

## ASSIGNMENT 2.3

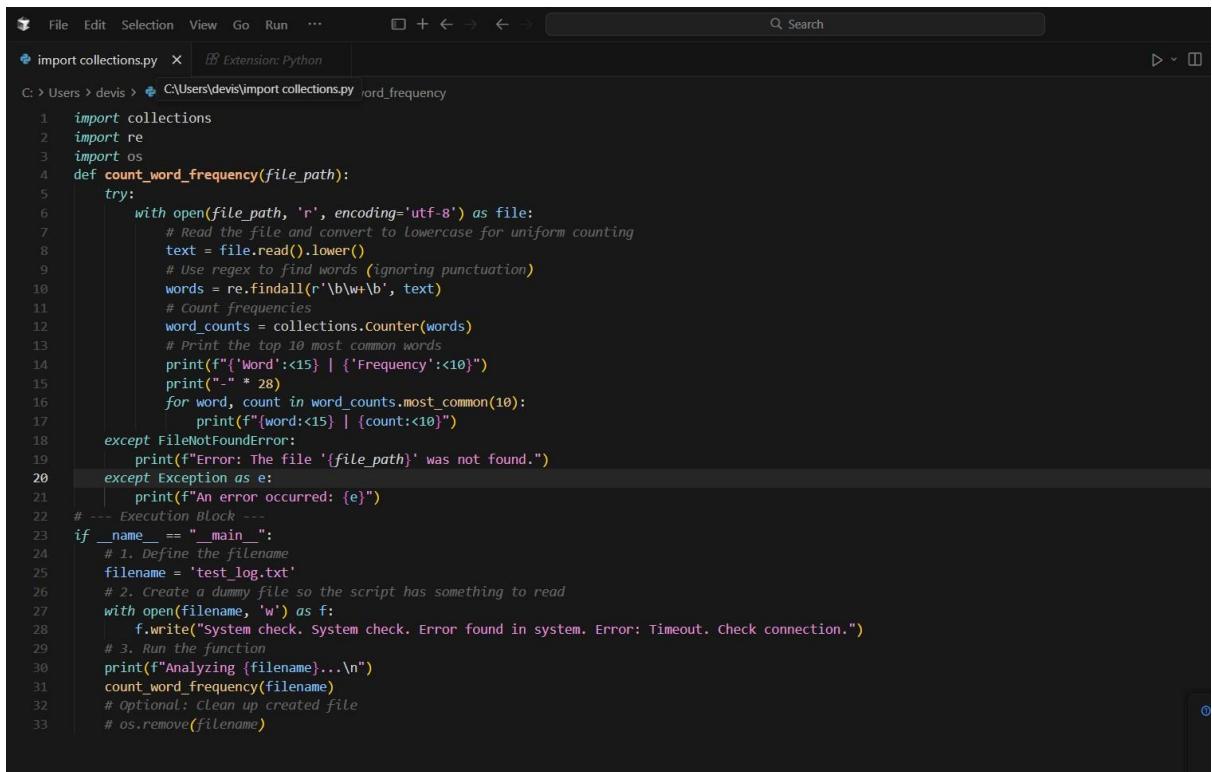
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Batch – 05

### Task – 01

**Prompt :** Write a Python script to analyze a log file and count keyword frequency.

### Code :



The screenshot shows a code editor window with a dark theme. The title bar says "File Edit Selection View Go Run ...". The status bar shows "C:\Users\devis> C:\Users\devis\import collections.py word\_frequency". The code itself is as follows:

```
1 import collections
2 import re
3 import os
4 def count_word_frequency(file_path):
5     try:
6         with open(file_path, 'r', encoding='utf-8') as file:
7             # Read the file and convert to lowercase for uniform counting
8             text = file.read().lower()
9             # Use regex to find words (ignoring punctuation)
10            words = re.findall(r'\b\w+\b', text)
11            # Count frequencies
12            word_counts = collections.Counter(words)
13            # Print the top 10 most common words
14            print(f'{Word:<15} | {Frequency:<10}')
15            print("-" * 28)
16            for word, count in word_counts.most_common(10):
17                print(f'{word:<15} | {count:<10}')
18    except FileNotFoundError:
19        print(f"Error: The file '{file_path}' was not found.")
20    except Exception as e:
21        print(f"An error occurred: {e}")
22 # --- Execution Block ---
23 if __name__ == "__main__":
24     # 1. Define the filename
25     filename = 'test_log.txt'
26     # 2. Create a dummy file so the script has something to read
27     with open(filename, 'w') as f:
28         f.write("System check. System check. Error found in system. Error: Timeout. Check connection.")
29     # 3. Run the function
30     print(f"Analyzing {filename}...\n")
31     count_word_frequency(filename)
32     # Optional: Clean up created file
33     # os.remove(filename)
```

### Output :

```
PS C:\Users\devis> & C:/Users/devis/AppData/Local/Python/bin/python.exe "c:/Users/devis/import collections.py"
Analyzing test_log.txt...
Word          | Frequency
-----
system        | 3
check         | 3
error         | 2
found         | 1
in            | 1
timeout       | 1
connection    | 1
PS C:\Users\devis>
```

## Explanation :

- Imports libraries for word counting (Counter), pattern matching (re), and file handling (os).
- Reads a text file and converts all text to lowercase.
- Uses regex to extract words while ignoring punctuation.
- Counts how many times each word appears.
- Displays the top 10 most frequent words in table format.
- Uses try-except to handle missing files or runtime errors.
- Creates a sample file for testing the function.
- Calls the function to analyze the file content.
- Optional line can delete the test file after execution.

## TASK – 02

**Prompt :** Write a Python program that creates a text file, writes sample text into it, then reads and prints the file content.

## Code :

The screenshot shows a code editor window with a dark theme. At the top, there's a menu bar with File, Edit, Selection, View, Go, Run, and a separator. To the right of the menu are icons for opening, saving, and navigating. A search bar with the placeholder "Search" is located at the top right. Below the menu, there's a tab bar with "import collections.py" and an "Extension: Python" indicator. The main area displays the following Python code:

```
1 filename = "sample.txt"
2
3 # Write sample text to the file
4 with open(filename, 'w', encoding='utf-8') as f:
5     f.write("Hello, this is a sample text file written by Python.\nSecond line of the file.")
6 # Read the content and print it
7 with open(filename, 'r', encoding='utf-8') as f:
8     content = f.read()
9     print(f"\nContent of '{filename}':\n{content}")
10
```

A tooltip at the bottom of the code editor says "Ctrl+L to chat, Ctrl+K to generate".

## Output :

The screenshot shows a terminal window with a dark theme. The title bar includes tabs for Problems, Output, Debug Console, Terminal, and Ports. The main area shows the command "PS C:\Users\devis> & C:/Users/devis/AppData/Local/Python/bin/python.exe "c:/Users/devis/import collections.py"" followed by the output:

```
Content of 'sample.txt':
Hello, this is a sample text file written by Python.
Second line of the file.
PS C:\Users\devis>
```

## Explanation :

- Stores the file name in a variable.
- Opens the file in write mode and writes sample text into it.
- Automatically closes the file after writing.
- Reopens the file in read mode.
- Reads the entire content and prints it to the screen.

## Task – 03

**Prompt :** Write Python code to read a CSV file using pandas and calculate the mean, minimum, and maximum of a numeric column.

## Code :

The screenshot shows a Jupyter Notebook interface with a dark theme. On the left, there's a sidebar with icons for file operations like copy, paste, and refresh. The main area has two panes. The left pane contains Python code:import pandas as pd  
# Create sample data  
data = {  
 'value': [10, 20, 30, 40, 50]  
}  
# Create DataFrame  
df = pd.DataFrame(data)  
# Save to CSV  
df.to\_csv("data.csv", index=False)  
print("CSV file created successfully.")  
# Read CSV file  
data = pd.read\_csv("data.csv")  
print("Mean:", data['value'].mean())  
print("Minimum:", data['value'].min())  
print("Maximum:", data['value'].max())The right pane is titled "Gemini" and contains a task card:

D Write Python code to read a CSV file using pandas and calculate the mean, minimum, and maximum of a numeric column.

It looks like the code to read a CSV file and calculate the mean, minimum, and maximum of a numeric column ('value') has already been executed in the notebook. Here are the results from the executed cell:

CSV file created successfully.  
Mean: 30.0  
Minimum: 10  
Maximum: 50

The code used to achieve this is in cell 3MSoHj5J1uaU and looks like

Explain the Python code that created the CSV and calculated statistics  
Visualize the 'value' column from the data  
How can I add a new column to the dataframe?

## Output :

```
... CSV file created successfully.  
Mean: 30.0  
Minimum: 10  
Maximum: 50
```

## Explanation :

- Imports the pandas library for data handling.
- Creates sample numeric data in a dictionary.
- Converts the data into a DataFrame.
- Saves the DataFrame as a CSV file.
- Reads the CSV file back into the program.
- Calculates and prints the mean, minimum, and maximum values.

## TASK – 04

**Prompt :** Write Python code for Bubble Sort and Python's built-in sort() method, then give a short comparison of both in terms of efficiency and simplicity.

## Code :

```
import collections.py • Extension: Python
C: > Users C:\Users\devis\import collections.py ...
1 def bubble_sort(arr):
2     n = len(arr)
3     # Traverse through all array elements
4     for i in range(n):
5         # Last i elements are already in place, so we don't check them
6         for j in range(0, n - i - 1):
7             # Traverse the array from 0 to n-i-1
8             # Swap if the element found is greater than the next element
9             if arr[j] > arr[j + 1]:
10                 arr[j], arr[j + 1] = arr[j + 1], arr[j]
11
12     return arr
13
14 # --- Execution ---
15 if __name__ == "__main__":
16     # Test Data
17     data_1 = [64, 34, 25, 12, 22, 11, 90]
18     data_2 = [64, 34, 25, 12, 22, 11, 90]
19     print(f"Original List: {data_1}\n")
20     # 1. Bubble Sort (Manual)
21     sorted_bubble = bubble_sort(data_1)
22     print(f"Bubble Sort Result: {sorted_bubble}")
23     # 2. Python Built-in Sort
24     # .sort() modifies the List in-place
25     data_2.sort()
26     print(f"Built-in Sort Result: {data_2}")
```

## Output :

```
Problems Output Debug Console Terminal Ports
Original List: [64, 34, 25, 12, 22, 11, 90]

Bubble Sort Result: [11, 12, 22, 25, 34, 64, 90]
Built-in Sort Result: [11, 12, 22, 25, 34, 64, 90]
PS C:\Users\devis>
```

## Explanation :

- Bubble Sort is a manual sorting algorithm that repeatedly swaps adjacent elements, it is easy to understand but slow for large lists.
- Built-in sort() is optimized and much faster because it uses Python's efficient internal algorithm.
- Bubble Sort has higher time complexity ( $O(n^2)$ ), while built-in sort is more efficient ( $\approx O(n \log n)$ ).
- Built-in sort() is preferred in real applications due to better performance and simplicity.