Working On Real Project With Python A Part Of Big Data Analysis

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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"D:\Project\Python\Weather Data Analysis\Weather Data Analysis.csv") data Date/Time Temp C Dew Point Temp C Rel Hum % Speed_km/h \ 86 1/1/2012 0:00 -1.8 -3.9 4 1 -3.7 87 1/1/2012 1:00 -1.8 4 2 1/1/2012 2:00 -3.4 89 -1.8 7 3 88 1/1/2012 3:00 -1.5 -3.2 6 4 1/1/2012 4:00 -1.5 -3.3 88 7 . . . 8779 12/31/2012 19:00 0.1 -2.781 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

	Visibility_km	Press_kPa	Weather
0	8.0	$10\overline{1}.24$	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
                           99.95
8781
                 4.8
                                                    Snow
8782
                 9.7
                           99.91
                                                    Snow
8783
                           99.89
                11.3
                                                    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 1/1/2012 0:00 -1.8 -3.9 86 4 1 1/1/2012 1:00 -3.7 87 -1.8 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 3 101.27 4.0 Freezing Drizzle, Fog 4 101.23 4.8 Fog

.shape

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

data.shape

(8784, 8)

.index

This attiribute provides the index of the dataframe

```
data.index
```

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

.columns

It shows the name of each column

.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

.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
                       24
Visibility km
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 a single column only.

In a column it shows all the unique values with their count.	It can be applied on a single column only.
<pre>data['Weather'].value_counts()</pre>	
Weather	
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
	41
Drizzle	37
Snow, Fog	
Snow, Blowing Snow	19 18
Rain, Snow	
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: count, dtype: int64
```

.info()

```
Provides basic information about the dtaaframe
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
     Temp_C
                        8784 non-null
                                        float64
 1
2
     Dew Point Temp_C 8784 non-null
                                        float64
 3
     Rel Hum %
                        8784 non-null
                                        int64
     Wind Speed_km/h
 4
                        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
  1/1/2012 0:00
                    -1.8
                                      -3.9
                                                    86
                                                                      4
1 1/1/2012 1:00
                                      -3.7
                                                    87
                                                                      4
                    -1.8
   Visibility_km Press_kPa Weather
             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
                      24
Visibility km
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()
Weather
Mainly Clear
                                            2106
Mostly Cloudy
                                            2069
Cloudy
                                            1728
Clear
                                            1326
Snow
                                             390
Rain
                                             306
Rain Showers
                                             188
Fog
                                             150
                                             116
Rain, Fog
Drizzle, Fog
                                              80
```

```
Snow Showers
                                                60
                                                41
Drizzle
Snow, Fog
                                                37
Snow, Blowing Snow
                                                19
Rain, Snow
                                                18
Thunderstorms, Rain Showers
                                                16
Haze
                                                16
Drizzle, Snow, Fog
                                                15
                                                14
Freezing Rain
Freezing Drizzle, Snow
                                                11
Freezing Drizzle
                                                 7
Snow, Ice Pellets
                                                 6
Freezing Drizzle, Fog
                                                 6
                                                 5
Snow, Haze
Freezing Fog
                                                 4
Snow Showers, Fog
                                                 4
Moderate Snow
Rain, Snow, Ice Pellets
Freezing Rain, Fog
Freezing Drizzle, Haze
                                                 3
                                                 3
Rain, Haze
                                                 3
Thunderstorms, Rain
                                                 3
Thunderstorms, Rain Showers, Fog
                                                 2
Freezing Rain, Haze
Drizzle, Snow
                                                 2
                                                 2
Rain Showers, Snow Showers
Thunderstorms
                                                 2
Moderate Snow, Blowing Snow
                                                 2
                                                 1
Rain Showers, Fog
Thunderstorms, Moderate Rain Showers, Fog
                                                 1
                                                 1
Snow Pellets
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
                                                 1
Rain, Snow Grains
                                                 1
Thunderstorms, Heavy Rain Showers
Freezing Rain, Snow Grains
                                                 1
Name: count, 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 7	1/5/2012 19:00	-9.2	-	15.4	61	
116	1/5/2012 20:00	-9.8	-	15.7	62	
9 117 13	1/5/2012 21:00	-9.0	-	14.8	63	
8646 4	12/26/2012 6:00	-13.4	-	14.8	89	
8698 19	12/28/2012 10:00	-6.1		-8.6	82	
8713 11	12/29/2012 1:00	-11.9	-	13.6	87	
8714 13	12/29/2012 2:00	-11.8	-	13.1	90	
8756 24	12/30/2012 20:00	-13.8	-	16.5	80	
#Group	Visibility_km Pr 25.0 25.0 25.0 25.0 25.0 25.0 24.1 25.0 25.0 25.0 25.0 25.0 25.0 27.0 28.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0	101.74 100.71 100.80 100.83 100.83 102.47 101.27 101.31 101.33 101.52	Clear			
Speed	Date/Time _km/h \	Temp_C	Dew Point Te	emp_C Rel	Hum_%	Wind
67 24	1/3/2012 19:00	-16.9	-	24.8	50	
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 9	1/5/2012 20:00	-9.8	-	15.7	62	

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						
67 114 115 116 117	25.0 25.0 25.0 25.0 25.0	ess_kPa 101.74 100.71 100.80 100.83 100.83	Clear Clear Clear Clear Clear			
8646 8698 8713 8714 8756	25.0 24.1 25.0 25.0 25.0	102.47 101.27 101.31 101.33 101.52	Clear Clear Clear Clear 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
  1/1/2012 0:00
                    -1.8
                                     -3.9
                                                  86
                                                                    4
1 1/1/2012 1:00
                                                  87
                   -1.8
                                     -3.7
  Visibility_km Press_kPa Weather
0
             8.0
                     101.24
                               Fog
            8.0
                    101.24
                               Fog
data[data['Wind Speed_km/h']==4] #Answer
```

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind
0	_km/h \	-1.8	-3.9	86	
4 1 4	1/1/2012 1:00	-1.8	-3.7	87	
96 4	1/5/2012 0:00	-8.8	-11.7	79	
101 4	1/5/2012 5:00	-7.0	-9.5	82	
146 4	1/7/2012 2:00	-8.1	-11.1	79	
8768 4	12/31/2012 8:00	-8.6	-10.3	87	
8769 4	12/31/2012 9:00	-8.1	-9.6	89	
8770 4	12/31/2012 10:00	-7.4	-8.9	89	
8772 4	12/31/2012 12:00	-5.8	-7.5	88	
8773 4	12/31/2012 13:00	-4.6	-6.6	86	
0	Visibility_km Pr 8.0	ess_kPa 101.24	Weather Fog		
1 96 101 146	8.0 9.7 4.0 19.3	101.24 100.32 100.19 100.15	Fog Snow Snow Cloudy		
8768 8769 8770 8772 8773	3.2 2.4 6.4 12.9 12.9	101.14 101.09 101.05 100.78 100.63	Snow Showers Snow Snow, Fog Snow Snow		
[474	rows x 8 columns]				

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

```
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
  1/1/2012 0:00
                    -1.8
                                      -3.9
                                                   86
                                                                    4
1 1/1/2012 1:00
                                                   87
                    -1.8
                                      -3.7
  Visibility_km Press_kPa Weather
0
             8.0
                     101.24
                                Fog
             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
  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
                                                   89
                                                                     7
                   -1.8
                                      -3.4
3 1/1/2012 3:00
                    -1.5
                                      -3.2
                                                   88
                                                                    6
4 1/1/2012 4:00
                                                   88
                                                                     7
                    -1.5
                                      -3.3
  Visibility km Press kPa
                               Weather Condition
```

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
1
             8.0
                     101.24
                                          Fog
data.Visibility_km.mean()
27.664446721311478
```

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

```
data.Press_kPa.std()
0.8440047459486474
```

Q) 8. What is the Varience 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()

Weather Condition
Mainly Clear 2106
Mostly Cloudy 2069
```

Cloudy Clear	1728 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 3 3 2 2	
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	ī	
Rain, Snow, Fog	ī	
Moderate Rain, Fog	1	
Freezing Rain, Ice Pellets, Fog	1	
Drizzle,Ice Pellets,Fog	ī	
Thunderstorms, Rain, Fog	1	
Rain, Ice Pellets	1	
Rain, Snow Grains	ī	
Thunderstorms, Heavy Rain Showers	1	
Freezing Rain, Snow Grains	1	
Name: count, dtype: int64		
, ,1		

#Filtering data[data['Weather Condition']== 'Snow'] Date/Time Temp C Dew Point Temp C Rel Hum % Wind Speed km/h \ 1/3/2012 7:00 55 -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 93 -0.5 -1.5 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 19.3 88 100.79 Snow 9.7 100.13 8779 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(20) Date/Time Temp C Dew Point Temp C Rel Hum % Wind Speed km/h 8740 12/30/2012 4:00 -9.3 -10.6 90 13

8741 11	12/30/2012 5:00	-9.1	-10.4	90	
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 4	12/31/2012 8:00	-8.6	-10.3	87	
8769 4	12/31/2012 9:00	-8.1	-9.6	89	
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 4	12/31/2012 13:00	-4.6	-6.6	86	
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					
8740 8741	9.7 4.0	$10\overline{0}.28$ 100.32	ather Condition Snow,Fog Snow,Fog		
8742 8767	8.0 19.3	100.39 101.19	Snow, Fog Snow Showers		
8768 8769	3.2 2.4	101.14 101.09	Snow Showers Snow Snow Food		
8770 8771 8772	6.4 9.7 12.9	101.05 100.93 100.78	Snow, Fog Snow Snow		

			100.63 100.57 100.47 100.40 100.30 100.13 100.03 99.95 99.91 99.89		12.9 11.3 9.7 12.9 9.7 9.7 9.7 4.8 9.7 11.3		8773 8774 8775 8776 8777 8778 8779 8780 8781 8782 8783
--	--	--	-----------------------------------------------------------------------------------------------	--	------------------------------------------------------------------------	--	--------------------------------------------------------------------------------------

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

```
data.head(2)
                  Temp_C Dew Point Temp_C Rel Hum_% Wind Speed_km/h
       Date/Time
/
  1/1/2012 0:00
                                        -3.9
                                                      86
                                                                         4
                     -1.8
  1/1/2012 1:00
                                                      87
                                                                         4
                     -1.8
                                        -3.7
                   Press_kPa Weather Condition
   Visibility km
0
              8.0
                      101.24
                                            Fog
             8.0
                      101.24
                                            Fog
data[(data['Wind Speed km/h'] >24) & (data['Visibility km'] ==25)]
                         Temp_C Dew Point Temp_C Rel Hum_% Wind
             Date/Time
Speed_km/h \
        1/1/2012 23:00
                            5.3
                                               2.0
                                                            79
23
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
                                              -12.0
                           -8.6
                                                            76
26
      12/30/2012 17:00
                                              -15.8
                                                            74
8753
                          -12.1
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
                                            -14.4
                                                           77
8760
       12/31/2012 0:00 -11.1
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
. . .
                         101.34
               25.0
                                     Mainly Clear
8705
               25.0
                        101.26
                                     Mainly Clear
8753
8755
               25.0
                        101.47
                                     Mainly Clear
               25.0
                        101.52
                                    Mostly Cloudy
8759
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
                                                  87
                                                                    4
                   -1.8
                                     -3.7
  Visibility km Press kPa Weather Condition
0
            8.0
                    101.24
1
            8.0
                    101.24
                                         Fog
data.columns
Index(['Date/Time', 'Temp C', 'Dew Point Temp C', 'Rel Hum %',
       'Wind Speed_km/h', 'Visibility_km', 'Press_kPa', 'Weather
Condition'],
     dtype='object')
data.groupby('Weather
Condition').mean(numeric only=True).reset index()
                         Weather Condition Temp C Dew Point
Temp C \
                                     Clear
                                             6.825716
```

0.089367 1	Cloudy	7.970544	
2.375810	Ctoudy	7.970344	
2	Drizzle	7.353659	
5.504878 3	Drizzle,Fog	8.067500	
7.033750	Di 122 te, i og	8.007500	
4	Drizzle,Ice Pellets,Fog	0.400000	-
0.700000	Doi: -10 Cook	1 050000	
5 0.150000	Drizzle,Snow	1.050000	
6	Drizzle,Snow,Fog	0.693333	
0.120000	_		
7 3.159333	Fog	4.303333	
8	Freezing Drizzle	-5.657143	_
8.000000	J		
9	Freezing Drizzle,Fog	-2.533333	-
4.183333 10	Freezing Drizzle,Haze	-5.433333	_
8.000000	rreczing brizzte, naze	- 3 : 433333	
11	Freezing Drizzle,Snow	-5.109091	-
7.072727	Franzina Faa	7 575000	
12 9.250000	Freezing Fog	-7.575000	-
13	Freezing Rain	-3.885714	-
6.078571			
14 3.750000	Freezing Rain,Fog	-2.225000	-
15	Freezing Rain,Haze	-4.900000	_
7.450000			
16	Freezing Rain,Ice Pellets,Fog	-2.600000	-
3.700000 17	Freezing Rain, Snow Grains	-5.000000	_
7.300000	rreczing nain, snew crains	3.000000	
18	Haze	-0.200000	-
2.975000 19	Mainly Clear	12.558927	
4.581671	Hainty Clear	12.330927	
20	Moderate Rain,Fog	1.700000	
0.800000	Madagata Coo.	F F2F000	
21 7.250000	Moderate Snow	-5.525000	-
22	Moderate Snow, Blowing Snow	-5.450000	-
6.500000			
23 3.131174	Mostly Cloudy	10.574287	
24	Rain	9.786275	
7.042810			

25 9.187766	Rain Showers	13.722340	
26	Rain Showers,Fog	12.800000	
12.100000 27	Rain Showers, Snow Showers	2.150000	-
1.500000 28	Pain For	8.273276	
7.219828	Rain, Fog	0.2/32/0	
29 2.066667	Rain,Haze	4.633333	
30	Rain,Ice Pellets	0.600000	-
0.600000 31	Rain,Snow	1.055556	-
0.566667 32	Rain, Snow Grains	1.900000	
2.100000	·		-
33 0.300000	Rain, Snow, Fog	0.800000	
34	Rain, Snow, Ice Pellets	1.100000	-
0.175000 35	Snow	-4.524103	-
7.623333 36	Snow Pellets	0.700000	
6.400000			-
37 7.866667	Snow Showers	-3.506667	-
38	Snow Showers, Fog	-10.675000	-
11.900000 39	Snow,Blowing Snow	-5.410526	-
7.621053 40	Snow, Fog	-5.075676	
6.364865			
41 6.860000	Snow, Haze	-4.020000	-
42	Snow,Ice Pellets	-1.883333	-
3.666667 43	Thunderstorms	24.150000	
19.750000 44	Thunderstorms, Heavy Rain Showers	10.900000	
9.000000	·		
45 Thunde 18.500000	rstorms, Moderate Rain Showers, Fog	19.600000	
46	Thunderstorms,Rain	20.433333	
18.533333 47	Thunderstorms, Rain Showers	20.037500	
17.618750 48	Thunderstorms, Rain Showers, Fog	21.600000	
18.700000			
49	Thunderstorms, Rain, Fog	20.600000	

10	\sim	\sim	\sim
18.	60	90	00
_			

0 64.497738 10.557315 30.153243 101.587443 1 69.592593 16.127315 26.625752 100.911441 2 88.243902 16.097561 17.931707 100.435366 3 93.275000 11.862500 5.257500 100.786625 4 92.000000 20.000000 4.000000 100.790000 5 93.500000 14.000000 10.500000 100.890000 6 95.866667 15.533333 5.513333 99.28133 7 92.286667 7.946667 6.248000 101.184067 8 83.571429 16.571429 9.200000 100.202857 9 88.500000 17.000000 5.266667 100.441667 10 82.000000 16.272727 5.872727 100.520999 12 87.750000 4,750000 0.550000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 7.500000 7.550000 99.945000						
1 69.592593 16.127315 26.625752 100.911441 2 88.243902 16.097561 17.931707 100.435366 3 93.275000 11.862500 5.257500 100.786625 4 92.000000 20.000000 4.000000 100.790000 5 93.500000 14.000000 10.500000 100.890000 6 95.866667 15.533333 5.513333 99.281333 7 92.286667 7.946667 6.248000 101.184067 8 83.571429 16.571429 9.200000 100.202857 9 88.500000 17.000000 5.266667 100.441667 10 82.000000 10.333333 2.666667 100.441667 11 86.090909 16.272727 5.872727 100.520909 12 87.750000 4.750000 0.650000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 15.500000 7.550000 99.945000 15 82.500000 7.500000 8.000000 100.375000		Rel Hum_%	Wind	Speed_km/h	Visibility_km	Press_kPa
1 69.592593 16.127315 26.625752 100.911441 2 88.243902 16.097561 17.931707 100.435366 3 93.275000 11.862500 5.257500 100.786625 4 92.000000 20.000000 4.000000 100.790000 5 93.500000 14.000000 10.500000 100.890000 6 95.866667 15.533333 5.513333 99.281333 7 92.286667 7.946667 6.248000 101.184067 8 83.571429 16.571429 9.200000 100.202857 9 88.500000 17.000000 5.266667 100.441667 10 82.000000 10.333333 2.666667 100.441667 11 86.090909 16.272727 5.872727 100.520909 12 87.750000 4.750000 0.650000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 15.500000 7.550000 99.945000 15 82.500000 7.500000 8.000000 100.375000	0	64.497738		10.557315	30.153243	101.587443
2 88.243902 16.097561 17.931707 100.435366 3 93.275000 11.862500 5.257500 100.786625 4 92.000000 20.000000 4.000000 100.790000 5 93.500000 14.000000 10.500000 100.890000 6 95.866667 15.533333 5.513333 99.281333 7 92.286667 7.946667 6.248000 101.184067 8 83.571429 16.571429 9.200000 100.202857 9 88.500000 17.000000 5.266667 100.41667 10 82.000000 10.333333 2.666667 100.41667 11 86.090909 16.272727 5.872727 100.520909 12 87.750000 4.750000 0.650000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 7.550000 7.550000 99.945000 15 82.500000 7.500000 8.000000 100.375000 16 92.000000 28.000000 4.800000 98.560000 <		69 592593				
3 93.275000 11.862500 5.257500 100.786625 4 92.000000 20.000000 4.000000 100.790000 5 93.500000 14.000000 100.500000 100.890000 6 95.866667 15.533333 5.513333 99.281333 7 92.286667 7.946667 6.248000 101.184067 8 83.571429 16.571429 9.200000 100.202857 9 88.500000 17.000000 5.266667 100.441667 10 82.000000 10.333333 2.666667 100.316667 11 86.090909 16.272727 5.872772 100.520909 12 87.750000 4.750000 0.650000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 7.500000 7.550000 99.945000 15 82.500000 7.500000 7.550000 100.375000 16 92.000000 28.000000 8.00000 100.950000 17 84.00000 32.00000 7.831250 101.482500						
4 92.000000 20.000000 1.0.500000 100.790000 5 93.500000 14.000000 10.500000 100.890000 6 95.866667 15.533333 5.513333 99.281333 7 92.286667 7.946667 6.248000 101.184067 8 83.571429 16.571429 9.200000 100.202857 9 88.500000 17.000000 5.266667 100.441667 10 82.000000 10.333333 2.666667 100.316667 11 86.090909 16.272727 5.872727 100.520909 12 87.750000 4.750000 0.659000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 7.500000 7.550000 99.945000 15 82.500000 7.500000 2.400000 100.375000 16 92.000000 32.000000 4.800000 98.560000 17 84.000000 32.000000 4.800000 99.980000 <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td>	2					
5 93.500000 14.000000 10.500000 100.890000 6 95.866667 15.533333 5.513333 99.281333 7 92.286667 7.946667 6.248000 101.184067 8 83.571429 16.571429 9.200000 100.202857 9 88.500000 17.000000 5.266667 100.441667 10 82.000000 10.333333 2.666667 100.316667 11 86.090909 16.272727 5.872727 100.520909 12 87.750000 4.750000 0.650000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 7.500000 7.550000 99.945000 15 82.500000 7.500000 2.400000 100.375000 16 92.000000 28.000000 4.800000 98.560000 17 84.000000 32.000000 4.800000 98.560000 18 81.625000 10.437500 7.831250 101.482500	3					
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8 83.571429 16.571429 9.200000 100.202857 9 88.500000 17.000000 5.266667 100.441667 10 82.000000 10.3333333 2.666667 100.316667 11 86.090909 16.272727 5.872727 100.520909 12 87.750000 4.750000 0.650000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 15.500000 7.550000 99.945000 15 82.500000 7.500000 2.400000 100.375000 16 92.000000 28.000000 8.000000 100.950000 17 84.000000 32.000000 4.800000 98.560000 18 81.625000 10.437500 7.831250 101.482500 19 60.667142 14.144824 34.264862 101.248832 20 94.000000 17.000000 6.400000 99.980000 21 87.750000 33.750000 0.750000 100.275000 22 92.500000 40.000000 18.856536 100.233333	7	92.286667		7.946667	6.248000	101.184067
9 88.500000 17.000000 5.266667 100.441667 10 82.000000 10.3333333 2.666667 100.316667 11 86.090909 16.272727 5.872727 100.520909 12 87.750000 4.750000 0.650000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 15.500000 7.550000 99.945000 15 82.500000 7.500000 2.400000 100.375000 16 92.000000 28.000000 8.000000 100.950000 17 84.000000 32.000000 4.800000 98.560000 18 81.625000 10.437500 7.831250 101.482500 19 60.667142 14.144824 34.264862 101.248832 20 94.000000 17.000000 6.400000 99.980000 21 87.750000 33.750000 0.750000 100.275000 22 92.500000 40.000000 0.600000 100.570000 23 62.102465 15.813920 31.253842 100.25288						
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11 86.090909 16.272727 5.872727 100.520909 12 87.750000 4.750000 0.650000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 15.500000 7.550000 99.945000 15 82.500000 7.500000 2.400000 100.375000 16 92.000000 28.000000 8.000000 100.950000 17 84.00000 32.000000 4.800000 98.560000 18 81.625000 10.437500 7.831250 101.482500 19 60.667142 14.144824 34.264862 101.248832 20 94.00000 17.000000 6.40000 99.98000 21 87.750000 33.750000 0.750000 100.57000 22 92.500000 40.000000 0.600000 100.57000 23 62.102465 15.813920 31.253842 101.025288 24 83.624183 19.254902 18.856536 100.233333 25 75.159574 17.132979 22.816489 100.404043 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
12 87.750000 4.750000 0.650000 102.320000 13 84.642857 19.214286 8.242857 99.647143 14 89.500000 15.500000 7.550000 99.945000 15 82.500000 7.500000 2.400000 100.375000 16 92.000000 28.000000 8.000000 100.950000 17 84.000000 32.000000 4.800000 98.560000 18 81.625000 10.437500 7.831250 101.482500 19 60.667142 14.144824 34.264862 101.248832 20 94.000000 17.000000 6.40000 99.980000 21 87.750000 33.750000 0.750000 100.275000 22 92.500000 40.000000 0.600000 100.570000 23 62.102465 15.813920 31.253842 101.025288 24 83.624183 19.254902 18.856536 100.233333 25 75.159574 17.132979 22.816489 100.404043 26 96.000000 13.000000 6.873276 100.5000						
13 84.642857 19.214286 8.242857 99.647143 14 89.500000 15.500000 7.550000 99.945000 15 82.500000 7.500000 2.400000 100.375000 16 92.000000 28.000000 8.000000 100.950000 17 84.00000 32.000000 4.800000 98.560000 18 81.625000 10.437500 7.831250 101.482500 19 60.667142 14.144824 34.264862 101.248832 20 94.000000 17.000000 6.40000 99.980000 21 87.750000 33.750000 0.750000 100.275000 22 92.500000 40.000000 0.600000 100.570000 23 62.102465 15.813920 31.253842 101.025288 24 83.624183 19.254902 18.856536 100.233333 25 75.159574 17.132979 22.816489 100.404043 26 96.000000 13.000000 6.400000 99.830000 27 76.500000 22.500000 21.700000 100.5008						
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15 82.500000 7.500000 2.400000 100.375000 16 92.000000 28.000000 8.000000 100.950000 17 84.00000 32.000000 4.800000 98.560000 18 81.625000 10.437500 7.831250 101.482500 19 60.667142 14.144824 34.264862 101.248832 20 94.000000 17.000000 6.40000 99.980000 21 87.750000 33.750000 0.750000 100.275000 22 92.500000 40.000000 0.600000 100.570000 23 62.102465 15.813920 31.253842 101.025288 24 83.624183 19.254902 18.856536 100.2333333 25 75.159574 17.132979 22.816489 100.404043 26 96.000000 13.000000 6.400000 99.830000 27 76.500000 22.500000 21.70000 101.100000 30 92.000000 24.00000 9.700000 100.500862 29 83.333333 11.666667 6.700000 100.120	13	84.642857		19.214286		99.647143
16 92.000000 28.000000 8.000000 100.950000 17 84.000000 32.000000 4.800000 98.560000 18 81.625000 10.437500 7.831250 101.482500 19 60.667142 14.144824 34.264862 101.248832 20 94.000000 17.000000 6.400000 99.980000 21 87.750000 33.750000 0.750000 100.275000 22 92.500000 40.000000 0.600000 100.570000 23 62.102465 15.813920 31.253842 101.025288 24 83.624183 19.254902 18.856536 100.233333 25 75.159574 17.132979 22.816489 100.404043 26 96.000000 13.000000 6.400000 99.830000 27 76.500000 22.500000 21.700000 101.100000 28 93.189655 14.793103 6.873276 100.500862 29 83.333333 11.666667 6.700000 100.120000 31 89.000000 26.000000 25.000000 10	14	89.500000		15.500000	7.550000	99.945000
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36 59.000000 35.000000 2.400000 99.700000	34	91.500000		23.250000		100.105000
	35	79.307692		20.038462	11.171795	100.536103
	36	59.000000		35.000000	2.400000	99.700000
37 72.350000 19.233333 20.158333 100.963500				19.233333		100.963500
38 90.750000 13.750000 7.025000 101.292500						
39 84.473684 34.842105 4.105263 99.704737						
40 90.675676 17.324324 4.537838 100.688649						
42 87.666667 23.833333 7.416667 100.548333						
43 77.000000 7.500000 24.550000 100.230000						
44 88.000000 9.000000 2.400000 100.260000						
45 93.000000 15.000000 3.200000 100.010000	45	93.000000		15.000000	3.200000	100.010000

4	47	89.000000 86.375000	15.666667 18.312500	19.833333 15.893750	100.420000 100.233750
4	48	84.000000	19.666667	9.700000	100.063333
4	49	88.000000	19.000000	4.800000	100.080000

Q) 12. What is the Minimum & Maximum value of each columns against 'each weather condition'?

```
data.head(2)
       Date/Time Temp C Dew Point Temp C Rel Hum % Wind Speed km/h
  1/1/2012 0:00
                     -1.8
                                        -3.9
                                                     86
                                                     87
1 1/1/2012 1:00
                    -1.8
                                        -3.7
   Visibility km Press kPa Weather Condition
0
             8.0
                      101.24
                                            Foa
             8.0
                      101.24
                                            Fog
data.groupby('Weather Condition').min()
                                                  Date/Time Temp C \
Weather Condition
Clear
                                                              -23.3
                                             1/11/2012 1:00
                                             1/1/2012 17:00
                                                              -21.4
Cloudy
                                            1/23/2012 21:00
                                                                1.1
Drizzle
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
                                           12/18/2012 21:00
Drizzle, Snow, Fog
                                                                0.3
                                              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
                                                               -5.8
Freezing Drizzle, Haze
                                             2/1/2012 11:00
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
                                                               -2.6
                                            12/17/2012 3:00
Freezing Rain, Snow Grains
                                                                -5.0
                                            1/13/2012 9:00
                                            1/22/2012 12:00
Haze
                                                              -11.5
Mainly Clear
                                            1/10/2012 11:00
                                                              -22.8
Moderate Rain, Fog
                                            12/10/2012 8:00
                                                                1.7
                                                                -6.3
Moderate Snow
                                            1/12/2012 15:00
                                                                -5.5
Moderate Snow, Blowing Snow
                                          12/27/2012 10:00
Mostly Cloudy
                                             1/1/2012 16:00
                                                              -23.2
```

Rain Showers Rain Showers, Fog Rain Showers, Fog Rain Showers, Snow Showers Rain, Fog Rain, Haze Rain, Ice Pellets Rain, Snow Rain, Snow Grains Rain, Snow, Fog Rain, Snow, Ice Pellets Snow Snow Pellets Snow Showers Snow Showers, Fog Snow, Blowing Snow Snow, Fog Snow, Haze Snow, Ice Pellets Thunderstorms Thunderstorms Thunderstorms, Heavy Rain Showers Thunderstorms, Rain Showers Thunderstorms, Rain Showers Thunderstorms, Rain Showers Thunderstorms, Rain Showers, Fog Thunderstorms, Rain, Fog	1/1/2012 18:00 1/1/2012 22:00 10/20/2012 3:00 11/4/2012 8:00 1/23/2012 18:00 3/13/2012 7:00 12/18/2012 5:00 1/10/2012 5:00 12/21/2012 0:00 12/8/2012 11:00 12/21/2012 1:00 12/21/2012 1:00 12/21/2012 1:00 1/10/2012 1:00 1/12/2012 7:00 12/26/2012 9:00 1/13/2012 21:00 12/16/2012 15:00 2/1/2012 17:00 12/16/2012 15:00 2/1/2012 17:00 12/10/2012 3:00 7/16/2012 1:00 5/29/2012 6:00 7/17/2012 6:00 5/29/2012 16:00 6/29/2012 3:00 7/17/2012 5:00	0.3 1.6 12.8 2.1 0.0 4.0 0.6 0.6 1.9 0.8 0.9 -16.7 0.7 -13.3 -11.3 -12.0 -10.1 -4.3 -4.3 21.6 10.9 19.6 19.4 11.0 19.5 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
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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
	Nind Coard Im (b	
Visibility_km \ Weather Condition	Wind Speed_km/h	
Clear	0	
11.3 Cloudy	Θ	
11.3 Drizzle	0	
6.4 Drizzle,Fog	Θ	
1.0 Drizzle,Ice Pellets,Fog	20	
4.0		
Drizzle,Snow 9.7	9	
Drizzle, Snow, Fog 2.4	7	
Fog 0.2	0	
Freezing Drizzle	6	

3.6 Freezing Drizzle, Haze 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, Ice Pellets, Fog 32 4.8 Haze 0 4.8 Haze 0 4.8 Haze 0 4.8 Hoderate Rain, Fog 17 6.4 Moderate Snow 0 6.6 Moderate Snow, Blowing Snow 39 6.6 Mostly Cloudy 11.3 Rain 0 4.0 Rain Showers, Fog 13 6.4 Rain Showers, Fog 0 6.4 Rain, Fog 0 2.0 Rain, Haze 7 4.0 Rain, Joe Pellets 9 7 Rain, Snow 13 2.4 Rain, Snow Grains 26	4.8		
Freezing Drizzle, Haze 2 9 2.0	Freezing Drizzle, Fog	6	
2.0 Freezing Drizzle, Snow 2.4 Freezing Fog 0.2 Freezing Rain 7 2.8 Freezing Rain, Fog 2.8 Freezing Rain, Haze 2.0 Freezing Rain, Ice Pellets, Fog 8.0 Freezing Rain, Snow Grains 4.8 Haze 4.8 Haze 0 4.8 Mainly Clear 12.9 Moderate Rain, Fog 6.4 Moderate Snow, Blowing Snow 0.6 Mostly Cloudy 11.3 Rain 4.0 Rain Showers 6.4 Rain Showers, Fog 6.4 Rain Showers, Fog 6.4 Rain Showers, Snow Showers 17 19.3 Rain, Fog 24 9.7 Rain, Joe Pellets 9.7 Rain, Snow 13 24 24 82 9.7 Rain, Snow 13 24 25 26 86 87 87 88 89 89 89 80 80 80 80 80 80 80 80 80 80 80 80 80	3.6	_	
Freezing Drizzle, Snow 6 2.4 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9		9	
2.4 Freezing Fog		6	
0.2 Freezing Rain 7 2.8 7 2.8 7 2.8 7 2.8 6 2.0 8 Freezing Rain, Ice Pellets, Fog 28 8.0 8 Freezing Rain, Snow Grains 32 4.8 4.8 Mainly Clear 0 12.9 0 Moderate Rain, Fog 17 6.4 6 Moderate Snow 26 0.6 0 Mostly Cloudy 0 11.3 3 Rain 0 4.0 0 8ain Showers 0 6.4 0 8ain Showers, Fog 13 6.4 0 8ain Showers, Snow Showers 17 19.3 0 8ain, Fog 0 2.0 0 8ain, Haze 7 4.0 0 8ain, Jice Pellets 24 9.7 0 8ain, Snow 26	2.4	ŭ	
Freezing Rain 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7 2.8 7	Freezing Fog	0	
2.8 7 2.8 7 2.8 6 2.0 28 Freezing Rain, Ice Pellets, Fog 28 8.0 8 Freezing Rain, Snow Grains 32 4.8 4 Haze 0 4.8 0 Mainly Clear 0 12.9 0 Moderate Rain, Fog 17 6.4 26 Moderate Snow, Blowing Snow 39 0.6 39 Mostly Cloudy 0 11.3 8 Rain 8 6.4 8 Rain Showers 0 6.4 8 Rain Showers, Fog 13 6.4 17 8ain Showers, Snow Showers 17 19.3 13 Rain, Fog 0 2.0 0 Rain, Haze 7 4.0 0 Rain, Ice Pellets 24 9.7 13 2.4 13 <td< td=""><td>0.2</td><td>_</td><td></td></td<>	0.2	_	
Freezing Rain,Fog 2.8 Freezing Rain,Haze 2.0 Freezing Rain,Ice Pellets,Fog 8.0 Freezing Rain,Snow Grains 32 4.8 Haze 4.8 Mainly Clear 12.9 Moderate Rain,Fog 6.4 Moderate Snow,Blowing Snow 0.6 Mostly Cloudy 11.3 Rain A4.0 Rain Showers 6.4 Rain Showers,Fog 6.4 Rain Showers,Fog 6.4 Rain,Fog 2.0 Rain,Haze 7 4.0 Rain,Haze 7 4.0 Rain,Jice Pellets 9.7 Rain,Snow 2.4 Rain,Snow 7 Rain,Snow 8 Rain,		7	
2.8 6 2.0 Freezing Rain, Ice Pellets, Fog 28 8.0 32 Freezing Rain, Snow Grains 32 4.8 48 Haze 0 4.8 0 Mainly Clear 0 12.9 17 6.4 26 Moderate Rain, Fog 17 6.4 26 Moderate Snow, Blowing Snow 39 0.6 0 Mostly Cloudy 0 11.3 0 Rain 0 4.0 0 Rain Showers 0 6.4 0 Rain Showers, Fog 13 6.4 17 19.3 17 19.3 17 19.3 17 19.3 17 19.3 17 19.3 17 19.3 17 19.3 17 19.3 17 19.3 18 2.0 19 Rain, Haze <td></td> <td>7</td> <td></td>		7	
Freezing Rain, Haze 2.0 Freezing Rain, Ice Pellets, Fog 28 8.0 Freezing Rain, Snow Grains 32 4.8 Haze 0 Haze 0 Hainly Clear 0 12.9 Moderate Rain, Fog 17 6.4 Moderate Snow 26 Hoderate Snow, Blowing Snow 39 0.6 Moderate Snow, Blowing Snow 0 11.3 Rain 0 4.0 Rain Showers, Fog 13 6.4 Rain Showers, Fog 13 6.4 Rain Showers, Fog 0 2.0 Rain, Haze 7 4.0 Rain, Ice Pellets 24 9.7 Rain, Snow 26 Rain, Snow Grains 26		,	
2.0 Freezing Rain, Ice Pellets, Fog		6	
8.0 Freezing Rain, Snow Grains 4.8 Haze 4.8 Mainly Clear 12.9 Moderate Rain, Fog 6.4 Moderate Snow 0.6 Moderate Snow, Blowing Snow 0.6 Mostly Cloudy 11.3 Rain 4.0 Rain Showers 6.4 Rain Showers, Fog 6.4 Rain Showers, Fog 6.7 Rain, Haze 4.0 Rain, Haze 4.0 Rain, Ice Pellets 9.7 Rain, Snow 26 Rain, Snow 27 Rain, Snow 28 Rain, Snow 29 Rain, Snow 20 Rain, Snow 21 Rain, Snow 21 Rain, Snow 21 Rain, Snow 22 Rain, Snow 23 Rain, Snow 24 Rain, Snow 26	2.0		
Freezing Rain, Snow Grains 4.8 Haze 4.8 Mainly Clear 12.9 Moderate Rain, Fog 6.4 Moderate Snow 0.6 Moderate Snow, Blowing Snow 0.6 Mostly Cloudy 11.3 Rain Rain Showers 6.4 Rain Showers, Fog 6.4 Rain Showers, Fog 6.4 Rain Showers, Snow Showers 17 19.3 Rain, Fog 2.0 Rain, Haze 4.0 Rain, Ice Pellets 9.7 Rain, Snow 26 Rain, Snow 13 2.4 Rain, Snow Grains 26		28	
4.8 Haze 0 4.8 Mainly Clear 0 12.9 Moderate Rain, Fog 17 6.4 Moderate Snow 26 0.6 39 0.6 0 0 Mostly Cloudy 0 0 11.3 0 0 Rain 0 0 4.0 0 0 Rain Showers 0 0 6.4 13 0 8.4 17 0 9.3 13 0 8ain, Showers, Snow Showers 17 17 19.3 17 0 8ain, Fog 0 0 2.0 0 0 Rain, Haze 7 7 4.0 0 0 Rain, Jce Pellets 24 0 Rain, Snow 13 0 2.4 13 0 8ain, Snow Grains 26		22	
Haze 0 4.8 0 Mainly Clear 0 12.9 0 Moderate Rain,Fog 17 6.4 0 Moderate Snow 26 0.6 0 Moderate Snow,Blowing Snow 39 0.6 0 Mostly Cloudy 0 11.3 0 Rain 0 4.0 0 Rain Showers 0 6.4 0 Rain Showers,Fog 13 6.4 17 19.3 0 Rain,Fog 0 2.0 0 Rain,Haze 7 4.0 0 Rain,Lice Pellets 24 9.7 0 Rain,Snow 13 2.4 0 Rain,Snow Grains 26		32	
4.8 Mainly Clear 0 12.9 0 Moderate Rain, Fog 17 6.4 26 Moderate Snow 26 0.6 39 0.6 0 Mostly Cloudy 0 11.3 8ain Rain 0 4.0 0 Rain Showers 0 6.4 13 6.4 13 Rain Showers, Fog 13 6.4 17 19.3 17 19.3 17 19.3 0 2.0 0 Rain, Fog 0 2.0 0 Rain, Haze 7 4.0 7 Rain, Ice Pellets 24 9.7 7 Rain, Snow 13 2.4 8ain, Snow Grains 26		Θ	
12.9 Moderate Rain,Fog 17 6.4	4.8		
Moderate Rain, Fog 17 6.4 26 Moderate Snow 39 0.6 39 Moderate Snow, Blowing Snow 39 0.6 0 Mostly Cloudy 0 11.3 0 Rain 0 4.0 0 Rain Showers 0 6.4 0 Rain Showers, Fog 13 6.4 17 19.3 0 Rain, Fog 0 2.0 0 Rain, Fog 0 2.0 0 Rain, Haze 7 4.0 0 Rain, Ice Pellets 24 9.7 2 Rain, Snow 13 2.4 24 Rain, Snow Grains 26	Mainly Clear	0	
6.4 Moderate Snow 26 0.6 39 0.6 6 Mostly Cloudy 0 11.3 8 Rain 0 4.0 0 Rain Showers 0 6.4 13 Rain Showers, Fog 13 6.4 17 19.3 17 Rain, Fog 0 2.0 0 Rain, Haze 7 4.0 7 Rain, Ice Pellets 24 9.7 24 Rain, Snow 13 2.4 13 Rain, Snow Grains 26			
Moderate Snow 26 0.6 39 Mostly Cloudy 0 11.3 0 Rain 0 4.0 0 Rain Showers 0 6.4 13 Rain Showers, Fog 13 6.4 17 19.3 17 19.3 0 Rain, Fog 0 2.0 0 Rain, Haze 7 4.0 7 Rain, Ice Pellets 24 9.7 24 Rain, Snow 13 2.4 24 Rain, Snow Grains 26		1/	
0.6 39 0.6 0 Mostly Cloudy 0 11.3 0 Rain 0 4.0 0 Rain Showers 0 6.4 13 Rain Showers, Fog 13 6.4 17 19.3 17 19.3 0 2.0 0 Rain, Fog 0 2.0 0 Rain, Haze 7 4.0 7 Rain, Ice Pellets 24 9.7 13 Rain, Snow 13 2.4 13 Rain, Snow Grains 26		26	
Moderate Snow, Blowing Snow 39 0.6 0 Mostly Cloudy 0 11.3 0 Rain 0 4.0 0 Rain Showers 0 6.4 13 Rain Showers, Fog 13 6.4 17 19.3 0 Rain, Fog 0 2.0 0 Rain, Haze 7 4.0 7 Rain, Ice Pellets 24 9.7 24 Rain, Snow 13 2.4 13 Rain, Snow Grains 26		20	
Mostly Cloudy 0 11.3 0 Rain 0 4.0 0 Rain Showers 0 6.4 13 6.4 17 19.3 17 19.3 0 2.0 0 Rain, Fog 0 2.0 0 Rain, Haze 7 4.0 24 Rain, Ice Pellets 24 9.7 13 Rain, Snow 13 2.4 24 Rain, Snow Grains 26	Moderate Snow, Blowing Snow	39	
11.3 Rain	0.6		
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Rain Showers 0 6.4 13 6.4 13 6.4 17 Rain Showers, Snow Showers 17 19.3 0 Rain, Fog 0 2.0 0 Rain, Haze 7 4.0 7 Rain, Ice Pellets 24 9.7 24 Rain, Snow 13 2.4 24 Rain, Snow Grains 26		U	
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	-	0	
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	6.4	_	
Rain Showers, Snow Showers 19.3 Rain, Fog 2.0 Rain, Haze 7 4.0 Rain, Ice Pellets 9.7 Rain, Snow 13 2.4 Rain, Snow Grains 17	Rain Showers, Fog	13	
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			
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	·	1/	
2.0 Rain, Haze 7 4.0 Rain, Ice Pellets 24 9.7 Rain, Snow 13 2.4 Rain, Snow Grains 26		Θ	
Rain, Haze 7 4.0 Rain, Ice Pellets 24 9.7 Rain, Snow 13 2.4 Rain, Snow Grains 26		O O	
Rain, Ice Pellets 9.7 Rain, Snow 13 2.4 Rain, Snow Grains 26	Rain, Haze	7	
9.7 Rain,Snow 13 2.4 Rain,Snow Grains 26	4.0		
Rain, Snow 13 2.4 Rain, Snow Grains 26	Rain, Ice Pellets	24	
2.4 Rain,Snow Grains 26		12	
Rain, Snow Grains 26		13	
		26	
	25.0	20	

Rain, Snow, Fog		9
6.4 Rain, Snow, Ice Pellets		17
4.8		_,
Snow		0
1.0 Snow Pellets		35
2.4		33
Snow Showers		0
2.4		7
Snow Showers, Fog 4.0		7
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		O
Thunderstorms, Heavy Rain Showers		9
2.4		15
Thunderstorms, Moderate Rain Showers, Fog 3.2		15
Thunderstorms, Rain		4
16.1		_
Thunderstorms, Rain Showers 6.4		7
Thunderstorms, Rain Showers, Fog		7
9.7		
Thunderstorms, Rain, Fog		19
4.8		
	Press_kPa	
Weather Condition Clear	00 52	
Cloudy	99.52 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 Freezing Drizzle, Snow	100.28	
	99.19	

Freezing Fog Freezing Rain Freezing Rain,Fog Freezing Rain,Jce Pellets,Fog Freezing Rain,Snow Grains Haze Mainly Clear Moderate Rain,Fog Moderate Snow Moderate Snow,Blowing Snow Mostly Cloudy Rain Rain Showers Rain Showers,Fog Rain Showers,Fog Rain,Fog Rain,Fog Rain,Fog Rain,Jce Pellets Rain,Snow Grains Rain,Snow Fog Rain,Snow,Fog Snow,Howers Fog Snow,Howers Snow,Hog Snow,Haze Snow,Lce Pellets Thunderstorms Thunderstorms Thunderstorms,Rain Thunderstorms,Rain Thunderstorms,Rain Thunderstorms,Rain Showers Thunderstorms,Rain Showers Thunderstorms,Rain Showers Thunderstorms,Rain,Fog data.groupby('Weather Condition').max()	101.97 98.22 98.32 100.34 100.95 98.56 100.35 98.67 99.98 99.88 100.50 98.36 97.52 98.51 99.83 101.09 98.61 100.50 100.12 98.18 100.60 100.73 99.85 97.75 99.70 99.49 100.63 98.11 99.38 100.61 99.38 100.61 99.38 100.61 99.38 100.61 99.38 100.61 99.40 99.84 100.26 100.19 99.65 99.71 100.08		
data.groupby('weather Condition').max()	Date/Time	Temp C	\
Weather Condition Clear	9/9/2012 5:00	32.8	
Cloudy Drizzle Drizzle,Fog Drizzle,Ice Pellets,Fog Drizzle,Snow Drizzle,Snow,Fog	9/9/2012 3:00 9/9/2012 23:00 9/30/2012 3:00 9/30/2012 2:00 12/17/2012 9:00 12/19/2012 18:00 12/22/2012 3:00	32.6 30.5 18.8 19.9 0.4 1.2	
DI 122 CE, JIIOW, I UY	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
Visibility_km \	Wind Speed_km/h	
Weather Condition		
Clear	33	

48.3	
Cloudy	54
48.3	20
Drizzle 25.0	30
Drizzle, Fog	28
9.7	20
Drizzle,Ice Pellets,Fog	20
4.0	20
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	1.1
Freezing Drizzle, Haze	11
4.0	24
Freezing Drizzle, Snow 12.9	24
Freezing Fog	9
0.8	9
Freezing Rain	28
16.1	20
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	17
Haze 9.7	17
Mainly Clear	63
48.3	05
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 48.3	41
Rain Showers, Fog	13
6.4 Rain Showers, Snow Showers	28
24.1 Rain, Fog	46
9.7	
Rain, Haze	17
Rain,Ice Pellets	24
9.7	
Rain, Snow 25.0	52
Rain, Snow Grains 25.0	26
Rain, Snow, Fog	9
6.4	3
	20
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	22
	48
Snow, Blowing Snow	46
9.7	0.5
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	3
	10
Thunderstorms, Moderate Rain Showers, Fog 3.2	15
Thunderstorms, Rain	30
24.1	
Thunderstorms, Rain Showers	32
25.0	32
	35
Thunderstorms, Rain Showers, Fog	33
9.7	10
Thunderstorms, Rain, Fog	19

4.8	
	Press_kPa
Weather Condition	102 62
Clear Cloudy	103.63 103.65
Drizzle	101.56
Drizzle, Fog	101.50
Drizzle, Ice Pellets, Fog	102.07
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 99.83
Rain Showers, Fog Rain Showers, Snow Showers	101.11
Rain, Fog	101.11
Rain, Haze	100.61
Rain, Ice Pellets	100.01
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

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

data[data['Weather Cond	ition']	== 'Fog']		
C		Temp_C	Dew Point Temp_C	Rel Hum_%	Wind
0	_km/h \ 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	1/1/2012 6:00		-3.1	89	
7	1/1/2012 0.00	-1.5	-5.1	09	
8716 6	12/29/2012 4:00	-16.0	-17.2	90	
8717 4	12/29/2012 5:00	-14.8	-15.9	91	
8718 4	12/29/2012 6:00	-13.8	-15.3	88	
8719 7	12/29/2012 7:00	-14.8	-16.4	88	
8722 7	12/29/2012 10:00	-12.0	-13.3	90	
,	Vicibility km Do	ooo kDo	Waathar Candition		
0 1 4 5	8.0 8.0 8.8 4.8 6.4	101.24 101.24 101.23 101.27	Weather Condition Fog Fog Fog Fog		
6	6.4	101.29	Fog		
8716 8717 8718 8719	9.7 6.4 9.7 8.0	101.25 101.25 101.25 101.22	Fog Fog Fog Fog		
8722	6.4	101.15	Fog		

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

data[(data['Weather Condition'] == 'Clear') | (data['Visibility km'] >40)].tail(20) Temp C Dew Point Temp C Rel Hum % Wind Date/Time Speed km/h 12/26/2012 4:00 8644 -13.1-14.7 88 12/26/2012 5:00 89 8645 -12.7-14.1 12/26/2012 6:00 8646 -13.4 -14.8 89 8651 12/26/2012 11:00 77 -11.3 -14.5 20 8652 12/26/2012 12:00 -10.6 -14.3 74 8698 12/28/2012 10:00 82 -6.1 -8.6 19 8699 12/28/2012 11:00 -6.2 -8.8 82 24 8700 12/28/2012 12:00 -7.2 -9.9 81 24 8701 12/28/2012 13:00 79 -6.8 -9.8 20 12/28/2012 14:00 -6.5 -9.9 77 8702 22 8703 12/28/2012 15:00 -6.8 -10.3 76 24 8704 12/28/2012 16:00 -7.7 -11.0 77 30 12/29/2012 1:00 8713 -11.9 -13.6 87 11 90 8714 12/29/2012 2:00 -11.8 -13.1 13 12/30/2012 12:00 -15.7 75 8748 -12.2 26 12/30/2012 13:00 -12.4 -16.2 73 8749 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 12/30/2012 16:00 72 8752 -11.4 -15.5 26

```
8756
      12/30/2012 20:00
                         -13.8
                                              -16.5
                                                             80
24
      Visibility km
                      Press kPa Weather Condition
8644
                25.0
                         102.55
                                              Clear
8645
                25.0
                         102.48
                                              Clear
8646
                25.0
                         102.47
                                              Clear
                48.3
                         102.50
8651
                                      Mainly Clear
                48.3
                         102.36
                                      Mainly Clear
8652
                24.1
                         101.27
                                              Clear
8698
8699
                48.3
                         101.24
                                      Mainly Clear
8700
                48.3
                         101.22
                                      Mainly Clear
8701
                48.3
                         101.17
                                      Mainly Clear
                48.3
8702
                         101.17
                                      Mainly Clear
                48.3
                         101.22
8703
                                      Mainly Clear
                         101.25
8704
                48.3
                                      Mainly Clear
                25.0
                         101.31
                                             Clear
8713
8714
                25.0
                         101.33
                                              Clear
8748
                48.3
                         100.91
                                     Mostly Cloudy
8749
                48.3
                         100.92
                                     Mostly Cloudy
                48.3
                         100.96
                                      Mainly Clear
8750
                48.3
8751
                         101.05
                                      Mainly Clear
8752
                48.3
                         101.15
                                      Mainly Clear
                         101.52
                                              Clear
8756
                25.0
```

Q) 15. Find all instances when:

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

B. 'Visibility is above 40'

```
data.head(2)
       Date/Time Temp C Dew Point Temp C Rel Hum % Wind Speed km/h
  1/1/2012 0:00
                    -1.8
                                      -3.9
                                                   86
                                                                     4
1 1/1/2012 1:00
                    -1.8
                                      -3.7
                                                   87
   Visibility km Press kPa Weather Condition
0
             8.0
                     101.24
                                          Fog
             8.0
                     101.24
1
                                          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 \
        1/5/2012 10:00
                          -6.0
                                           -10.0
                                                         73
106
```

17					
107	1/5/2012	11:00	-5.6	-10.2	70
22	1 /5 /0010	10.00		• •	6.0
108 20	1/5/2012	12:00	-4.7	-9.6	69
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 /20 /2012	14.00	11 0	16 1	70
37	12/30/2012	14:00	-11.8	-16.1	70
8751	12/30/2012	15:00	-11.3	-15.6	70
32	12 /20 /2012	16.00	77 4	15.5	70
8752 26	12/30/2012	16:00	-11.4	-15.5	72
8756	12/30/2012	20:00	-13.8	-16.5	80
24					
	Visibility	km Pr	ecc kPa	Weather Condition	
106		_\\'''	100.45	Mainly Clear	
107		3.3	100.41	Mainly Clear	
108 109		3.3 3.3	100.38	Mainly Clear Mainly Clear	
110		3.3 3.3	100.46	Mainly Clear	
8749		3.3	100.92	Mostly Cloudy	
8750 8751		3.3 3.3	100.96 101.05	Mainly Clear Mainly Clear	
8752		3.3	101.15	Mainly Clear	
8756	25	5.0	101.52	Clear	
[2921	rows x 8 co	olumns1			
	10W3 X 0 C	J Cumii 3]			

Correlation Plots

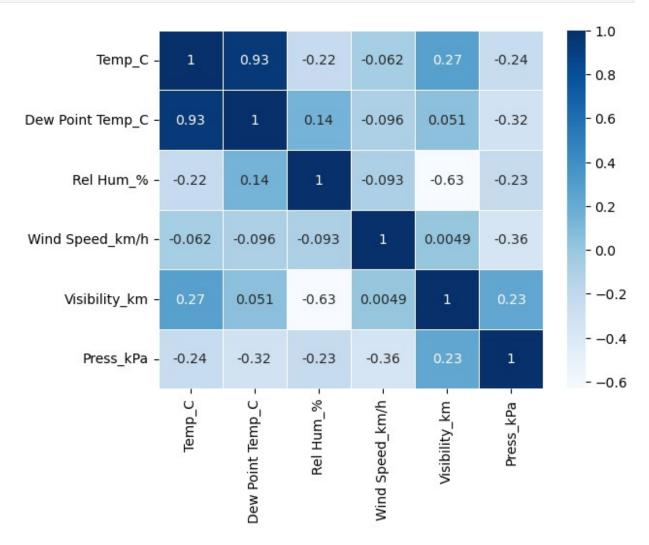
```
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

1) Correlation Heat Map

```
data.head(2)

Date/Time Temp_C Dew Point Temp_C Rel Hum_% Wind Speed_km/h
\
```

```
1/1/2012 0:00
                    -1.8
                                       -3.9
                                                    86
                                                                       4
                                                    87
                                                                       4
  1/1/2012 1:00
                                       -3.7
                    -1.8
   Visibility km
                 Press_kPa Weather Condition
0
             8.0
                     101.24
                                           Fog
             8.0
1
                     101.24
                                           Fog
cor_metrix = data[['Temp_C','Dew Point Temp_C','Rel Hum_%','Wind
Speed_km/h','Visibility_km','Press_kPa']].corr()
sns.heatmap(cor metrix, annot =True, cmap = "Blues", linewidths = .5)
<Axes: >
```



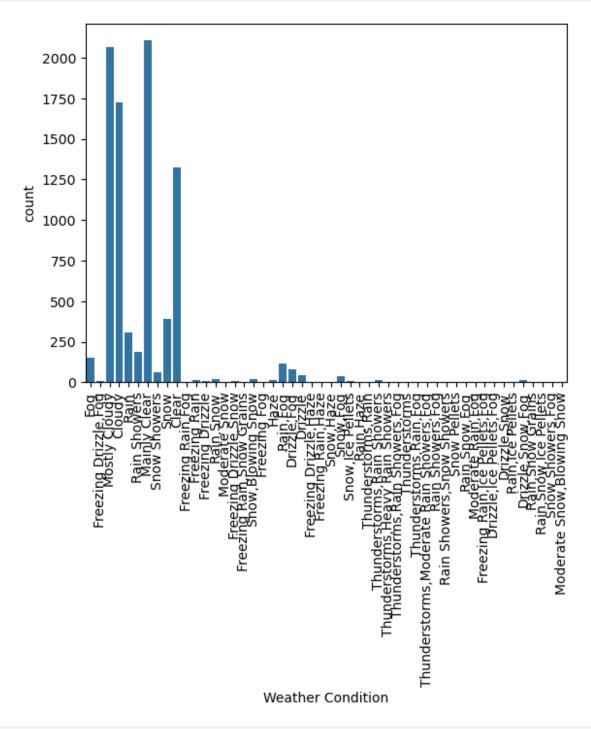
2) Count Plot of Weather Conditions

sns.countplot(x='Weather Condition', data =data)
plt.xticks(rotation=90)

```
([0,
1,
2,
3,
4,
5,
6,
7,
8,
9,
10,
    12,
    13,
    14,
15,
16,
    17,
    18,
    19,
    20,
    21,
    23,
    24,
    25,
26,
    27,
28,
29,
30,
31,
32,
33,
    34,
35,
36,
    37,
38,
    39,
    40,
    41,
42,
    43,
    44,
    45,
    46,
    47,
48,
49],
```

```
[Text(0, 0, 'Fog'),
Text(1, 0, 'Freezing Drizzle, Fog'),
Text(2, 0, 'Mostly Cloudy'),
Text(3, 0, 'Cloudy'),
Text(4, 0, 'Rain'),
Text(5, 0, 'Rain Showers'),
Text(6, 0, 'Mainly Clear'),
Text(7, 0, 'Snow Showers'),
Text(8, 0, 'Snow'),
Text(9, 0, 'Clear'),
Text(10, 0, 'Freezing Rain, Fog'),
Text(11, 0, 'Freezing Rain'),
Text(12, 0, 'Freezing Drizzle'),
Text(13, 0, 'Rain,Snow'),
Text(14, 0, 'Moderate Snow'),
Text(15, 0, 'Freezing Drizzle, Snow'),
Text(16, 0, 'Freezing Rain, Snow Grains'),
            'Snow,Blowing Snow'),
Text(17, 0,
Text(18, 0, 'Freezing Fog'),
Text(19, 0, 'Haze'),
Text(20, 0, 'Rain, Fog'),
Text(21, 0, 'Drizzle,Fog'),
Text(22, 0, 'Drizzle'),
Text(23, 0, 'Freezing Drizzle, Haze'),
Text(24, 0, 'Freezing Rain, Haze'),
Text(25, 0, 'Snow, Haze'),
Text(26, 0, 'Snow, Fog'),
Text(27, 0, 'Snow, Ice Pellets'),
Text(28, 0, 'Rain, Haze'),
Text(29, 0,
             'Thunderstorms, Rain'),
Text(30, 0, 'Thunderstorms, Rain Showers'),
Text(31, 0,
             'Thunderstorms, Heavy Rain Showers'),
Text(32, 0,
             'Thunderstorms, Rain Showers, Fog'),
Text(33, 0, 'Thunderstorms'),
            'Thunderstorms,Rain,Fog'),
Text(34, 0,
Text(35, 0, 'Thunderstorms, Moderate Rain Showers, Fog'),
Text(36, 0,
            'Rain Showers, Fog'),
Text(37, 0, 'Rain Showers, Snow Showers'),
Text(38, 0, 'Snow Pellets'),
Text(39, 0, 'Rain, Snow, Fog'),
Text(40, 0, 'Moderate Rain, Fog'),
Text(41, 0, 'Freezing Rain, Ice Pellets, Fog'),
Text(42, 0, 'Drizzle,Ice Pellets,Fog'),
Text(43, 0, 'Drizzle, Snow'),
Text(44, 0, 'Rain, Ice Pellets'),
Text(45, 0, 'Drizzle, Snow, Fog'),
Text(46, 0, 'Rain, Snow Grains'),
Text(47, 0, 'Rain, Snow, Ice Pellets'),
```

```
Text(48, 0, 'Snow Showers, Fog'),
Text(49, 0, 'Moderate Snow, Blowing Snow')])
```



```
sns.pairplot(data[['Temp_C','Dew Point Temp_C','Rel Hum_%','Wind
Speed_km/h','Visibility_km','Press_kPa']])
<seaborn.axisgrid.PairGrid at 0x1f155f8e660>
```

