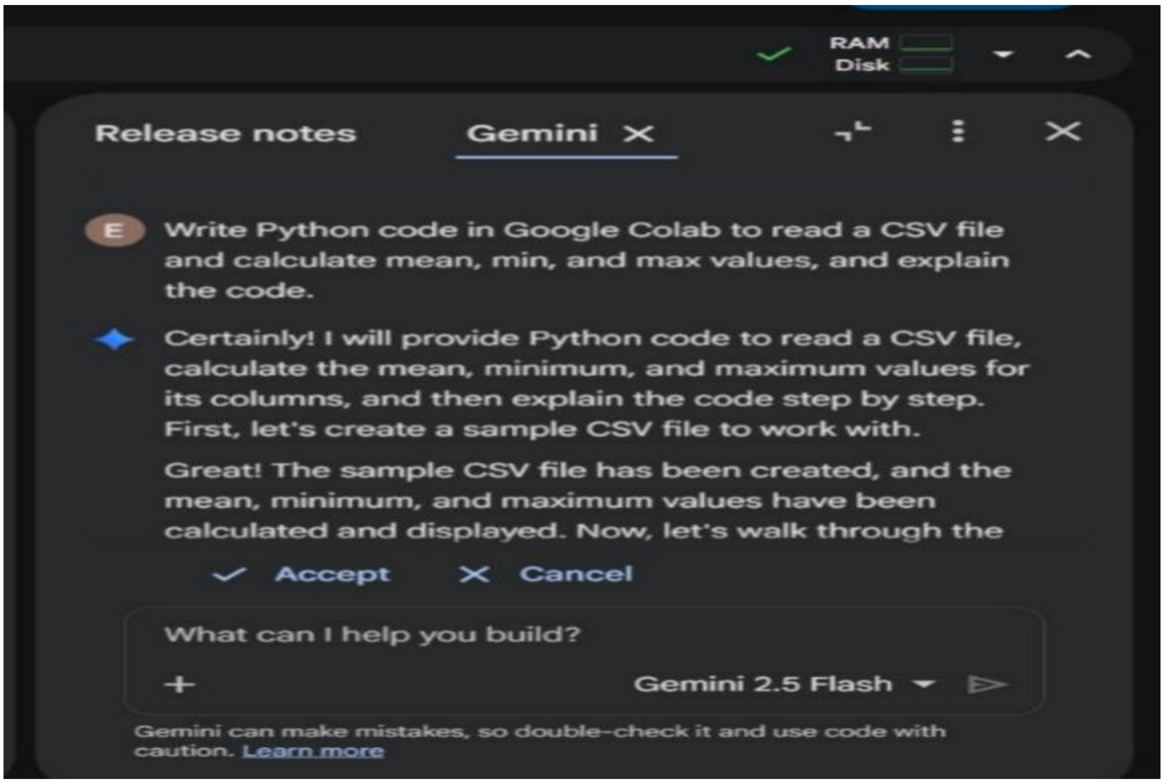
EXPLANATION:

- The program creates a new text file using write mode.
- Sample text is written into the file.
- The file is then opened in read mode.
- The program reads the content of the file.
- Finally, the file content is displayed on the screen.

TASK-03

CSV Data Analysis

PROMPT:



Write Python code in Google Colab to read a CSV file and calculate mean, min, and max values, and explain the code.

Certainly! I will provide Python code to read a CSV file, calculate the mean, minimum, and maximum values for its columns, and then explain the code step by step. First, let's create a sample CSV file to work with.

Great! The sample CSV file has been created, and the mean, minimum, and maximum values have been calculated and displayed. Now, let's walk through the

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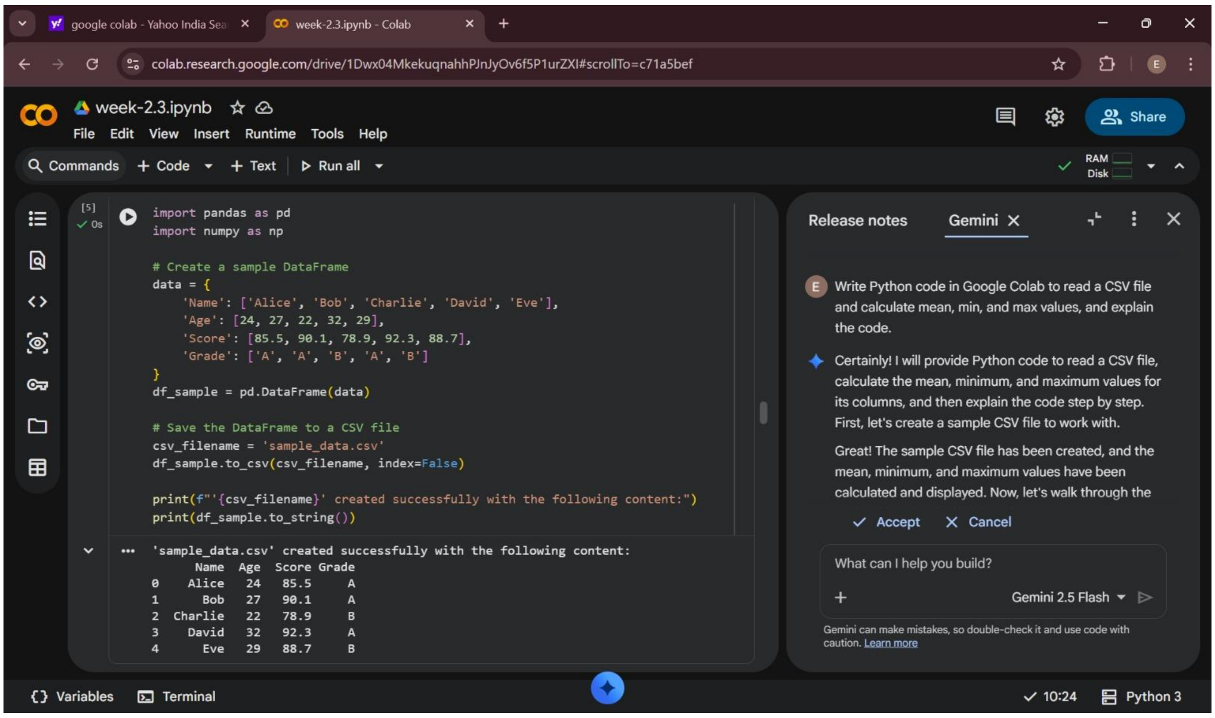
CODE:



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```python
import pandas as pd
import numpy as np

# Create a sample DataFrame
data = {
    'Name': ['Alice', 'Bob', 'Charlie', 'David', 'Eve'],
    'Age': [24, 27, 22, 32, 29],
    'Score': [85.5, 90.1, 78.9, 92.3, 88.7],
    'Grade': ['A', 'A', 'B', 'A', 'B']
}
df_sample = pd.DataFrame(data)

# Save the DataFrame to a CSV file
csv_filename = 'sample_data.csv'
df_sample.to_csv(csv_filename, index=False)

print(f"'{csv_filename}' created successfully with the following content:")
print(df_sample.to_string())
```

```
'sample_data.csv' created successfully with the following content:
      Name  Age  Score Grade
0    Alice   24   85.5     A
1      Bob   27   90.1     A
2  Charlie   22   78.9     B
3    David   32   92.3     A
4      Eve   29   88.7     B
```

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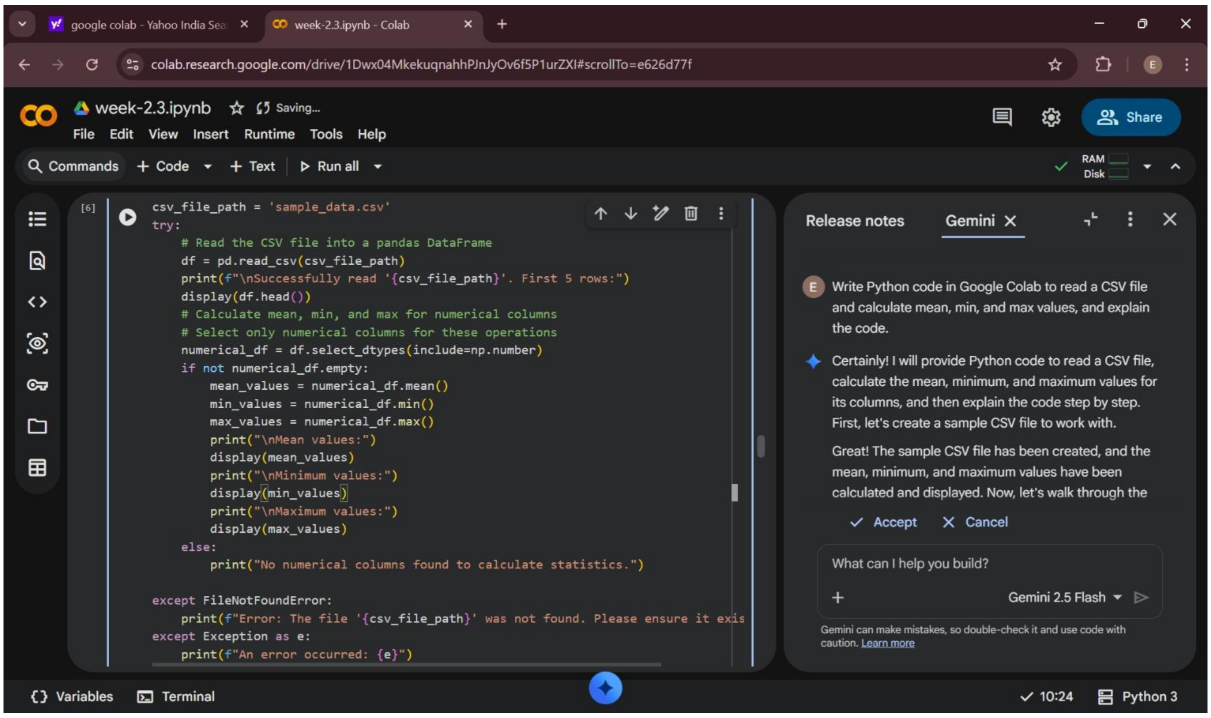

```python
csv_file_path = 'sample_data.csv'
try:
    # Read the CSV file into a pandas DataFrame
    df = pd.read_csv(csv_file_path)
    print(f"\nSuccessfully read '{csv_file_path}'. First 5 rows:")
    display(df.head())
    # Calculate mean, min, and max for numerical columns
    # Select only numerical columns for these operations
    numerical_df = df.select_dtypes(include=np.number)
    if not numerical_df.empty:
        mean_values = numerical_df.mean()
        min_values = numerical_df.min()
        max_values = numerical_df.max()
        print("\nMean values:")
        display(mean_values)
        print("\nMinimum values:")
        display(min_values)
        print("\nMaximum values:")
        display(max_values)
    else:
        print("No numerical columns found to calculate statistics.")

except FileNotFoundError:
    print(f"Error: The file '{csv_file_path}' was not found. Please ensure it exis
except Exception as e:
    print(f"An error occurred: {e}")
```

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Great! The sample CSV file has been created, and the mean, minimum, and maximum values have been calculated and displayed. Now, let's walk through the

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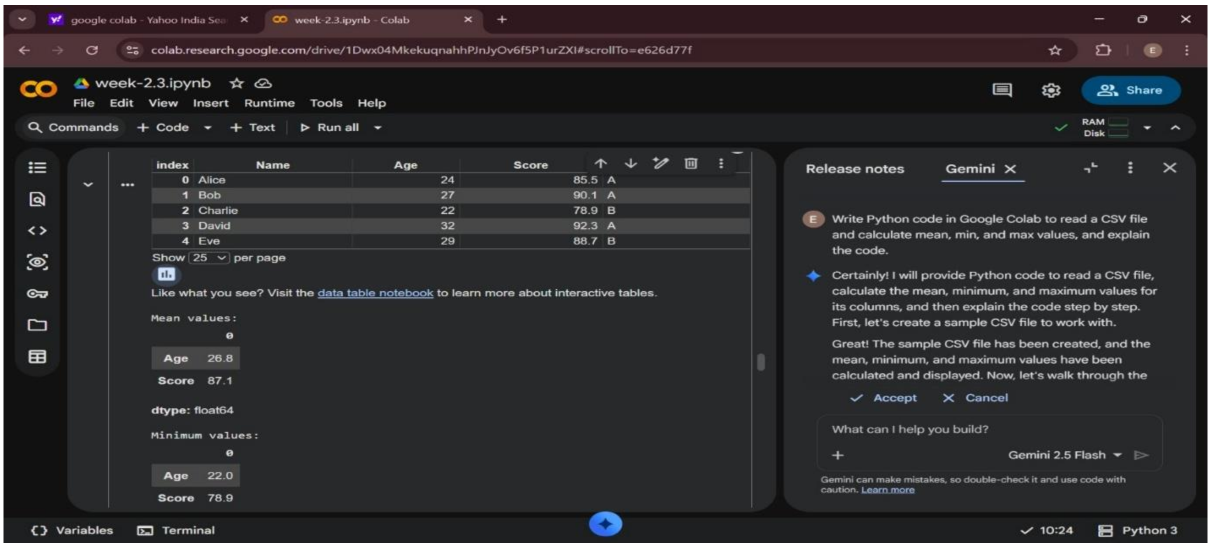
OUTPUT:



index	Name	Age	Score	
0	Alice	24	85.5	A
1	Bob	27	90.1	A
2	Charlie	22	78.9	B
3	David	32	92.3	A
4	Eve	29	88.7	B

Show 25 per page

Like what you see? Visit the data table notebook to learn more about interactive tables.

```
Mean values:
          0
 Age    26.8
 Score  87.1

dtype: float64

Minimum values:
          0
 Age    22.0
 Score  78.9
```

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Great! The sample CSV file has been created, and the mean, minimum, and maximum values have been calculated and displayed. Now, let's walk through the

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EXPLANATION:

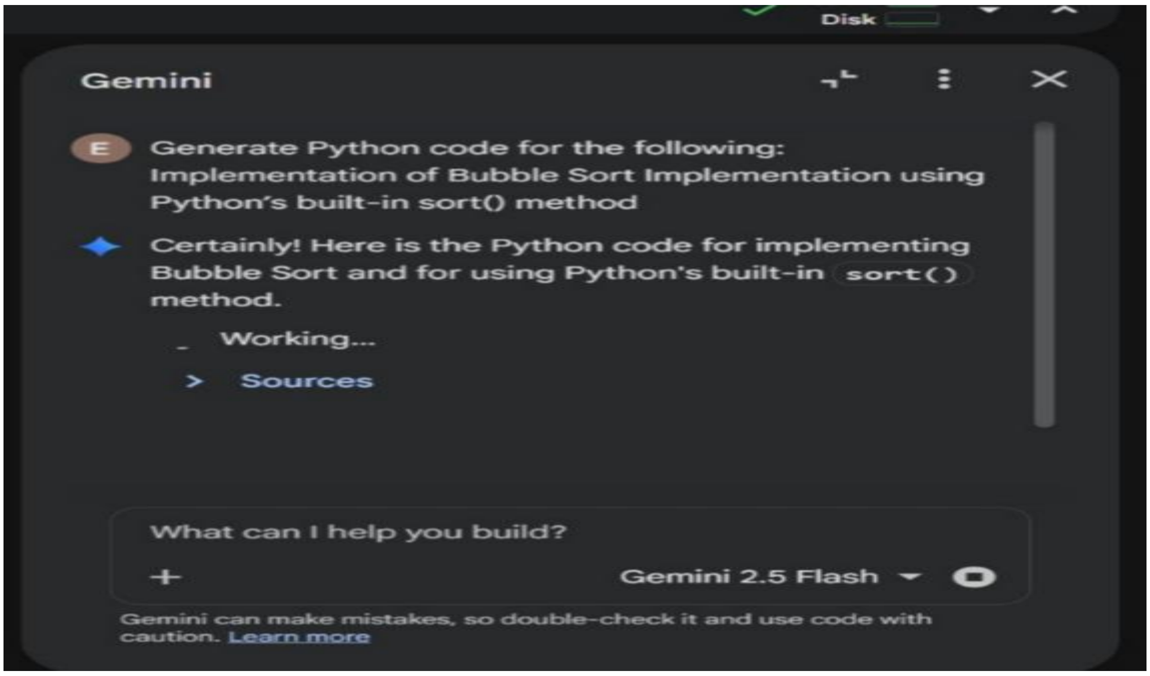
- The program imports the pandas library to work with CSV data.
- The CSV file is uploaded and read into a DataFrame.
- The dataset is displayed to understand its structure.

- The program calculates the mean of numeric columns.
- It finds the minimum value in each numeric column.
- It finds the maximum value in each numeric column.
- The results are displayed as output.

TASK-04

Sorting Lists – Manual vs Built-in

PROMPT:



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Generate Python code for the following: Implementation of Bubble Sort Implementation using Python's built-in sort() method

Certainly! Here is the Python code for implementing Bubble Sort and for using Python's built-in `sort()` method.

Working...

> Sources

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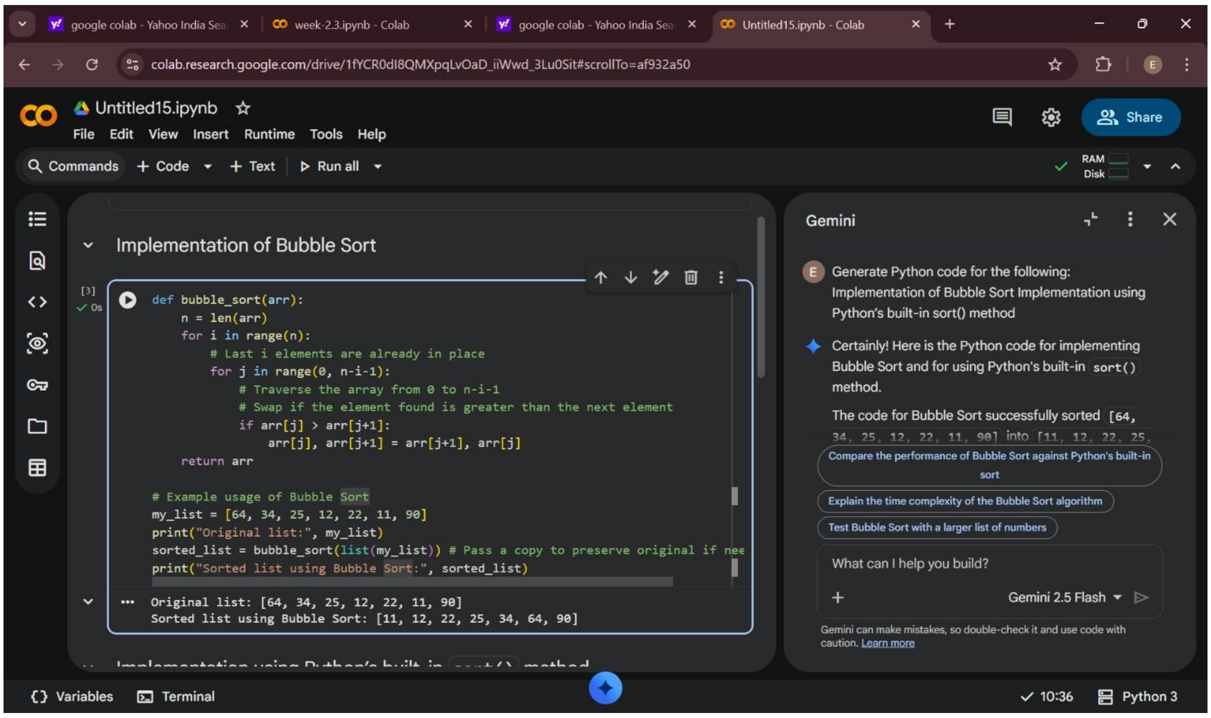
CODE: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Terminal
10:36
Python 3

Implementation of Bubble Sort

```
[3]
def bubble_sort(arr):
    n = len(arr)
    for i in range(n):
        # Last i elements are already in place
        for j in range(0, n-i-1):
            # Traverse the array from 0 to n-i-1
            # Swap if the element found is greater than the next element
            if arr[j] > arr[j+1]:
                arr[j], arr[j+1] = arr[j+1], arr[j]
    return arr

# Example usage of Bubble Sort
my_list = [64, 34, 25, 12, 22, 11, 90]
print("Original list:", my_list)
sorted_list = bubble_sort(list(my_list)) # Pass a copy to preserve original if nee
print("Sorted list using Bubble Sort:", sorted_list)
```

```
Original list: [64, 34, 25, 12, 22, 11, 90]
Sorted list using Bubble Sort: [11, 12, 22, 25, 34, 64, 90]
```

Gemini

Generate Python code for the following: Implementation of Bubble Sort Implementation using Python's built-in sort() method

Certainly! Here is the Python code for implementing Bubble Sort and for using Python's built-in `sort()` method.

The code for Bubble Sort successfully sorted `[64, 34, 25, 12, 22, 11, 90]` into `[11, 12, 22, 25,`

Compare the performance of Bubble Sort against Python's built-in sort

Explain the time complexity of the Bubble Sort algorithm

Test Bubble Sort with a larger list of numbers

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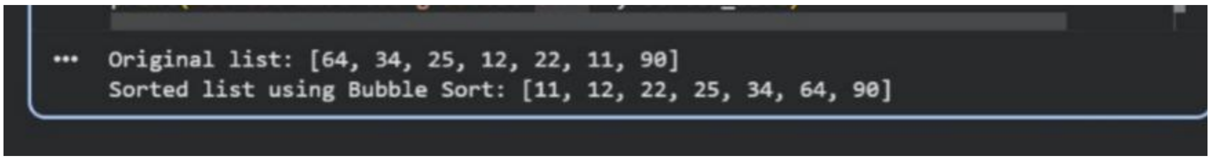
OUTPUT:



```
Original list: [64, 34, 25, 12, 22, 11, 90]
Sorted list using Bubble Sort: [11, 12, 22, 25, 34, 64, 90]
```

EXPLANATION:

1. Bubble Sort

- Bubble sort repeatedly compares adjacent elements.
- If the elements are in the wrong order, they are swapped.
- This process continues until the list is completely sorted.
- It is easy to understand but inefficient for large datasets.

2. Python Built-in sort()

- The sort() method sorts the list directly using an optimized algorithm.
- It is faster and more efficient than bubble sort.
- It requires less code and is suitable for large datasets.

Comparison

- Bubble sort has higher time complexity and is slower.
- Python’s sort() is optimized and much faster.
- Bubble sort is mainly used for learning,
  while sort() is used in real applications.