WEATHER

1. Q. 1) Find all the unique 'Wind Speed' values in the data.
2. Q. 2) Find the number of times when the 'Weather is exactly Clear.'
3. Q. 3) Find the number of times when the 'Wind Speed was exactly 4 km/h'.
4. Q. 4) Find out all the Null Values in the data.
5. Q. 5) Rename the column name 'Weather' of the dataframe to 'Weather Condition'.
6. Q. 6) What is the mean 'Visibility'?
7. Q. 7) What is the Standard Deviation of 'Pressure' in this data?
8. Q. 8) What is the Variance of 'Relative Humidity' in this data?
9. Q. 9) Find all instances when 'Snow' was recorded.
10. Q. 10) Find all instances when 'Wind Speed is above 24' and 'Visibility is 25'.
11. Q. 11) What is the Mean value of each column against each 'Weather Condition'?
12. Q. 12) What is the Minimum & Maximum value of each column against each 'Weather Condition'?
13. Q. 13) Show all the Records where Weather Condition is Fog.
14. Q. 14) Find all instances when 'Weather is Clear' or 'Visibility is above 40'.
15. Q. 15) Find all instances when:  
    A. 'Weather is Clear' and 'Relative Humidity is greater than 50', or  
    B. 'Visibility is above 40'.
16. Identify the number of occurrences for each unique 'Temperature' value.
17. Find instances when 'Visibility' is exactly 10 km.
18. Calculate the median 'Wind Speed'.
19. What is the maximum recorded 'Relative Humidity'?
20. Identify all records where 'Weather Condition' is 'Rain'.
21. Find instances where 'Temperature' is below 0°C and 'Weather Condition' includes 'Snow'.
22. List all records where 'Weather Condition' contains 'Haze'.
23. Identify the range (difference between max and min) of 'Pressure' readings.
24. Count the number of times 'Visibility' is exactly 30 km.
25. Show all records with 'Wind Speed' above 30 and 'Temperature' above 25°C.
26. Find the highest and lowest recorded 'Temperature' for each 'Weather Condition'.
27. Calculate the mean, median, and mode for 'Wind Speed'.

**Exploratory and Aggregation Questions**  
28. What are the unique values in the 'Temperature' column?  
29. How many records exist for each unique 'Weather Condition'?  
30. Identify the top 3 most frequent weather conditions in the dataset.  
31. Find the total count of records where the visibility is below 10.  
32. List all the unique values of 'Wind Direction'.

**Statistical and Summary Questions**  
33. What is the median wind speed in the dataset?  
34. What is the mode of the 'Temperature' column?  
35. What is the standard deviation of visibility for all records?  
36. What is the variance in 'Wind Speed' across all weather conditions?  
37. Compute the range (min and max) of temperature values for each weather condition.

**Filtering and Conditions**  
38. Find all instances where 'Temperature' is above 30°C and 'Wind Speed' is greater than 15 km/h.  
39. List all records where 'Visibility' is less than 10 and the weather condition contains 'Rain'.  
40. Identify records where 'Pressure' is below 1000 and 'Relative Humidity' is above 80%.  
41. Find all rows where 'Weather Condition' contains either 'Fog' or 'Snow'.  
42. Show all records where 'Visibility' is above 40, but 'Temperature' is below 0°C.

**Transformations and Calculations**  
43. Create a new column categorizing 'Visibility' into 'Low', 'Moderate', and 'High'.  
**44**. Add a column to calculate the wind chill based on temperature and wind speed (if formula available).  
45. Create a new column indicating whether the 'Pressure' is above or below the average pressure.  
46. Normalize the 'Temperature' column values between 0 and 1.  
47. Generate a 'Heat Index' column combining 'Temperature' and 'Relative Humidity'.

**Grouping and Comparisons**  
48. Group the data by 'Weather Condition' and calculate the average temperature for each condition.  
49. Compare the mean visibility during clear and cloudy weather conditions.  
50. Group by 'Wind Direction' and find the maximum 'Wind Speed' for each direction.  
51. Analyze which 'Weather Condition' is associated with the lowest average pressure.  
52. Find the most common 'Wind Speed' for each 'Weather Condition'.

**Visualization-Oriented Insights**  
53. Plot the distribution of 'Temperature' for different 'Weather Conditions'.  
54. Create a line chart showing 'Pressure' trends over time.  
55. Generate a bar chart comparing the average visibility across weather conditions.  
56. Visualize the correlation between 'Temperature' and 'Relative Humidity'.  
57. Create a scatter plot to show the relationship between 'Wind Speed' and 'Pressure'.

**Data Cleaning and Missing Values**  
58. Identify columns with missing values and fill them using mean/median/mode.  
59. Remove duplicate rows from the dataset.  
60. Standardize the formatting of the 'Weather Condition' column (e.g., remove inconsistencies in text).  
61. Impute missing visibility values based on the average visibility for the same weather condition.  
62. Drop any columns that contain more than 50% missing values.

**Advanced/Derived Insights**  
63. Analyze the correlation between 'Wind Speed' and 'Pressure'.  
64. Determine which weather condition has the highest variance in temperature.  
65. Find the time period where 'Visibility' consistently remained above 50.  
66. Identify if high wind speed is more common during certain weather conditions.  
67. Compare the temperature ranges for day and night (if time data is available).