In [2]:
```python
# Read data
import pandas as pd
data = pd.read_csv(r"C:\Users\17293\Downloads\1. Weather Data.csv")
data
```

Out[2]:

	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
...	...	...	...	...	...	...	...	...
8779	12/31/2012 19:00	0.1	-2.7	81	30	9.7	100.13	Snow
8780	12/31/2012 20:00	0.2	-2.4	83	24	9.7	100.03	Snow
8781	12/31/2012 21:00	-0.5	-1.5	93	28	4.8	99.95	Snow
8782	12/31/2012 22:00	-0.2	-1.8	89	28	9.7	99.91	Snow
8783	12/31/2012 23:00	0.0	-2.1	86	30	11.3	99.89	Snow

8784 rows × 8 columns

In [3]:
```python
# Analyze DataFrames
# First 5 rows in the data
data.head()
```

Out[3]:

	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 [4]:
```python
# No. of rows and No. of columns of the df
data.shape
```

Out[4]: (8784, 8)

In [5]:
```python
# Index
data.index
```

Out[5]: RangeIndex(start=0, stop=8784, step=1)

In [6]:
```python
# Columns
data.columns
```

Out[6]: Index(['Date/Time', 'Temp_C', 'Dew Point Temp_C', 'Rel Hum_%',
       'Wind Speed_km/h', 'Visibility_km', 'Press_kPa', 'Weather'],
      dtype='object')

In [7]:
```python
# Data-type
data.dtypes
```

Out[7]:
```
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 [8]:
```python
# Unique values
data['Weather'].unique()
```

Out[8]:
```
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 [9]:
```python
# Numbers of unique values
data.nunique()
```

Out[9]:
```
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 [10]:
```python
# Number of non-null values
data.count()
```

Out[10]:
```
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 [11]: `# All unique values with their count`
`data['Weather'].value_counts()`

Out[11]:
```
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 [12]:
```python
data.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   object
 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: float64(4), int64(2), object(2)
memory usage: 549.1+ KB
```

In [13]:
```python
# All unique 'Wind Speed' values in the data
data.head(2)
```

Out[13]:

	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

In [15]:
```python
data['Wind Speed_km/h'].nunique()
```

Out[15]: 34

In [17]:
```python
data['Wind Speed_km/h'].unique()
```

Out[17]:
```
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 [18]:
```python
# Number of times when the 'Weather is exactly Clear'
data.head(2)
```

Out[18]:

	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

In [19]:
```python
# value_counts()
data.Weather.value_counts()
```

Out[19]:
```
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]: `# Filtering`
`data[data.Weather == 'Clear']`

Out[22]:

	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
114	1/5/2012 18:00	-7.1	-14.4	56	11	25.0	100.71	Clear
115	1/5/2012 19:00	-9.2	-15.4	61	7	25.0	100.80	Clear
116	1/5/2012 20:00	-9.8	-15.7	62	9	25.0	100.83	Clear
117	1/5/2012 21:00	-9.0	-14.8	63	13	25.0	100.83	Clear
...	...	...	...	...	...	...	...	...
8646	12/26/2012 6:00	-13.4	-14.8	89	4	25.0	102.47	Clear
8698	12/28/2012 10:00	-6.1	-8.6	82	19	24.1	101.27	Clear
8713	12/29/2012 1:00	-11.9	-13.6	87	11	25.0	101.31	Clear
8714	12/29/2012 2:00	-11.8	-13.1	90	13	25.0	101.33	Clear
8756	12/30/2012 20:00	-13.8	-16.5	80	24	25.0	101.52	Clear

1326 rows × 8 columns

In [23]: `# groupby()`
`data.groupby('Weather').get_group('Clear')`

Out[23]:

	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
114	1/5/2012 18:00	-7.1	-14.4	56	11	25.0	100.71	Clear
115	1/5/2012 19:00	-9.2	-15.4	61	7	25.0	100.80	Clear
116	1/5/2012 20:00	-9.8	-15.7	62	9	25.0	100.83	Clear
117	1/5/2012 21:00	-9.0	-14.8	63	13	25.0	100.83	Clear
...	...	...	...	...	...	...	...	...
8646	12/26/2012 6:00	-13.4	-14.8	89	4	25.0	102.47	Clear
8698	12/28/2012 10:00	-6.1	-8.6	82	19	24.1	101.27	Clear
8713	12/29/2012 1:00	-11.9	-13.6	87	11	25.0	101.31	Clear
8714	12/29/2012 2:00	-11.8	-13.1	90	13	25.0	101.33	Clear
8756	12/30/2012 20:00	-13.8	-16.5	80	24	25.0	101.52	Clear

1326 rows × 8 columns

In [24]:
```python
# number of times when the 'Wind Speed was exactly 4 km/h'
data[data['Wind Speed_km/h']==4]
```

	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
96	1/5/2012 0:00	-8.8	-11.7	79	4	9.7	100.32	Snow
101	1/5/2012 5:00	-7.0	-9.5	82	4	4.0	100.19	Snow
146	1/7/2012 2:00	-8.1	-11.1	79	4	19.3	100.15	Cloudy
...	...	...	...	...	...	...	...	...
8768	12/31/2012 8:00	-8.6	-10.3	87	4	3.2	101.14	Snow Showers
8769	12/31/2012 9:00	-8.1	-9.6	89	4	2.4	101.09	Snow

In [26]:
```python
# Null Values in teh data
data.isnull().sum()
```

Out[26]:
```
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 [27]:
```python
data.notnull().sum()
```

Out[27]:
```
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 [36]:
```python
# rename the column name 'Weather' of the dataframe to 'Weather Condition'
data.rename(columns = {'Weather' : 'Weather Condition'}, inplace =True)
```

In [37]:
```python
data.head()
```

Out[37]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
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 [38]:
```python
# mean of 'Visibility '
data.Visibility_km.mean()
```

Out[38]: 27.66444672131151

In [39]:
```python
# standard deviation of 'Pressure'
data.Press_kPa.std()
```

Out[39]: 0.8440047459486474

In [40]:
```python
# Variance of 'Relative Humidity'
data['Rel Hum_%'].var()
```

Out[40]: 286.2485501984998

In [41]:
```python
# All instances when 'Snow' was recorded
#value_counts()
data['Weather Condition'].value_counts()
```

Out[41]:
```
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 Condition, dtype: int64
```

In [49]:
```python
# filtering
data[data['Weather Condition'] == 'Snow']
```

Out[49]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
55	1/3/2012 7:00	-14.0	-19.5	63	19	25.0	100.95	Snow
84	1/4/2012 12:00	-13.7	-21.7	51	11	24.1	101.25	Snow
86	1/4/2012 14:00	-11.3	-19.0	53	7	19.3	100.97	Snow
87	1/4/2012 15:00	-10.2	-16.3	61	11	9.7	100.89	Snow
88	1/4/2012 16:00	-9.4	-15.5	61	13	19.3	100.79	Snow
...	...	...	...	...	...	...	...	...
8779	12/31/2012 19:00	0.1	-2.7	81	30	9.7	100.13	Snow
8780	12/31/2012 20:00	0.2	-2.4	83	24	9.7	100.03	Snow
8781	12/31/2012 21:00	-0.5	-1.5	93	28	4.8	99.95	Snow
8782	12/31/2012 22:00	-0.2	-1.8	89	28	9.7	99.91	Snow
8783	12/31/2012 23:00	0.0	-2.1	86	30	11.3	99.89	Snow

390 rows × 8 columns

In [54]: `# str.contains`
`data[data['Weather Condition'].str.contains('Snow')].tail(50)`

Out[54]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
8680	12/27/2012 16:00	-4.5	-6.2	88	37	2.0	100.44	Snow,Blowing Snow
8681	12/27/2012 17:00	-4.2	-5.9	88	32	3.2	100.47	Snow,Blowing Snow
8682	12/27/2012 18:00	-4.0	-5.7	88	28	8.0	100.49	Snow,Blowing Snow
8683	12/27/2012 19:00	-3.9	-5.6	88	26	9.7	100.52	Snow,Blowing Snow
8684	12/27/2012 20:00	-3.7	-5.3	89	37	16.1	100.58	Snow
8685	12/27/2012 21:00	-3.7	-4.8	92	24	4.8	100.62	Freezing Drizzle,Snow

In [55]: `# all instances when 'Wind Speed is above 24' and 'Visibility is 25'`
`data.head(2)`

Out[55]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
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

In [57]: `data[(data['Wind Speed_km/h']>24)&(data['Visibility_km'] == 25)]`

Out[57]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
23	1/1/2012 23:00	5.3	2.0	79	30	25.0	99.31	Cloudy
24	1/2/2012 0:00	5.2	1.5	77	35	25.0	99.26	Rain Showers
25	1/2/2012 1:00	4.6	0.0	72	39	25.0	99.26	Cloudy
26	1/2/2012 2:00	3.9	-0.9	71	32	25.0	99.26	Mostly Cloudy
27	1/2/2012 3:00	3.7	-1.5	69	33	25.0	99.30	Mostly Cloudy
...	...	...	...	...	...	...	...	...
8705	12/28/2012 17:00	-8.6	-12.0	76	26	25.0	101.34	Mainly Clear
8753	12/30/2012 17:00	-12.1	-15.8	74	28	25.0	101.26	Mainly Clear
8755	12/30/2012 19:00	-13.4	-16.5	77	26	25.0	101.47	Mainly Clear
8759	12/30/2012 23:00	-12.1	-15.1	78	28	25.0	101.52	Mostly Cloudy
8760	12/31/2012 0:00	-11.1	-14.4	77	26	25.0	101.51	Cloudy

308 rows × 8 columns

In [58]: `# Mean value of each column against each 'Weather Conditon'`
`data.groupby('Weather Condition').mean()`

Out[58]:

Weather Condition	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa
Clear	6.825716	0.089367	64.497738	10.557315	30.153243	101.587443
Cloudy	7.970544	2.375810	69.592593	16.127315	26.625752	100.911441
Drizzle	7.353659	5.504878	88.243902	16.097561	17.931707	100.435366
Drizzle,Fog	8.067500	7.033750	93.275000	11.862500	5.257500	100.786625
Drizzle,Ice Pellets,Fog	0.400000	-0.700000	92.000000	20.000000	4.000000	100.790000
Drizzle,Snow	1.050000	0.150000	93.500000	14.000000	10.500000	100.890000
Drizzle,Snow,Fog	0.693333	0.120000	95.866667	15.533333	5.513333	99.281333
Fog	4.303333	3.159333	92.286667	7.946667	6.248000	101.184067
Freezing Drizzle	-5.657143	-8.000000	83.571429	16.571429	9.200000	100.202857
Freezing Drizzle,Fog	-2.533333	-4.183333	88.500000	17.000000	5.266667	100.441667
Freezing Drizzle,Haze	-5.433333	-8.000000	82.000000	10.333333	2.666667	100.316667
Freezing Drizzle,Snow	-5.109091	-7.072727	86.090909	16.272727	5.872727	100.520909
Freezing Fog	-7.575000	-9.250000	87.750000	4.750000	0.650000	102.320000
Freezing Rain	-3.885714	-6.078571	84.642857	19.214286	8.242857	99.647143
Freezing Rain,Fog	-2.225000	-3.750000	89.500000	15.500000	7.550000	99.945000
Freezing Rain,Haze	-4.900000	-7.450000	82.500000	7.500000	2.400000	100.375000
Freezing Rain,Ice Pellets,Fog	-2.600000	-3.700000	92.000000	28.000000	8.000000	100.950000
Freezing Rain,Snow Grains	-5.000000	-7.300000	84.000000	32.000000	4.800000	98.560000
Haze	-0.200000	-2.975000	81.625000	10.437500	7.831250	101.482500
Mainly Clear	12.558927	4.581671	60.667142	14.144824	34.264862	101.248832
Moderate Rain,Fog	1.700000	0.800000	94.000000	17.000000	6.400000	99.980000
Moderate Snow	-5.525000	-7.250000	87.750000	33.750000	0.750000	100.275000
Moderate Snow,Blowing Snow	-5.450000	-6.500000	92.500000	40.000000	0.600000	100.570000
Mostly Cloudy	10.574287	3.131174	62.102465	15.813920	31.253842	101.025288
Rain	9.786275	7.042810	83.624183	19.254902	18.856536	100.233333
Rain Showers	13.722340	9.187766	75.159574	17.132979	22.816489	100.404043
Rain Showers,Fog	12.800000	12.100000	96.000000	13.000000	6.400000	99.830000
Rain Showers,Snow Showers	2.150000	-1.500000	76.500000	22.500000	21.700000	101.100000
Rain,Fog	8.273276	7.219828	93.189655	14.793103	6.873276	100.500862
Rain,Haze	4.633333	2.066667	83.333333	11.666667	6.700000	100.540000

Weather Condition	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa
Rain,Ice Pellets	0.600000	-0.600000	92.000000	24.000000	9.700000	100.120000
Rain,Snow	1.055556	-0.566667	89.000000	28.388889	11.672222	99.951111
Rain,Snow Grains	1.900000	-2.100000	75.000000	26.000000	25.000000	100.600000
Rain,Snow,Fog	0.800000	0.300000	96.000000	9.000000	6.400000	100.730000
Rain,Snow,Ice Pellets	1.100000	-0.175000	91.500000	23.250000	6.000000	100.105000
Snow	-4.524103	-7.623333	79.307692	20.038462	11.171795	100.536103
Snow Pellets	0.700000	-6.400000	59.000000	35.000000	2.400000	99.700000
Snow Showers	-3.506667	-7.866667	72.350000	19.233333	20.158333	100.963500
Snow Showers,Fog	-10.675000	-11.900000	90.750000	13.750000	7.025000	101.292500
Snow,Blowing Snow	-5.410526	-7.621053	84.473684	34.842105	4.105263	99.704737
Snow,Fog	-5.075676	-6.364865	90.675676	17.324324	4.537838	100.688649
Snow,Haze	-4.020000	-6.860000	80.600000	5.000000	4.640000	100.782000
Snow,Ice Pellets	-1.883333	-3.666667	87.666667	23.833333	7.416667	100.548333
Thunderstorms	24.150000	19.750000	77.000000	7.500000	24.550000	100.230000
Thunderstorms,Heavy Rain Showers	10.900000	9.000000	88.000000	9.000000	2.400000	100.260000
Thunderstorms,Moderate Rain Showers,Fog	19.600000	18.500000	93.000000	15.000000	3.200000	100.010000
Thunderstorms,Rain	20.433333	18.533333	89.000000	15.666667	19.833333	100.420000
Thunderstorms,Rain Showers	20.037500	17.618750	86.375000	18.312500	15.893750	100.233750
Thunderstorms,Rain Showers,Fog	21.600000	18.700000	84.000000	19.666667	9.700000	100.063333
Thunderstorms,Rain,Fog	20.600000	18.600000	88.000000	19.000000	4.800000	100.080000

In [59]: *# min $ max value of each column against each 'Weather Condition'*
data.head()

Out[59]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
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 [62]: data.groupby('Weather Condition').min()

Out[62]:

Weather Condition	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Clear	1/11/2012 1:00	-23.3	-28.5	20	0	11.3	
Cloudy	1/1/2012 17:00	-21.4	-26.8	18	0	11.3	
Drizzle	1/23/2012 21:00	1.1	-0.2	74	0	6.4	
Drizzle,Fog	1/23/2012 20:00	0.0	-1.6	85	0	1.0	
Drizzle,Ice Pellets,Fog	12/17/2012 9:00	0.4	-0.7	92	20	4.0	
Drizzle,Snow	12/17/2012	0.9	0.1	92	9	9.7	

In [63]: `data.groupby('Weather Condition').max()`

Weather Condition	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km
Moderate Snow	12/27/2012 9:00	-4.9	-6.0	93	39	0.8
Moderate Snow,Blowing Snow	12/27/2012 12:00	-5.4	-6.4	93	41	0.6
Mostly Cloudy	9/9/2012 2:00	32.4	24.4	100	83	48.3
Rain	9/5/2012 2:00	22.8	20.4	99	52	48.3
Rain Showers	9/8/2012 16:00	26.4	23.0	97	41	48.3
Rain Showers,Fog	10/20/2012 3:00	12.8	12.1	96	13	6.4
Rain Showers,Snow Showers	12/5/2012 10:00	2.2	-1.2	78	28	24.1
Rain,Fog	9/30/2012 23:00	21.7	19.5	100	46	9.7
	3/13/2012					

In [64]:
```python
# all the records where weather condition is fog
data[data['Weather Condition'] == 'Fog']
```

Out[64]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
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

In [68]:
```python
# all instances when 'Weather is Clear' or 'Visibility is above 40'
data[(data['Weather Condition'] == 'Clear') | (data['Visibility_km']>40)]
```

Out[68]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
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

In [72]: `# (weather is clear and relative humidity is greater than 50) or (visibility is `
`data[(data['Weather Condition'] == 'Clear') & (data['Rel Hum_%']>50) | (data['Vis`

Out[72]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
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
110	1/5/2012 14:00	-5.1	-10.7	65	22	48.3	100.46	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

2921 rows × 8 columns