



Exploratory Data Analysis of Weather Data

```
In [1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

```
In [2]: data= pd.read_csv(r"C:\Users\Hp\Desktop\1. Weather Data (1).csv")
```

data

```
In [4]: data.head()
```

```
Out[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
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 [6]: data.shape
```

Out[6]: (8784, 8)

In [7]: `data.index`

Out[7]: `RangeIndex(start=0, stop=8784, step=1)`

In [8]: `data.columns`

Out[8]: `Index(['Date/Time', 'Temp_C', 'Dew Point Temp_C', 'Rel Hum_%',
'Wind Speed_km/h', 'Visibility_km', 'Press_kPa', 'Weather'],
dtype='object')`

In [9]: `data.dtypes`

Out[9]:

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

Out[12]: `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 [13]: `data.nunique()`

Out[13]:

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 [14]: `data.count()`

```
Out[14]: 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 [17]: data['Weather'].value_counts()
```

```

Out[17]:
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 [18]: 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 [19]: *#1. find all Wind speed unique value in data*

In [20]: `data.head(2)`

Out[20]:

	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 [21]: `data.nunique()`

Out[21]:

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

Out[22]: 34

In [23]: `data['Wind Speed_km/h'].unique() #Answer`

Out[23]:

```
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 []: *### find the number of time when the 'Weather is Clear*

In [24]: `data.head(2)`

Out[24]:

	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 [25]: data['Weather'].value_counts() #value_counts Method 1
```

```

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 [35]: #filtering
data.head(2)

```

Out[35]:

	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 [36]: `data[data.Weather == 'clear']`

Out[36]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
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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
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 []: *#Find the number of times when the wind speed was exactly the same as 4km/hr*In [42]: `data.head(2)`

Out[42]:

	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 [44]: `data[data['Wind Speed_km/h'] == 4] #Answer`

Out[44]:

	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 [45]: `#Find the number of null values in the data`In []: `data.head(2)`In [47]: `data.isnull().sum()`

Out[47]:

```

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 [49]: `data.notnull().sum()`

```
Out[49]: 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 [50]: #rename the coloumn name 'weather' of dataframe to weather condition
```

```
In [52]: data.head(2)
```

```
Out[52]:
```

	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 [63]: data.rename(columns = {'Weather' : 'Weather condition'})
```

Out[63]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_kmh	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 [57]: `#data.head()`In [64]: `data.rename(columns = {'Weather' : 'Weather condition'}, inplace= True)`In [65]: `data.head()`

Out[65]:

	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 [66]: *# What is Mean Visibility?*In [68]: `data.head(2)`

Out[68]:

	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 [69]: `data.Visibility_km.mean()`

Out[69]: 27.66444672131151

In [70]: *#what is standard deviation of 'pressure' in this data?*In [71]: `data.Press_kPa.std()`

Out[71]: 0.8440047459486474

In [72]: *#what is the variance of relative humidity in this area?*In [74]: `data['Rel Hum_%'].var()`

Out[74]: 286.2485501984998

In [75]: *#find all the instances where 'snow' was recorded?*In [76]: `data.head()`

Out[76]:

	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 [77]: data['Weather condition'].value_counts()

```

Out[77]:
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 [79]: #filtering
data[data['Weather condition'] == 'Snow']

```

Out[79]:

	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 [84]: #string contains
data[data['Weather condition'].str.contains('Snow')].head(50)
```

Out[84]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
41	1/2/2012 17:00	-2.1	-9.5	57	22	25.0	99.66	Snow Showers
44	1/2/2012 20:00	-5.6	-13.4	54	24	25.0	100.07	Snow Showers
45	1/2/2012 21:00	-5.8	-12.8	58	26	25.0	100.15	Snow Showers
47	1/2/2012 23:00	-7.4	-14.1	59	17	19.3	100.27	Snow Showers
48	1/3/2012 0:00	-9.0	-16.0	57	28	25.0	100.35	Snow Showers
50	1/3/2012 2:00	-10.5	-15.8	65	22	12.9	100.53	Snow Showers
51	1/3/2012 3:00	-11.3	-18.7	54	33	25.0	100.61	Snow Showers
53	1/3/2012 5:00	-12.9	-19.1	60	22	25.0	100.76	Snow Showers
54	1/3/2012 6:00	-13.3	-19.3	61	19	25.0	100.85	Snow Showers
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
89	1/4/2012 17:00	-8.9	-13.2	71	9	4.8	100.76	Snow
90	1/4/2012 18:00	-8.9	-12.6	75	11	9.7	100.69	Snow
91	1/4/2012 19:00	-8.4	-12.7	71	9	16.1	100.65	Snow
92	1/4/2012 20:00	-7.8	-12.1	71	9	16.1	100.61	Snow
93	1/4/2012 21:00	-7.6	-11.6	73	7	11.3	100.54	Snow
94	1/4/2012 22:00	-9.5	-12.7	77	6	9.7	100.50	Snow
95	1/4/2012	-9.6	-12.6	79	6	9.7	100.42	Snow

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
	23:00							
96	1/5/2012 0:00	-8.8	-11.7	79	4	9.7	100.32	Snow
97	1/5/2012 1:00	-7.5	-10.2	81	0	9.7	100.29	Snow
98	1/5/2012 2:00	-5.4	-8.3	80	9	8.0	100.28	Snow
99	1/5/2012 3:00	-5.0	-7.7	81	11	9.7	100.24	Snow
100	1/5/2012 4:00	-4.1	-6.5	83	9	4.8	100.21	Snow
101	1/5/2012 5:00	-7.0	-9.5	82	4	4.0	100.19	Snow
102	1/5/2012 6:00	-8.2	-10.7	82	6	6.4	100.26	Snow
103	1/5/2012 7:00	-7.1	-9.7	82	9	9.7	100.31	Snow
104	1/5/2012 8:00	-6.1	-9.1	79	11	9.7	100.39	Snow
123	1/6/2012 3:00	-10.6	-16.0	64	0	9.7	100.76	Snow
124	1/6/2012 4:00	-11.3	-16.1	68	15	3.2	100.70	Snow
125	1/6/2012 5:00	-11.8	-16.0	71	19	2.8	100.61	Snow
126	1/6/2012 6:00	-12.0	-16.2	71	22	4.8	100.58	Snow
127	1/6/2012 7:00	-14.4	-16.3	85	22	2.4	100.52	Snow
128	1/6/2012 8:00	-12.3	-16.2	73	24	11.3	100.51	Snow
129	1/6/2012 9:00	-12.5	-16.7	71	26	19.3	100.53	Snow
130	1/6/2012 10:00	-12.3	-16.3	72	28	16.1	100.47	Snow
131	1/6/2012 11:00	-12.0	-16.0	72	17	24.1	100.36	Snow
132	1/6/2012 12:00	-11.7	-15.4	74	28	19.3	100.23	Snow
133	1/6/2012 13:00	-11.9	-15.6	74	20	24.1	100.13	Snow

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
134	1/6/2012 14:00	-11.2	-14.8	75	19	19.3	100.07	Snow
135	1/6/2012 15:00	-11.5	-14.4	79	19	12.9	100.06	Snow
136	1/6/2012 16:00	-11.6	-14.7	78	19	19.3	100.10	Snow
137	1/6/2012 17:00	-11.2	-14.3	78	17	25.0	100.15	Snow
158	1/7/2012 14:00	-4.4	-6.9	83	6	8.0	100.09	Snow
159	1/7/2012 15:00	-3.7	-6.1	83	11	8.0	100.09	Snow
160	1/7/2012 16:00	-3.6	-5.9	84	0	8.0	100.15	Snow
161	1/7/2012 17:00	-3.1	-5.4	84	13	8.0	100.27	Snow
162	1/7/2012 18:00	-3.2	-5.3	85	6	9.7	100.33	Snow

In []: *#find all the instances when wind speed is above 24 and visibility is 25?*

In [85]: `data.head(2)`

Out[85]:

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

Out[90]:

	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 []: `#what is the mean vlaue of each coloumn against 'Waether condition'?`In [91]: `data.groupby('Weather condition').mean()`

Out[91]:

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

	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa
Weather condition						
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 [92]: `# what is the min and Maximum value of Weather condition?`

In [93]: `data.head()`

Out[93]:

	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 [94]:

```
data.groupby('Weather condition').min()
```

Out[94]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa
Weather condition							
Clear	1/11/2012 1:00	-23.3	-28.5	20	0	11.3	99.52
Cloudy	1/1/2012 17:00	-21.4	-26.8	18	0	11.3	98.39
Drizzle	1/23/2012 21:00	1.1	-0.2	74	0	6.4	97.84
Drizzle,Fog	1/23/2012 20:00	0.0	-1.6	85	0	1.0	98.65
Drizzle,Ice Pellets,Fog	12/17/2012 9:00	0.4	-0.7	92	20	4.0	100.79
Drizzle,Snow	12/17/2012 15:00	0.9	0.1	92	9	9.7	100.63
Drizzle,Snow,Fog	12/18/2012 21:00	0.3	-0.1	92	7	2.4	97.79
Fog	1/1/2012 0:00	-16.0	-17.2	80	0	0.2	98.31
Freezing Drizzle	1/13/2012 10:00	-9.0	-12.2	78	6	4.8	98.44
Freezing Drizzle,Fog	1/1/2012 2:00	-6.4	-9.0	82	6	3.6	98.74
Freezing Drizzle,Haze	2/1/2012 11:00	-5.8	-8.3	81	9	2.0	100.28
Freezing Drizzle,Snow	1/13/2012 3:00	-8.3	-10.4	79	6	2.4	99.19
Freezing Fog	1/22/2012 6:00	-19.0	-22.9	71	0	0.2	101.97
Freezing Rain	1/13/2012 11:00	-6.5	-9.0	81	7	2.8	98.22
Freezing Rain,Fog	1/17/2012 23:00	-6.1	-8.7	82	7	2.8	98.32
Freezing Rain,Haze	2/1/2012 14:00	-4.9	-7.5	82	6	2.0	100.34
Freezing Rain,Ice Pellets,Fog	12/17/2012 3:00	-2.6	-3.7	92	28	8.0	100.95
Freezing Rain,Snow Grains	1/13/2012 9:00	-5.0	-7.3	84	32	4.8	98.56
Haze	1/22/2012 12:00	-11.5	-16.0	68	0	4.8	100.35
Mainly Clear	1/10/2012 11:00	-22.8	-28.0	20	0	12.9	98.67

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa
Weather condition							
Moderate Rain,Fog	12/10/2012 8:00	1.7	0.8	94	17	6.4	99.98
Moderate Snow	1/12/2012 15:00	-6.3	-7.6	83	26	0.6	99.88
Moderate Snow,Blowing Snow	12/27/2012 10:00	-5.5	-6.6	92	39	0.6	100.50
Mostly Cloudy	1/1/2012 16:00	-23.2	-28.5	18	0	11.3	98.36
Rain	1/1/2012 18:00	0.3	-5.7	40	0	4.0	97.52
Rain Showers	1/1/2012 22:00	1.6	-7.2	37	0	6.4	98.51
Rain Showers,Fog	10/20/2012 3:00	12.8	12.1	96	13	6.4	99.83
Rain Showers,Snow Showers	11/4/2012 8:00	2.1	-1.8	75	17	19.3	101.09
Rain,Fog	1/23/2012 18:00	0.0	-1.2	83	0	2.0	98.61
Rain,Haze	3/13/2012 7:00	4.0	1.0	81	7	4.0	100.50
Rain,Ice Pellets	12/18/2012 5:00	0.6	-0.6	92	24	9.7	100.12
Rain,Snow	1/10/2012 5:00	0.6	-1.7	81	13	2.4	98.18
Rain,Snow Grains	12/21/2012 0:00	1.9	-2.1	75	26	25.0	100.60
Rain,Snow,Fog	12/8/2012 21:00	0.8	0.3	96	9	6.4	100.73
Rain,Snow,Ice Pellets	12/21/2012 1:00	0.9	-0.7	88	17	4.8	99.85
Snow	1/10/2012 1:00	-16.7	-24.6	41	0	1.0	97.75
Snow Pellets	11/24/2012 15:00	0.7	-6.4	59	35	2.4	99.70
Snow Showers	1/12/2012 7:00	-13.3	-19.3	52	0	2.4	99.49
Snow Showers,Fog	12/26/2012 9:00	-11.3	-12.7	89	7	4.0	100.63
Snow,Blowing Snow	1/13/2012 21:00	-12.0	-16.2	70	24	0.6	98.11

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa
Weather condition							
Snow,Fog	12/16/2012 15:00	-10.1	-12.0	77	4	1.2	99.38
Snow,Haze	2/1/2012 17:00	-4.3	-7.2	80	0	4.0	100.61
Snow,Ice Pellets	12/10/2012 3:00	-4.3	-5.9	76	19	2.8	99.40
Thunderstorms	7/16/2012 1:00	21.6	19.4	67	0	24.1	99.84
Thunderstorms,Heavy Rain Showers	5/29/2012 6:00	10.9	9.0	88	9	2.4	100.26
Thunderstorms,Moderate Rain Showers,Fog	7/17/2012 6:00	19.6	18.5	93	15	3.2	100.01
Thunderstorms,Rain	5/25/2012 20:00	19.4	18.2	83	4	16.1	100.19
Thunderstorms,Rain Showers	5/29/2012 16:00	11.0	7.0	68	7	6.4	99.65
Thunderstorms,Rain Showers,Fog	6/29/2012 3:00	19.5	16.1	80	7	9.7	99.71
Thunderstorms,Rain,Fog	7/17/2012 5:00	20.6	18.6	88	19	4.8	100.08

In [95]: `data.groupby('Weather condition').max()`

Out[95]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa
Weather condition							
Clear	9/9/2012 5:00	32.8	20.4	99	33	48.3	103.63
Cloudy	9/9/2012 23:00	30.5	22.6	99	54	48.3	103.65
Drizzle	9/30/2012 3:00	18.8	17.7	96	30	25.0	101.56
Drizzle,Fog	9/30/2012 2:00	19.9	19.1	100	28	9.7	102.07
Drizzle,Ice Pellets,Fog	12/17/2012 9:00	0.4	-0.7	92	20	4.0	100.79
Drizzle,Snow	12/19/2012 18:00	1.2	0.2	95	19	11.3	101.15
Drizzle,Snow,Fog	12/22/2012 3:00	1.1	0.6	98	32	9.7	100.15
Fog	9/22/2012 0:00	20.8	19.6	100	22	9.7	103.04
Freezing Drizzle	2/1/2012 5:00	-2.3	-3.3	93	26	12.9	101.02
Freezing Drizzle,Fog	12/10/2012 5:00	-0.3	-2.3	94	33	8.0	101.27
Freezing Drizzle,Haze	2/1/2012 13:00	-5.0	-7.7	83	11	4.0	100.36
Freezing Drizzle,Snow	3/2/2012 12:00	-3.3	-4.6	94	24	12.9	101.18
Freezing Fog	3/17/2012 6:00	-0.1	-0.3	99	9	0.8	102.85
Freezing Rain	2/1/2012 7:00	0.3	-1.7	92	28	16.1	101.00
Freezing Rain,Fog	12/17/2012 1:00	0.1	-0.9	93	26	9.7	101.01
Freezing Rain,Haze	2/1/2012 15:00	-4.9	-7.4	83	9	2.8	100.41
Freezing Rain,Ice Pellets,Fog	12/17/2012 3:00	-2.6	-3.7	92	28	8.0	100.95
Freezing Rain,Snow Grains	1/13/2012 9:00	-5.0	-7.3	84	32	4.8	98.56
Haze	3/13/2012 23:00	14.1	11.1	86	17	9.7	102.97
Mainly Clear	9/9/2012 9:00	33.0	21.2	99	63	48.3	103.59

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa
Weather condition							
Moderate Rain,Fog	12/10/2012 8:00	1.7	0.8	94	17	6.4	99.98
Moderate Snow	12/27/2012 9:00	-4.9	-6.7	93	39	0.8	100.67
Moderate Snow,Blowing Snow	12/27/2012 12:00	-5.4	-6.4	93	41	0.6	100.64
Mostly Cloudy	9/9/2012 2:00	32.4	24.4	100	83	48.3	103.65
Rain	9/5/2012 2:00	22.8	20.4	99	52	48.3	102.26
Rain Showers	9/8/2012 16:00	26.4	23.0	97	41	48.3	102.31
Rain Showers,Fog	10/20/2012 3:00	12.8	12.1	96	13	6.4	99.83
Rain Showers,Snow Showers	12/5/2012 10:00	2.2	-1.2	78	28	24.1	101.11
Rain,Fog	9/30/2012 23:00	21.7	19.5	100	46	9.7	101.77
Rain,Haze	3/13/2012 9:00	5.5	2.9	86	17	9.7	100.61
Rain,Ice Pellets	12/18/2012 5:00	0.6	-0.6	92	24	9.7	100.12
Rain,Snow	4/23/2012 3:00	1.7	0.5	94	52	25.0	101.07
Rain,Snow Grains	12/21/2012 0:00	1.9	-2.1	75	26	25.0	100.60
Rain,Snow,Fog	12/8/2012 21:00	0.8	0.3	96	9	6.4	100.73
Rain,Snow,Ice Pellets	12/21/2012 5:00	1.3	0.1	94	28	6.4	100.47
Snow	4/27/2012 9:00	3.7	0.3	96	57	25.0	102.73
Snow Pellets	11/24/2012 15:00	0.7	-6.4	59	35	2.4	99.70
Snow Showers	3/4/2012 21:00	2.9	-0.7	94	37	48.3	102.50
Snow Showers,Fog	12/29/2012 13:00	-10.0	-11.1	92	22	9.7	102.52
Snow,Blowing Snow	2/25/2012 9:00	-1.4	-2.9	91	48	9.7	100.62

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather condition
	3/14/2012 19:00	1.1	0.8	99	35	9.7	102.07	Snow,Fog
	2/1/2012 21:00	-3.6	-6.4	81	15	6.4	100.99	Snow,Haze
	3/3/2012 4:00	0.8	-1.7	92	33	11.3	100.96	Snow,Ice Pellets
	7/4/2012 16:00	26.7	20.1	87	15	25.0	100.62	Thunderstorms
	5/29/2012 6:00	10.9	9.0	88	9	2.4	100.26	Thunderstorms,Heavy Rain Showers
	7/17/2012 6:00	19.6	18.5	93	15	3.2	100.01	Thunderstorms,Moderate Rain Showers,Fog
	7/23/2012 18:00	21.3	19.1	93	30	24.1	100.83	Thunderstorms,Rain
	9/8/2012 4:00	25.5	23.1	98	32	25.0	101.06	Thunderstorms,Rain Showers
	7/31/2012 20:00	22.9	21.3	91	35	9.7	100.64	Thunderstorms,Rain Showers,Fog
	7/17/2012 5:00	20.6	18.6	88	19	4.8	100.08	Thunderstorms,Rain,Fog

In [96]: `#13.Show all the records where weather condition is 'fog'`

In [97]: `data.head()`

Out[97]:

	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 [98]: `data[data['Weather condition'] == 'Fog']`

Out[98]:

	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 []: `#find all the`