

Working on Real Project with Python

(A part of Big Data Analysis)

The Weather Dataset

Here, 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.

```
import pandas as pd

data = pd.read_csv(r"C:\Users\ROHIT GREWAL\Desktop\Data Science  
Lovers\Zicops\Videos\Python Projects\Project 1 - Weather Dataset.csv")
```

data

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h
0	1/1/2012 0:00	-1.8	-3.9	86	
4					
1	1/1/2012 1:00	-1.8	-3.7	87	
4					
2	1/1/2012 2:00	-1.8	-3.4	89	
7					
3	1/1/2012 3:00	-1.5	-3.2	88	
6					
4	1/1/2012 4:00	-1.5	-3.3	88	
7					
...
...					
8779	12/31/2012 19:00	0.1	-2.7	81	
30					
8780	12/31/2012 20:00	0.2	-2.4	83	
24					
8781	12/31/2012 21:00	-0.5	-1.5	93	
28					
8782	12/31/2012 22:00	-0.2	-1.8	89	
28					

```
8783 12/31/2012 23:00 0.0 -2.1 86
30
```

	Visibility_km	Press_kPa	Weather
0	8.0	101.24	Fog
1	8.0	101.24	Fog
2	4.0	101.26	Freezing Drizzle,Fog
3	4.0	101.27	Freezing Drizzle,Fog
4	4.8	101.23	Fog
...
8779	9.7	100.13	Snow
8780	9.7	100.03	Snow
8781	4.8	99.95	Snow
8782	9.7	99.91	Snow
8783	11.3	99.89	Snow

```
[8784 rows x 8 columns]
```

How to Analyze DataFrames ?

.head()

It shows the first N rows in the data (by default, N=5).

```
data.head()
```

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h
0	1/1/2012 0:00	-1.8	-3.9	86	4
1	1/1/2012 1:00	-1.8	-3.7	87	4
2	1/1/2012 2:00	-1.8	-3.4	89	7
3	1/1/2012 3:00	-1.5	-3.2	88	6
4	1/1/2012 4:00	-1.5	-3.3	88	7

	Visibility_km	Press_kPa	Weather
0	8.0	101.24	Fog
1	8.0	101.24	Fog
2	4.0	101.26	Freezing Drizzle,Fog
3	4.0	101.27	Freezing Drizzle,Fog
4	4.8	101.23	Fog

.shape

It shows the total no. of rows and no. of columns of the dataframe

```
data.shape  
(8784, 8)
```

.index

This attribute provides the index of the dataframe

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

.columns

It shows the name of each column

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

.dtypes

It shows the data-type of each column

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

.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()

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)
```

.nunique()

It shows the total no. of unique values in each column. It can be applied on a single column as well as on whole dataframe.

```
data.nunique()

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

Weather	50
dtype: int64	

.count

It shows the total no. of non-null values in each column. It can be applied on a single column as well as on whole dataframe.

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

.value_counts

In a column, it shows all the unique values with their count. It can be applied on single column only.

```
data['Weather'].value_counts()
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
Rain,Snow,Ice Pellets	4
Freezing Fog	4
Snow Showers,Fog	4
Moderate Snow	4
Freezing Rain,Fog	4
Thunderstorms,Rain	3
Freezing Drizzle,Haze	3
Thunderstorms,Rain Showers,Fog	3
Rain,Haze	3
Rain Showers,Snow Showers	2
Drizzle,Snow	2
Freezing Rain,Haze	2
Moderate Snow,Blowing Snow	2
Thunderstorms	2
Freezing Rain,Ice Pellets,Fog	1
Drizzle,Ice Pellets,Fog	1
Rain,Ice Pellets	1
Thunderstorms,Heavy Rain Showers	1
Thunderstorms,Moderate Rain Showers,Fog	1
Thunderstorms,Rain,Fog	1
Rain Showers,Fog	1
Snow Pellets	1
Freezing Rain,Snow Grains	1
Moderate Rain,Fog	1
Rain,Snow,Fog	1
Rain,Snow Grains	1

Name: Weather, dtype: int64

.info()

Provides basic information about the dataframe.

```
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.

```

data.head(2)

```

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

```

\

```

	Visibility_km	Press_kPa	Weather
0	8.0	101.24	Fog
1	8.0	101.24	Fog

```

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

data['Wind Speed_km/h'].nunique()
34

data['Wind Speed_km/h'].unique() # Answer
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'.

```
data.head(2)
```

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

	Visibility_km	Press_kPa	Weather
0	8.0	101.24	Fog
1	8.0	101.24	Fog

```
# value_counts()
```

```
data.Weather.value_counts()
```

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
Rain,Snow,Ice Pellets	4

Freezing Fog	4
Snow Showers,Fog	4
Moderate Snow	4
Freezing Rain,Fog	4
Thunderstorms,Rain	3
Freezing Drizzle,Haze	3
Thunderstorms,Rain Showers,Fog	3
Rain,Haze	3
Rain Showers,Snow Showers	2
Drizzle,Snow	2
Freezing Rain,Haze	2
Moderate Snow,Blowing Snow	2
Thunderstorms	2
Freezing Rain,Ice Pellets,Fog	1
Drizzle,Ice Pellets,Fog	1
Rain,Ice Pellets	1
Thunderstorms,Heavy Rain Showers	1
Thunderstorms,Moderate Rain Showers,Fog	1
Thunderstorms,Rain,Fog	1
Rain Showers,Fog	1
Snow Pellets	1
Freezing Rain,Snow Grains	1
Moderate Rain,Fog	1
Rain,Snow,Fog	1
Rain,Snow Grains	1

Name: Weather, dtype: int64

Filtering

#data.head(2)

data[data.Weather == 'Clear']

	Date/Time	Temp_C	Dew Point	Temp_C	Rel Hum_%	Wind
Speed_km/h \						
67	1/3/2012 19:00	-16.9		-24.8	50	
24						
114	1/5/2012 18:00	-7.1		-14.4	56	
11						
115	1/5/2012 19:00	-9.2		-15.4	61	
7						
116	1/5/2012 20:00	-9.8		-15.7	62	
9						
117	1/5/2012 21:00	-9.0		-14.8	63	
13						
...	
...						
8646	12/26/2012 6:00	-13.4		-14.8	89	
4						
8698	12/28/2012 10:00	-6.1		-8.6	82	
19						
8713	12/29/2012 1:00	-11.9		-13.6	87	

```

11
8714 12/29/2012 2:00 -11.8 -13.1 90
13
8756 12/30/2012 20:00 -13.8 -16.5 80
24

```

```

      Visibility_km  Press_kPa Weather
67             25.0    101.74   Clear
114            25.0    100.71   Clear
115            25.0    100.80   Clear
116            25.0    100.83   Clear
117            25.0    100.83   Clear
...            ...         ...    ...
8646           25.0    102.47   Clear
8698           24.1    101.27   Clear
8713           25.0    101.31   Clear
8714           25.0    101.33   Clear
8756           25.0    101.52   Clear

```

```
[1326 rows x 8 columns]
```

```

# groupby()
#data.head(2)
data.groupby('Weather').get_group('Clear')

```

```

      Date/Time  Temp_C  Dew Point Temp_C  Rel Hum_%  Wind
Speed_km/h \
67  1/3/2012 19:00  -16.9  -24.8  50
24
114 1/5/2012 18:00  -7.1  -14.4  56
11  1/5/2012 19:00  -9.2  -15.4  61
7
116 1/5/2012 20:00  -9.8  -15.7  62
9
117 1/5/2012 21:00  -9.0  -14.8  63
13
...      ...      ...      ...      ...
...
8646 12/26/2012 6:00  -13.4  -14.8  89
4
8698 12/28/2012 10:00  -6.1  -8.6  82
19
8713 12/29/2012 1:00  -11.9  -13.6  87
11
8714 12/29/2012 2:00  -11.8  -13.1  90
13
8756 12/30/2012 20:00  -13.8  -16.5  80
24

```

	Visibility_km	Press_kPa	Weather
67	25.0	101.74	Clear
114	25.0	100.71	Clear
115	25.0	100.80	Clear
116	25.0	100.83	Clear
117	25.0	100.83	Clear
...
8646	25.0	102.47	Clear
8698	24.1	101.27	Clear
8713	25.0	101.31	Clear
8714	25.0	101.33	Clear
8756	25.0	101.52	Clear

[1326 rows x 8 columns]

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

```
data.head(2)
```

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

	Visibility_km	Press_kPa	Weather
0	8.0	101.24	Fog
1	8.0	101.24	Fog

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

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h
0	1/1/2012 0:00	-1.8	-3.9	86	4
1	1/1/2012 1:00	-1.8	-3.7	87	4
96	1/5/2012 0:00	-8.8	-11.7	79	4
101	1/5/2012 5:00	-7.0	-9.5	82	4
146	1/7/2012 2:00	-8.1	-11.1	79	4
...
8768	12/31/2012 8:00	-8.6	-10.3	87	4

```

4
8769  12/31/2012  9:00    -8.1                -9.6                89
4
8770  12/31/2012 10:00    -7.4                -8.9                89
4
8772  12/31/2012 12:00    -5.8                -7.5                88
4
8773  12/31/2012 13:00    -4.6                -6.6                86
4

```

	Visibility_km	Press_kPa	Weather
0	8.0	101.24	Fog
1	8.0	101.24	Fog
96	9.7	100.32	Snow
101	4.0	100.19	Snow
146	19.3	100.15	Cloudy
...
8768	3.2	101.14	Snow Showers
8769	2.4	101.09	Snow
8770	6.4	101.05	Snow, Fog
8772	12.9	100.78	Snow
8773	12.9	100.63	Snow

[474 rows x 8 columns]

Q. 4) Find out all the Null Values in the data.

```
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

```

```
data.notnull().sum()
```

```

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'.

```
data.head(2)
```

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

	Visibility_km	Press_kPa	Weather
0	8.0	101.24	Fog
1	8.0	101.24	Fog

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

```
data.head()
```

	Date/Time	Temp_C	Dew Point	Temp_C	Rel Hum_%	Wind Speed_km/h
0	1/1/2012 0:00	-1.8		-3.9	86	4
1	1/1/2012 1:00	-1.8		-3.7	87	4
2	1/1/2012 2:00	-1.8		-3.4	89	7
3	1/1/2012 3:00	-1.5		-3.2	88	6
4	1/1/2012 4:00	-1.5		-3.3	88	7

	Visibility_km	Press_kPa	Weather Condition
0	8.0	101.24	Fog
1	8.0	101.24	Fog
2	4.0	101.26	Freezing Drizzle,Fog
3	4.0	101.27	Freezing Drizzle,Fog
4	4.8	101.23	Fog

Q.6) What is the mean 'Visibility' ?

```
data.head(2)
```

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

	Visibility_km	Press_kPa	Weather Condition
0	8.0	101.24	Fog
1	8.0	101.24	Fog

```
data.Visibility_km.mean()
```

27.66444672131151

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

```
data.Press_kPa.std()
```

0.8440047459486474

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

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

286.2485501984998

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

```
# value_counts()
#data.head(2)
data['Weather Condition'].value_counts()
```

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
Snow Showers,Fog	4
Freezing Fog	4
Rain,Snow,Ice Pellets	4
Moderate Snow	4
Freezing Rain,Fog	4
Rain,Haze	3
Thunderstorms,Rain Showers,Fog	3
Freezing Drizzle,Haze	3
Thunderstorms,Rain	3
Drizzle,Snow	2
Freezing Rain,Haze	2
Rain Showers,Snow Showers	2
Thunderstorms	2
Moderate Snow,Blowing Snow	2
Rain Showers,Fog	1
Thunderstorms,Heavy Rain Showers	1
Rain,Snow,Fog	1
Freezing Rain,Ice Pellets,Fog	1
Moderate Rain,Fog	1
Snow Pellets	1
Rain,Snow Grains	1
Rain,Ice Pellets	1
Freezing Rain,Snow Grains	1
Drizzle,Ice Pellets,Fog	1
Thunderstorms,Rain,Fog	1
Thunderstorms,Moderate Rain Showers,Fog	1

Name: Weather Condition, dtype: int64

```
#Filtering
```

```
data[data['Weather Condition'] == 'Snow']
```

	Date/Time	Temp_C	Dew Point	Temp_C	Rel Hum_%	Wind
Speed_km/h \						
55	1/3/2012 7:00	-14.0		-19.5	63	
19						
84	1/4/2012 12:00	-13.7		-21.7	51	
11						
86	1/4/2012 14:00	-11.3		-19.0	53	
7						
87	1/4/2012 15:00	-10.2		-16.3	61	
11						
88	1/4/2012 16:00	-9.4		-15.5	61	
13						
...	
...						
8779	12/31/2012 19:00	0.1		-2.7	81	
30						
8780	12/31/2012 20:00	0.2		-2.4	83	
24						
8781	12/31/2012 21:00	-0.5		-1.5	93	
28						
8782	12/31/2012 22:00	-0.2		-1.8	89	
28						
8783	12/31/2012 23:00	0.0		-2.1	86	
30						

	Visibility_km	Press_kPa	Weather Condition
55	25.0	100.95	Snow
84	24.1	101.25	Snow
86	19.3	100.97	Snow
87	9.7	100.89	Snow
88	19.3	100.79	Snow
...
8779	9.7	100.13	Snow
8780	9.7	100.03	Snow
8781	4.8	99.95	Snow
8782	9.7	99.91	Snow
8783	11.3	99.89	Snow

```
[390 rows x 8 columns]
```

```
# str.contains
```

```
data[data['Weather Condition'].str.contains('Snow')].tail(50)
```

	Date/Time	Temp_C	Dew Point	Temp_C	Rel Hum_%	Wind
Speed_km/h \						
8680	12/27/2012 16:00	-4.5		-6.2	88	
37						

8681	12/27/2012 17:00	-4.2	-5.9	88
32				
8682	12/27/2012 18:00	-4.0	-5.7	88
28				
8683	12/27/2012 19:00	-3.9	-5.6	88
26				
8684	12/27/2012 20:00	-3.7	-5.3	89
37				
8685	12/27/2012 21:00	-3.7	-4.8	92
24				
8686	12/27/2012 22:00	-3.8	-4.6	94
20				
8687	12/27/2012 23:00	-4.0	-5.6	89
24				
8688	12/28/2012 0:00	-4.2	-5.7	89
19				
8689	12/28/2012 1:00	-4.4	-6.6	85
15				
8690	12/28/2012 2:00	-4.3	-6.3	86
11				
8691	12/28/2012 3:00	-4.6	-5.9	91
13				
8692	12/28/2012 4:00	-4.9	-5.9	93
9				
8723	12/29/2012 11:00	-10.9	-12.2	90
7				
8724	12/29/2012 12:00	-10.5	-11.6	92
11				
8725	12/29/2012 13:00	-10.0	-11.1	92
22				
8726	12/29/2012 14:00	-9.3	-10.5	91
22				
8727	12/29/2012 15:00	-8.8	-10.0	91
20				
8728	12/29/2012 16:00	-8.5	-9.9	90
24				
8729	12/29/2012 17:00	-9.0	-10.4	90
19				
8730	12/29/2012 18:00	-9.3	-10.9	88
26				
8731	12/29/2012 19:00	-9.5	-11.2	87
26				
8732	12/29/2012 20:00	-9.7	-11.6	86
24				
8733	12/29/2012 21:00	-9.8	-11.8	85
24				
8734	12/29/2012 22:00	-10.1	-11.6	89
15				
8735	12/29/2012 23:00	-10.0	-12.0	85

20					
8736	12/30/2012 0:00	-9.6	-11.3	87	
13					
8737	12/30/2012 1:00	-9.4	-10.5	92	
9					
8738	12/30/2012 2:00	-9.3	-10.4	92	
9					
8739	12/30/2012 3:00	-9.1	-10.4	90	
11					
8740	12/30/2012 4:00	-9.3	-10.6	90	
13					
8741	12/30/2012 5:00	-9.1	-10.4	90	
11					
8742	12/30/2012 6:00	-9.3	-10.8	89	
17					
8767	12/31/2012 7:00	-9.3	-11.3	85	
0					
8768	12/31/2012 8:00	-8.6	-10.3	87	
4					
8769	12/31/2012 9:00	-8.1	-9.6	89	
4					
8770	12/31/2012 10:00	-7.4	-8.9	89	
4					
8771	12/31/2012 11:00	-6.7	-7.9	91	
9					
8772	12/31/2012 12:00	-5.8	-7.5	88	
4					
8773	12/31/2012 13:00	-4.6	-6.6	86	
4					
8774	12/31/2012 14:00	-3.4	-5.7	84	
6					
8775	12/31/2012 15:00	-2.3	-4.6	84	
9					
8776	12/31/2012 16:00	-1.4	-4.0	82	
13					
8777	12/31/2012 17:00	-1.1	-3.3	85	
19					
8778	12/31/2012 18:00	-1.3	-3.1	88	
17					
8779	12/31/2012 19:00	0.1	-2.7	81	
30					
8780	12/31/2012 20:00	0.2	-2.4	83	
24					
8781	12/31/2012 21:00	-0.5	-1.5	93	
28					
8782	12/31/2012 22:00	-0.2	-1.8	89	
28					
8783	12/31/2012 23:00	0.0	-2.1	86	
30					

	Visibility_km	Press_kPa	Weather Condition
8680	2.0	100.44	Snow,Blowing Snow
8681	3.2	100.47	Snow,Blowing Snow
8682	8.0	100.49	Snow,Blowing Snow
8683	9.7	100.52	Snow,Blowing Snow
8684	16.1	100.58	Snow
8685	4.8	100.62	Freezing Drizzle,Snow
8686	4.8	100.65	Freezing Drizzle,Snow
8687	9.7	100.70	Snow
8688	8.0	100.78	Freezing Drizzle,Snow
8689	6.4	100.83	Freezing Drizzle,Snow
8690	12.9	100.93	Freezing Drizzle,Snow
8691	4.0	101.01	Snow
8692	9.7	101.00	Snow
8723	6.4	101.09	Snow Showers,Fog
8724	8.0	100.93	Snow Showers,Fog
8725	9.7	100.63	Snow Showers,Fog
8726	4.8	100.60	Snow,Fog
8727	1.2	100.55	Snow,Fog
8728	1.2	100.49	Snow,Fog
8729	2.4	100.46	Snow,Fog
8730	6.4	100.38	Snow,Fog
8731	3.2	100.33	Snow,Fog
8732	9.7	100.25	Snow,Fog
8733	8.0	100.24	Snow,Fog
8734	2.4	100.20	Snow,Fog
8735	6.4	100.19	Snow,Fog
8736	3.2	100.23	Snow,Fog
8737	2.4	100.22	Snow,Fog
8738	4.0	100.28	Snow,Fog
8739	3.6	100.30	Snow,Fog
8740	9.7	100.28	Snow,Fog
8741	4.0	100.32	Snow,Fog
8742	8.0	100.39	Snow,Fog
8767	19.3	101.19	Snow Showers
8768	3.2	101.14	Snow Showers
8769	2.4	101.09	Snow
8770	6.4	101.05	Snow,Fog
8771	9.7	100.93	Snow
8772	12.9	100.78	Snow
8773	12.9	100.63	Snow
8774	11.3	100.57	Snow
8775	9.7	100.47	Snow
8776	12.9	100.40	Snow
8777	9.7	100.30	Snow
8778	9.7	100.19	Snow
8779	9.7	100.13	Snow
8780	9.7	100.03	Snow

8781	4.8	99.95	Snow
8782	9.7	99.91	Snow
8783	11.3	99.89	Snow

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

```
data.head(2)
```

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

	Visibility_km	Press_kPa	Weather Condition
0	8.0	101.24	Fog
1	8.0	101.24	Fog

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

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h
23	1/1/2012 23:00	5.3	2.0	79	
30					
24	1/2/2012 0:00	5.2	1.5	77	
35					
25	1/2/2012 1:00	4.6	0.0	72	
39					
26	1/2/2012 2:00	3.9	-0.9	71	
32					
27	1/2/2012 3:00	3.7	-1.5	69	
33					
...
...					
8705	12/28/2012 17:00	-8.6	-12.0	76	
26					
8753	12/30/2012 17:00	-12.1	-15.8	74	
28					
8755	12/30/2012 19:00	-13.4	-16.5	77	
26					
8759	12/30/2012 23:00	-12.1	-15.1	78	
28					
8760	12/31/2012 0:00	-11.1	-14.4	77	
26					

	Visibility_km	Press_kPa	Weather Condition
--	---------------	-----------	-------------------

23	25.0	99.31	Cloudy
24	25.0	99.26	Rain Showers
25	25.0	99.26	Cloudy
26	25.0	99.26	Mostly Cloudy
27	25.0	99.30	Mostly Cloudy
...
8705	25.0	101.34	Mainly Clear
8753	25.0	101.26	Mainly Clear
8755	25.0	101.47	Mainly Clear
8759	25.0	101.52	Mostly Cloudy
8760	25.0	101.51	Cloudy

[308 rows x 8 columns]

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

```
data.head(2)
```

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

	Visibility_km	Press_kPa	Weather Condition
0	8.0	101.24	Fog
1	8.0	101.24	Fog

```
data.groupby('Weather Condition').mean()
```

Temp_C \ Weather Condition	Temp_C	Dew Point
Clear	6.825716	0.089367
Cloudy	7.970544	2.375810
Drizzle	7.353659	5.504878
Drizzle,Fog	8.067500	7.033750
Drizzle,Ice Pellets,Fog	0.400000	-0.700000
Drizzle,Snow	1.050000	0.150000

Drizzle,Snow,Fog	0.693333	0.120000
Fog	4.303333	3.159333
Freezing Drizzle	-5.657143	-8.000000
Freezing Drizzle,Fog	-2.533333	-4.183333
Freezing Drizzle,Haze	-5.433333	-8.000000
Freezing Drizzle,Snow	-5.109091	-7.072727
Freezing Fog	-7.575000	-9.250000
Freezing Rain	-3.885714	-6.078571
Freezing Rain,Fog	-2.225000	-3.750000
Freezing Rain,Haze	-4.900000	-7.450000
Freezing Rain,Ice Pellets,Fog	-2.600000	-3.700000
Freezing Rain,Snow Grains	-5.000000	-7.300000
Haze	-0.200000	-2.975000
Mainly Clear	12.558927	4.581671
Moderate Rain,Fog	1.700000	0.800000
Moderate Snow	-5.525000	-7.250000
Moderate Snow,Blowing Snow	-5.450000	-6.500000
Mostly Cloudy	10.574287	3.131174
Rain	9.786275	7.042810
Rain Showers	13.722340	9.187766
Rain Showers,Fog	12.800000	12.100000
Rain Showers,Snow Showers	2.150000	-1.500000
Rain,Fog	8.273276	7.219828
Rain,Haze	4.633333	2.066667
Rain,Ice Pellets	0.600000	-0.600000
Rain,Snow	1.055556	-0.566667

Rain,Snow Grains	1.900000	-2.100000
Rain,Snow,Fog	0.800000	0.300000
Rain,Snow,Ice Pellets	1.100000	-0.175000
Snow	-4.524103	-7.623333
Snow Pellets	0.700000	-6.400000
Snow Showers	-3.506667	-7.866667
Snow Showers,Fog	-10.675000	-11.900000
Snow,Blowing Snow	-5.410526	-7.621053
Snow,Fog	-5.075676	-6.364865
Snow,Haze	-4.020000	-6.860000
Snow,Ice Pellets	-1.883333	-3.666667
Thunderstorms	24.150000	19.750000
Thunderstorms,Heavy Rain Showers	10.900000	9.000000
Thunderstorms,Moderate Rain Showers,Fog	19.600000	18.500000
Thunderstorms,Rain	20.433333	18.533333
Thunderstorms,Rain Showers	20.037500	17.618750
Thunderstorms,Rain Showers,Fog	21.600000	18.700000
Thunderstorms,Rain,Fog	20.600000	18.600000
	Rel Hum_%	Wind Speed_km/h \
Weather Condition		
Clear	64.497738	10.557315
Cloudy	69.592593	16.127315
Drizzle	88.243902	16.097561
Drizzle,Fog	93.275000	11.862500
Drizzle,Ice Pellets,Fog	92.000000	20.000000
Drizzle,Snow	93.500000	14.000000
Drizzle,Snow,Fog	95.866667	15.533333
Fog	92.286667	7.946667
Freezing Drizzle	83.571429	16.571429
Freezing Drizzle,Fog	88.500000	17.000000
Freezing Drizzle,Haze	82.000000	10.333333
Freezing Drizzle,Snow	86.090909	16.272727

Freezing Fog	87.750000	4.750000
Freezing Rain	84.642857	19.214286
Freezing Rain,Fog	89.500000	15.500000
Freezing Rain,Haze	82.500000	7.500000
Freezing Rain,Ice Pellets,Fog	92.000000	28.000000
Freezing Rain,Snow Grains	84.000000	32.000000
Haze	81.625000	10.437500
Mainly Clear	60.667142	14.144824
Moderate Rain,Fog	94.000000	17.000000
Moderate Snow	87.750000	33.750000
Moderate Snow,Blowing Snow	92.500000	40.000000
Mostly Cloudy	62.102465	15.813920
Rain	83.624183	19.254902
Rain Showers	75.159574	17.132979
Rain Showers,Fog	96.000000	13.000000
Rain Showers,Snow Showers	76.500000	22.500000
Rain,Fog	93.189655	14.793103
Rain,Haze	83.333333	11.666667
Rain,Ice Pellets	92.000000	24.000000
Rain,Snow	89.000000	28.388889
Rain,Snow Grains	75.000000	26.000000
Rain,Snow,Fog	96.000000	9.000000
Rain,Snow,Ice Pellets	91.500000	23.250000
Snow	79.307692	20.038462
Snow Pellets	59.000000	35.000000
Snow Showers	72.350000	19.233333
Snow Showers,Fog	90.750000	13.750000
Snow,Blowing Snow	84.473684	34.842105
Snow,Fog	90.675676	17.324324
Snow,Haze	80.600000	5.000000
Snow,Ice Pellets	87.666667	23.833333
Thunderstorms	77.000000	7.500000
Thunderstorms,Heavy Rain Showers	88.000000	9.000000
Thunderstorms,Moderate Rain Showers,Fog	93.000000	15.000000
Thunderstorms,Rain	89.000000	15.666667
Thunderstorms,Rain Showers	86.375000	18.312500
Thunderstorms,Rain Showers,Fog	84.000000	19.666667
Thunderstorms,Rain,Fog	88.000000	19.000000
Visibility_km		Press_kPa
Weather Condition		
Clear	30.153243	101.587443
Cloudy	26.625752	100.911441
Drizzle	17.931707	100.435366
Drizzle,Fog	5.257500	100.786625
Drizzle,Ice Pellets,Fog	4.000000	100.790000
Drizzle,Snow	10.500000	100.890000
Drizzle,Snow,Fog	5.513333	99.281333
Fog	6.248000	101.184067

Freezing Drizzle	9.200000	100.202857
Freezing Drizzle,Fog	5.266667	100.441667
Freezing Drizzle,Haze	2.666667	100.316667
Freezing Drizzle,Snow	5.872727	100.520909
Freezing Fog	0.650000	102.320000
Freezing Rain	8.242857	99.647143
Freezing Rain,Fog	7.550000	99.945000
Freezing Rain,Haze	2.400000	100.375000
Freezing Rain,Ice Pellets,Fog	8.000000	100.950000
Freezing Rain,Snow Grains	4.800000	98.560000
Haze	7.831250	101.482500
Mainly Clear	34.264862	101.248832
Moderate Rain,Fog	6.400000	99.980000
Moderate Snow	0.750000	100.275000
Moderate Snow,Blowing Snow	0.600000	100.570000
Mostly Cloudy	31.253842	101.025288
Rain	18.856536	100.233333
Rain Showers	22.816489	100.404043
Rain Showers,Fog	6.400000	99.830000
Rain Showers,Snow Showers	21.700000	101.100000
Rain,Fog	6.873276	100.500862
Rain,Haze	6.700000	100.540000
Rain,Ice Pellets	9.700000	100.120000
Rain,Snow	11.672222	99.951111
Rain,Snow Grains	25.000000	100.600000
Rain,Snow,Fog	6.400000	100.730000
Rain,Snow,Ice Pellets	6.000000	100.105000
Snow	11.171795	100.536103
Snow Pellets	2.400000	99.700000
Snow Showers	20.158333	100.963500
Snow Showers,Fog	7.025000	101.292500
Snow,Blowing Snow	4.105263	99.704737
Snow,Fog	4.537838	100.688649
Snow,Haze	4.640000	100.782000
Snow,Ice Pellets	7.416667	100.548333
Thunderstorms	24.550000	100.230000
Thunderstorms,Heavy Rain Showers	2.400000	100.260000
Thunderstorms,Moderate Rain Showers,Fog	3.200000	100.010000
Thunderstorms,Rain	19.833333	100.420000
Thunderstorms,Rain Showers	15.893750	100.233750
Thunderstorms,Rain Showers,Fog	9.700000	100.063333
Thunderstorms,Rain,Fog	4.800000	100.080000

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

```
data.head(2)
```

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

	Visibility_km	Press_kPa	Weather Condition
0	8.0	101.24	Fog
1	8.0	101.24	Fog

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

	Date/Time	Temp_C
Weather Condition		
Clear	1/11/2012 1:00	-23.3
Cloudy	1/1/2012 17:00	-21.4
Drizzle	1/23/2012 21:00	1.1
Drizzle,Fog	1/23/2012 20:00	0.0
Drizzle,Ice Pellets,Fog	12/17/2012 9:00	0.4
Drizzle,Snow	12/17/2012 15:00	0.9
Drizzle,Snow,Fog	12/18/2012 21:00	0.3
Fog	1/1/2012 0:00	-16.0
Freezing Drizzle	1/13/2012 10:00	-9.0
Freezing Drizzle,Fog	1/1/2012 2:00	-6.4
Freezing Drizzle,Haze	2/1/2012 11:00	-5.8
Freezing Drizzle,Snow	1/13/2012 3:00	-8.3
Freezing Fog	1/22/2012 6:00	-19.0
Freezing Rain	1/13/2012 11:00	-6.5
Freezing Rain,Fog	1/17/2012 23:00	-6.1
Freezing Rain,Haze	2/1/2012 14:00	-4.9
Freezing Rain,Ice Pellets,Fog	12/17/2012 3:00	-2.6
Freezing Rain,Snow Grains	1/13/2012 9:00	-5.0
Haze	1/22/2012 12:00	-11.5
Mainly Clear	1/10/2012 11:00	-22.8
Moderate Rain,Fog	12/10/2012 8:00	1.7
Moderate Snow	1/12/2012 15:00	-6.3
Moderate Snow,Blowing Snow	12/27/2012 10:00	-5.5
Mostly Cloudy	1/1/2012 16:00	-23.2
Rain	1/1/2012 18:00	0.3
Rain Showers	1/1/2012 22:00	1.6
Rain Showers,Fog	10/20/2012 3:00	12.8

Rain Showers,Snow Showers	11/4/2012 8:00	2.1
Rain,Fog	1/23/2012 18:00	0.0
Rain,Haze	3/13/2012 7:00	4.0
Rain,Ice Pellets	12/18/2012 5:00	0.6
Rain,Snow	1/10/2012 5:00	0.6
Rain,Snow Grains	12/21/2012 0:00	1.9
Rain,Snow,Fog	12/8/2012 21:00	0.8
Rain,Snow,Ice Pellets	12/21/2012 1:00	0.9
Snow	1/10/2012 1:00	-16.7
Snow Pellets	11/24/2012 15:00	0.7
Snow Showers	1/12/2012 7:00	-13.3
Snow Showers,Fog	12/26/2012 9:00	-11.3
Snow,Blowing Snow	1/13/2012 21:00	-12.0
Snow,Fog	12/16/2012 15:00	-10.1
Snow,Haze	2/1/2012 17:00	-4.3
Snow,Ice Pellets	12/10/2012 3:00	-4.3
Thunderstorms	7/16/2012 1:00	21.6
Thunderstorms,Heavy Rain Showers	5/29/2012 6:00	10.9
Thunderstorms,Moderate Rain Showers,Fog	7/17/2012 6:00	19.6
Thunderstorms,Rain	5/25/2012 20:00	19.4
Thunderstorms,Rain Showers	5/29/2012 16:00	11.0
Thunderstorms,Rain Showers,Fog	6/29/2012 3:00	19.5
Thunderstorms,Rain,Fog	7/17/2012 5:00	20.6
	Dew Point Temp_C	Rel Hum_
% \		
Weather Condition		
Clear	-28.5	20
Cloudy	-26.8	18
Drizzle	-0.2	74
Drizzle,Fog	-1.6	85
Drizzle,Ice Pellets,Fog	-0.7	92
Drizzle,Snow	0.1	92
Drizzle,Snow,Fog	-0.1	92
Fog	-17.2	80
Freezing Drizzle	-12.2	78
Freezing Drizzle,Fog	-9.0	82
Freezing Drizzle,Haze	-8.3	81

Freezing Drizzle,Snow	-10.4	79
Freezing Fog	-22.9	71
Freezing Rain	-9.0	81
Freezing Rain,Fog	-8.7	82
Freezing Rain,Haze	-7.5	82
Freezing Rain,Ice Pellets,Fog	-3.7	92
Freezing Rain,Snow Grains	-7.3	84
Haze	-16.0	68
Mainly Clear	-28.0	20
Moderate Rain,Fog	0.8	94
Moderate Snow	-7.6	83
Moderate Snow,Blowing Snow	-6.6	92
Mostly Cloudy	-28.5	18
Rain	-5.7	40
Rain Showers	-7.2	37
Rain Showers,Fog	12.1	96
Rain Showers,Snow Showers	-1.8	75
Rain,Fog	-1.2	83
Rain,Haze	1.0	81
Rain,Ice Pellets	-0.6	92
Rain,Snow	-1.7	81
Rain,Snow Grains	-2.1	75
Rain,Snow,Fog	0.3	96
Rain,Snow,Ice Pellets	-0.7	88
Snow	-24.6	41
Snow Pellets	-6.4	59

Snow Showers	-19.3	52
Snow Showers,Fog	-12.7	89
Snow,Blowing Snow	-16.2	70
Snow,Fog	-12.0	77
Snow,Haze	-7.2	80
Snow,Ice Pellets	-5.9	76
Thunderstorms	19.4	67
Thunderstorms,Heavy Rain Showers	9.0	88
Thunderstorms,Moderate Rain Showers,Fog	18.5	93
Thunderstorms,Rain	18.2	83
Thunderstorms,Rain Showers	7.0	68
Thunderstorms,Rain Showers,Fog	16.1	80
Thunderstorms,Rain,Fog	18.6	88
Wind Speed_km/h		
Visibility_km \ Weather Condition		
Clear	0	
11.3		
Cloudy	0	
11.3		
Drizzle	0	
6.4		
Drizzle,Fog	0	
1.0		
Drizzle,Ice Pellets,Fog	20	
4.0		
Drizzle,Snow	9	
9.7		
Drizzle,Snow,Fog	7	
2.4		
Fog	0	
0.2		
Freezing Drizzle	6	
4.8		
Freezing Drizzle,Fog	6	
3.6		

Freezing Drizzle,Haze	9
2.0	
Freezing Drizzle,Snow	6
2.4	
Freezing Fog	0
0.2	
Freezing Rain	7
2.8	
Freezing Rain,Fog	7
2.8	
Freezing Rain,Haze	6
2.0	
Freezing Rain,Ice Pellets,Fog	28
8.0	
Freezing Rain,Snow Grains	32
4.8	
Haze	0
4.8	
Mainly Clear	0
12.9	
Moderate Rain,Fog	17
6.4	
Moderate Snow	26
0.6	
Moderate Snow,Blowing Snow	39
0.6	
Mostly Cloudy	0
11.3	
Rain	0
4.0	
Rain Showers	0
6.4	
Rain Showers,Fog	13
6.4	
Rain Showers,Snow Showers	17
19.3	
Rain,Fog	0
2.0	
Rain,Haze	7
4.0	
Rain,Ice Pellets	24
9.7	
Rain,Snow	13
2.4	
Rain,Snow Grains	26
25.0	
Rain,Snow,Fog	9
6.4	
Rain,Snow,Ice Pellets	17

4.8	
Snow	0
1.0	
Snow Pellets	35
2.4	
Snow Showers	0
2.4	
Snow Showers,Fog	7
4.0	
Snow,Blowing Snow	24
0.6	
Snow,Fog	4
1.2	
Snow,Haze	0
4.0	
Snow,Ice Pellets	19
2.8	
Thunderstorms	0
24.1	
Thunderstorms,Heavy Rain Showers	9
2.4	
Thunderstorms,Moderate Rain Showers,Fog	15
3.2	
Thunderstorms,Rain	4
16.1	
Thunderstorms,Rain Showers	7
6.4	
Thunderstorms,Rain Showers,Fog	7
9.7	
Thunderstorms,Rain,Fog	19
4.8	

	Press_kPa
Weather Condition	
Clear	99.52
Cloudy	98.39
Drizzle	97.84
Drizzle,Fog	98.65
Drizzle,Ice Pellets,Fog	100.79
Drizzle,Snow	100.63
Drizzle,Snow,Fog	97.79
Fog	98.31
Freezing Drizzle	98.44
Freezing Drizzle,Fog	98.74
Freezing Drizzle,Haze	100.28
Freezing Drizzle,Snow	99.19
Freezing Fog	101.97
Freezing Rain	98.22
Freezing Rain,Fog	98.32

Freezing Rain,Haze	100.34
Freezing Rain,Ice Pellets,Fog	100.95
Freezing Rain,Snow Grains	98.56
Haze	100.35
Mainly Clear	98.67
Moderate Rain,Fog	99.98
Moderate Snow	99.88
Moderate Snow,Blowing Snow	100.50
Mostly Cloudy	98.36
Rain	97.52
Rain Showers	98.51
Rain Showers,Fog	99.83
Rain Showers,Snow Showers	101.09
Rain,Fog	98.61
Rain,Haze	100.50
Rain,Ice Pellets	100.12
Rain,Snow	98.18
Rain,Snow Grains	100.60
Rain,Snow,Fog	100.73
Rain,Snow,Ice Pellets	99.85
Snow	97.75
Snow Pellets	99.70
Snow Showers	99.49
Snow Showers,Fog	100.63
Snow,Blowing Snow	98.11
Snow,Fog	99.38
Snow,Haze	100.61
Snow,Ice Pellets	99.40
Thunderstorms	99.84
Thunderstorms,Heavy Rain Showers	100.26
Thunderstorms,Moderate Rain Showers,Fog	100.01
Thunderstorms,Rain	100.19
Thunderstorms,Rain Showers	99.65
Thunderstorms,Rain Showers,Fog	99.71
Thunderstorms,Rain,Fog	100.08

```
data.groupby('Weather Condition').max()
```

Weather Condition	Date/Time	Temp_C	\
Clear	9/9/2012 5:00	32.8	
Cloudy	9/9/2012 23:00	30.5	
Drizzle	9/30/2012 3:00	18.8	
Drizzle,Fog	9/30/2012 2:00	19.9	
Drizzle,Ice Pellets,Fog	12/17/2012 9:00	0.4	
Drizzle,Snow	12/19/2012 18:00	1.2	
Drizzle,Snow,Fog	12/22/2012 3:00	1.1	
Fog	9/22/2012 0:00	20.8	
Freezing Drizzle	2/1/2012 5:00	-2.3	
Freezing Drizzle,Fog	12/10/2012 5:00	-0.3	

Freezing Drizzle,Haze	2/1/2012 13:00	-5.0
Freezing Drizzle,Snow	3/2/2012 12:00	-3.3
Freezing Fog	3/17/2012 6:00	-0.1
Freezing Rain	2/1/2012 7:00	0.3
Freezing Rain,Fog	12/17/2012 1:00	0.1
Freezing Rain,Haze	2/1/2012 15:00	-4.9
Freezing Rain,Ice Pellets,Fog	12/17/2012 3:00	-2.6
Freezing Rain,Snow Grains	1/13/2012 9:00	-5.0
Haze	3/13/2012 23:00	14.1
Mainly Clear	9/9/2012 9:00	33.0
Moderate Rain,Fog	12/10/2012 8:00	1.7
Moderate Snow	12/27/2012 9:00	-4.9
Moderate Snow,Blowing Snow	12/27/2012 12:00	-5.4
Mostly Cloudy	9/9/2012 2:00	32.4
Rain	9/5/2012 2:00	22.8
Rain Showers	9/8/2012 16:00	26.4
Rain Showers,Fog	10/20/2012 3:00	12.8
Rain Showers,Snow Showers	12/5/2012 10:00	2.2
Rain,Fog	9/30/2012 23:00	21.7
Rain,Haze	3/13/2012 9:00	5.5
Rain,Ice Pellets	12/18/2012 5:00	0.6
Rain,Snow	4/23/2012 3:00	1.7
Rain,Snow Grains	12/21/2012 0:00	1.9
Rain,Snow,Fog	12/8/2012 21:00	0.8
Rain,Snow,Ice Pellets	12/21/2012 5:00	1.3
Snow	4/27/2012 9:00	3.7
Snow Pellets	11/24/2012 15:00	0.7
Snow Showers	3/4/2012 21:00	2.9
Snow Showers,Fog	12/29/2012 13:00	-10.0
Snow,Blowing Snow	2/25/2012 9:00	-1.4
Snow,Fog	3/14/2012 19:00	1.1
Snow,Haze	2/1/2012 21:00	-3.6
Snow,Ice Pellets	3/3/2012 4:00	0.8
Thunderstorms	7/4/2012 16:00	26.7
Thunderstorms,Heavy Rain Showers	5/29/2012 6:00	10.9
Thunderstorms,Moderate Rain Showers,Fog	7/17/2012 6:00	19.6
Thunderstorms,Rain	7/23/2012 18:00	21.3
Thunderstorms,Rain Showers	9/8/2012 4:00	25.5
Thunderstorms,Rain Showers,Fog	7/31/2012 20:00	22.9
Thunderstorms,Rain,Fog	7/17/2012 5:00	20.6
Dew Point Temp_C		Rel Hum_
% \		
Weather Condition		
Clear	20.4	99
Cloudy	22.6	99
Drizzle	17.7	96

Drizzle,Fog	19.1	100
Drizzle,Ice Pellets,Fog	-0.7	92
Drizzle,Snow	0.2	95
Drizzle,Snow,Fog	0.6	98
Fog	19.6	100
Freezing Drizzle	-3.3	93
Freezing Drizzle,Fog	-2.3	94
Freezing Drizzle,Haze	-7.7	83
Freezing Drizzle,Snow	-4.6	94
Freezing Fog	-0.3	99
Freezing Rain	-1.7	92
Freezing Rain,Fog	-0.9	93
Freezing Rain,Haze	-7.4	83
Freezing Rain,Ice Pellets,Fog	-3.7	92
Freezing Rain,Snow Grains	-7.3	84
Haze	11.1	86
Mainly Clear	21.2	99
Moderate Rain,Fog	0.8	94
Moderate Snow	-6.7	93
Moderate Snow,Blowing Snow	-6.4	93
Mostly Cloudy	24.4	100
Rain	20.4	99
Rain Showers	23.0	97
Rain Showers,Fog	12.1	96
Rain Showers,Snow Showers	-1.2	78
Rain,Fog	19.5	100

Rain,Haze	2.9	86
Rain,Ice Pellets	-0.6	92
Rain,Snow	0.5	94
Rain,Snow Grains	-2.1	75
Rain,Snow,Fog	0.3	96
Rain,Snow,Ice Pellets	0.1	94
Snow	0.3	96
Snow Pellets	-6.4	59
Snow Showers	-0.7	94
Snow Showers,Fog	-11.1	92
Snow,Blowing Snow	-2.9	91
Snow,Fog	0.8	99
Snow,Haze	-6.4	81
Snow,Ice Pellets	-1.7	92
Thunderstorms	20.1	87
Thunderstorms,Heavy Rain Showers	9.0	88
Thunderstorms,Moderate Rain Showers,Fog	18.5	93
Thunderstorms,Rain	19.1	93
Thunderstorms,Rain Showers	23.1	98
Thunderstorms,Rain Showers,Fog	21.3	91
Thunderstorms,Rain,Fog	18.6	88
Wind Speed_km/h		
Visibility_km \		
Weather Condition		
Clear	33	
48.3		
Cloudy	54	

48.3	
Drizzle	30
25.0	
Drizzle,Fog	28
9.7	
Drizzle,Ice Pellets,Fog	20
4.0	
Drizzle,Snow	19
11.3	
Drizzle,Snow,Fog	32
9.7	
Fog	22
9.7	
Freezing Drizzle	26
12.9	
Freezing Drizzle,Fog	33
8.0	
Freezing Drizzle,Haze	11
4.0	
Freezing Drizzle,Snow	24
12.9	
Freezing Fog	9
0.8	
Freezing Rain	28
16.1	
Freezing Rain,Fog	26
9.7	
Freezing Rain,Haze	9
2.8	
Freezing Rain,Ice Pellets,Fog	28
8.0	
Freezing Rain,Snow Grains	32
4.8	
Haze	17
9.7	
Mainly Clear	63
48.3	
Moderate Rain,Fog	17
6.4	
Moderate Snow	39
0.8	
Moderate Snow,Blowing Snow	41
0.6	
Mostly Cloudy	83
48.3	
Rain	52
48.3	
Rain Showers	41
48.3	

Rain Showers,Fog	13
6.4	
Rain Showers,Snow Showers	28
24.1	
Rain,Fog	46
9.7	
Rain,Haze	17
9.7	
Rain,Ice Pellets	24
9.7	
Rain,Snow	52
25.0	
Rain,Snow Grains	26
25.0	
Rain,Snow,Fog	9
6.4	
Rain,Snow,Ice Pellets	28
6.4	
Snow	57
25.0	
Snow Pellets	35
2.4	
Snow Showers	37
48.3	
Snow Showers,Fog	22
9.7	
Snow,Blowing Snow	48
9.7	
Snow,Fog	35
9.7	
Snow,Haze	15
6.4	
Snow,Ice Pellets	33
11.3	
Thunderstorms	15
25.0	
Thunderstorms,Heavy Rain Showers	9
2.4	
Thunderstorms,Moderate Rain Showers,Fog	15
3.2	
Thunderstorms,Rain	30
24.1	
Thunderstorms,Rain Showers	32
25.0	
Thunderstorms,Rain Showers,Fog	35
9.7	
Thunderstorms,Rain,Fog	19
4.8	

Weather Condition	Press_kPa
Clear	103.63
Cloudy	103.65
Drizzle	101.56
Drizzle,Fog	102.07
Drizzle,Ice Pellets,Fog	100.79
Drizzle,Snow	101.15
Drizzle,Snow,Fog	100.15
Fog	103.04
Freezing Drizzle	101.02
Freezing Drizzle,Fog	101.27
Freezing Drizzle,Haze	100.36
Freezing Drizzle,Snow	101.18
Freezing Fog	102.85
Freezing Rain	101.00
Freezing Rain,Fog	101.01
Freezing Rain,Haze	100.41
Freezing Rain,Ice Pellets,Fog	100.95
Freezing Rain,Snow Grains	98.56
Haze	102.97
Mainly Clear	103.59
Moderate Rain,Fog	99.98
Moderate Snow	100.67
Moderate Snow,Blowing Snow	100.64
Mostly Cloudy	103.65
Rain	102.26
Rain Showers	102.31
Rain Showers,Fog	99.83
Rain Showers,Snow Showers	101.11
Rain,Fog	101.77
Rain,Haze	100.61
Rain,Ice Pellets	100.12
Rain,Snow	101.07
Rain,Snow Grains	100.60
Rain,Snow,Fog	100.73
Rain,Snow,Ice Pellets	100.47
Snow	102.73
Snow Pellets	99.70
Snow Showers	102.50
Snow Showers,Fog	102.52
Snow,Blowing Snow	100.62
Snow,Fog	102.07
Snow,Haze	100.99
Snow,Ice Pellets	100.96
Thunderstorms	100.62
Thunderstorms,Heavy Rain Showers	100.26
Thunderstorms,Moderate Rain Showers,Fog	100.01
Thunderstorms,Rain	100.83

Thunderstorms,Rain Showers	101.06
Thunderstorms,Rain Showers,Fog	100.64
Thunderstorms,Rain,Fog	100.08

Q. 13) Show all the Records where Weather Condition is Fog.

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

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h \
0	1/1/2012 0:00	-1.8	-3.9	86	
4					
1	1/1/2012 1:00	-1.8	-3.7	87	
4					
4	1/1/2012 4:00	-1.5	-3.3	88	
7					
5	1/1/2012 5:00	-1.4	-3.3	87	
9					
6	1/1/2012 6:00	-1.5	-3.1	89	
7					
...	
...					
8716	12/29/2012 4:00	-16.0	-17.2	90	
6					
8717	12/29/2012 5:00	-14.8	-15.9	91	
4					
8718	12/29/2012 6:00	-13.8	-15.3	88	
4					
8719	12/29/2012 7:00	-14.8	-16.4	88	
7					
8722	12/29/2012 10:00	-12.0	-13.3	90	
7					

	Visibility_km	Press_kPa	Weather Condition
0	8.0	101.24	Fog
1	8.0	101.24	Fog
4	4.8	101.23	Fog
5	6.4	101.27	Fog
6	6.4	101.29	Fog
...
8716	9.7	101.25	Fog
8717	6.4	101.25	Fog
8718	9.7	101.25	Fog
8719	8.0	101.22	Fog
8722	6.4	101.15	Fog

[150 rows x 8 columns]

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

```
data[(data['Weather Condition'] == 'Clear') | (data['Visibility_km'] > 40)].tail(50)
```

	Date/Time	Temp_C	Dew Point	Temp_C	Rel Hum_%	Wind Speed_km/h
8387	12/15/2012 11:00	-9.3		-14.9	64	19
8388	12/15/2012 12:00	-9.1		-15.1	62	19
8389	12/15/2012 13:00	-8.4		-14.7	60	19
8390	12/15/2012 14:00	-8.0		-14.2	61	13
8391	12/15/2012 15:00	-7.8		-13.7	63	15
8392	12/15/2012 16:00	-8.5		-14.8	60	20
8394	12/15/2012 18:00	-9.1		-15.1	62	17
8396	12/15/2012 20:00	-8.7		-15.1	60	20
8408	12/16/2012 8:00	-9.5		-14.8	65	32
8599	12/24/2012 7:00	-11.1		-13.9	80	15
8600	12/24/2012 8:00	-11.0		-13.9	79	13
8601	12/24/2012 9:00	-10.5		-13.7	77	13
8602	12/24/2012 10:00	-9.9		-13.4	76	11
8603	12/24/2012 11:00	-9.0		-13.7	69	11
8604	12/24/2012 12:00	-7.9		-13.3	65	9
8605	12/24/2012 13:00	-7.6		-13.1	65	15
8606	12/24/2012 14:00	-7.8		-13.7	63	15
8607	12/24/2012 15:00	-7.5		-13.3	63	13

8610 9	12/24/2012 18:00	-10.4	-13.8	76
8630 6	12/25/2012 14:00	-7.7	-14.1	60
8631 17	12/25/2012 15:00	-7.1	-13.7	59
8632 11	12/25/2012 16:00	-7.5	-13.9	60
8633 13	12/25/2012 17:00	-8.3	-13.4	67
8637 4	12/25/2012 21:00	-9.7	-12.5	80
8638 4	12/25/2012 22:00	-10.9	-13.2	83
8639 11	12/25/2012 23:00	-10.4	-12.7	83
8640 4	12/26/2012 0:00	-11.8	-13.5	87
8641 6	12/26/2012 1:00	-11.2	-12.9	87
8642 4	12/26/2012 2:00	-12.7	-14.4	87
8643 6	12/26/2012 3:00	-14.2	-15.8	88
8644 6	12/26/2012 4:00	-13.1	-14.7	88
8645 4	12/26/2012 5:00	-12.7	-14.1	89
8646 4	12/26/2012 6:00	-13.4	-14.8	89
8651 20	12/26/2012 11:00	-11.3	-14.5	77
8652 20	12/26/2012 12:00	-10.6	-14.3	74
8698 19	12/28/2012 10:00	-6.1	-8.6	82
8699 24	12/28/2012 11:00	-6.2	-8.8	82
8700 24	12/28/2012 12:00	-7.2	-9.9	81
8701 20	12/28/2012 13:00	-6.8	-9.8	79
8702 22	12/28/2012 14:00	-6.5	-9.9	77
8703 24	12/28/2012 15:00	-6.8	-10.3	76
8704 30	12/28/2012 16:00	-7.7	-11.0	77
8713	12/29/2012 1:00	-11.9	-13.6	87

11				
8714	12/29/2012 2:00	-11.8	-13.1	90
13				
8748	12/30/2012 12:00	-12.2	-15.7	75
26				
8749	12/30/2012 13:00	-12.4	-16.2	73
37				
8750	12/30/2012 14:00	-11.8	-16.1	70
37				
8751	12/30/2012 15:00	-11.3	-15.6	70
32				
8752	12/30/2012 16:00	-11.4	-15.5	72
26				
8756	12/30/2012 20:00	-13.8	-16.5	80
24				

	Visibility_km	Press_kPa	Weather	Condition
8387	48.3	102.74	Mainly	Clear
8388	48.3	102.71	Mainly	Clear
8389	48.3	102.64		Clear
8390	48.3	102.59	Mainly	Clear
8391	48.3	102.55	Mainly	Clear
8392	48.3	102.54	Mainly	Clear
8394	25.0	102.54		Clear
8396	25.0	102.50		Clear
8408	48.3	101.85		Cloudy
8599	25.0	101.23		Clear
8600	25.0	101.32		Clear
8601	24.1	101.41		Clear
8602	48.3	101.45	Mainly	Clear
8603	48.3	101.44	Mainly	Clear
8604	48.3	101.43	Mainly	Clear
8605	48.3	101.45	Mainly	Clear
8606	48.3	101.46	Mainly	Clear
8607	48.3	101.49	Mainly	Clear
8610	25.0	101.45		Clear
8630	48.3	101.95	Mainly	Clear
8631	48.3	101.98		Clear
8632	48.3	102.03		Clear
8633	25.0	102.10		Clear
8637	25.0	102.28		Clear
8638	25.0	102.34		Clear
8639	25.0	102.45		Clear
8640	25.0	102.41		Clear
8641	25.0	102.42		Clear
8642	25.0	102.45		Clear
8643	25.0	102.52		Clear
8644	25.0	102.55		Clear
8645	25.0	102.48		Clear

8646	25.0	102.47		Clear
8651	48.3	102.50	Mainly	Clear
8652	48.3	102.36	Mainly	Clear
8698	24.1	101.27		Clear
8699	48.3	101.24	Mainly	Clear
8700	48.3	101.22	Mainly	Clear
8701	48.3	101.17	Mainly	Clear
8702	48.3	101.17	Mainly	Clear
8703	48.3	101.22	Mainly	Clear
8704	48.3	101.25	Mainly	Clear
8713	25.0	101.31		Clear
8714	25.0	101.33		Clear
8748	48.3	100.91	Mostly	Cloudy
8749	48.3	100.92	Mostly	Cloudy
8750	48.3	100.96	Mainly	Clear
8751	48.3	101.05	Mainly	Clear
8752	48.3	101.15	Mainly	Clear
8756	25.0	101.52		Clear

Q. 15) Find all instances when :

A. 'Weather is Clear' and 'Relative Humidity is greater than 50'

or

B. 'Visibility is above 40'

```
data.head(2)
```

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

	Visibility_km	Press_kPa	Weather Condition
0	8.0	101.24	Fog
1	8.0	101.24	Fog

```
data[(data['Weather Condition'] == 'Clear') & (data['Rel Hum_%'] > 50)| (data['Visibility_km'] > 40)]
```

	Date/Time	Temp_C	Dew Point	Temp_C	Rel Hum_%	Wind Speed_km/h
106	1/5/2012 10:00	-6.0		-10.0	73	
17						
107	1/5/2012 11:00	-5.6		-10.2	70	

```

22
108      1/5/2012 12:00      -4.7              -9.6              69
20
109      1/5/2012 13:00      -4.4              -9.7              66
26
110      1/5/2012 14:00      -5.1             -10.7              65
22
...      ...      ...      ...      ...
...
8749     12/30/2012 13:00     -12.4             -16.2              73
37
8750     12/30/2012 14:00     -11.8             -16.1              70
37
8751     12/30/2012 15:00     -11.3             -15.6              70
32
8752     12/30/2012 16:00     -11.4             -15.5              72
26
8756     12/30/2012 20:00     -13.8             -16.5              80
24

```

```

      Visibility_km  Press_kPa  Weather Condition
106              48.3      100.45      Mainly Clear
107              48.3      100.41      Mainly Clear
108              48.3      100.38      Mainly Clear
109              48.3      100.40      Mainly Clear
110              48.3      100.46      Mainly Clear
...              ...      ...      ...
8749              48.3      100.92      Mostly Cloudy
8750              48.3      100.96      Mainly Clear
8751              48.3      101.05      Mainly Clear
8752              48.3      101.15      Mainly Clear
8756              25.0      101.52      Clear

```

```
[2921 rows x 8 columns]
```
