CHRIST
(DEEMED TO BE UNIVERSITY)
DELHI-NCR, INDIA

Advance Python Programming

MCA-372

CIA – 01

BY

HIMANSHU HEDA (24225013)

SUBMITTED TO

Dr. Manjula Shannhog

SCHOOL OF SCIENCES

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Consider Weather dataset

1. Generate a 2D line plot showing how temperature varies across cities.
2. Generate a 2D bar chart comparing humidity levels in all cities.
3. Generate a 2D scatter plot showing the relationship between wind speed and AQI.
4. Generate a 2D pie chart showing the percentage share of rainfall for each city.
5. Generate a 2D stacked bar chart comparing temperature and humidity across cities.
6. Generate a 3D scatter plot with Temperature, Humidity, and AQI.
7. Generate a 3 different lines for temperature, humidity, AQI across different geographical points.

Consider Sales-Profit dataset

8. 3D Line Plot – Revenue vs. Units Sold Across Regions
9. 3D Bar Chart – Comparing Units Sold, Revenue, and Profit Margin
10. 3D Scatter Plot – Profit Margin vs Revenue vs Customer Rating

Importing the libraries

```python
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
from mpl_toolkits.mplot3d import Axes3D
```

✓ 0.0s Python

Importing DataSet of Weather and Sales-Profit

```python
data = pd.read_csv("./weather_dataset.csv")
data1 = pd.read_csv("./sales_performance_dataset.csv")
```

✓ 0.0s Python

Use to know what data we have in Weather and Sales as well

```
data.head()
```
✓ 0.0s Python

	City	Latitude	Longitude	Temperature (°C)	Humidity (%)	Wind Speed (km/h)	Air Quality Index (AQI)	Rainfall (mm)
0	Delhi	28.7	77.1	35	60	12	210	80
1	Mumbai	19.1	72.8	30	85	18	70	250
2	Bangalore	12.9	77.6	27	75	14	90	180
3	Hyderabad	17.4	78.5	32	65	10	120	120
4	Chennai	13.1	80.2	33	80	16	150	200

```
data1.head()
```
✓ 0.0s Python

	Product	Region	Units Sold	Revenue ($)	Profit Margin (%)	Customer Rating
0	Laptop	North	120	240000	15	4.5
1	Laptop	South	140	280000	17	4.3
2	Laptop	East	130	260000	16	4.4
3	Laptop	West	110	220000	14	4.2

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```python
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data1 = pd.read_csv("./sales_performance_dataset.csv")
```
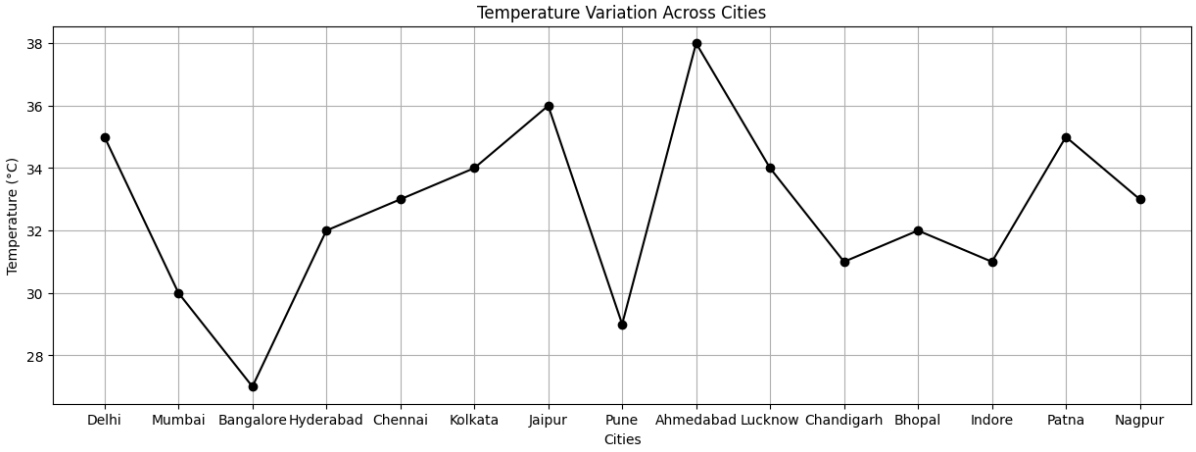
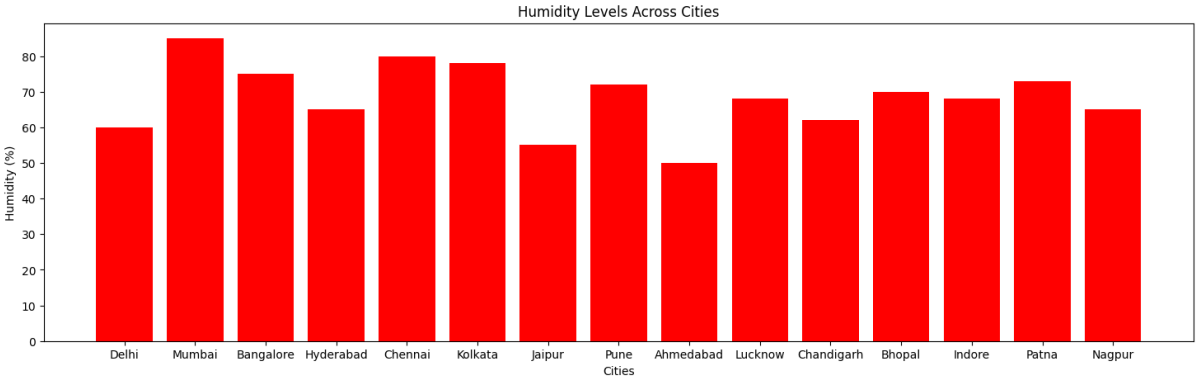

```python
data.head()
```

```python
data1.head()
```

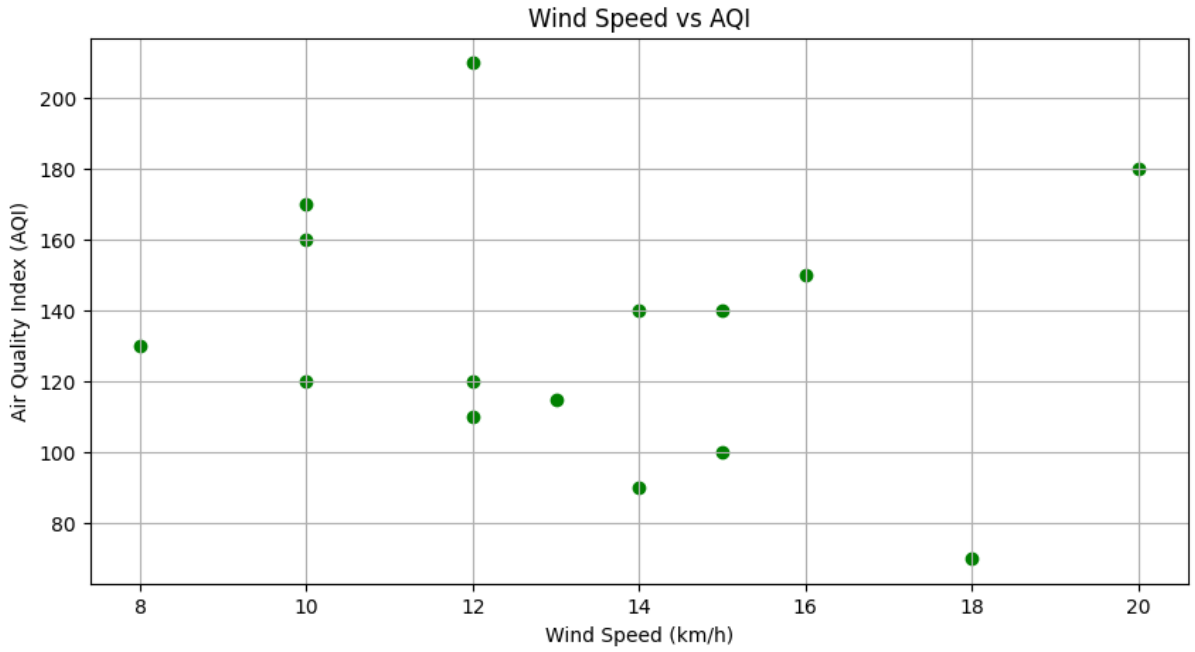
```python
# 1. 2D Line plot - Temperature Variation across cities (Line plot)
plt.figure(figsize=(15, 5))
plt.plot(data['City'], data['Temperature (°C)'], marker='o', linestyle='-',
color='black')

plt.xlabel("Cities")
plt.ylabel("Temperature (°C)")
plt.title("Temperature Variation Across Cities")
plt.grid()
plt.show()
```



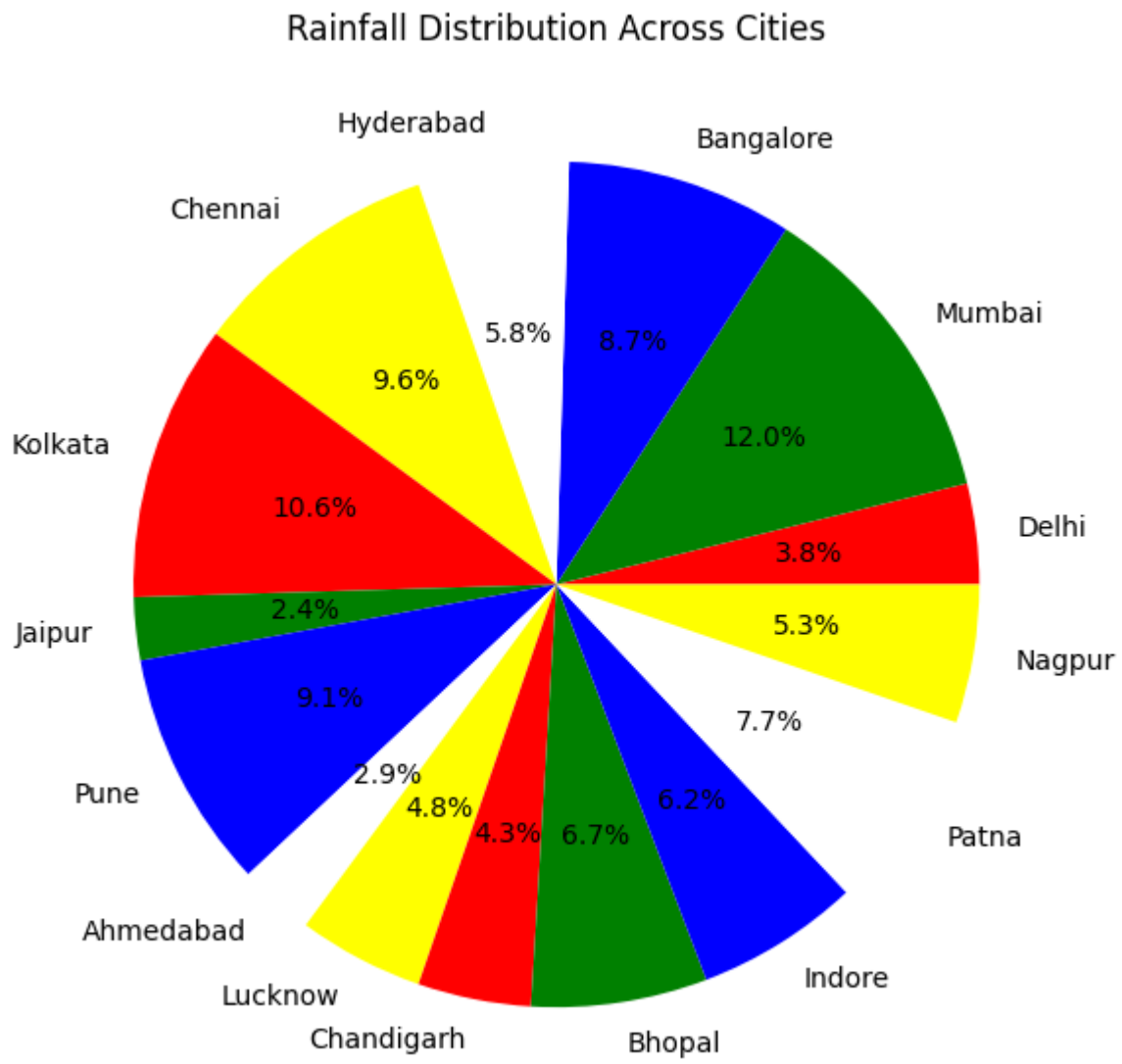

```python
# 2. 2D Bar Chart - Humidity Levels
plt.figure(figsize=(18, 5))
plt.bar(data['City'], data['Humidity (%)'], color='red')

plt.xlabel("Cities")
plt.ylabel("Humidity (%)")
plt.title("Humidity Levels Across Cities")
plt.show()
```



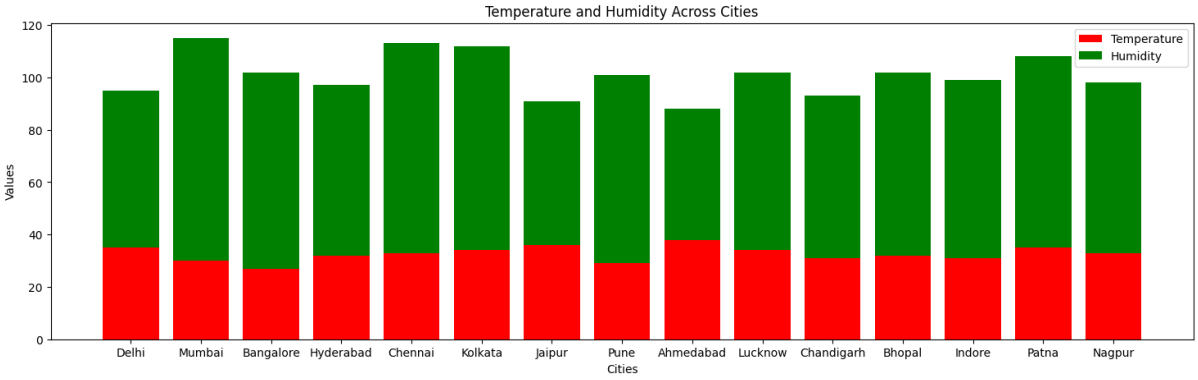

```python
# 3. 2D Scatter Plot - Wind Speed vs AQI
plt.figure(figsize=(10, 5))
plt.scatter(data['Wind Speed (km/h)'], data['Air Quality Index (AQI)'],
color='g')

plt.xlabel("Wind Speed (km/h)")
plt.ylabel("Air Quality Index (AQI)")
plt.title("Wind Speed vs AQI")
plt.grid()
plt.show()
```



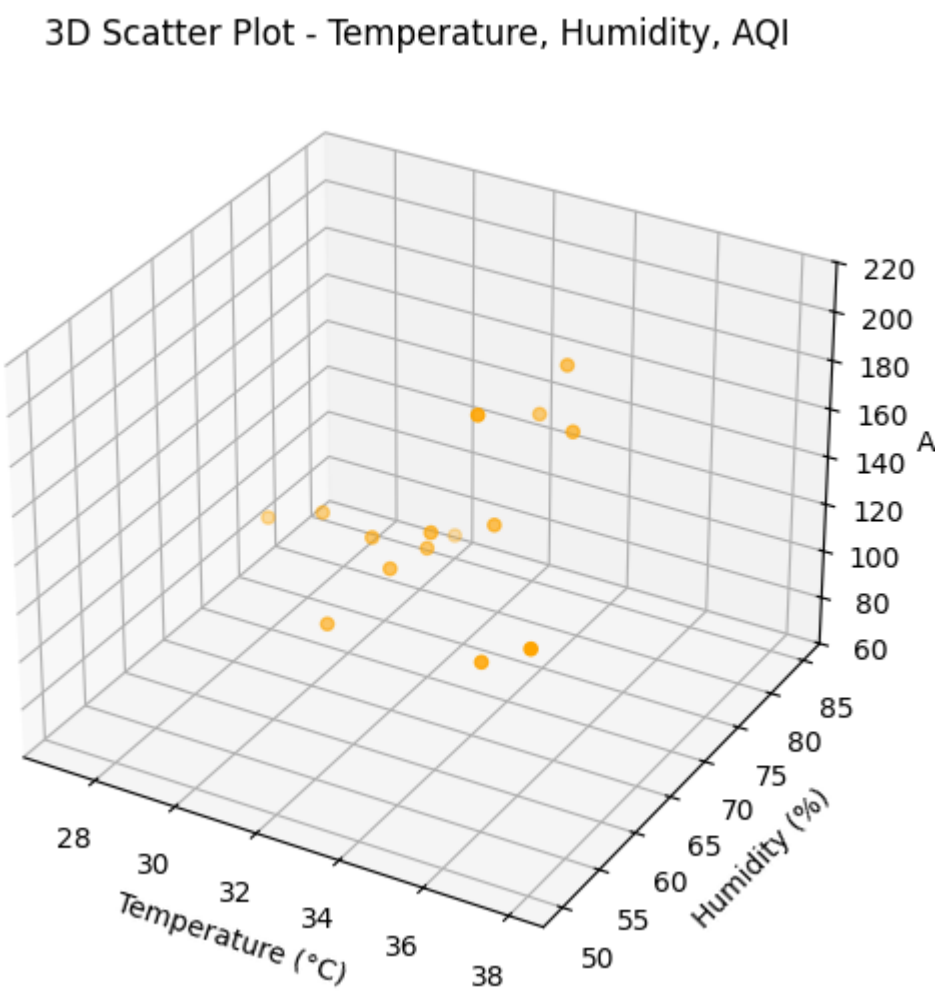

```
# 4. 2D Pie Chart - Rainfall Distribution
plt.figure(figsize=(7, 7))
plt.pie(data['Rainfall (mm)'], labels=data['City'], autopct='%1.1f%%',
colors=['red', 'green', 'blue', 'w', 'yellow'])

plt.title("Rainfall Distribution Across Cities")
plt.show()
```



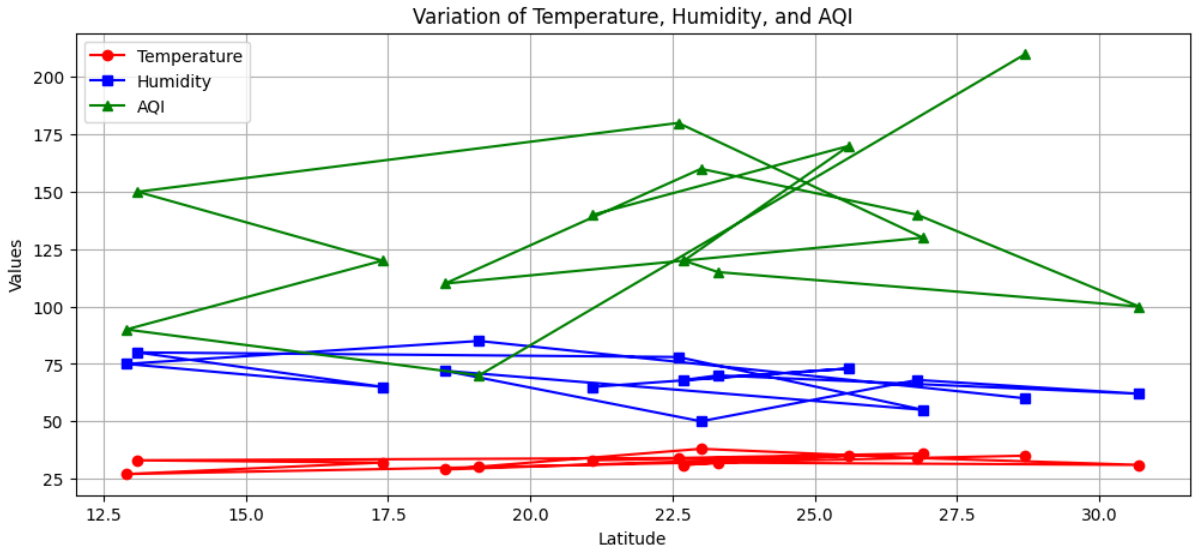

```
# 5. 2D Stacked Bar Chart - Temperature & Humidity
plt.figure(figsize=(18, 5))
bar_width = 0.5
plt.bar(data['City'], data['Temperature (°C)'], color='r',
label='Temperature')
plt.bar(data['City'], data['Humidity (%)'], color='g',
bottom=data['Temperature (°C)'], label='Humidity')

plt.xlabel("Cities")
plt.ylabel("Values")
plt.title("Temperature and Humidity Across Cities")
plt.legend()
plt.show()
```



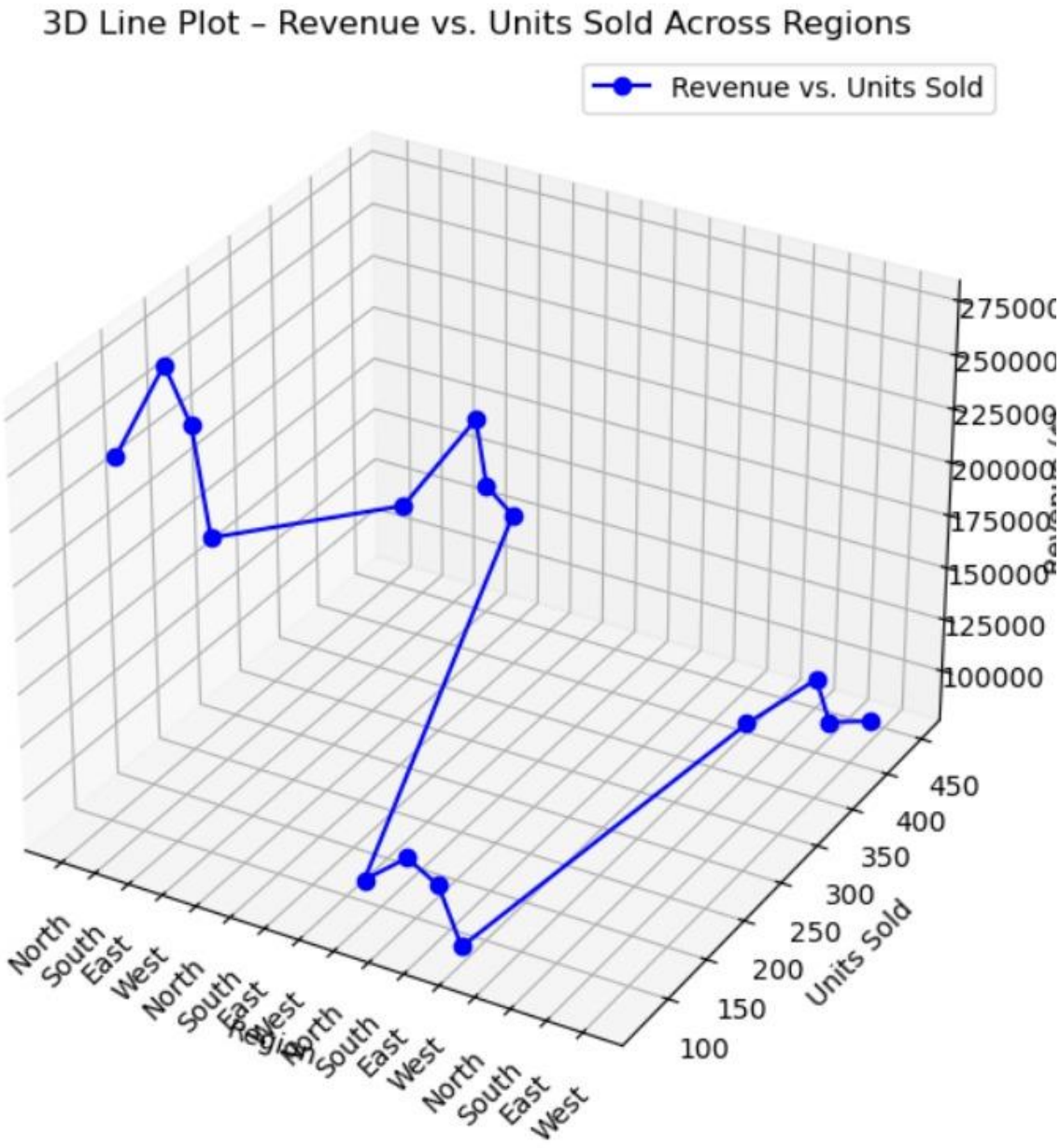

```
# 6. 3D Scatter Plot - Temperature, Humidity, AQI
fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')
ax.scatter(data['Temperature (°C)'], data['Humidity (%)'], data['Air Quality
Index (AQI)'], color='orange')

ax.set_xlabel("Temperature (°C)")
ax.set_ylabel("Humidity (%)")
ax.set_zlabel("AQI")
ax.set_title("3D Scatter Plot - Temperature, Humidity, AQI")
plt.show()
```




```
# 7. 2D Line plot - Temperature, Humidity, AQI over Geographic Points
plt.figure(figsize=(12, 5))
plt.plot(data['Latitude'], data['Temperature (°C)'], marker='o', linestyle='-
', color='r', label='Temperature')
plt.plot(data['Latitude'], data['Humidity (%)'], marker='s', linestyle='-',
color='b', label='Humidity')
plt.plot(data['Latitude'], data['Air Quality Index (AQI)'], marker='^',
linestyle='-', color='g', label='AQI')

plt.xlabel("Latitude")
plt.ylabel("Values")
plt.title("Variation of Temperature, Humidity, and AQI")
plt.legend()
plt.grid()
plt.show()
```

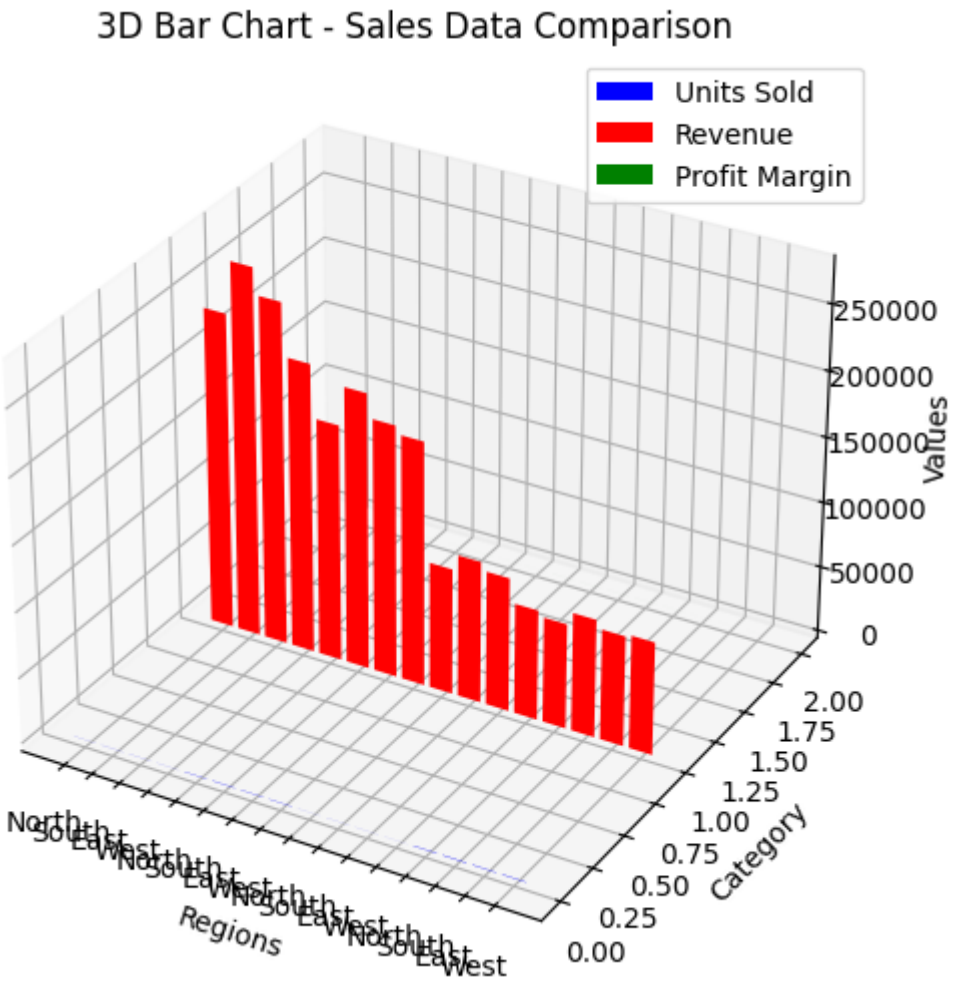



```python
#8: 3D Line Plot – Revenue vs. Units Sold Across Regions
import pandas as pd
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D

revenue = df["Revenue ($)"]
units_sold = df["Units Sold"]
regions = df["Region"]

# Convert regions to numeric indices for plotting
region_indices = range(len(regions))  # Convert categorical region names to
numeric indices

# Create a 3D line plot
fig = plt.figure(figsize=(10, 7))
ax = fig.add_subplot(111, projection='3d')

ax.plot(region_indices, units_sold, revenue, marker='o', linestyle='-',
color='blue', label="Revenue vs. Units Sold")

# Label axes
ax.set_xlabel("Region")
ax.set_ylabel("Units Sold")
ax.set_zlabel("Revenue ($)")
ax.set_title("3D Line Plot – Revenue vs. Units Sold Across Regions")

ax.set_xticks(region_indices)
ax.set_xticklabels(regions, rotation=45)

plt.legend()
plt.show()
```




```
# 9. 3D Bar Chart - Units Sold, Revenue, Profit Margin
fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')
x_indexes = np.arange(len(data1['Region']))
ax.bar(x_indexes, data1['Units Sold'], zs=0, zdir='y', color='b', label='Units
Sold')
ax.bar(x_indexes, data1['Revenue ($)'], zs=1, zdir='y', color='r',
label='Revenue')
```

```
ax.bar(x_indexes, data1['Profit Margin (%)'], zs=2, zdir='y', color='g',
label='Profit Margin')
ax.set_xticks(x_indexes)
ax.set_xticklabels(data1['Region'])
ax.set_xlabel("Regions")
ax.set_ylabel("Category")
ax.set_zlabel("Values")
ax.set_title("3D Bar Chart - Sales Data Comparison")
ax.legend()
plt.show()
```




```
# 10. 3D Scatter Plot - Profit Margin vs Revenue vs Customer Rating
fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')
ax.scatter(data1['Profit Margin (%)'], data1['Revenue ($)'], data1['Customer
Rating'], color='orange')

ax.set_xlabel("Profit Margin (%)")
ax.set_ylabel("Revenue")
```

```
ax.set_zlabel("Customer Rating")
ax.set_title("3D Scatter Plot - Profit Margin vs Revenue vs Customer Rating")
plt.show()
```