

# AI Assisted Coding

## ASSIGNMENT 2.3

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### Question:

#### Task1:

WordFrequencyfromTextFile

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

### Prompt:

Create a Python program that creates a text file, writes sample text into it, then reads the file and displays its contents.

Add clear comments in the code.

## CodeScreenshot:

The screenshot shows a code editor window with a dark theme. On the left, there's a sidebar titled 'Files' showing a directory structure with 'sample\_data' and 'words.txt'. The main area contains Python code for reading word frequencies from a file. The code uses regular expressions to find word boundaries and the `Counter` class from the `collections` module to count occurrences. It handles file not found errors and prints the most common words and their counts.

```
import re
from collections import Counter

def count_word_frequencies(filepath):
    """
    Reads a text file, counts the frequency of each word, and returns the counts.
    Words are converted to lowercase and punctuation is ignored.
    """

    try:
        with open(filepath, 'r') as file:
            text = file.read()
            # Convert text to lowercase and find all word sequences (alphanumeric)
            # \b matches word boundaries, \w+ matches one or more word characters
            words = re.findall(r'\b\w+\b', text.lower())
            # Use collections.Counter to easily count word occurrences
            word_counts = Counter(words)
            return word_counts
    except FileNotFoundError:
        return f"Error: The file '{filepath}' was not found. Please ensure it exists."
    except Exception as e:
        return f"An unexpected error occurred: {e}"

    # --- Main execution ---
    # Assuming the text file is named 'words.txt' and is located in the '/content/' directory.
    # You can change 'file_path' if your file is named differently or in another location.
    file_path = '/content/words.txt'

    print(f"Reading file: {file_path}\n")

    frequencies = count_word_frequencies(file_path)

    # Check if the function returned a dictionary (Counter object) or an error string
    if isinstance(frequencies, dict):
        print("Word Frequencies (most common first):")
        # Iterate through the most common words and their counts
        for word, count in frequencies.most_common():
            print(f" {word}: {count}")
    else:
        print(frequencies) # Print the error message
```

## Output(O/P):

The screenshot shows a terminal window displaying the output of the Python script. It starts with an error message about a missing file, then reads the file 'words.txt', and finally prints a list of words and their counts, ordered by frequency.

```
print(frequencies) # Print the error mess
...
*** Reading file: /content/words.txt

Word Frequencies (most common first):
'apple': 4
'banana': 3
'orange': 3
'dog': 3
'cat': 2
```

## Explanation:

This program reads a text file and splits the content into words.

Each word is stored in a dictionary where the key is the word and the value is its count. If a word appears again, its count is increased.

Finally, the program prints how many times each word appears in the file. This helps in analyzing text data and finding frequently used words.

## Question:

Task2:

FileOperationsUsingCursorAI

Scenario: You are automating basic file operations.

Task: Use Cursor AI to generate a program that:

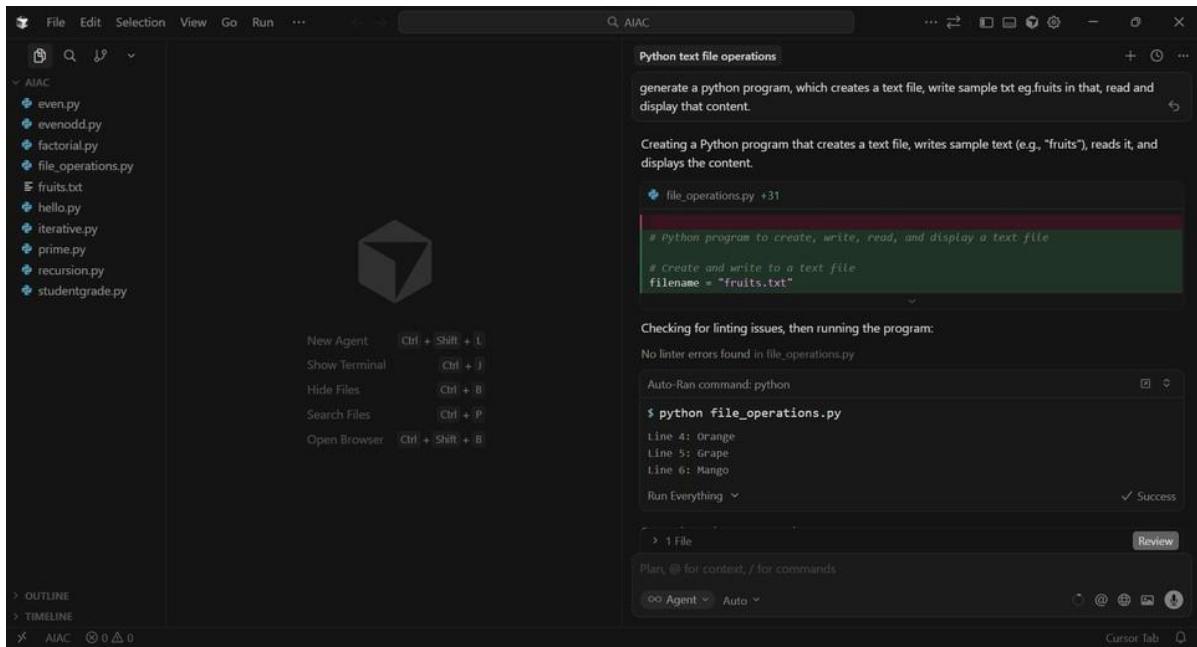
Creates a text file

Writes sample text

Reads and displays the content

## Prompt:

generate a python program, which creates a text file, writes sample text eg. fruits in that, read and display that content.



The screenshot shows the AIAC (AI Assistant for Code) interface. On the left, there's a sidebar with a file tree containing files like even.py, evenodd.py, factorial.py, file\_operations.py, fruits.txt, hello.py, iterative.py, prime.py, recursion.py, and studentgrade.py. Below the sidebar are keyboard shortcuts for New Agent, Show Terminal, Hide Files, Search Files, and Open Browser. At the bottom left are OUTLINE and TIMELINE buttons. The main workspace has a title bar "Q AIAC". A search bar says "Python text file operations". Below it is a text area with the following content:

```
generate a python program, which creates a text file, writes sample text eg. fruits in that, read and display that content.

Creating a Python program that creates a text file, writes sample text (e.g., "fruits"), reads it, and displays the content.

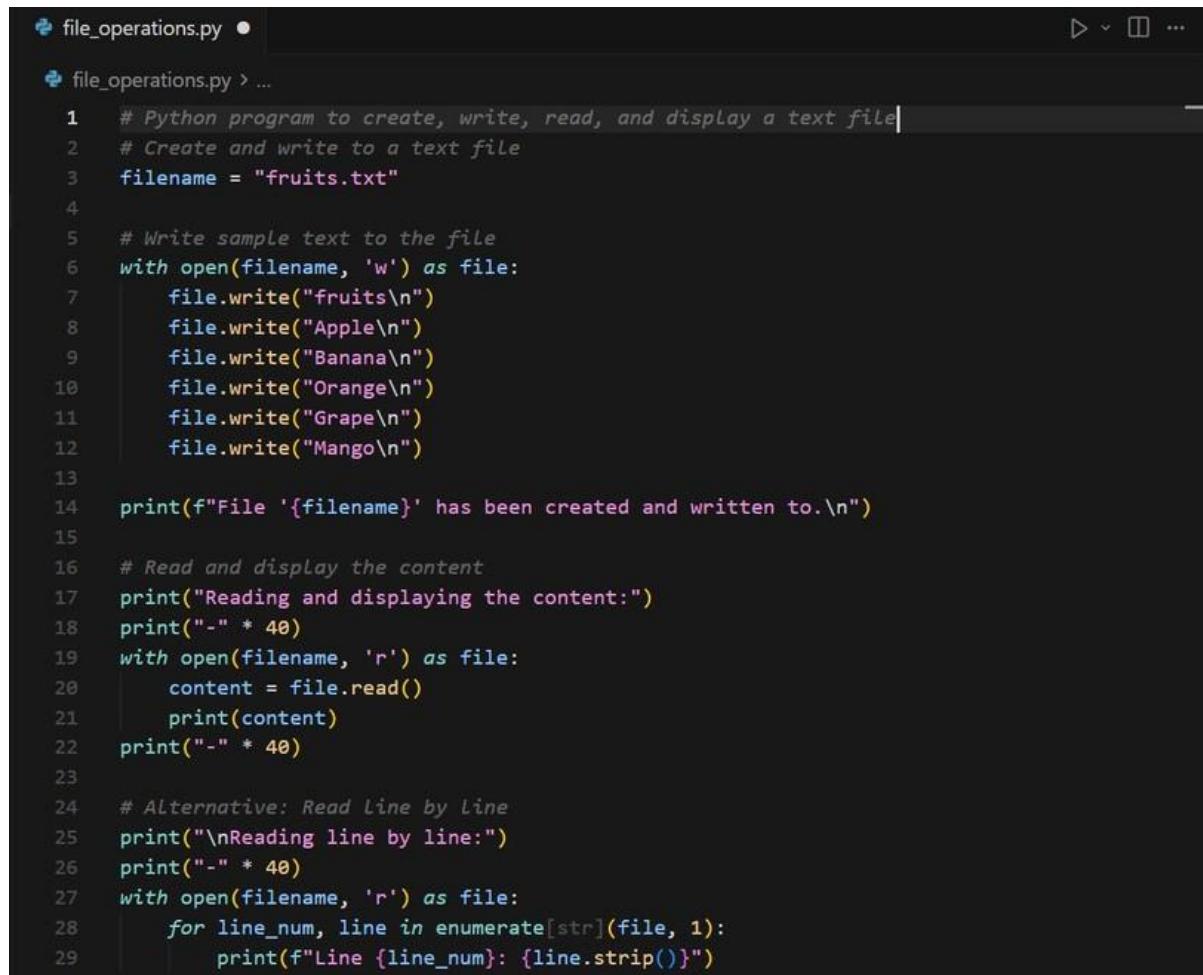
file_operations.py +31
# Python program to create, write, read, and display a text file
# Create and write to a text file
filename = "fruits.txt"

Checking for linting issues, then running the program:
No linter errors found in file_operations.py

Auto-Ran command: python
$ python file_operations.py
line 4: Orange
line 5: Grape
line 6: Mango

Run Everything ✓ Success
Review
1 File
Plan, @ for context, / for commands
Agent Auto
Cursor Tab
```

## CodeScreenshot:



The screenshot shows a code editor window with a dark theme. The title bar says "file\_operations.py". The code is a Python script for file operations. It starts by creating a file named "fruits.txt" and writing several fruit names to it. Then, it reads the content of the file and prints it. Finally, it demonstrates an alternative way to read the file line by line.

```
1 # Python program to create, write, read, and display a text file
2 # Create and write to a text file
3 filename = "fruits.txt"
4
5 # Write sample text to the file
6 with open(filename, 'w') as file:
7     file.write("fruits\n")
8     file.write("Apple\n")
9     file.write("Banana\n")
10    file.write("Orange\n")
11    file.write("Grape\n")
12    file.write("Mango\n")
13
14 print(f"File '{filename}' has been created and written to.\n")
15
16 # Read and display the content
17 print("Reading and displaying the content:")
18 print("-" * 40)
19 with open(filename, 'r') as file:
20     content = file.read()
21     print(content)
22 print("-" * 40)
23
24 # Alternative: Read Line by Line
25 print("\nReading line by line:")
26 print("-" * 40)
27 with open(filename, 'r') as file:
28     for line_num, line in enumerate(str(file), 1):
29         print(f"Line {line_num}: {line.strip()}")
```

## Output(O/P):

```
Problems Output Debug Console Terminal Ports

● $ python file_operations.py
File 'fruits.txt' has been created and written to.

Reading and displaying the content:
-----
fruits
Apple
Banana
Orange
Grape
Mango

-----
Reading line by line:
-----
Line 1: fruits
Line 2: Apple
Line 3: Banana
Line 4: Orange
Line 5: Grape
Line 6: Mango
○ $ []
```

## Explanation:

This program demonstrates basic file handling in Python using Cursor.

First, a text file is created and sample text is written into it.

Then, the same file is opened in read mode and its contents are displayed on the screen. It shows how Python can be used to create, write, and read files easily.

Such operations are useful in automation and data storage tasks.

**Question:**

Task3:CSVDataAnalysis

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.

**Prompt:**

Generate Python code to read a CSV file and calculate the mean, minimum, and maximum values of a numeric column.

The screenshot shows the Gemini AI interface. At the top, it says "Gemini" with a gear icon, and there are three icons: a left arrow, a right arrow, and a cross. Below this is a list item with a green circular icon containing a white letter "K". The text next to it reads: "Generate Python code to read a CSV file and calculate the mean, minimum, and maximum values of a numeric column." Below this, there is a button labeled "< > Empty cell". Underneath the button, the text "Working..." is displayed, indicating that the AI is processing the request.

## CodeScreenshot:

```
▶ import pandas as pd
import io

# Uncomment the lines below and replace 'your_file.csv' with your CSV file path
try:
    df = pd.read_csv('scores.csv')
except FileNotFoundError:
    print("Error: CSV file not found. Please check the path.")
    exit()

# Specify the numeric column you want to analyze
column_name = 'score'

# Check if the column exists in the DataFrame
if column_name in df.columns:
    # Ensure the column is numeric (e.g., float or int)
    # pd.to_numeric will convert values to numeric, coercing errors to NaN
    numeric_column = pd.to_numeric(df[column_name], errors='coerce')

    # Drop rows where the numeric conversion resulted in NaN (non-numeric values)
    numeric_column = numeric_column.dropna()

    if not numeric_column.empty:
        # Calculate mean, minimum, and maximum
        mean_value = numeric_column.mean()
        min_value = numeric_column.min()
        max_value = numeric_column.max()

        print(f"Statistics for column '{column_name}':")
        print(f" Mean: {mean_value:.2f}")
        print(f" Minimum: {min_value:.2f}")
        print(f" Maximum: {max_value:.2f}")
    else:
        print(f"Column '{column_name}' contains no valid numeric data after cleaning.")
else:
    print(f"Error: Column '{column_name}' not found in the CSV file. Available columns: {df.columns.tolist()}")
```

## Output(O/P):

```
... Statistics for column 'score':
Mean: 82.00
Minimum: 67.00
Maximum: 92.00
```

## Explanation:

This program reads data from a CSV file using Python.

It extracts numerical values from a column and calculates the mean, minimum, and maximum.

CSV analysis is used in data processing and analytics applications.

## Question:

Task4:SortingListsManualvsBuilt-in

Scenario: You are reviewing algorithm choices for efficiency. Task:

Use Gemini to generate:

Bubblesort

Python's built-in `sort()`

Compare both implementations.

## Prompt:

K Generate Python code for Bubble Sort

`<> Empty cell`

- ◆ Here's the Python code for implementing the Bubble Sort algorithm. After the code, I'll explain how it works in simple terms.

`▼ Sources`

1. [github.com/rbernalop/codemunity](https://github.com/rbernalop/codemunity)

`↳ ↻`

K Generate Python code for built-in sort

- ◆ Certainly! Python provides excellent built-in ways to sort lists. Here are examples using both the `list.sort()` method and the `sorted()` function, along with an explanation of their differences.

`↳ ↻`

## CodeScreenshot:

ManualBubbleSortCode:

```
def bubble_sort(arr):
    n = len(arr)
    # Traverse through all array elements
    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] # Swap elements
    return arr

# --- Example Usage ---
my_list = [64, 34, 25, 12, 22, 11, 90]
print("Original list:", my_list)

sorted_list = bubble_sort(my_list)
print("Sorted list using Bubble Sort:", sorted_list)

my_list_2 = [5, 1, 4, 2, 8]
print("\nOriginal list 2:", my_list_2)

sorted_list_2 = bubble_sort(my_list_2)
print("Sorted list 2 using Bubble Sort:", sorted_list_2)
```

Sortingusingsort()function:

```
# --- Using the list.sort() method ---
# This method sorts the list in-place (modifies the original list) and returns None.

my_list_1 = [64, 34, 25, 12, 22, 11, 90]
print("Original list (list.sort()):", my_list_1)

my_list_1.sort()
print("Sorted list (list.sort()):", my_list_1)

# You can also sort in descending order
my_list_2 = ['banana', 'apple', 'cherry', 'date']
print("\nOriginal list (descending):", my_list_2)

my_list_2.sort(reverse=True)
print("Sorted list (descending):", my_list_2)
```

## Output(O/P):

Bubblesort:

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

Original list 2: [5, 1, 4, 2, 8]
Sorted list 2 using Bubble Sort: [1, 2, 4, 5, 8]
```

SortFunction:

```
Original list (list.sort()): [64, 34, 25, 12, 22, 11, 90]
Sorted list (list.sort()): [11, 12, 22, 25, 34, 64, 90]
```

```
Original list (descending): ['banana', 'apple', 'cherry', 'date']
Sorted list (descending): ['date', 'cherry', 'banana', 'apple']
```

### Explanation:

Bubble sort is a simple sorting algorithm that repeatedly compares and swaps adjacent elements. It is easy to understand but inefficient for large data sets. Python's built-in sort function is shorter, optimized and much faster. The built-in method should be preferred in real-world applications.