

Weather data Analysis

In [52]: `'''The Weather Dataset`

The Weather dataset is a time-Series data set with per-hour information about the weather conditions at a particular location. It records Temperature, Dew point Temperature, Relative Humidity, Wind Speed, Visibility, Pressure and conditions.

This data is available as a csv file. We are going to analyze this data set using the Pandas dataframe.

`'''`

Out[52]: `'The Weather Dataset\n\nThe Weather dataset is a time-Series data set with per-hour information about\nthe weather conditions at a particular location. It records Temperature,\nDew point Temperature, Relative Humidity, Wind Speed, V\nisibility,Pressure and\nconditions.\n\nThis data is available as a csv file.W\ne are going to analyze this data set\nusing the Pandas dataframe.\n'`

In [53]: `import pandas as pd`

In [54]: `data = pd.read_csv('weather.csv')`

In [55]: `data.head()`

Out[55]:

	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 [56]: `# .shape (shows the no. of rows and columns in a dataframe)`

`data.shape`

Out[56]: `(8784, 8)`

```
In [57]: # .index (The attribute provides the index of the dataframe)
```

```
data.index
```

```
Out[57]: RangeIndex(start=0, stop=8784, step=1)
```

```
In [58]: # .columns (It shows the name of each column)
```

```
data.columns
```

```
Out[58]: Index(['Date/Time', 'Temp_C', 'Dew Point Temp_C', 'Rel Hum_%',  
               'Wind Speed_km/h', 'Visibility_km', 'Press_kPa', 'Weather'],  
               dtype='object')
```

```
In [59]: # .dtypes (It shows the data type of each column)
```

```
data.dtypes
```

```
Out[59]: 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 [60]: # .unique() In a column, it shows all the unique values. It can be applied  
# on a single column only, not on the whole dataframe.
```

```
data['Weather'].unique()
```

```
Out[60]: 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 [61]: *# .nunique() it shows the total no of unique values in each column. It can be a # a single column as well as on whole dataframe*

```
data.nunique()
```

Out[61]:

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 [62]: *# .count (It shows the total no of non-null values in each column. #It can be applied on single column as well as on whole dataframe.)*

```
data.count()
```

Out[62]:

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 [63]: *# .value_counts (In a column, it shows all the unique values with their count
It can be applied on a single column only.*

```
data['Weather'].value_counts()
```

Out[63]:

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 [64]: `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
```

Q)1. Find all the unique 'Wind Speed' values in the data

In [65]: `data['Wind Speed_km/h'].nunique()`

Out[65]: 34

In [66]: `data['Wind Speed_km/h'].unique() # Answer`

Out[66]: `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)`

Q) 2. Find the number of times when the weather is exactly clear.

In [67]: `data.head(3)`

Out[67]:

	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

```
In [21]: # value_counts()  
data.Weather.value_counts()
```

```
Out[21]: 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 [23]: # Filtering

```
data.head(2)
data[data.Weather == '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 [25]: # groupby()
data.head()
data.groupby('Weather').get_group('Clear')
```

Out[25]:

	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

Q)3 Find the number of times when the 'Wind Speed was exactly 4 km/hr'

In [27]: `data.head(2)`

```
# Filterings
data[data['Wind Speed_km/h'] == 4]
```

Out[27]:

	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
8770	12/31/2012 10:00	-7.4	-8.9	89	4	6.4	101.05	Snow,Fog
8772	12/31/2012 12:00	-5.8	-7.5	88	4	12.9	100.78	Snow
8773	12/31/2012 13:00	-4.6	-6.6	86	4	12.9	100.63	Snow

474 rows × 8 columns

In [29]: # groupby

```
data.head(2)
data.groupby('Wind Speed_km/h').get_group(4)
```

Out[29]:

	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
8770	12/31/2012 10:00	-7.4	-8.9	89	4	6.4	101.05	Snow,Fog
8772	12/31/2012 12:00	-5.8	-7.5	88	4	12.9	100.78	Snow
8773	12/31/2012 13:00	-4.6	-6.6	86	4	12.9	100.63	Snow

474 rows × 8 columns

Q)4 Find out all the null values in the data

In [30]: data.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 [31]: `data.notnull().sum()`

Out[31]:

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)5 Rename the column name 'Weather' of the dataframe to 'Weather Condition'

In [32]: `data.head(2)`

Out[32]:

	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 [34]: # Here data is temporarily renamed for this line of code not in ori_data
`data.rename(columns = {'Weather' : 'Weather Condition'})`

Out[34]:

	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
...
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 [35]: # If we want to rename the data permanently in the dataframe

`data.rename(columns = {'Weather' : 'Weather Condition'}, inplace = True)`

In [36]: data

Out[36]:

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

Q)6 What is the mean 'Visibility'?

In [37]: data.head(2)

Out[37]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Conditon
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 [38]: data.Visibility_km.mean()

Out[38]: 27.664446721311478

Q)7 What is the Standard Deviation of 'Pressure' in the data?

In [40]: `data.head(2)`

Out[40]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Conditon
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 [41]: `data.Press_kPa.std()`

Out[41]: 0.8440047459486474

Q)8. What is the Variance of 'Relative Humidity' in this data?

In [42]: `data['Rel Hum_%'].var()`

Out[42]: 286.2485501984998

Q)9 Find all the instances when 'Snow' was recorded.

```
In [71]: # value_counts()
data.head(2)
data['Weather'].value_counts()
```

```
Out[71]: 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 [73]: #Filtering

```
data.head(2)
data[data['Weather'] == 'Snow']
```

Out[73]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
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 [75]: `#str.contains``data[data['Weather'].str.contains('Snow')].tail(20)`

Out[75]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
8740	12/30/2012 4:00	-9.3	-10.6	90	13	9.7	100.28	Snow,Fog
8741	12/30/2012 5:00	-9.1	-10.4	90	11	4.0	100.32	Snow,Fog
8742	12/30/2012 6:00	-9.3	-10.8	89	17	8.0	100.39	Snow,Fog
8767	12/31/2012 7:00	-9.3	-11.3	85	0	19.3	101.19	Snow Showers
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
8770	12/31/2012 10:00	-7.4	-8.9	89	4	6.4	101.05	Snow,Fog
8771	12/31/2012 11:00	-6.7	-7.9	91	9	9.7	100.93	Snow
8772	12/31/2012 12:00	-5.8	-7.5	88	4	12.9	100.78	Snow
8773	12/31/2012 13:00	-4.6	-6.6	86	4	12.9	100.63	Snow
8774	12/31/2012 14:00	-3.4	-5.7	84	6	11.3	100.57	Snow
8775	12/31/2012 15:00	-2.3	-4.6	84	9	9.7	100.47	Snow
8776	12/31/2012 16:00	-1.4	-4.0	82	13	12.9	100.40	Snow
8777	12/31/2012 17:00	-1.1	-3.3	85	19	9.7	100.30	Snow
8778	12/31/2012 18:00	-1.3	-3.1	88	17	9.7	100.19	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

Q)10 Find all the instances when 'Wind Speed is above 24 and 'Visibility is 25'

In [76]: `data.head(2) # use of & operator`

Out[76]:

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

Out[78]:

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

Q)11 What is the Mean value of each column against each 'Weather Condition'?

In [79]: `data.head(2)`

Out[79]:

	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 [80]: `data.groupby('Weather').mean()`

```
C:\Users\91958\AppData\Local\Temp\ipykernel_18708\3094402736.py:1: FutureWarning: The default value of numeric_only in DataFrameGroupBy.mean is deprecated. In a future version, numeric_only will default to False. Either specify numeric_only or select only columns which should be valid for the function.  
    data.groupby('Weather').mean()
```

Out[80]:

Weather	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kP
Clear	6.825716	0.089367	64.497738	10.557315	30.153243	101.58744
Cloudy	7.970544	2.375810	69.592593	16.127315	26.625752	100.91144
Drizzle	7.353659	5.504878	88.243902	16.097561	17.931707	100.43536
Drizzle,Fog	8.067500	7.033750	93.275000	11.862500	5.257500	100.78662
Drizzle,Ice Pellets,Fog	0.400000	-0.700000	92.000000	20.000000	4.000000	100.79000
Drizzle,Snow	1.050000	0.150000	93.500000	14.000000	10.500000	100.89000
Drizzle,Snow,Fog	0.693333	0.120000	95.866667	15.533333	5.513333	99.28133
Fog	4.303333	3.159333	92.286667	7.946667	6.248000	101.18406
Freezing Drizzle	-5.657143	-8.000000	83.571429	16.571429	9.200000	100.20285
Freezing Drizzle,Fog	-2.533333	-4.183333	88.500000	17.000000	5.266667	100.44166
Freezing Drizzle,Haze	-5.433333	-8.000000	82.000000	10.333333	2.666667	100.31666
Freezing Drizzle,Snow	-5.109091	-7.072727	86.090909	16.272727	5.872727	100.52090
Freezing Fog	-7.575000	-9.250000	87.750000	4.750000	0.650000	102.32000
Freezing Rain	-3.885714	-6.078571	84.642857	19.214286	8.242857	99.64714
Freezing Rain,Fog	-2.225000	-3.750000	89.500000	15.500000	7.550000	99.94500
Freezing Rain,Haze	-4.900000	-7.450000	82.500000	7.500000	2.400000	100.37500
Freezing Rain,Ice Pellets,Fog	-2.600000	-3.700000	92.000000	28.000000	8.000000	100.95000
Freezing Rain,Snow Grains	-5.000000	-7.300000	84.000000	32.000000	4.800000	98.56000
Haze	-0.200000	-2.975000	81.625000	10.437500	7.831250	101.48250
Mainly Clear	12.558927	4.581671	60.667142	14.144824	34.264862	101.24883
Moderate Rain,Fog	1.700000	0.800000	94.000000	17.000000	6.400000	99.98000
Moderate Snow	-5.525000	-7.250000	87.750000	33.750000	0.750000	100.27500
Moderate Snow,Blowing Snow	-5.450000	-6.500000	92.500000	40.000000	0.600000	100.57000
Mostly Cloudy	10.574287	3.131174	62.102465	15.813920	31.253842	101.02528
Rain	9.786275	7.042810	83.624183	19.254902	18.856536	100.23333
Rain Showers	13.722340	9.187766	75.159574	17.132979	22.816489	100.40404
Rain Showers,Fog	12.800000	12.100000	96.000000	13.000000	6.400000	99.83000
Rain Showers,Snow Showers	2.150000	-1.500000	76.500000	22.500000	21.700000	101.10000
Rain,Fog	8.273276	7.219828	93.189655	14.793103	6.873276	100.50086
Rain,Haze	4.633333	2.066667	83.333333	11.666667	6.700000	100.54000
Rain,Ice Pellets	0.600000	-0.600000	92.000000	24.000000	9.700000	100.12000
Rain,Snow	1.055556	-0.566667	89.000000	28.388889	11.672222	99.95111

	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kP
Weather						
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	100.536100
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	99.70473
Snow,Fog	-5.075676	-6.364865	90.675676	17.324324	4.537838	100.68864
Snow,Haze	-4.020000	-6.860000	80.600000	5.000000	4.640000	100.78200
Snow,Ice Pellets	-1.883333	-3.666667	87.666667	23.833333	7.416667	100.54833
Thunderstorms	24.150000	19.750000	77.000000	7.500000	24.550000	100.23000
Thunderstorms,Heavy Rain Showers	10.900000	9.000000	88.000000	9.000000	2.400000	100.26000
Thunderstorms,Moderate Rain Showers,Fog	19.600000	18.500000	93.000000	15.000000	3.200000	100.01000
Thunderstorms,Rain	20.433333	18.533333	89.000000	15.666667	19.833333	100.42000
Thunderstorms,Rain Showers	20.037500	17.618750	86.375000	18.312500	15.893750	100.23375
Thunderstorms,Rain Showers,Fog	21.600000	18.700000	84.000000	19.666667	9.700000	100.06333
Thunderstorms,Rain,Fog	20.600000	18.600000	88.000000	19.000000	4.800000	100.08000

Q)12. What is the Minimum & Maximum value of each column against each 'Weather Condition'?

In [81]: `data.head(2)`

Out[81]:

	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 [82]: `data.groupby("Weather").min()`

Out[82]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Weather							
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 15:00	0.9	0.1	92	9	9.7	
Drizzle,Snow,Fog	12/18/2012 21:00	0.3	-0.1	92	7	2.4	
Fog	1/1/2012 0:00	-16.0	-17.2	80	0	0.2	
Freezing Drizzle	1/13/2012 10:00	-9.0	-12.2	78	6	4.8	
Freezing Drizzle,Fog	1/1/2012 2:00	-6.4	-9.0	82	6	3.6	
Freezing Drizzle,Haze	2/1/2012 11:00	-5.8	-8.3	81	9	2.0	
Freezing Drizzle,Snow	1/13/2012 3:00	-8.3	-10.4	79	6	2.4	
Freezing Fog	1/22/2012 6:00	-19.0	-22.9	71	0	0.2	
Freezing Rain	1/13/2012 11:00	-6.5	-9.0	81	7	2.8	
Freezing Rain,Fog	1/17/2012 23:00	-6.1	-8.7	82	7	2.8	
Freezing Rain,Haze	2/1/2012 14:00	-4.9	-7.5	82	6	2.0	
Freezing Rain,Ice Pellets,Fog	12/17/2012 3:00	-2.6	-3.7	92	28	8.0	
Freezing Rain,Snow Grains	1/13/2012 9:00	-5.0	-7.3	84	32	4.8	
Haze	1/22/2012 12:00	-11.5	-16.0	68	0	4.8	
Mainly Clear	1/10/2012 11:00	-22.8	-28.0	20	0	12.9	
Moderate Rain,Fog	12/10/2012 8:00	1.7	0.8	94	17	6.4	
Moderate Snow	1/12/2012 15:00	-6.3	-7.6	83	26	0.6	

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Weather							
Moderate Snow,Blowing Snow	12/27/2012 10:00	-5.5	-6.6	92	39	0.6	
Mostly Cloudy	1/1/2012 16:00	-23.2	-28.5	18	0	11.3	
Rain	1/1/2012 18:00	0.3	-5.7	40	0	4.0	
Rain Showers	1/1/2012 22:00	1.6	-7.2	37	0	6.4	
Rain Showers,Fog	10/20/2012 3:00	12.8	12.1	96	13	6.4	
Rain Showers,Snow Showers	11/4/2012 8:00	2.1	-1.8	75	17	19.3	
Rain,Fog	1/23/2012 18:00	0.0	-1.2	83	0	2.0	
Rain,Haze	3/13/2012 7:00	4.0	1.0	81	7	4.0	
Rain,Ice Pellets	12/18/2012 5:00	0.6	-0.6	92	24	9.7	
Rain,Snow	1/10/2012 5:00	0.6	-1.7	81	13	2.4	
Rain,Snow Grains	12/21/2012 0:00	1.9	-2.1	75	26	25.0	
Rain,Snow,Fog	12/8/2012 21:00	0.8	0.3	96	9	6.4	
Rain,Snow,Ice Pellets	12/21/2012 1:00	0.9	-0.7	88	17	4.8	
Snow	1/10/2012 1:00	-16.7	-24.6	41	0	1.0	
Snow Pellets	11/24/2012 15:00	0.7	-6.4	59	35	2.4	
Snow Showers	1/12/2012 7:00	-13.3	-19.3	52	0	2.4	
Snow Showers,Fog	12/26/2012 9:00	-11.3	-12.7	89	7	4.0	
Snow,Blowing Snow	1/13/2012 21:00	-12.0	-16.2	70	24	0.6	
Snow,Fog	12/16/2012 15:00	-10.1	-12.0	77	4	1.2	
Snow,Haze	2/1/2012 17:00	-4.3	-7.2	80	0	4.0	
Snow,Ice Pellets	12/10/2012 3:00	-4.3	-5.9	76	19	2.8	
Thunderstorms	7/16/2012 1:00	21.6	19.4	67	0	24.1	

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Weather							
Thunderstorms,Heavy Rain Showers	5/29/2012 6:00	10.9	9.0	88	9	2.4	
Thunderstorms,Moderate Rain Showers,Fog	7/17/2012 6:00	19.6	18.5	93	15	3.2	
Thunderstorms,Rain	5/25/2012 20:00	19.4	18.2	83	4	16.1	
Thunderstorms,Rain Showers	5/29/2012 16:00	11.0	7.0	68	7	6.4	
Thunderstorms,Rain Showers,Fog	6/29/2012 3:00	19.5	16.1	80	7	9.7	
Thunderstorms,Rain,Fog	7/17/2012 5:00	20.6	18.6	88	19	4.8	

In [84]: `data.groupby("Weather").max()`

Out[84]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Weather							
Clear	9/9/2012 5:00	32.8	20.4	99	33	48.3	
Cloudy	9/9/2012 23:00	30.5	22.6	99	54	48.3	
Drizzle	9/30/2012 3:00	18.8	17.7	96	30	25.0	
Drizzle,Fog	9/30/2012 2:00	19.9	19.1	100	28	9.7	
Drizzle,Ice Pellets,Fog	12/17/2012 9:00	0.4	-0.7	92	20	4.0	
Drizzle,Snow	12/19/2012 18:00	1.2	0.2	95	19	11.3	
Drizzle,Snow,Fog	12/22/2012 3:00	1.1	0.6	98	32	9.7	
Fog	9/22/2012 0:00	20.8	19.6	100	22	9.7	
Freezing Drizzle	2/1/2012 5:00	-2.3	-3.3	93	26	12.9	
Freezing Drizzle,Fog	12/10/2012 5:00	-0.3	-2.3	94	33	8.0	
Freezing Drizzle,Haze	2/1/2012 13:00	-5.0	-7.7	83	11	4.0	
Freezing Drizzle,Snow	3/2/2012 12:00	-3.3	-4.6	94	24	12.9	
Freezing Fog	3/17/2012 6:00	-0.1	-0.3	99	9	0.8	
Freezing Rain	2/1/2012 7:00	0.3	-1.7	92	28	16.1	
Freezing Rain,Fog	12/17/2012 1:00	0.1	-0.9	93	26	9.7	
Freezing Rain,Haze	2/1/2012 15:00	-4.9	-7.4	83	9	2.8	
Freezing Rain,Ice Pellets,Fog	12/17/2012 3:00	-2.6	-3.7	92	28	8.0	
Freezing Rain,Snow Grains	1/13/2012 9:00	-5.0	-7.3	84	32	4.8	
Haze	3/13/2012 23:00	14.1	11.1	86	17	9.7	
Mainly Clear	9/9/2012 9:00	33.0	21.2	99	63	48.3	
Moderate Rain,Fog	12/10/2012 8:00	1.7	0.8	94	17	6.4	
Moderate Snow	12/27/2012 9:00	-4.9	-6.7	93	39	0.8	

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Weather							
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	
Rain,Haze	3/13/2012 9:00	5.5	2.9	86	17	9.7	
Rain,Ice Pellets	12/18/2012 5:00	0.6	-0.6	92	24	9.7	
Rain,Snow	4/23/2012 3:00	1.7	0.5	94	52	25.0	
Rain,Snow Grains	12/21/2012 0:00	1.9	-2.1	75	26	25.0	
Rain,Snow,Fog	12/8/2012 21:00	0.8	0.3	96	9	6.4	
Rain,Snow,Ice Pellets	12/21/2012 5:00	1.3	0.1	94	28	6.4	
Snow	4/27/2012 9:00	3.7	0.3	96	57	25.0	
Snow Pellets	11/24/2012 15:00	0.7	-6.4	59	35	2.4	
Snow Showers	3/4/2012 21:00	2.9	-0.7	94	37	48.3	
Snow Showers,Fog	12/29/2012 13:00	-10.0	-11.1	92	22	9.7	
Snow,Blowing Snow	2/25/2012 9:00	-1.4	-2.9	91	48	9.7	
Snow,Fog	3/14/2012 19:00	1.1	0.8	99	35	9.7	
Snow,Haze	2/1/2012 21:00	-3.6	-6.4	81	15	6.4	
Snow,Ice Pellets	3/3/2012 4:00	0.8	-1.7	92	33	11.3	
Thunderstorms	7/4/2012 16:00	26.7	20.1	87	15	25.0	

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Weather							
Thunderstorms,Heavy Rain Showers	5/29/2012 6:00	10.9	9.0	88	9	2.4	
Thunderstorms,Moderate Rain Showers,Fog	7/17/2012 6:00	19.6	18.5	93	15	3.2	
Thunderstorms,Rain	7/23/2012 18:00	21.3	19.1	93	30	24.1	
Thunderstorms,Rain Showers	9/8/2012 4:00	25.5	23.1	98	32	25.0	
Thunderstorms,Rain Showers,Fog	7/31/2012 20:00	22.9	21.3	91	35	9.7	
Thunderstorms,Rain,Fog	7/17/2012 5:00	20.6	18.6	88	19	4.8	

Q)13 Show all the records where weather condition is fog.

In [92]: `#filtering`

```
data.head(2)
data.groupby('Weather').get_group('Fog')
```

Out[92]:

	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

In [93]: # value_counts

```
data[data['Weather'] == 'Fog']
```

Out[93]:

	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

```
In [94]: # value_counts  
data.Weather.value_counts()
```

```
Out[94]: 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
```

Q)14 Find all the instances when 'Weather is Clear' or 'Visibility is above 40'

In [95]: `data.head(2)`

Out[95]:

	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 [98]: `data[(data['Weather'] == 'Clear') & (data['Visibility_km'] > 60)]`

Out[98]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
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Q) 15. Find all instances when: A. 'Weather is Clear' and 'Relative Humidity is greater than 50' or B. 'Visibility is above 40'

In [100]: `data[(data['Weather'] == 'Clear') & (data['Rel_Hum_%'] > 50)]`

Out[100]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
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
241	1/11/2012 1:00	-10.7	-17.8	56	17	25.0	101.49	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

1070 rows × 8 columns

In []: `data[(data['Weather'] == 'Clear') & (data['Rel_Hum_%'] > 50) & (data['Visibility']`