* *Working On RealTime Project With Python* *

(*A Part Of Big Analysis*)

The Weather Dataset

Here, The weather dataset is a Time-series data set with per-hour information about the weather condition at a particular Location. It Record Tempreture,Dew Point Tempreture,Relative Humidity,Wind Speed,Visibility,Pressure and Conditions.

```
import pandas as pd
df= pd.read_csv("file.csv")
df.head()
```

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog

Next steps: Generate code with df View recommended plots

```
df.shape
```

```
(8784, 8)
```

The dataframe have "8784" row and "8" **Column**

```
df.describe()
```

	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa
count	8784.000000	8784.000000	8784.000000	8784.000000	8784.000000	8784.000000
mean	8.798144	2.555294	67.431694	14.945469	27.664447	101.051623
std	11.687883	10.883072	16.918881	8.688696	12.622688	0.844005
min	-23.300000	-28.500000	18.000000	0.000000	0.200000	97.520000
25%	0.100000	-5.900000	56.000000	9.000000	24.100000	100.560000
50%	9.300000	3.300000	68.000000	13.000000	25.000000	101.070000
75%	18.800000	11.800000	81.000000	20.000000	25.000000	101.590000

```
df.nunique()
```

```
Date/Time           8784
Temp_C               533
Dew Point Temp_C     489
Rel Hum_%             83
Wind Speed_km/h       34
Visibility_km         24
Press_kPa            518
Weather               50
dtype: int64
```

```
df["Weather"].unique()
```

```
array(['Fog', 'Freezing Drizzle,Fog', 'Mostly Cloudy', 'Cloudy', 'Rain',
       'Rain Showers', 'Mainly Clear', 'Snow Showers', 'Snow', 'Clear',
       'Freezing Rain,Fog', 'Freezing Rain', 'Freezing Drizzle',
       'Rain,Snow', 'Moderate Snow', 'Freezing Drizzle,Snow',
       'Freezing Rain,Snow Grains', 'Snow,Blowing Snow', 'Freezing Fog',
       'Haze', 'Rain,Fog', 'Drizzle,Fog', 'Drizzle',
       'Freezing Drizzle,Haze', 'Freezing Rain,Haze', 'Snow,Haze',
            'Snow,Fog', 'Snow,Ice Pellets', 'Rain,Haze', 'Thunderstorms,Rain',
            'Thunderstorms,Rain Showers', 'Thunderstorms,Heavy Rain Showers',
            'Thunderstorms,Rain Showers,Fog', 'Thunderstorms',
            'Thunderstorms,Rain,Fog',
            'Thunderstorms,Moderate Rain Showers,Fog', 'Rain Showers,Fog',
            'Rain Showers,Snow Showers', 'Snow Pellets', 'Rain,Snow,Fog',
            'Moderate Rain,Fog', 'Freezing Rain,Ice Pellets,Fog',
            'Drizzle,Ice Pellets,Fog', 'Drizzle,Snow', 'Rain,Ice Pellets',
            'Drizzle,Snow,Fog', 'Rain,Snow Grains', 'Rain,Snow,Ice Pellets',
            'Snow Showers,Fog', 'Moderate Snow,Blowing Snow'], dtype=object)
```

```
df.index

     RangeIndex(start=0, stop=8784, step=1)
```

```
df.columns

     Index(['Date/Time', 'Temp_C', 'Dew Point Temp_C', 'Rel Hum_%',
            'Wind Speed_km/h', 'Visibility_km', 'Press_kPa', 'Weather'],
           dtype='object')
```

```
df.dtypes

     Date/Time            object
     Temp_C              float64
     Dew Point Temp_C    float64
     Rel Hum_%             int64
     Wind Speed_km/h       int64
     Visibility_km       float64
     Press_kPa           float64
     Weather              object
     dtype: object
```

```
df.count()

     Date/Time           8784
     Temp_C              8784
     Dew Point Temp_C    8784
     Rel Hum_%           8784
     Wind Speed_km/h     8784
     Visibility_km       8784
     Press_kPa           8784
     Weather             8784
     dtype: int64
```

```
df.value_counts()

     Date/Time        Temp_C  Dew Point Temp_C  Rel Hum_%  Wind Speed_km/h  Visibility_km  Press_kPa  Weather
     1/1/2012 0:00    -1.8    -3.9              86         4                8.0            101.24     Fog             1
     6/1/2012 12:00    19.3    3.3              35         20               48.3           101.32     Cloudy          1
     5/9/2012 7:00     14.3    12.5             89         15               4.8            100.12     Fog             1
     5/9/2012 8:00     14.3    12.3             88         17               6.4            100.12     Fog             1
     5/9/2012 9:00     14.0    12.3             89         9                4.0            100.10     Drizzle,Fog     1
                                                                                                                 ..
     12/8/2012 3:00    2.1    -1.5              77         6                25.0           101.18     Cloudy          1
     12/8/2012 2:00    2.0    -1.9              75         7                25.0           101.17     Cloudy          1
     12/8/2012 23:00   1.3     0.6              95         17               8.0            100.96     Drizzle,Fog     1
     12/8/2012 22:00   1.2     0.6              96         13               6.4            100.84     Fog             1
     9/9/2012 9:00     14.8    8.8              67         17               48.3           100.65     Mainly Clear    1
     Name: count, Length: 8784, dtype: int64
```

```
df["Weather"].value_counts()

     Weather
     Mainly Clear                               2106
     Mostly Cloudy                              2069
     Cloudy                                     1728
     Clear                                      1326
     Snow                                        390
     Rain                                        306
     Rain Showers                                188
     Fog                                         150
     Rain,Fog                                    116
     Drizzle,Fog                                  80
     Snow Showers                                 60
     Drizzle                                      41
     Snow,Fog                                     37
     Snow,Blowing Snow                            19
     Rain,Snow                                    18
     Thunderstorms,Rain Showers                   16
     Haze                                         16
     Drizzle,Snow,Fog                             15
     Freezing Rain                                14
     Freezing Drizzle,Snow                        11
     Freezing Drizzle                           7
     Snow,Ice Pellets                           6
     Freezing Drizzle,Fog                       6
     Snow,Haze                                  5
     Freezing Fog                               4
     Snow Showers,Fog                           4
     Moderate Snow                              4
     Rain,Snow,Ice Pellets                      4
     Freezing Rain,Fog                          4
     Freezing Drizzle,Haze                      3
     Rain,Haze                                  3
     Thunderstorms,Rain                         3
     Thunderstorms,Rain Showers,Fog             3
     Freezing Rain,Haze                         2
     Drizzle,Snow                               2
     Rain Showers,Snow Showers                  2
     Thunderstorms                              2
     Moderate Snow,Blowing Snow                 2
     Rain Showers,Fog                           1
     Thunderstorms,Moderate Rain Showers,Fog    1
     Snow Pellets                               1
     Rain,Snow,Fog                              1
     Moderate Rain,Fog                          1
     Freezing Rain,Ice Pellets,Fog              1
     Drizzle,Ice Pellets,Fog                    1
     Thunderstorms,Rain,Fog                     1
     Rain,Ice Pellets                           1
     Rain,Snow Grains                           1
     Thunderstorms,Heavy Rain Showers           1
     Freezing Rain,Snow Grains                  1
     Name: count, dtype: int64
```

Q) 1. Find all the unique "Wind Speed" Values In THe Data.

```
df["Wind Speed_km/h"].nunique()
```

```
34
```

```
df["Wind Speed_km/h"].unique()
```

```
array([ 4,  7,  6,  9, 15, 13, 20, 22, 19, 24, 30, 35, 39, 32, 33, 26, 44,
       43, 48, 37, 28, 17, 11,  0, 83, 70, 57, 46, 41, 52, 50, 63, 54,  2])
```

Q) 2. Find The number Of times When The "Weather Is Exactly Clear".

```
df.groupby("Weather").get_group("Clear")
```

1 to 25 of 1326 entries Filter

index	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h ▲	Visibility_km	Pr
364	1/16/2012 4:00	-18.7	-23.5	66	0	25.0	
365	1/16/2012 5:00	-19.1	-23.3	69	0	25.0	
366	1/16/2012 6:00	-18.7	-23.2	68	0	25.0	
502	1/21/2012 22:00	-17.6	-23.3	61	0	25.0	
504	1/22/2012 0:00	-18.3	-22.5	70	0	25.0	
506	1/22/2012 2:00	-18.5	-22.6	70	0	25.0	
603	1/26/2012 3:00	-8.1	-12.5	71	0	25.0	
604	1/26/2012 4:00	-8.5	-13.5	67	0	25.0	
827	2/4/2012 11:00	-7.6	-13.6	62	0	48.3	
838	2/4/2012 22:00	-10.3	-14.9	69	0	25.0	
839	2/4/2012 23:00	-10.1	-14.3	71	0	25.0	
849	2/5/2012 9:00	-13.5	-16.1	81	0	24.1	
917	2/8/2012 5:00	-12.6	-21.2	49	0	25.0	
1179	2/19/2012 3:00	-6.0	-10.3	72	0	25.0	
1201	2/20/2012 1:00	-7.6	-12.6	67	0	25.0	
1222	2/20/2012 22:00	-3.3	-8.8	66	0	25.0	
	2/24/2012						

There are 1326 clear weather

Q) 3. Find The Number Of Times When The "Wind Speed Was Exactly 4 KM/h'

```
df[df["Wind Speed_km/h"] == 4]
```

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weathe
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	
96	1/5/2012 0:00	-8.8	-11.7	79	4	9.7	100.32	
101	1/5/2012 5:00	-7.0	-9.5	82	4	4.0	100.19	
146	1/7/2012 2:00	-8.1	-11.1	79	4	19.3	100.15	
...	...	...	...	...	...	...	...	
8768	12/31/2012 8:00	-8.6	-10.3	87	4	3.2	101.14	S

there are 474 wind speed have 4km

Q) 4. Find Out All the null values In The Table

```
df.isnull().sum()
```

```
Date/Time           0
Temp_C              0
Dew Point Temp_C    0
Rel Hum_%           0
```

```
Wind Speed_km/h     0
Visibility_km       0
Press_kPa           0
Weather             0
dtype: int64
```

In this table dont have any null device

Q) 5. Rename The "Weather" Column To Weather Condition.

```
df.rename(columns= {"Weather" : "Weather Condition"})
df.head()
```

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog

Next steps: Generate code with df View recommended plots

Q) 6. What Is The Mean Of "Visibility"?

```
df.Visibility_km.mean()
```

```
27.664446721311478
```

The mean Of Visiblity is "min - 27.664446721311478".

Q) 7.What is The Standard Daviation of "Pressure" in this dataset?

```
df.Press_kPa.std()
```

```
0.8440047459486483
```

Q) 8.What Is the Variance of "Relative Humidity" In This Data?

```
df["Rel Hum_%"].var()
```

```
286.24855019850196
```

Q) 9.Find All Instances When "Snow" Was Recorded?

```
df[df["Weather"] == "Snow"].value_counts()
```

```
Date/Time         Temp_C  Dew Point Temp_C  Rel Hum_%  Wind Speed_km/h  Visibility_km  Press_kPa  Weather
1/10/2012 1:00     2.3    -3.4              66         35               25.0           100.28     Snow       1
2/11/2012 11:00   -13.1   -18.8             62         11               24.1           101.03     Snow       1
2/15/2012 4:00    -0.7    -3.5              81         0                25.0           101.39     Snow       1
2/15/2012 21:00    1.3     0.1              92         13               8.0            101.95     Snow       1
2/15/2012 14:00    1.5     0.0              90         7                9.7            101.68     Snow       1
                                                                                                            ..
1/6/2012 7:00     -14.4   -16.3             85         22               2.4            100.52     Snow       1
1/6/2012 6:00     -12.0   -16.2             71         22               4.8            100.58     Snow       1
1/6/2012 5:00     -11.8   -16.0             71         19               2.8            100.61     Snow       1
1/6/2012 4:00     -11.3   -16.1             68         15               3.2            100.70     Snow       1
4/27/2012 9:00     2.7    -3.2              65         32               24.1           100.40     Snow       1
Name: count, Length: 390, dtype: int64
```

390 times Snow Was Recorded

Q) 10. Find All Instances When "Wind speed Is more then 24" and "Visiblity is 25"?

```
df[(df['Wind Speed_km/h'] > 24) & (df['Visibility_km'] == 25)]
```

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weathe
23	1/1/2012 23:00	5.3	2.0	79	30	25.0	99.31	Cloud
24	1/2/2012 0:00	5.2	1.5	77	35	25.0	99.26	Rai Shower
25	1/2/2012 1:00	4.6	0.0	72	39	25.0	99.26	Cloud
26	1/2/2012 2:00	3.9	-0.9	71	32	25.0	99.26	Mostl Cloud
27	1/2/2012 3:00	3.7	-1.5	69	33	25.0	99.30	Mostl Cloud
...	...	...	...	...	...	...	...	..
8705	12/28/2012 17:00	-8.6	-12.0	76	26	25.0	101.34	Mainl Clea

Total 308 instances

```
mean_values = df.groupby('Weather')[numeric_columns].mean()
print(mean_values)
```

```
Snow,Ice Pellets                              7.416667  100.548333
Thunderstorms                                24.550000  100.230000
Thunderstorms,Heavy Rain Showers              2.400000  100.260000
Thunderstorms,Moderate Rain Showers,Fog       3.200000  100.010000
Thunderstorms,Rain                           19.833333  100.420000
Thunderstorms,Rain Showers                   15.893750  100.233750
Thunderstorms,Rain Showers,Fog                9.700000  100.063333
Thunderstorms,Rain,Fog                        4.800000  100.080000
```

Q) 12. What Is The Min and Max Value Of Each Column Against Each "Weather Condition"?

```
max_values = df.groupby('Weather')[numeric_columns].max()
print(max_values)
```

```
Rain,Snow,Fog                                          9            6.4
Rain,Snow,Ice Pellets                                 28            6.4
Snow                                                  57           25.0
Snow Pellets                                          35            2.4
Snow Showers                                          37           48.3
Snow Showers,Fog                                      22            9.7
Snow,Blowing Snow                                     48            9.7
Snow,Fog                                              35            9.7
Snow,Haze                                             15            6.4
Snow,Ice Pellets                                      33           11.3
Thunderstorms                                         15           25.0
Thunderstorms,Heavy Rain Showers                       9            2.4
Thunderstorms,Moderate Rain Showers,Fog               15            3.2
Thunderstorms,Rain                                    30           24.1
Thunderstorms,Rain Showers                            32           25.0
Thunderstorms,Rain Showers,Fog                        35            9.7
Thunderstorms,Rain,Fog                                19            4.8

                                         Press_kPa
Weather
Clear                                       103.63
Cloudy                                      103.65
Drizzle                                     101.56
Drizzle,Fog                                 102.07
Drizzle,Ice Pellets,Fog                     100.79
Drizzle,Snow                                101.15
Drizzle,Snow,Fog                            100.15
Fog                                         103.04
Freezing Drizzle                            101.02
Freezing Drizzle,Fog                        101.27
Freezing Drizzle,Haze                       100.36
Freezing Drizzle,Snow                       101.18
Freezing Fog                                102.85
Freezing Rain                               101.00
Freezing Rain,Fog                           101.01
Freezing Rain,Haze                          100.41
Freezing Rain,Ice Pellets,Fog               100.95
Freezing Rain,Snow Grains                    98.56
Haze                                        102.97
Mainly Clear                                103.59
Moderate Rain,Fog                            99.98
Moderate Snow                               100.67
Moderate Snow,Blowing Snow                  100.64
Mostly Cloudy                               103.65
Rain                                        102.26
Rain Showers                                102.31
Rain Showers,Fog                             99.83
Rain Showers,Snow Showers                   101.11
Rain,Fog                                    101.77
Rain,Haze                                   100.61
Rain,Ice Pellets                            100.12
Rain,Snow                                   101.07
Rain,Snow Grains                            100.60
Rain,Snow,Fog                               100.73
Rain,Snow,Ice Pellets                       100.47
Snow                                        102.73
Snow Pellets                                 99.70
Snow Showers                                102.50
Snow Showers,Fog                            102.52
```

Double-click (or enter) to edit

```
import pandas as pd

# Load the CSV file into a DataFrame
df = pd.read_csv('file.csv')

# Specify the numeric columns you want to convert
numeric_columns = ['Temp_C', 'Dew Point Temp_C', 'Rel Hum_%', 'Wind Speed_km/h', 'Visibility_km', 'Press_kPa']

# Convert specified columns to numeric, coerce errors to NaN
df[numeric_columns] = df[numeric_columns].apply(pd.to_numeric, errors='coerce')

# Drop rows with NaN values in specified numeric columns
df.dropna(subset=numeric_columns, inplace=True)

# Calculate mean values for each column against each 'Weather Condition'
mean_values = df.groupby('Weather')[numeric_columns].mean()

# Display the mean values
print(mean_values)
```

```
                                            Temp_C  Dew Point Temp_C  \
Weather
Clear                                     6.825716          0.089367
Cloudy                                    7.970544          2.375810
Drizzle                                   7.353659          5.504878
Drizzle,Fog                               8.067500          7.033750
Drizzle,Ice Pellets,Fog                   0.400000         -0.700000
Drizzle,Snow                              1.050000          0.150000
Drizzle,Snow,Fog                          0.693333          0.120000
Fog                                       4.303333          3.159333
Freezing Drizzle                         -5.657143         -8.000000
Freezing Drizzle,Fog                     -2.533333         -4.183333
Freezing Drizzle,Haze                    -5.433333         -8.000000
Freezing Drizzle,Snow                    -5.109091         -7.072727
Freezing Fog                             -7.575000         -9.250000
Freezing Rain                            -3.885714         -6.078571
Freezing Rain,Fog                        -2.225000         -3.750000
Freezing Rain,Haze                       -4.900000         -7.450000
Freezing Rain,Ice Pellets,Fog            -2.600000         -3.700000
Freezing Rain,Snow Grains                -5.000000         -7.300000
Haze                                     -0.200000         -2.975000
Mainly Clear                             12.558927          4.581671
Moderate Rain,Fog                         1.700000          0.800000
Moderate Snow                            -5.525000         -7.250000
Moderate Snow,Blowing Snow               -5.450000         -6.500000
Mostly Cloudy                            10.574287          3.131174
Rain                                      9.786275          7.042810
Rain Showers                             13.722340          9.187766
Rain Showers,Fog                         12.800000         12.100000
Rain Showers,Snow Showers                 2.150000         -1.500000
Rain,Fog                                  8.273276          7.219828
Rain,Haze                                 4.633333          2.066667
Rain,Ice Pellets                          0.600000         -0.600000
Rain,Snow                                 1.055556         -0.566667
Rain,Snow Grains                          1.900000         -2.100000
Rain,Snow,Fog                             0.800000          0.300000
Rain,Snow,Ice Pellets                     1.100000         -0.175000
Snow                                     -4.524103         -7.623333
Snow Pellets                              0.700000         -6.400000
Snow Showers                             -3.506667         -7.866667
Snow Showers,Fog                        -10.675000        -11.900000
Snow,Blowing Snow                        -5.410526         -7.621053
Snow,Fog                                 -5.075676         -6.364865
Snow,Haze                                -4.020000         -6.860000
Snow,Ice Pellets                         -1.883333         -3.666667
Thunderstorms                            24.150000         19.750000
Thunderstorms,Heavy Rain Showers         10.900000          9.000000
Thunderstorms,Moderate Rain Showers,Fog  19.600000         18.500000
Thunderstorms,Rain                       20.433333         18.533333
Thunderstorms,Rain Showers               20.037500         17.618750
Thunderstorms,Rain Showers,Fog           21.600000         18.700000
Thunderstorms,Rain,Fog                   20.600000         18.600000

                                         Rel Hum_%  Wind Speed_km/h  \
Weather
Clear                                    64.497738        10.557315
Cloudy                                   69.592593        16.127315
Drizzle                                  88.243902        16.097561
```

Q) 13. Show All The Records Where Weather Is "Fog"

```
df[df["Weather"] == "Fog"]
```

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog
4	1/1/2012 4:00	-1.5	-3.3	88	7	4.8	101.23	Fog
5	1/1/2012 5:00	-1.4	-3.3	87	9	6.4	101.27	Fog
6	1/1/2012 6:00	-1.5	-3.1	89	7	6.4	101.29	Fog
...	...	...	...	...	...	...	...	...
8716	12/29/2012 4:00	-16.0	-17.2	90	6	9.7	101.25	Fog
8717	12/29/2012 5:00	-14.8	-15.9	91	4	6.4	101.25	Fog
8718	12/29/2012 6:00	-13.8	-15.3	88	4	9.7	101.25	Fog
8719	12/29/2012 7:00	-14.8	-16.4	88	7	8.0	101.22	Fog
8722	12/29/2012 10:00	-12.0	-13.3	90	7	6.4	101.15	Fog

150 rows × 8 columns

There Are 150 Fog Weather

Q) 14. Find All The Instances When "Weather Is Clear" OR "Visiblity is Over 40".

```
df[(df["Weather"] == "Clear") | (df["Visibility_km"] > 40)]
```

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
67	1/3/2012 19:00	-16.9	-24.8	50	24	25.0	101.74	Clear
106	1/5/2012 10:00	-6.0	-10.0	73	17	48.3	100.45	Mainly Clear
107	1/5/2012 11:00	-5.6	-10.2	70	22	48.3	100.41	Mainly Clear
108	1/5/2012 12:00	-4.7	-9.6	69	20	48.3	100.38	Mainly Clear
109	1/5/2012 13:00	-4.4	-9.7	66	26	48.3	100.40	Mainly Clear
...	...	...	...	...	...	...	...	...
8749	12/30/2012 13:00	-12.4	-16.2	73	37	48.3	100.92	Mostly Cloudy
8750	12/30/2012 14:00	-11.8	-16.1	70	37	48.3	100.96	Mainly Clear
8751	12/30/2012 15:00	-11.3	-15.6	70	32	48.3	101.05	Mainly Clear
8752	12/30/2012 16:00	-11.4	-15.5	72	26	48.3	101.15	Mainly Clear
8756	12/30/2012 20:00	-13.8	-16.5	80	24	25.0	101.52	Clear

3027 rows × 8 columns

Q) 15. Find All The Instances When:

```
 A. "Weather is clear" and "Relative Humidity is Greater then 50"
  or


  B. "Visibility is above 40"
```

```
df[(df["Weather"] == "Clear") & (df["Rel Hum_%"] > 50) | (df["Visibility_km"] > 40)]
```

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
106	1/5/2012 10:00	-6.0	-10.0	73	17	48.3	100.45	Mainly Clear
107	1/5/2012 11:00	-5.6	-10.2	70	22	48.3	100.41	Mainly Clear
108	1/5/2012 12:00	-4.7	-9.6	69	20	48.3	100.38	Mainly Clear
109	1/5/2012 13:00	-4.4	-9.7	66	26	48.3	100.40	Mainly Clear