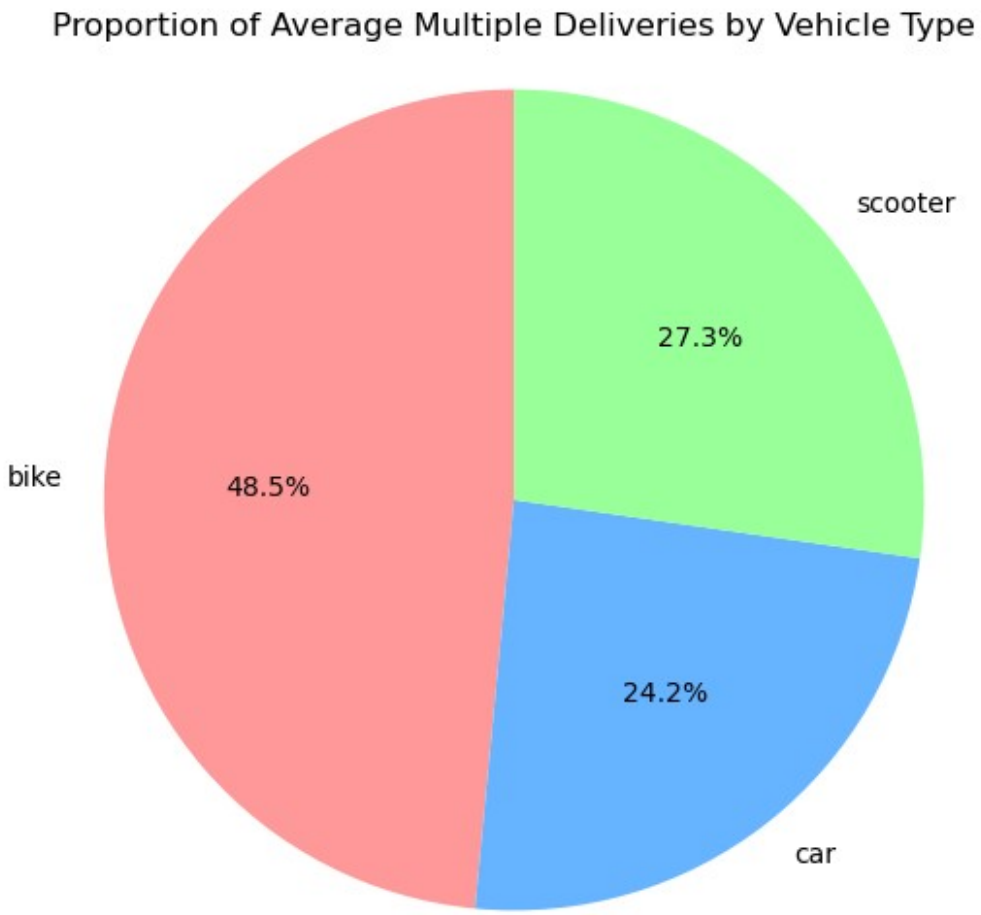
```python
import os
import zipfile
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Step 1: Download the dataset from Kaggle
os.system('kaggle datasets download -d gauravmalik26/food-delivery-dataset')

# Step 2: Extract the ZIP file
with zipfile.ZipFile('food-delivery-dataset.zip', 'r') as zip_ref:
    zip_ref.extractall('food_delivery_dataset')

# Step 3: List the files in the extracted directory to find the correct CSV file name
extracted_dir = 'food_delivery_dataset'
files = os.listdir(extracted_dir)
print("Extracted files:", files)

# Step 4: Use the correct file from the extracted list
csv_file_path = f"{extracted_dir}/train.csv"  # Replace with 'train.csv' since it's one of the files

# Step 5: Create a DataFrame from the extracted CSV file
df = pd.read_csv(csv_file_path)

# Display the first few rows of the DataFrame
print(df.head())
```

```
Extracted files: ['Sample_Submission.csv', 'test.csv', 'train.csv']
        ID Delivery_person_ID Delivery_person_Age
Delivery_person_Ratings  \
0  0x4607     INDORES13DEL02                  37
4.9
1  0xb379     BANGRES18DEL02                  34
4.5
2  0x5d6d     BANGRES19DEL01                  23
4.4
3  0x7a6a    COIMBRES13DEL02                  38
4.7
4  0x70a2     CHENRES12DEL01                  32
4.6

   Restaurant_latitude  Restaurant_longitude
Delivery_location_latitude  \
0            22.745049             75.892471
22.765049
1            12.913041             77.683237
13.043041
```

```
2            12.914264              77.678400
12.924264
3            11.003669              76.976494
11.053669
4            12.972793              80.249982
13.012793

   Delivery_location_longitude  Order_Date Time_Orderd
Time_Order_picked  \
0                    75.912471  19-03-2022    11:30:00
11:45:00
1                    77.813237  25-03-2022    19:45:00
19:50:00
2                    77.688400  19-03-2022    08:30:00
08:45:00
3                    77.026494  05-04-2022    18:00:00
18:10:00
4                    80.289982  26-03-2022    13:30:00
13:45:00

       Weatherconditions Road_traffic_density  Vehicle_condition  \
0       conditions Sunny                 High                  2
1      conditions Stormy                  Jam                  2
2  conditions Sandstorms                  Low                  0
3       conditions Sunny               Medium                  0
4      conditions Cloudy                 High                  1

  Type_of_order Type_of_vehicle multiple_deliveries Festival
City  \
0        Snack      motorcycle                    0      No
Urban
1        Snack         scooter                    1      No
Metropolitian
2       Drinks      motorcycle                    1      No
Urban
3       Buffet      motorcycle                    1      No
Metropolitian
4        Snack         scooter                    1      No
Metropolitian

  Time_taken(min)
0        (min) 24
1        (min) 33
2        (min) 26
3        (min) 21
4        (min) 30

#Hypothesis-1 Bikes are able to do multiple deliveries compare to
scooter and car.
```

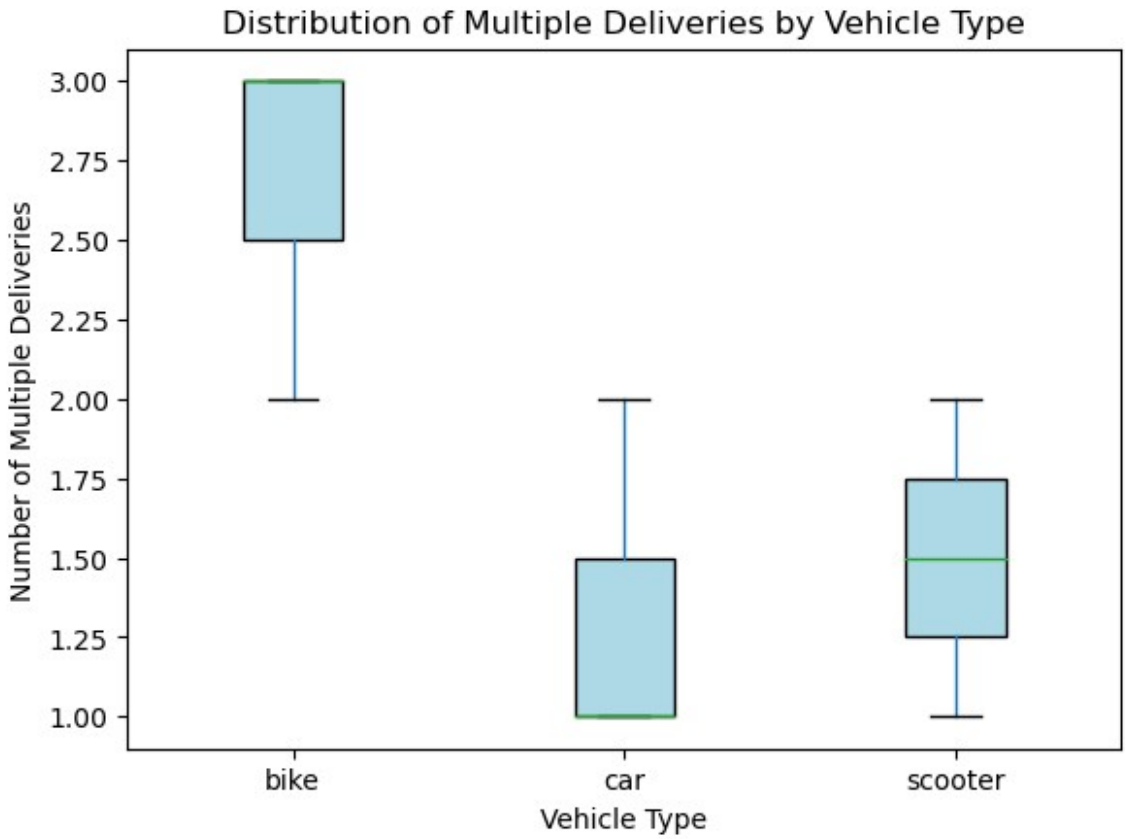
```
# Simulating a dataset structure based on the problem description
data = {
    'vehicle_type': ['bike', 'car', 'bike', 'car', 'scooter', 'bike',
'scooter', 'car'],
    'multiple_deliveries': [2, 1, 3, 2, 1, 3, 2, 1]
}

# Creating a DataFrame
df = pd.DataFrame(data)

# Grouping the data by vehicle type and calculating the average
multiple deliveries
grouped_data = df.groupby('vehicle_type')
['multiple_deliveries'].mean().reset_index()



# 1. Pie Chart: Proportion of Average Multiple Deliveries by Vehicle
Type
plt.figure(figsize=(6, 6))
plt.pie(grouped_data['multiple_deliveries'],
labels=grouped_data['vehicle_type'], autopct='%1.1f%%',
colors=['#ff9999','#66b3ff','#99ff99'], startangle=90)
plt.title('Proportion of Average Multiple Deliveries by Vehicle Type')
plt.axis('equal')  # Equal aspect ratio ensures that pie is drawn as a
circle.
plt.show()
```



This Pie Chart displays the proportion of average multiple deliveries by vehicle type. Bikes dominate the proportion, handling more multiple deliveries compared to cars and scooters.

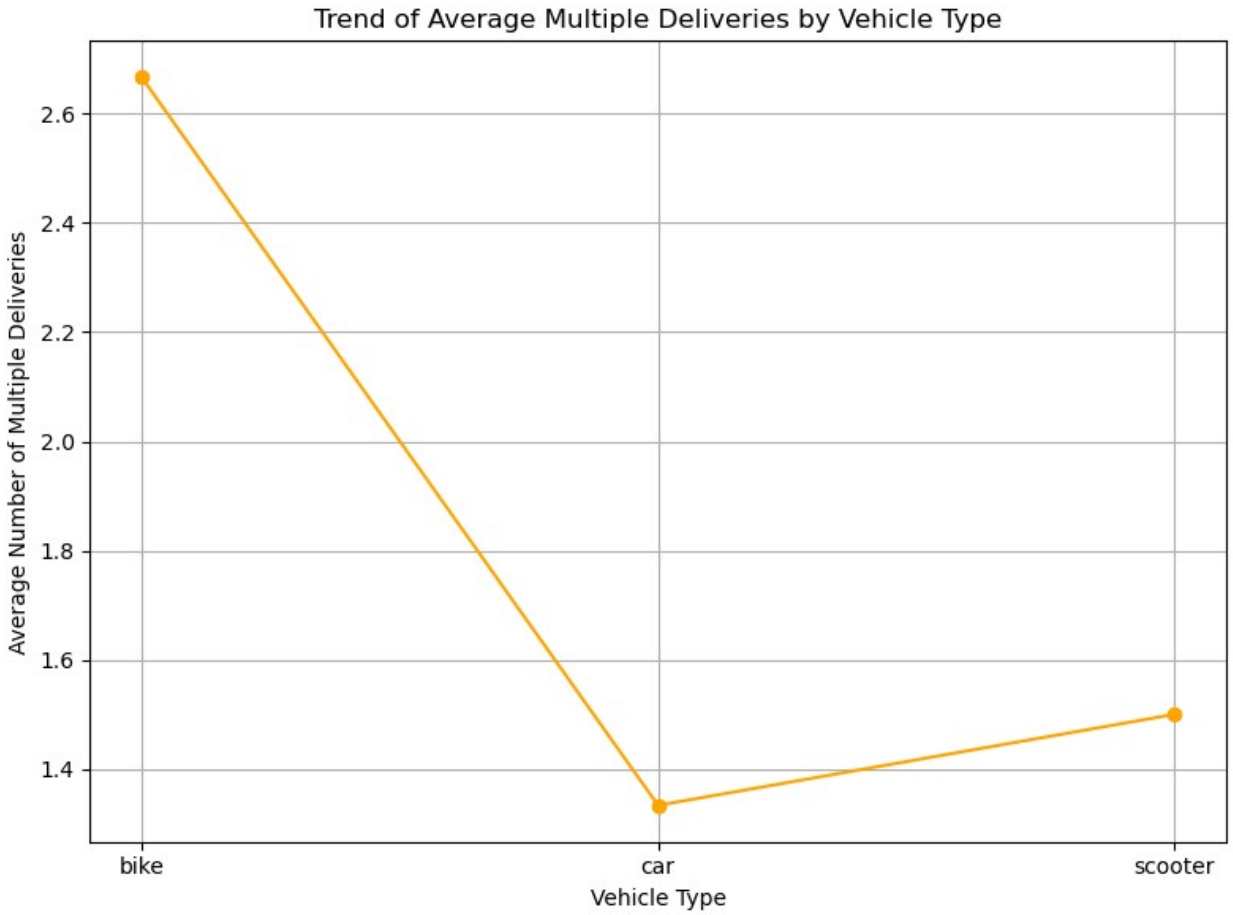
```
# 2. Box Plot: Distribution of Multiple Deliveries for Each Vehicle
Type
plt.figure(figsize=(8, 6))
df.boxplot(column='multiple_deliveries', by='vehicle_type',
grid=False, patch_artist=True, boxprops=dict(facecolor='lightblue'))
plt.title('Distribution of Multiple Deliveries by Vehicle Type')
plt.suptitle('')  # Remove the default 'Boxplot grouped by...' title
plt.xlabel('Vehicle Type')
plt.ylabel('Number of Multiple Deliveries')
plt.show()
```

```
<Figure size 800x600 with 0 Axes>
```



This Box Plot shows the distribution of multiple deliveries for each vehicle type. Bikes have a wider distribution of deliveries, indicating more variation in the number of multiple deliveries compared to cars and scooters.

```
# 3. Line Chart: Trend of Average Multiple Deliveries Across Vehicle
Types
plt.figure(figsize=(8, 6))
plt.plot(grouped_data['vehicle_type'],
grouped_data['multiple_deliveries'], marker='o', linestyle='-',
color='orange')
plt.title('Trend of Average Multiple Deliveries by Vehicle Type')
plt.xlabel('Vehicle Type')
plt.ylabel('Average Number of Multiple Deliveries')
plt.grid(True)
plt.tight_layout()
plt.show()
```

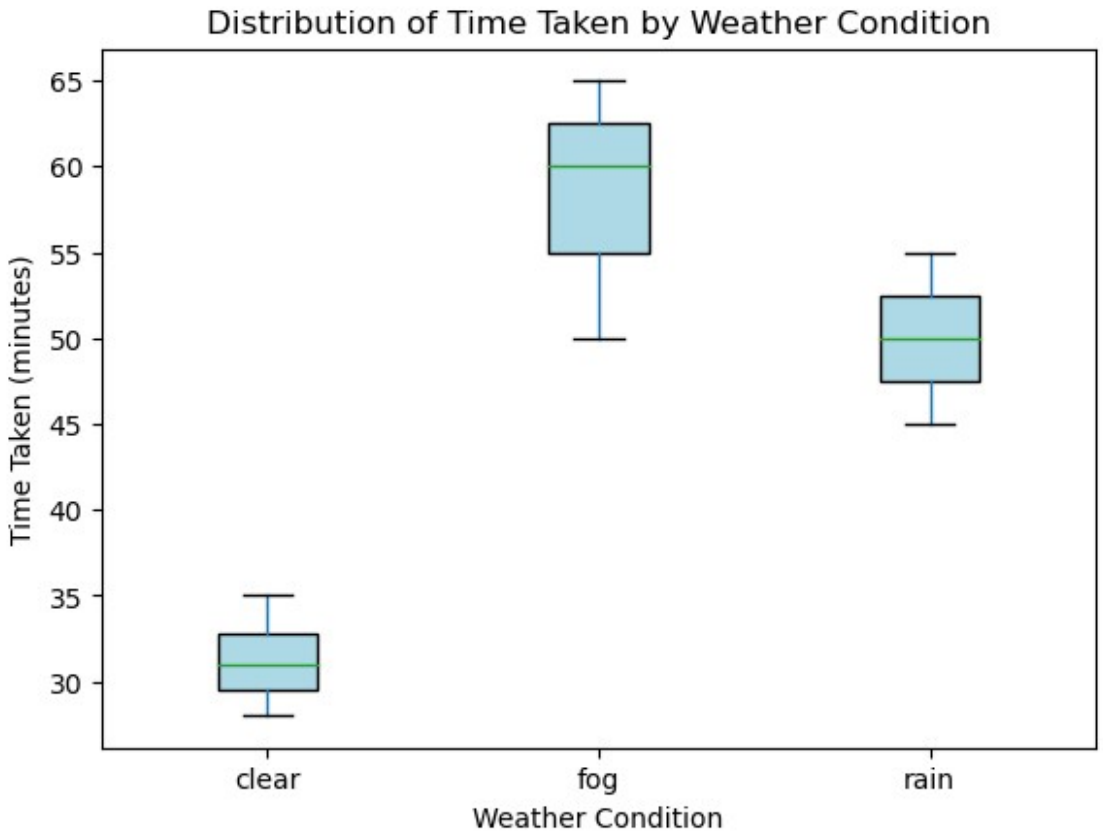


This line Chart illustrates the trend of average multiple deliveries across vehicle types. The chart highlights that bikes generally handle more deliveries, while cars handle the fewest.

```
# Hypothesis-2 the weather conditions impact the time taken to deliver

# Simulating a dataset structure based on the problem description
data = {
    'weather_condition': ['clear', 'rain', 'fog', 'clear', 'rain',
'fog', 'clear', 'rain', 'clear', 'fog'],
    'time_taken': [30, 45, 50, 35, 55, 60, 28, 50, 32, 65]  # Time
taken for delivery in minutes
}

# Creating a DataFrame
df_weather = pd.DataFrame(data)

# Grouping the data by weather condition and calculating the average
time taken for delivery
grouped_weather_data = df_weather.groupby('weather_condition')
['time_taken'].mean().reset_index()

# 1. Box Plot: Distribution of Time Taken by Weather Condition
```

```
plt.figure(figsize=(8, 6))
df_weather.boxplot(column='time_taken', by='weather_condition',
grid=False, patch_artist=True, boxprops=dict(facecolor='lightblue'))
plt.title('Distribution of Time Taken by Weather Condition')
plt.suptitle('')  # Remove default 'Boxplot grouped by...' title
plt.xlabel('Weather Condition')
plt.ylabel('Time Taken (minutes)')
plt.show()
```

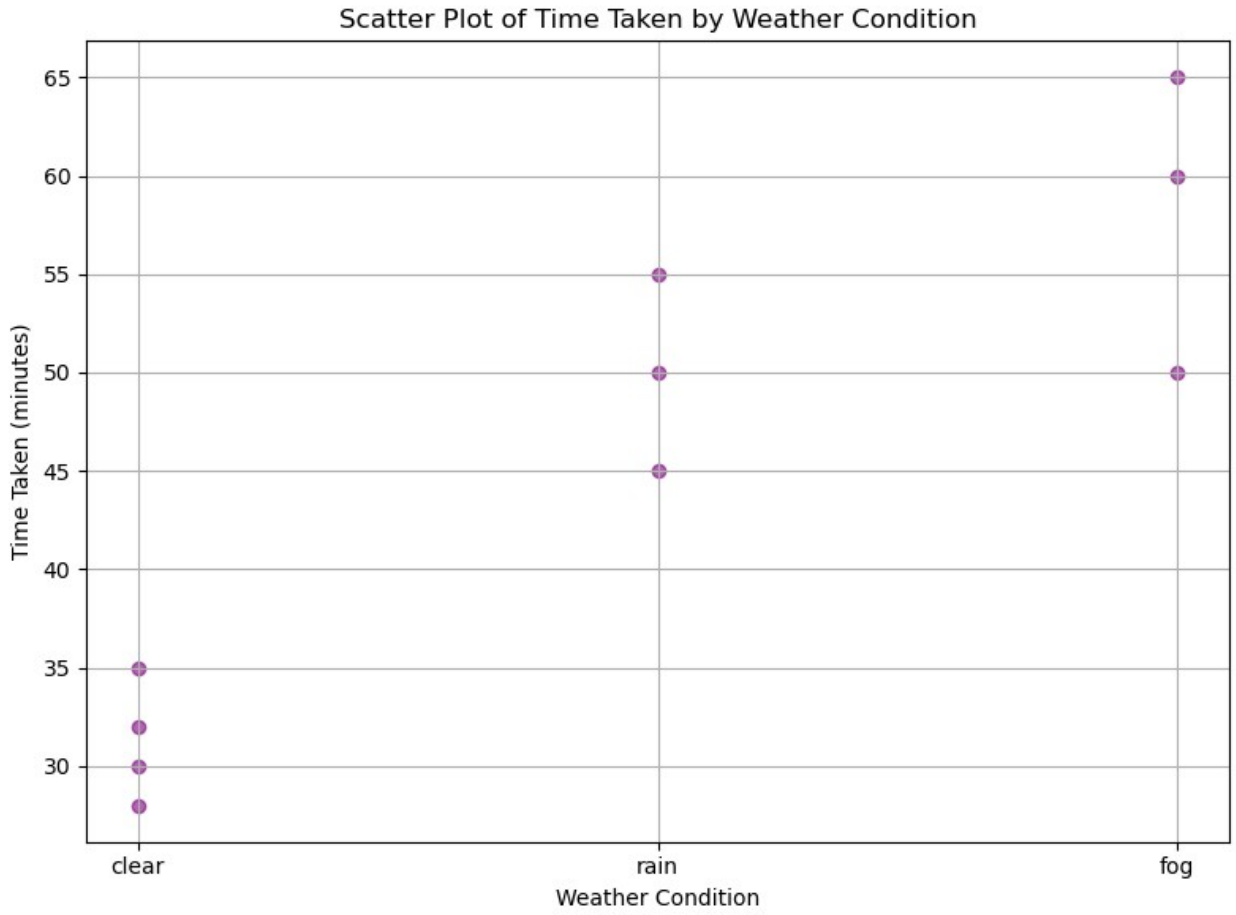
```
<Figure size 800x600 with 0 Axes>
```



This boxplot shows that the average time taken is shortest in clear weather, around 30 to 35 minutes, while it is longest in foggy conditions, where the median is approximately 60 minutes. The distribution of time taken in rainy conditions is in between, with the median around 50 minutes, but there is more variability in foggy conditions compared to clear or rainy weather.

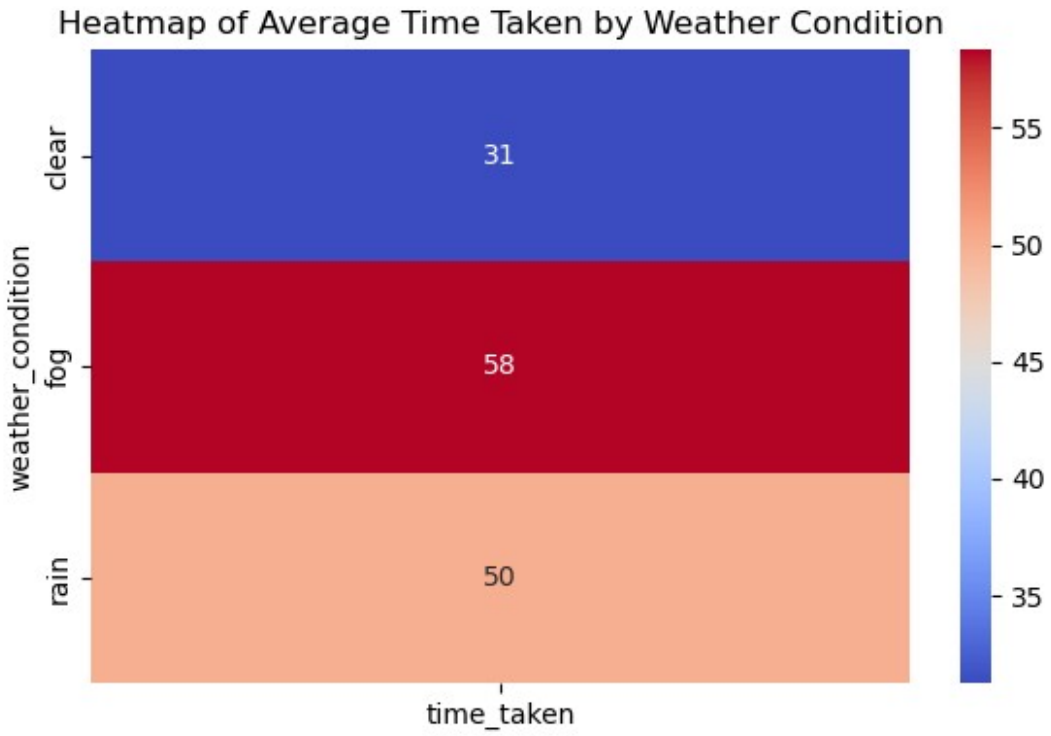
```
# 2. Scatter Plot: Time Taken by Weather Condition
plt.figure(figsize=(8, 6))
plt.scatter(df_weather['weather_condition'], df_weather['time_taken'],
color='purple', alpha=0.6)
plt.title('Scatter Plot of Time Taken by Weather Condition')
plt.xlabel('Weather Condition')
```

```
plt.ylabel('Time Taken (minutes)')
plt.grid(True)
plt.tight_layout()
plt.show()
```



This scatter plot shows that the time taken is clustered at around 30 to 35 minutes in clear weather, indicating lower travel times. In contrast, travel times are higher in foggy conditions, with times ranging from 55 to 65 minutes, while rainy conditions show times around 45 to 55 minutes, suggesting weather significantly impacts travel duration.

```
# 3. Heatmap: Average Time Taken by Weather Condition
plt.figure(figsize=(6, 4))
heatmap_weather_data = df_weather.pivot_table(values='time_taken',
index='weather_condition', aggfunc='mean')
sns.heatmap(heatmap_weather_data, annot=True, cmap='coolwarm',
cbar=True)
plt.title('Heatmap of Average Time Taken by Weather Condition')
plt.tight_layout()
plt.show()
```



The heatmap shows that the average time taken is shortest in clear weather at 31 minutes, represented by the blue color. In contrast, foggy conditions have the longest average time of 58 minutes, indicated by dark red, while rainy conditions fall in between with an average of 50 minutes, shown by a lighter red.