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email : jayaramk998@gmail.com (mailto:jayaramk998@gmail.com) Linkedin: https://www.linkedin.com/in/jayaram98/ (https://www.linkedin.com/in/jayaram98/) Data analytics project with python

1. Weather Data Analysis Project

Importing library and modules

In [5]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

Importing dataset

In [10]:

```
df = pd.read_csv("C:/Users/Administrator/Desktop/Jupyter/Python project/1. Weather Data.csv
```

Analysing DataFrames

In [9]:

```
df.head()
```

Out[9]:

	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
2	1/1/2012 2:00	-1.8	-3.4	89	7	4.0	101.26	Freezing Drizzle,Fog
3	1/1/2012 3:00	-1.5	-3.2	88	6	4.0	101.27	Freezing Drizzle,Fog
4	1/1/2012 4:00	-1.5	-3.3	88	7	4.8	101.23	Fog

In [11]:

```
df.shape
```

Out[11]:

```
(8784, 8)
```

In [12]:

```
df.index
```

Out[12]:

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

In [28]:

```
# Basic information about our data
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8784 entries, 0 to 8783
Data columns (total 8 columns):
 #   Column            Non-Null Count  Dtype         
---  ------            --------------  -----         
 0   Date/Time         8784 non-null   datetime64[ns]
 1   Temp_C            8784 non-null   float64       
 2   Dew Point Temp_C  8784 non-null   float64       
 3   Rel Hum_%         8784 non-null   int64         
 4   Wind Speed_km/h   8784 non-null   int64         
 5   Visibility_km     8784 non-null   float64       
 6   Press_kPa         8784 non-null   float64       
 7   Weather           8784 non-null   object        
dtypes: datetime64[ns](1), float64(4), int64(2), object(1)
memory usage: 549.1+ KB
```

In [13]:

```
df.columns
```

Out[13]:

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

In [15]:

```
df.dtypes
```

Out[15]:

```
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
```

In [16]:

```
# Here you can see Date/Time is in Object formate,. We need to change it to Date/Time forma
def change_into_datetime(col):
    df[col] = pd.to_datetime(df[col])

for i in ["Date/Time"]:
    change_into_datetime(i)
```

In [18]:

```
# Now you can see it changed into datetime formate
df.dtypes
```

Out[18]:

```
Date/Time           datetime64[ns]
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
```

In [19]:

```
# See total unique value in Weather columns
df["Weather"].unique()
```

Out[19]:

```
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)
```

In [21]:

```
# Count total number of unique value in Weather columns
df["Weather"].nunique()
```

Out[21]:

```
50
```

In [25]:

```
# See total number of unique value with count
df["Weather"].value_counts()
```

Out[25]:

```
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: Weather, dtype: int64
```

In [22]:

```
# See totla number of unique value in all columns
df.nunique()
```

Out[22]:

```
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
```

In [23]:

```
# See total number of non null value in this dataframe
df.count()
```

Out[23]:

```
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
```

In [24]:

```
df.shape
```

Out[24]:

```
(8784, 8)
```

In [27]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8784 entries, 0 to 8783
Data columns (total 8 columns):
 #   Column            Non-Null Count  Dtype         
---  ------            --------------  -----         
 0   Date/Time         8784 non-null   datetime64[ns]
 1   Temp_C            8784 non-null   float64       
 2   Dew Point Temp_C  8784 non-null   float64       
 3   Rel Hum_%         8784 non-null   int64         
 4   Wind Speed_km/h   8784 non-null   int64         
 5   Visibility_km     8784 non-null   float64       
 6   Press_kPa         8784 non-null   float64       
 7   Weather           8784 non-null   object        
dtypes: datetime64[ns](1), float64(4), int64(2), object(1)
memory usage: 549.1+ KB
```

Q/ Find all the unique "Wind Speed" value in the data

In [29]:

```
df.head(2)
```

Out[29]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	2012-01-01 00:00:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	2012-01-01 01:00:00	-1.8	-3.7	87	4	8.0	101.24	Fog

In [30]:

```
df.nunique()
```

Out[30]:

```
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
```

In [32]:

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

Out[32]:

```
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],
      dtype=int64)
```

In [33]:

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

Out[33]:

```
34
```

Q/ Find the number of times when the "Wether is exactly clear"

In [34]:

```
df.head(2)
```

Out[34]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	2012-01-01 00:00:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	2012-01-01 01:00:00	-1.8	-3.7	87	4	8.0	101.24	Fog

In [39]:

```
# using value_count()
df["Weather"].value_counts()
```

Out[39]:

```
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: Weather, dtype: int64
```

In [45]:

```
# Using filtering
df[df.Weather == "Clear"].head()
```

Out[45]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
67	2012-01-03 19:00:00	-16.9	-24.8	50	24	25.0	101.74	Clear
114	2012-01-05 18:00:00	-7.1	-14.4	56	11	25.0	100.71	Clear
115	2012-01-05 19:00:00	-9.2	-15.4	61	7	25.0	100.80	Clear
116	2012-01-05 20:00:00	-9.8	-15.7	62	9	25.0	100.83	Clear
117	2012-01-05 21:00:00	-9.0	-14.8	63	13	25.0	100.83	Clear

In [46]:

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

Out[46]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
67	2012-01-03 19:00:00	-16.9	-24.8	50	24	25.0	101.74	Clear
114	2012-01-05 18:00:00	-7.1	-14.4	56	11	25.0	100.71	Clear
115	2012-01-05 19:00:00	-9.2	-15.4	61	7	25.0	100.80	Clear
116	2012-01-05 20:00:00	-9.8	-15.7	62	9	25.0	100.83	Clear
117	2012-01-05 21:00:00	-9.0	-14.8	63	13	25.0	100.83	Clear
...	...	...	...	...	...	...	...	...
8646	2012-12-26 06:00:00	-13.4	-14.8	89	4	25.0	102.47	Clear
8698	2012-12-28 10:00:00	-6.1	-8.6	82	19	24.1	101.27	Clear
8713	2012-12-29 01:00:00	-11.9	-13.6	87	11	25.0	101.31	Clear
8714	2012-12-29 02:00:00	-11.8	-13.1	90	13	25.0	101.33	Clear
8756	2012-12-30 20:00:00	-13.8	-16.5	80	24	25.0	101.52	Clear

1326 rows × 8 columns

Q/ Find the number of times when the "Wind speed was exactly 4 km/hr"

In [48]:

```
df.groupby("Wind Speed_km/h").get_group(4)
```

Out[48]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	2012-01-01 00:00:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	2012-01-01 01:00:00	-1.8	-3.7	87	4	8.0	101.24	Fog
96	2012-01-05 00:00:00	-8.8	-11.7	79	4	9.7	100.32	Snow
101	2012-01-05 05:00:00	-7.0	-9.5	82	4	4.0	100.19	Snow
146	2012-01-07 02:00:00	-8.1	-11.1	79	4	19.3	100.15	Cloudy
...	...	...	...	...	...	...	...	...
8768	2012-12-31 08:00:00	-8.6	-10.3	87	4	3.2	101.14	Snow Showers
8769	2012-12-31 09:00:00	-8.1	-9.6	89	4	2.4	101.09	Snow
8770	2012-12-31 10:00:00	-7.4	-8.9	89	4	6.4	101.05	Snow,Fog
8772	2012-12-31 12:00:00	-5.8	-7.5	88	4	12.9	100.78	Snow
8773	2012-12-31 13:00:00	-4.6	-6.6	86	4	12.9	100.63	Snow

474 rows × 8 columns

Q/ Find out All null value in data

In [50]:

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

Out[50]:

```
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 [51]:

```
df.notnull().sum()
```

Out[51]:

```
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
```

Q/ Rename the column name "Weather of the dataframe" to Weather condition

In [52]:

```
df.head(2)
```

Out[52]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	2012-01-01 00:00:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	2012-01-01 01:00:00	-1.8	-3.7	87	4	8.0	101.24	Fog

In [53]:

```
df.rename(columns={"Weather":"Weather condition"}, inplace = True)
```

In [54]:

```
df.head(2)
```

Out[54]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
0	2012-01-01 00:00:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	2012-01-01 01:00:00	-1.8	-3.7	87	4	8.0	101.24	Fog

Q/ What is the mean Visibility?

In [56]:

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

Out[56]:

```
27.66444672131151
```

Q/ What is the standard deviation of "Pressure" in this data

In [61]:

```
# This formate is used, if there is no space in columns name
df.Press_kPa.std()
```

Out[61]:

```
0.8440047459486474
```

Q/ What is the variance of "Relative Humidity"

In [58]:

```
df.head(2)
```

Out[58]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
0	2012-01-01 00:00:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	2012-01-01 01:00:00	-1.8	-3.7	87	4	8.0	101.24	Fog

In [62]:

```
# This formate is used, if there is space in columns name
df["Rel Hum_%"].var()
```

Out[62]:

```
286.2485501984998
```

Q/ Find all instance when "Snow" was recorded

In [64]:

```
df[df["Weather condition"] == "Snow"]
```

Out[64]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
55	2012-01-03 07:00:00	-14.0	-19.5	63	19	25.0	100.95	Snow
84	2012-01-04 12:00:00	-13.7	-21.7	51	11	24.1	101.25	Snow
86	2012-01-04 14:00:00	-11.3	-19.0	53	7	19.3	100.97	Snow
87	2012-01-04 15:00:00	-10.2	-16.3	61	11	9.7	100.89	Snow
88	2012-01-04 16:00:00	-9.4	-15.5	61	13	19.3	100.79	Snow
...	...	...	...	...	...	...	...	...
8779	2012-12-31 19:00:00	0.1	-2.7	81	30	9.7	100.13	Snow
8780	2012-12-31 20:00:00	0.2	-2.4	83	24	9.7	100.03	Snow
8781	2012-12-31 21:00:00	-0.5	-1.5	93	28	4.8	99.95	Snow
8782	2012-12-31 22:00:00	-0.2	-1.8	89	28	9.7	99.91	Snow
8783	2012-12-31 23:00:00	0.0	-2.1	86	30	11.3	99.89	Snow

390 rows × 8 columns

Q/ Find all instance when "Wind Speed is above 24" and visivility is 25

In [69]:

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

Out[69]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
23	2012-01-01 23:00:00	5.3	2.0	79	30	25.0	99.31	Cloudy
24	2012-01-02 00:00:00	5.2	1.5	77	35	25.0	99.26	Rain Showers
25	2012-01-02 01:00:00	4.6	0.0	72	39	25.0	99.26	Cloudy
26	2012-01-02 02:00:00	3.9	-0.9	71	32	25.0	99.26	Mostly Cloudy
27	2012-01-02 03:00:00	3.7	-1.5	69	33	25.0	99.30	Mostly Cloudy
...	...	...	...	...	...	...	...	...
8705	2012-12-28 17:00:00	-8.6	-12.0	76	26	25.0	101.34	Mainly Clear
8753	2012-12-30 17:00:00	-12.1	-15.8	74	28	25.0	101.26	Mainly Clear
8755	2012-12-30 19:00:00	-13.4	-16.5	77	26	25.0	101.47	Mainly Clear
8759	2012-12-30 23:00:00	-12.1	-15.1	78	28	25.0	101.52	Mostly Cloudy
8760	2012-12-31 00:00:00	-11.1	-14.4	77	26	25.0	101.51	Cloudy

308 rows × 8 columns

Q/ What is the minimum & maxmium value of each column against each "Weather condition"

In [73]:

```
df.groupby("Weather condition").mean()  # min(), max() can also be used
```

Out[73]:

Weather condition	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kl
Clear	6.825716	0.089367	64.497738	10.557315	30.153243	101.5874
Cloudy	7.970544	2.375810	69.592593	16.127315	26.625752	100.9114
Drizzle	7.353659	5.504878	88.243902	16.097561	17.931707	100.4353
Drizzle,Fog	8.067500	7.033750	93.275000	11.862500	5.257500	100.7866
Drizzle,Ice Pellets,Fog	0.400000	-0.700000	92.000000	20.000000	4.000000	100.7900
Drizzle,Snow	1.050000	0.150000	93.500000	14.000000	10.500000	100.8900
Drizzle,Snow,Fog	0.693333	0.120000	95.866667	15.533333	5.513333	99.2813
Fog	4.303333	3.159333	92.286667	7.946667	6.248000	101.1840
Freezing Drizzle	-5.657143	-8.000000	83.571429	16.571429	9.200000	100.2028
Freezing Drizzle,Fog	-2.533333	-4.183333	88.500000	17.000000	5.266667	100.4416
Freezing Drizzle,Haze	-5.433333	-8.000000	82.000000	10.333333	2.666667	100.3166
Freezing Drizzle,Snow	-5.109091	-7.072727	86.090909	16.272727	5.872727	100.5209
Freezing Fog	-7.575000	-9.250000	87.750000	4.750000	0.650000	102.3200
Freezing Rain	-3.885714	-6.078571	84.642857	19.214286	8.242857	99.6471
Freezing Rain,Fog	-2.225000	-3.750000	89.500000	15.500000	7.550000	99.9450
Freezing Rain,Haze	-4.900000	-7.450000	82.500000	7.500000	2.400000	100.3750
Freezing Rain,Ice Pellets,Fog	-2.600000	-3.700000	92.000000	28.000000	8.000000	100.9500
Freezing Rain,Snow Grains	-5.000000	-7.300000	84.000000	32.000000	4.800000	98.5600
Haze	-0.200000	-2.975000	81.625000	10.437500	7.831250	101.4825
Mainly Clear	12.558927	4.581671	60.667142	14.144824	34.264862	101.2488
Moderate Rain,Fog	1.700000	0.800000	94.000000	17.000000	6.400000	99.9800
Moderate Snow	-5.525000	-7.250000	87.750000	33.750000	0.750000	100.2750
Moderate Snow,Blowing Snow	-5.450000	-6.500000	92.500000	40.000000	0.600000	100.5700
Mostly Cloudy	10.574287	3.131174	62.102465	15.813920	31.253842	101.0252
Rain	9.786275	7.042810	83.624183	19.254902	18.856536	100.2333
Rain Showers	13.722340	9.187766	75.159574	17.132979	22.816489	100.4040
Rain Showers,Fog	12.800000	12.100000	96.000000	13.000000	6.400000	99.8300
Rain Showers,Snow Showers	2.150000	-1.500000	76.500000	22.500000	21.700000	101.1000
Rain,Fog	8.273276	7.219828	93.189655	14.793103	6.873276	100.5008
Rain,Haze	4.633333	2.066667	83.333333	11.666667	6.700000	100.5400
Rain,Ice Pellets	0.600000	-0.600000	92.000000	24.000000	9.700000	100.1200

Weather condition	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kl
Rain,Snow	1.055556	-0.566667	89.000000	28.388889	11.672222	99.9511
Rain,Snow Grains	1.900000	-2.100000	75.000000	26.000000	25.000000	100.6000
Rain,Snow,Fog	0.800000	0.300000	96.000000	9.000000	6.400000	100.7300
Rain,Snow,Ice Pellets	1.100000	-0.175000	91.500000	23.250000	6.000000	100.1050
Snow	-4.524103	-7.623333	79.307692	20.038462	11.171795	100.5361
Snow Pellets	0.700000	-6.400000	59.000000	35.000000	2.400000	99.7000
Snow Showers	-3.506667	-7.866667	72.350000	19.233333	20.158333	100.9635
Snow Showers,Fog	-10.675000	-11.900000	90.750000	13.750000	7.025000	101.2925
Snow,Blowing Snow	-5.410526	-7.621053	84.473684	34.842105	4.105263	99.7047
Snow,Fog	-5.075676	-6.364865	90.675676	17.324324	4.537838	100.6886
Snow,Haze	-4.020000	-6.860000	80.600000	5.000000	4.640000	100.7820
Snow,Ice Pellets	-1.883333	-3.666667	87.666667	23.833333	7.416667	100.5483
Thunderstorms	24.150000	19.750000	77.000000	7.500000	24.550000	100.2300
Thunderstorms,Heavy Rain Showers	10.900000	9.000000	88.000000	9.000000	2.400000	100.2600
Thunderstorms,Moderate Rain Showers,Fog	19.600000	18.500000	93.000000	15.000000	3.200000	100.0100
Thunderstorms,Rain	20.433333	18.533333	89.000000	15.666667	19.833333	100.4200
Thunderstorms,Rain Showers	20.037500	17.618750	86.375000	18.312500	15.893750	100.2337
Thunderstorms,Rain Showers,Fog	21.600000	18.700000	84.000000	19.666667	9.700000	100.0633
Thunderstorms,Rain,Fog	20.600000	18.600000	88.000000	19.000000	4.800000	100.0800

Q/ Show all the record where weather condition is Fog

In [74]:

```
df.head(2)
```

Out[74]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
0	2012-01-01 00:00:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	2012-01-01 01:00:00	-1.8	-3.7	87	4	8.0	101.24	Fog

In [78]:

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

Out[78]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
0	2012-01-01 00:00:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	2012-01-01 01:00:00	-1.8	-3.7	87	4	8.0	101.24	Fog
4	2012-01-01 04:00:00	-1.5	-3.3	88	7	4.8	101.23	Fog
5	2012-01-01 05:00:00	-1.4	-3.3	87	9	6.4	101.27	Fog
6	2012-01-01 06:00:00	-1.5	-3.1	89	7	6.4	101.29	Fog
...	...	...	...	...	...	...	...	...
8716	2012-12-29 04:00:00	-16.0	-17.2	90	6	9.7	101.25	Fog
8717	2012-12-29 05:00:00	-14.8	-15.9	91	4	6.4	101.25	Fog
8718	2012-12-29 06:00:00	-13.8	-15.3	88	4	9.7	101.25	Fog
8719	2012-12-29 07:00:00	-14.8	-16.4	88	7	8.0	101.22	Fog
8722	2012-12-29 10:00:00	-12.0	-13.3	90	7	6.4	101.15	Fog

150 rows × 8 columns

Q/ Find all instance when "Weather is clear" or "Visivility is above 40"

In [83]:

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

Out[83]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
67	2012-01-03 19:00:00	-16.9	-24.8	50	24	25.0	101.74	Clear
106	2012-01-05 10:00:00	-6.0	-10.0	73	17	48.3	100.45	Mainly Clear
107	2012-01-05 11:00:00	-5.6	-10.2	70	22	48.3	100.41	Mainly Clear
108	2012-01-05 12:00:00	-4.7	-9.6	69	20	48.3	100.38	Mainly Clear
109	2012-01-05 13:00:00	-4.4	-9.7	66	26	48.3	100.40	Mainly Clear

Type *Markdown* and LaTeX: α^2