Green University of Bangladesh
Department of Computer Science and Engineering (CSE)

Faculty of Sciences and Engineering

Semester: (Spring, Year:2025), B.Sc. in CSE (Day)

LabPerformance 02: PythonTools

Course Title: Artificial Intelligence Lab

Course Code: CSE-316 Section:221-14

Student Details

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Lab Date : 05-02-2025

Submission Date : 11-02-2025

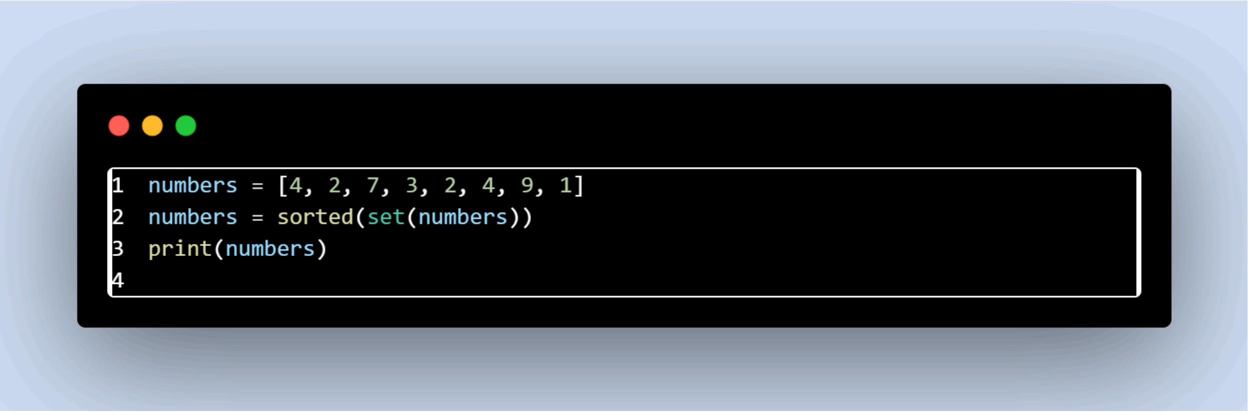
Course Teacher's Name : Md. Sabbir Hosen Mamun

Lab Report Status

Marks: ………………………………… **Signature:.....................**

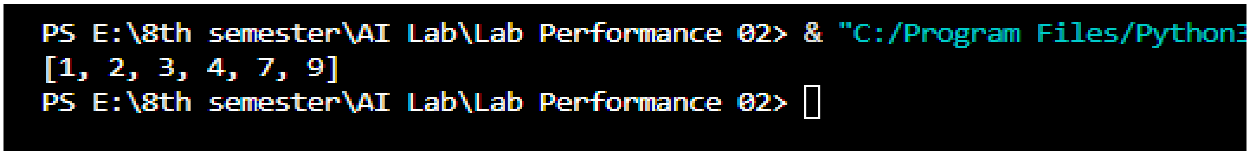
Comments:... **Date:..............................**

1.**List**: Given a list of numbers, remove duplicates and sort in ascending order.



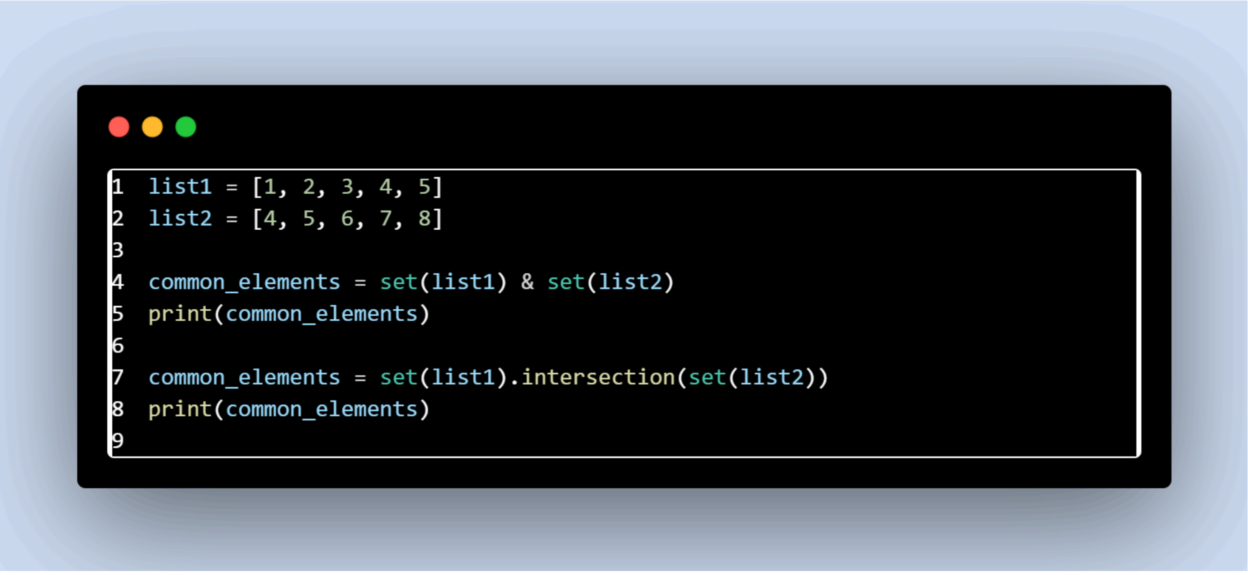
```python
numbers = [4, 2, 7, 3, 2, 4, 9, 1]
numbers = sorted(set(numbers))
print(numbers)

```

Output:



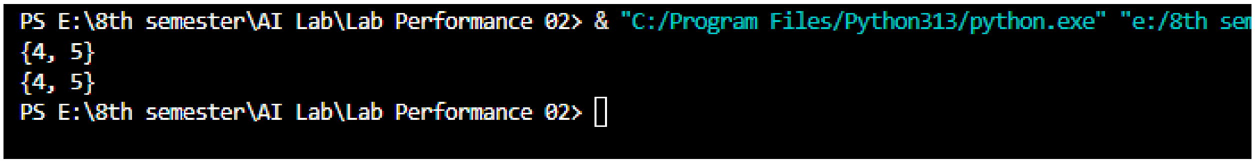
```
PS E:\8th semester\AI Lab\Lab Performance 02> & "C:/Program Files/Python3
[1, 2, 3, 4, 7, 9]
PS E:\8th semester\AI Lab\Lab Performance 02>
```

2.**Set**: Find the common elements between two lists using sets.



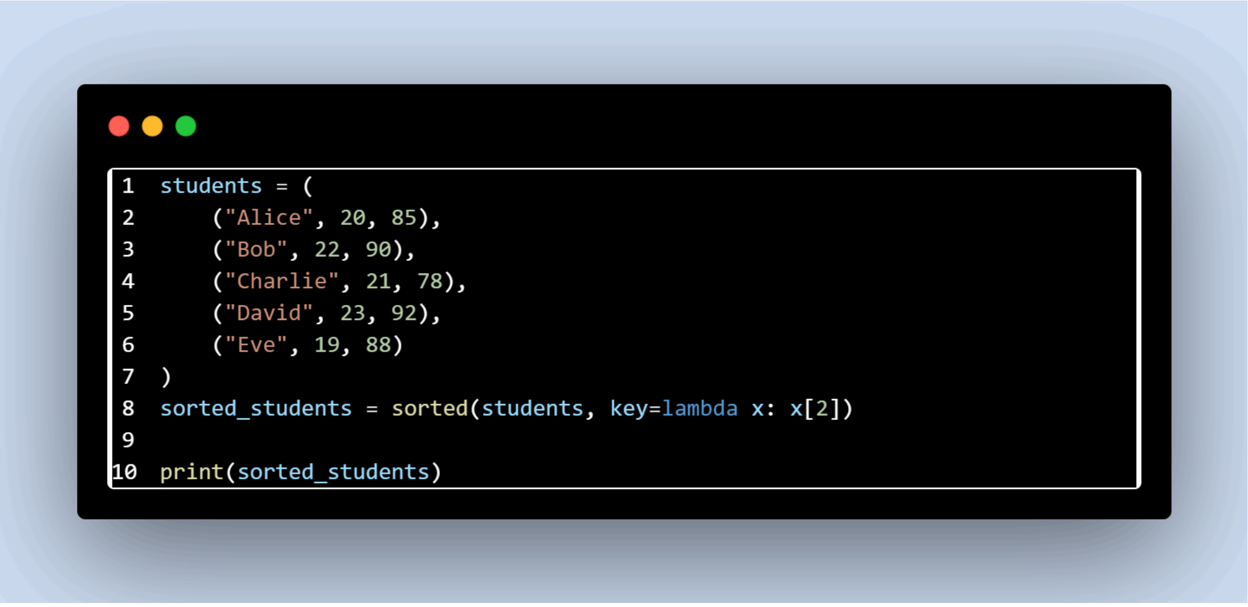
```python
list1 = [1, 2, 3, 4, 5]
list2 = [4, 5, 6, 7, 8]

common_elements = set(list1) & set(list2)
print(common_elements)

common_elements = set(list1).intersection(set(list2))
print(common_elements)

```

Output:



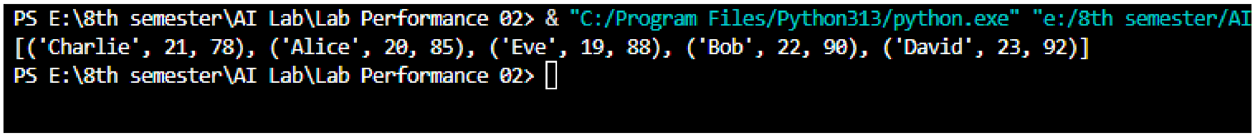
```
PS E:\8th semester\AI Lab\Lab Performance 02> & "C:/Program Files/Python313/python.exe" "e:/8th sem
{4, 5}
{4, 5}
PS E:\8th semester\AI Lab\Lab Performance 02>
```

3.**Tuple**: Create a tuple of student records (name, age, grade) and sort by grade.



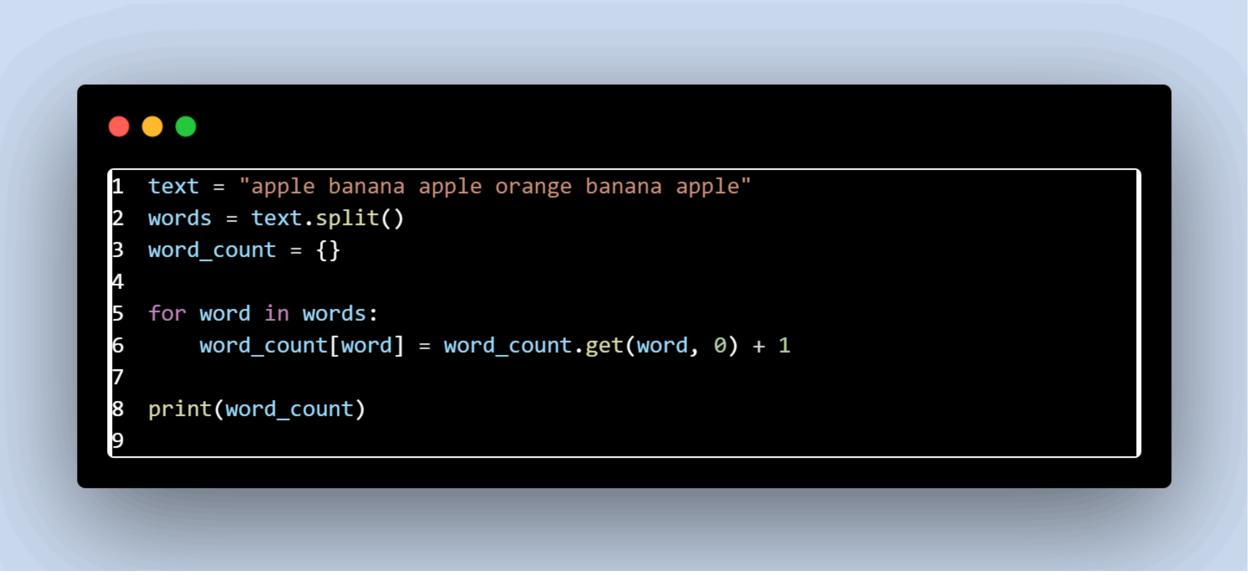
```python
students = (
    ("Alice", 20, 85),
    ("Bob", 22, 90),
    ("Charlie", 21, 78),
    ("David", 23, 92),
    ("Eve", 19, 88)
)
sorted_students = sorted(students, key=lambda x: x[2])

print(sorted_students)
```

Output:

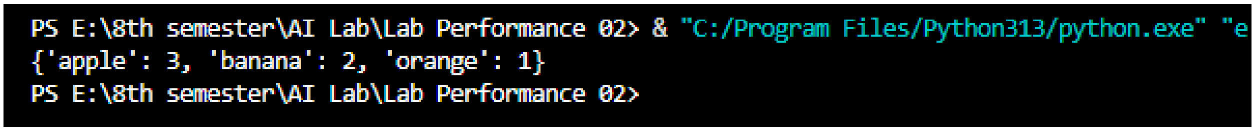


```
PS E:\8th semester\AI Lab\Lab Performance 02> & "C:/Program Files/Python313/python.exe" "e:/8th semester/AI
[('Charlie', 21, 78), ('Alice', 20, 85), ('Eve', 19, 88), ('Bob', 22, 90), ('David', 23, 92)]
PS E:\8th semester\AI Lab\Lab Performance 02> 
```

4.**Dictionary**: Count word occurrences in a given text and store them in a dictionary.

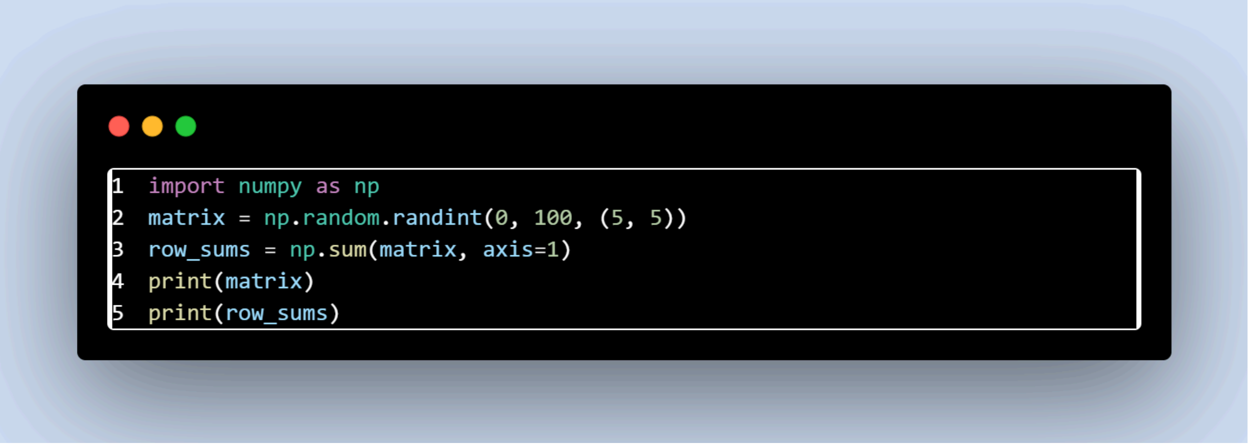


```python
text = "apple banana apple orange banana apple"
words = text.split()
word_count = {}

for word in words:
    word_count[word] = word_count.get(word, 0) + 1

print(word_count)

```



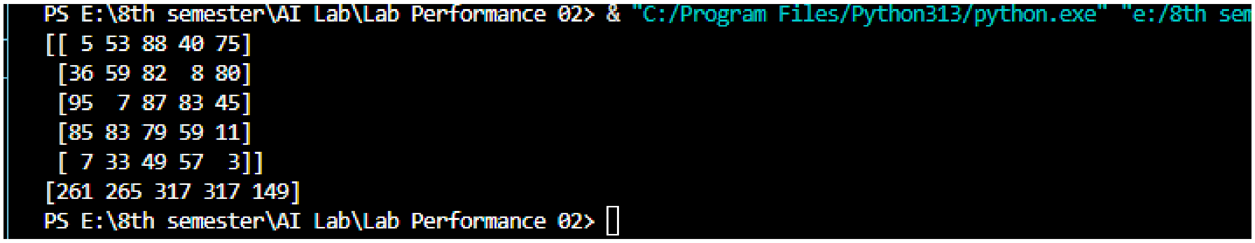
```
PS E:\8th semester\AI Lab\Lab Performance 02> & "C:/Program Files/Python313/python.exe" "e
{'apple': 3, 'banana': 2, 'orange': 1}
PS E:\8th semester\AI Lab\Lab Performance 02>
```

5. NumPy#1: Generate a 5x5 matrix of random integers and compute row-wise sums.



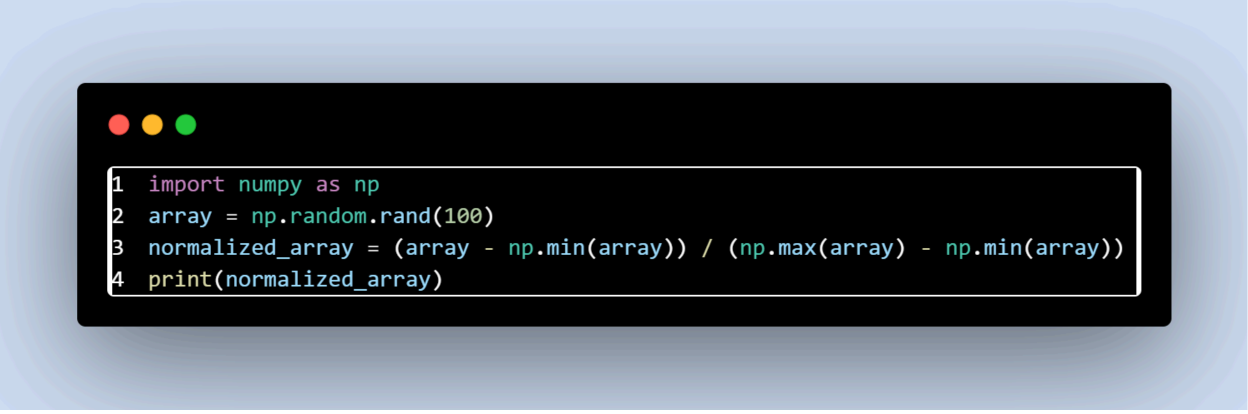
```python
import numpy as np
matrix = np.random.randint(0, 100, (5, 5))
row_sums = np.sum(matrix, axis=1)
print(matrix)
print(row_sums)
```

Output:



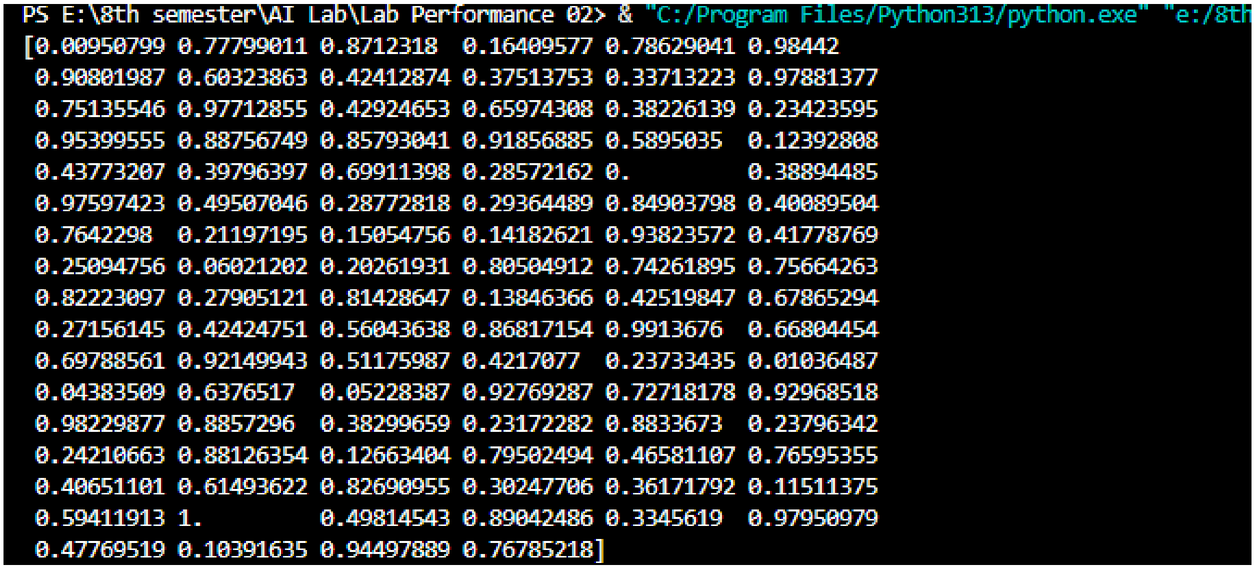
```
PS E:\8th semester\AI Lab\Lab Performance 02> & "C:/Program Files/Python313/python.exe" "e:/8th sem
[[ 5 53 88 40 75]
 [36 59 82  8 80]
 [95  7 87 83 45]
 [85 83 79 59 11]
 [ 7 33 49 57  3]]
[261 265 317 317 149]
PS E:\8th semester\AI Lab\Lab Performance 02> 
```

6.**NumPy#2**: Create an array of 100 random values and normalize them between 0 and 1.



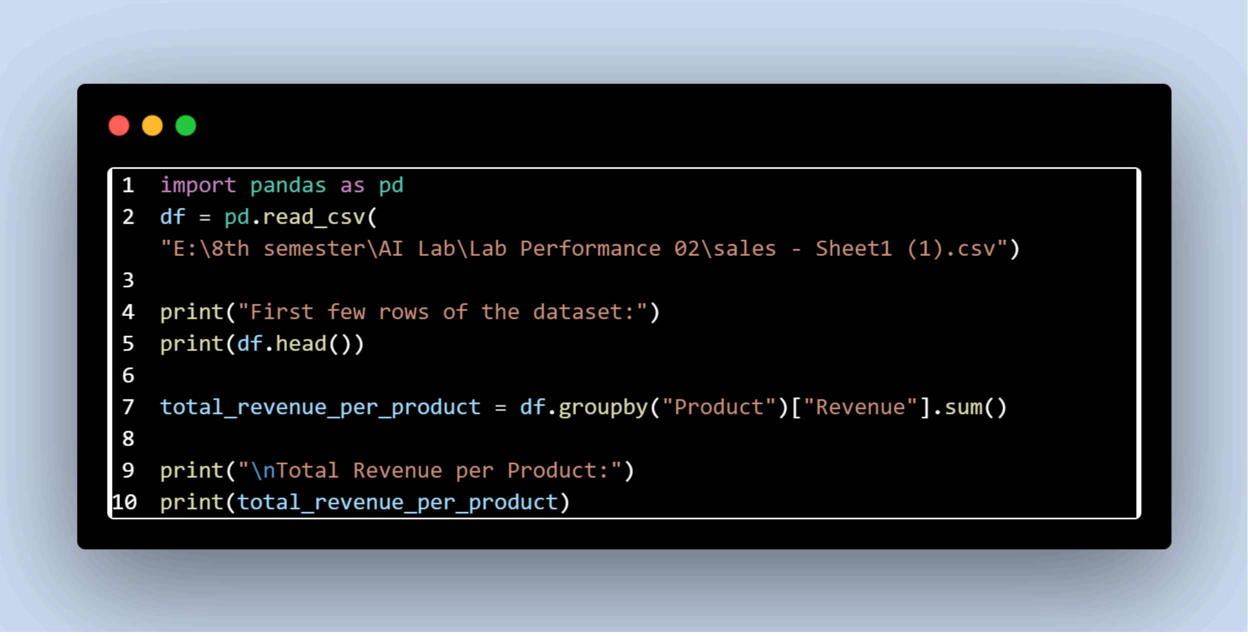
```python
import numpy as np
array = np.random.rand(100)
normalized_array = (array - np.min(array)) / (np.max(array) - np.min(array))
print(normalized_array)
```

Output:



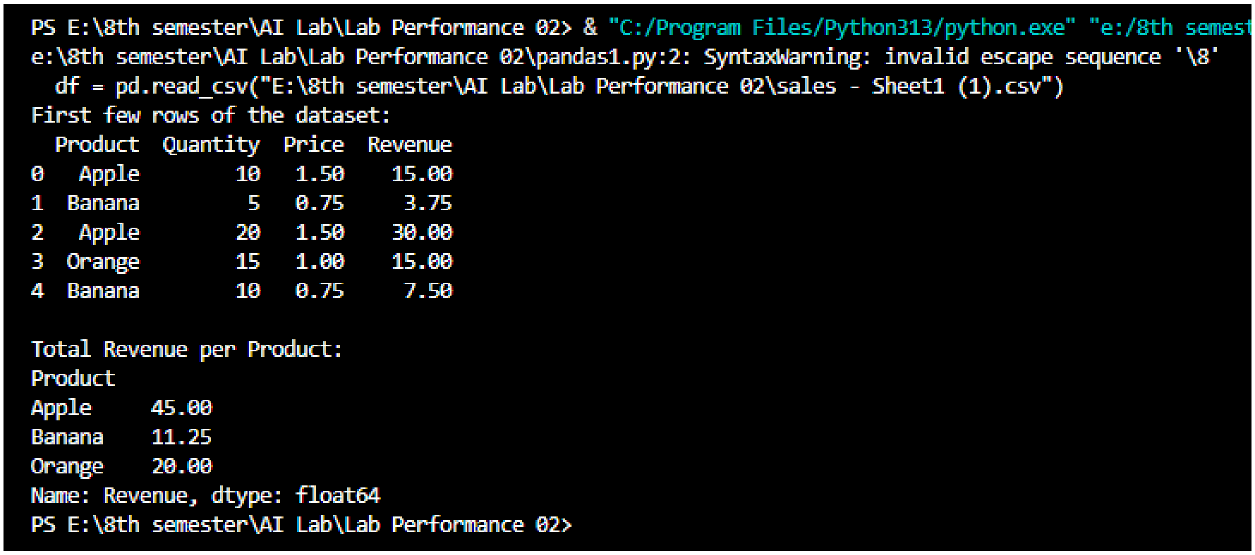
```
PS E:\8th semester\AI Lab\Lab Performance 02> & "C:/Program Files/Python313/python.exe" "e:/8th
[0.00950799 0.77799011 0.8712318  0.16409577 0.78629041 0.98442
 0.90801987 0.60323863 0.42412874 0.37513753 0.33713223 0.97881377
 0.75135546 0.97712855 0.42924653 0.65974308 0.38226139 0.23423595
 0.95399555 0.88756749 0.85793041 0.91856885 0.5895035  0.12392808
 0.43773207 0.39796397 0.69911398 0.28572162 0.         0.38894485
 0.97597423 0.49507046 0.28772818 0.29364489 0.84903798 0.40089504
 0.7642298  0.21197195 0.15054756 0.14182621 0.93823572 0.41778769
 0.25094756 0.06021202 0.20261931 0.80504912 0.74261895 0.75664263
 0.82223097 0.27905121 0.81428647 0.13846366 0.42519847 0.67865294
 0.27156145 0.42424751 0.56043638 0.86817154 0.9913676  0.66804454
 0.69788561 0.92149943 0.51175987 0.4217077  0.23733435 0.01036487
 0.04383509 0.6376517  0.05228387 0.92769287 0.72718178 0.92968518
 0.98229877 0.8857296  0.38299659 0.23172282 0.8833673  0.23796342
 0.24210663 0.88126354 0.12663404 0.79502494 0.46581107 0.76595355
 0.40651101 0.61493622 0.82690955 0.30247706 0.36171792 0.11511375
 0.59411913 1.         0.49814543 0.89042486 0.3345619  0.97950979
 0.47769519 0.10391635 0.94497889 0.76785218]
```

7.**Pandas#1**: Load a CSV file of sales data and compute total revenue per product.



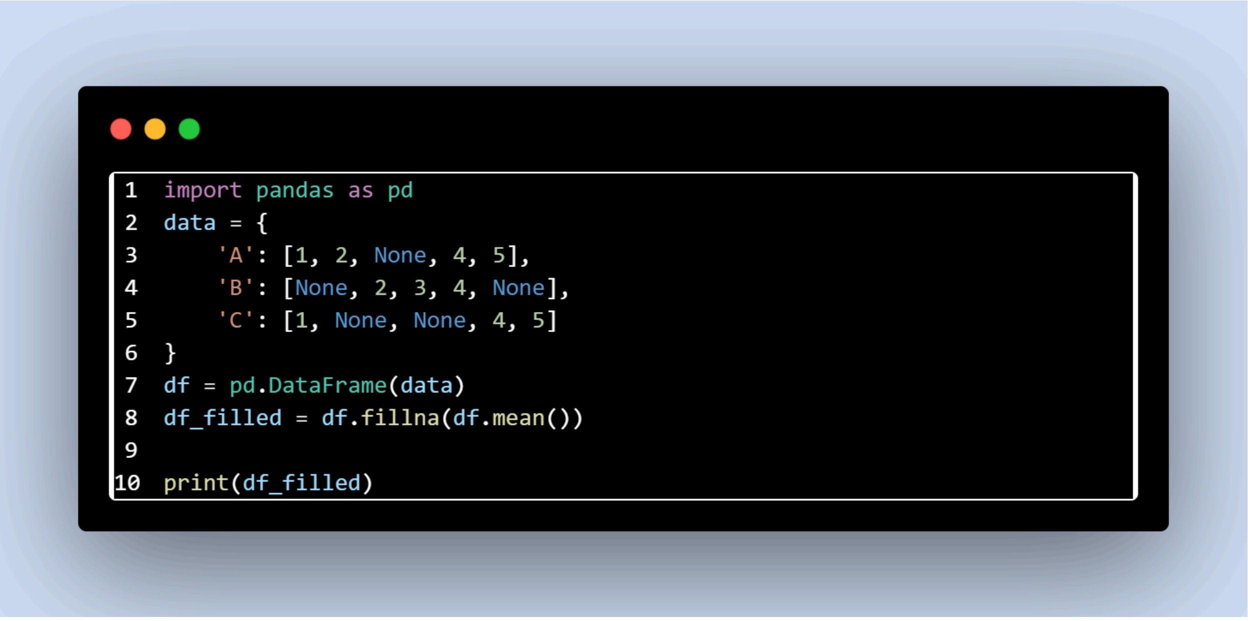
```python
import pandas as pd
df = pd.read_csv(
"E:\8th semester\AI Lab\Lab Performance 02\sales - Sheet1 (1).csv")

print("First few rows of the dataset:")
print(df.head())

total_revenue_per_product = df.groupby("Product")["Revenue"].sum()

print("\nTotal Revenue per Product:")
print(total_revenue_per_product)
```

Output:



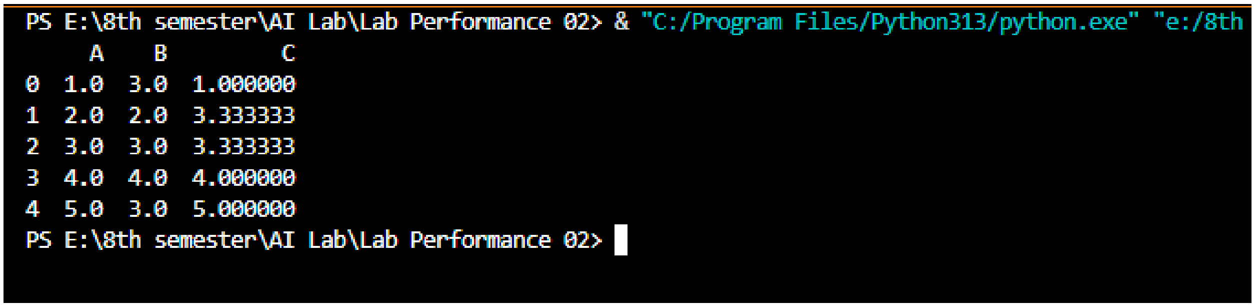
```
PS E:\8th semester\AI Lab\Lab Performance 02> & "C:/Program Files/Python313/python.exe" "e:/8th semest
e:\8th semester\AI Lab\Lab Performance 02\pandas1.py:2: SyntaxWarning: invalid escape sequence '\8'
  df = pd.read_csv("E:\8th semester\AI Lab\Lab Performance 02\sales - Sheet1 (1).csv")
First few rows of the dataset:
  Product  Quantity  Price  Revenue
0   Apple        10   1.50    15.00
1  Banana         5   0.75     3.75
2   Apple        20   1.50    30.00
3  Orange        15   1.00    15.00
4  Banana        10   0.75     7.50

Total Revenue per Product:
Product
Apple     45.00
Banana    11.25
Orange    20.00
Name: Revenue, dtype: float64
PS E:\8th semester\AI Lab\Lab Performance 02>
```

8.**Pandas#2**: Fill missing values in a dataset with column-wise means.



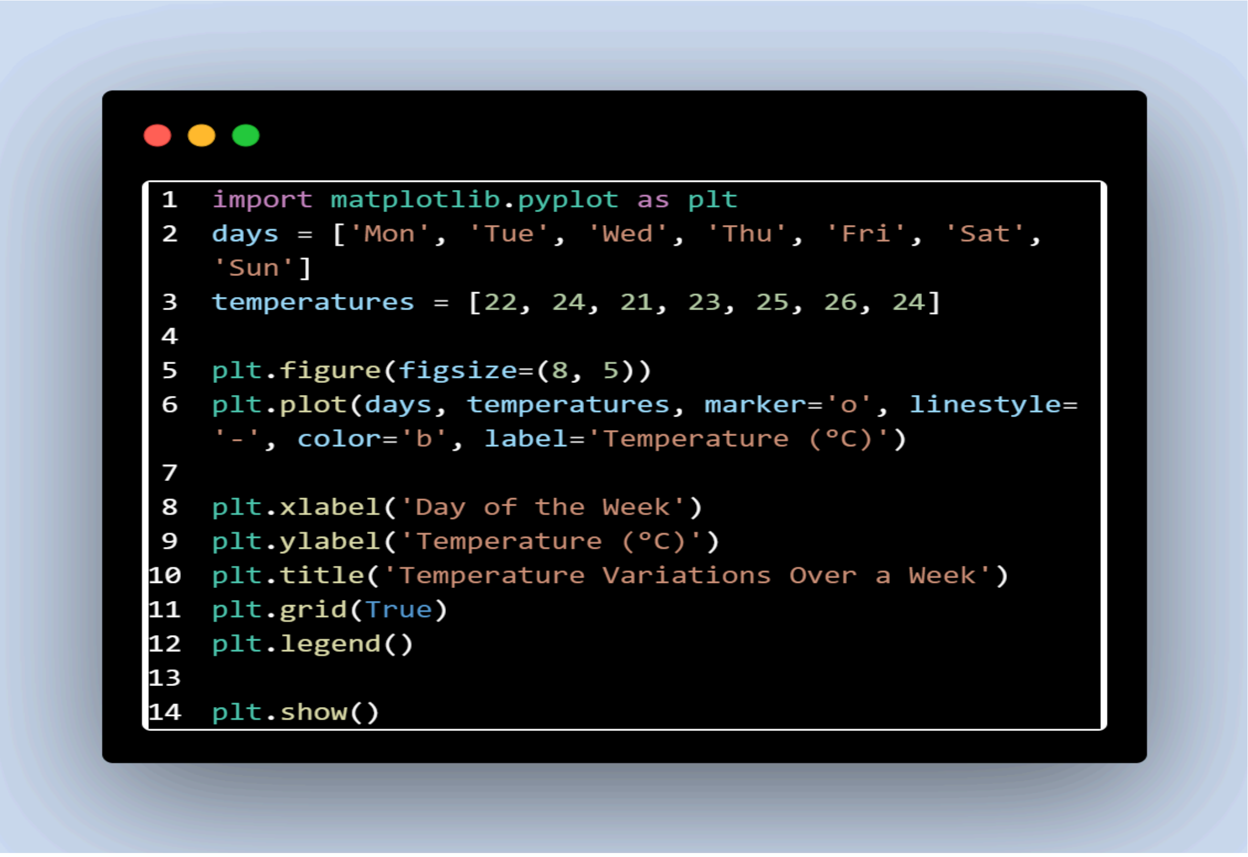
```python
import pandas as pd
data = {
    'A': [1, 2, None, 4, 5],
    'B': [None, 2, 3, 4, None],
    'C': [1, None, None, 4, 5]
}
df = pd.DataFrame(data)
df_filled = df.fillna(df.mean())

print(df_filled)
```

Output:



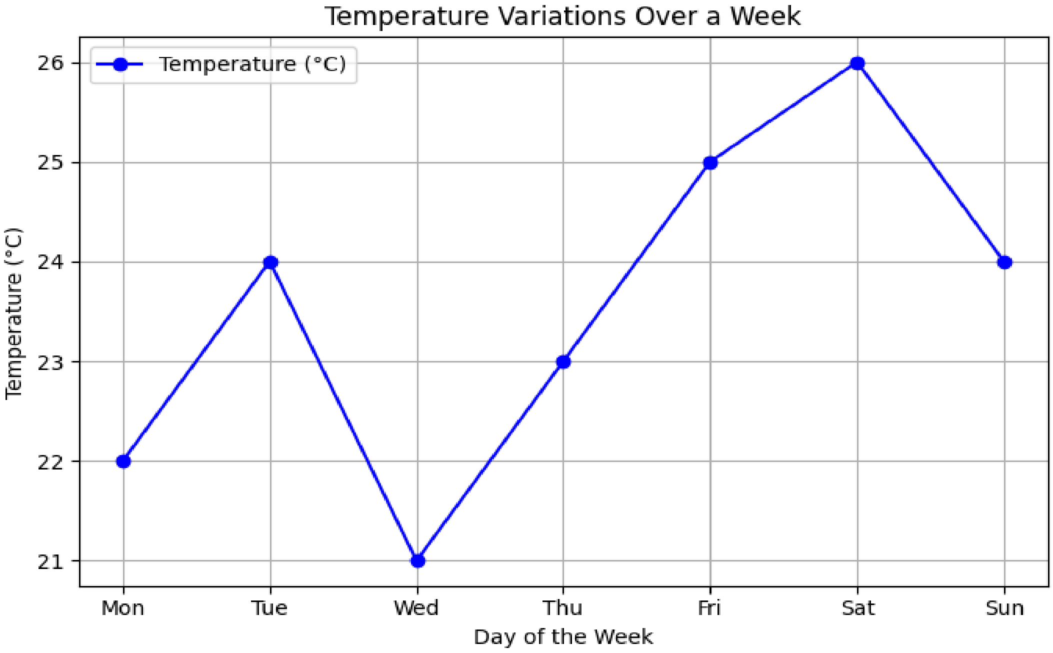
```
PS E:\8th semester\AI Lab\Lab Performance 02> & "C:/Program Files/Python313/python.exe" "e:/8th
     A    B         C
0  1.0  3.0  1.000000
1  2.0  2.0  3.333333
2  3.0  3.0  3.333333
3  4.0  4.0  4.000000
4  5.0  3.0  5.000000
PS E:\8th semester\AI Lab\Lab Performance 02> █
```

9.**Matplotlib#1**: Plot a line graph showing temperature variations over a week.

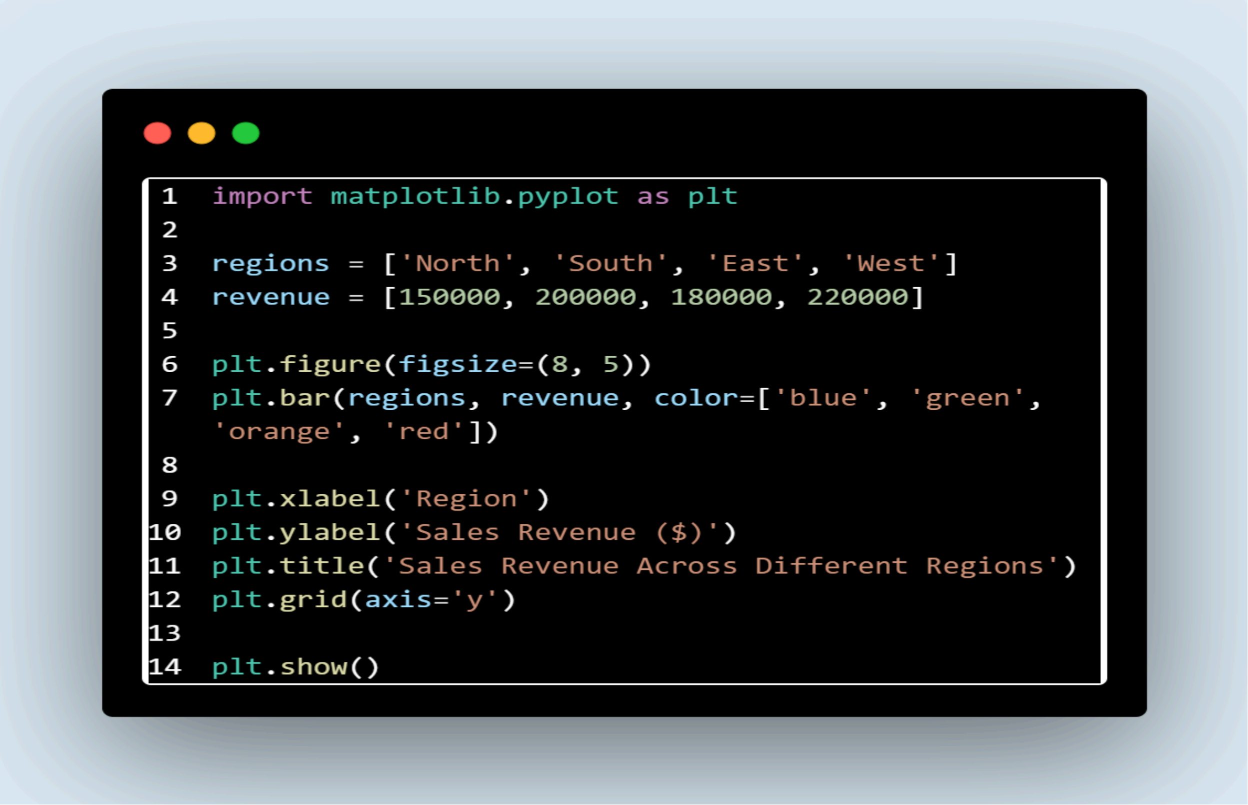


```python
import matplotlib.pyplot as plt
days = ['Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat', 'Sun']
temperatures = [22, 24, 21, 23, 25, 26, 24]

plt.figure(figsize=(8, 5))
plt.plot(days, temperatures, marker='o', linestyle='-', color='b', label='Temperature (°C)')

plt.xlabel('Day of the Week')
plt.ylabel('Temperature (°C)')
plt.title('Temperature Variations Over a Week')
plt.grid(True)
plt.legend()

plt.show()
```

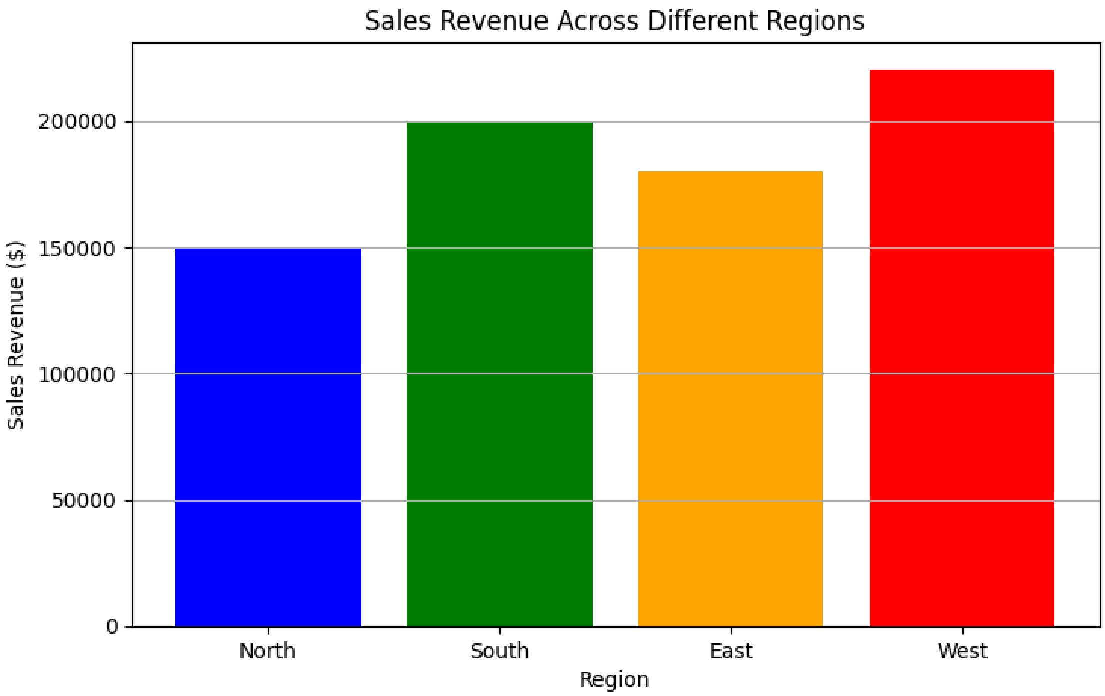
Output:



10.**Matplotlib#2**: Create a bar chart comparing sales revenue across different regions.



```python
import matplotlib.pyplot as plt

regions = ['North', 'South', 'East', 'West']
revenue = [150000, 200000, 180000, 220000]

plt.figure(figsize=(8, 5))
plt.bar(regions, revenue, color=['blue', 'green', 'orange', 'red'])

plt.xlabel('Region')
plt.ylabel('Sales Revenue ($)')
plt.title('Sales Revenue Across Different Regions')
plt.grid(axis='y')

plt.show()
```



Github Link:
https://github.com/programmermahi/Artificial-Intelligence/tree/main/Lab%20Performance%20o2