

Working on Real Project with Python

```
In [1]: import pandas as pd
```

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

```
In [3]: data
```

Out[3]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog
2	1/1/2012 2:00	-1.8	-3.4	89	7	4.0	101.26	Freezing Drizzle,Fog
3	1/1/2012 3:00	-1.5	-3.2	88	6	4.0	101.27	Freezing Drizzle,Fog
4	1/1/2012 4:00	-1.5	-3.3	88	7	4.8	101.23	Fog
...
8779	12/31/2012 19:00	0.1	-2.7	81	30	9.7	100.13	Snow
8780	12/31/2012 20:00	0.2	-2.4	83	24	9.7	100.03	Snow
8781	12/31/2012 21:00	-0.5	-1.5	93	28	4.8	99.95	Snow
8782	12/31/2012 22:00	-0.2	-1.8	89	28	9.7	99.91	Snow
8783	12/31/2012 23:00	0.0	-2.1	86	30	11.3	99.89	Snow

8784 rows × 8 columns

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

Out[4]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog
2	1/1/2012 2:00	-1.8	-3.4	89	7	4.0	101.26	Freezing Drizzle,Fog
3	1/1/2012 3:00	-1.5	-3.2	88	6	4.0	101.27	Freezing Drizzle,Fog
4	1/1/2012 4:00	-1.5	-3.3	88	7	4.8	101.23	Fog

In [5]: data.shape

Out[5]: (8784, 8)

In [6]: data.index

Out[6]: RangeIndex(start=0, stop=8784, step=1)

In [7]: data.columns

Out[7]: Index(['Date/Time', 'Temp_C', 'Dew Point Temp_C', 'Rel Hum_%',
'Wind Speed_km/h', 'Visibility_km', 'Press_kPa', 'Weather'],
dtype='object')

In [8]: data.dtypes

Out[8]: Date/Time object
Temp_C float64
Dew Point Temp_C float64
Rel Hum_% int64
Wind Speed_km/h int64
Visibility_km float64
Press_kPa float64
Weather object
dtype: object

In [9]: data['Weather'].unique()

Out[9]: array(['Fog', 'Freezing Drizzle,Fog', 'Mostly Cloudy', 'Cloudy', 'Rain',
'Rain Showers', 'Mainly Clear', 'Snow Showers', 'Snow', 'Clear',
'Freezing Rain,Fog', 'Freezing Rain', 'Freezing Drizzle',
'Rain,Snow', 'Moderate Snow', 'Freezing Drizzle,Snow',
'Freezing Rain,Snow Grains', 'Snow,Blowing Snow', 'Freezing Fog',
'Haze', 'Rain,Fog', 'Drizzle,Fog', 'Drizzle',
'Freezing Drizzle,Haze', 'Freezing Rain,Haze', 'Snow,Haze',
'Snow,Fog', 'Snow,Ice Pellets', 'Rain,Haze', 'Thunderstorms,Rain',
'Thunderstorms,Rain Showers', 'Thunderstorms,Heavy Rain Showers',
'Thunderstorms,Rain Showers,Fog', 'Thunderstorms',
'Thunderstorms,Rain,Fog',
'Thunderstorms,Moderate Rain Showers,Fog', 'Rain Showers,Fog',
'Rain Showers,Snow Showers', 'Snow Pellets', 'Rain,Snow,Fog',
'Moderate Rain,Fog', 'Freezing Rain,Ice Pellets,Fog',
'Drizzle,Ice Pellets,Fog', 'Drizzle,Snow', 'Rain,Ice Pellets',
'Drizzle,Snow,Fog', 'Rain,Snow Grains', 'Rain,Snow,Ice Pellets',
'Snow Showers,Fog', 'Moderate Snow,Blowing Snow'], dtype=object)

```
In [10]: data.nunique()
```

```
Out[10]: Date/Time      8784  
Temp_C      533  
Dew Point Temp_C    489  
Rel Hum_%      83  
Wind Speed_km/h     34  
Visibility_km     24  
Press_kPa      518  
Weather       50  
dtype: int64
```

```
In [11]: data.count()
```

```
Out[11]: Date/Time      8784  
Temp_C      8784  
Dew Point Temp_C    8784  
Rel Hum_%      8784  
Wind Speed_km/h     8784  
Visibility_km     8784  
Press_kPa      8784  
Weather       8784  
dtype: int64
```

```
In [12]: data['Weather'].value_counts()
```

```

Out[12]: Mainly Clear                2106
          Mostly Cloudy             2069
          Cloudy                    1728
          Clear                     1326
          Snow                      390
          Rain                      306
          Rain Showers              188
          Fog                      150
          Rain,Fog                  116
          Drizzle,Fog               80
          Snow Showers              60
          Drizzle                   41
          Snow,Fog                  37
          Snow,Blowing Snow         19
          Rain,Snow                 18
          Thunderstorms,Rain Showers 16
          Haze                      16
          Drizzle,Snow,Fog          15
          Freezing Rain              14
          Freezing Drizzle,Snow      11
          Freezing Drizzle           7
          Snow,Ice Pellets           6
          Freezing Drizzle,Fog       6
          Snow,Haze                  5
          Freezing Fog               4
          Snow Showers,Fog           4
          Moderate Snow              4
          Rain,Snow,Ice Pellets      4
          Freezing Rain,Fog          4
          Freezing Drizzle,Haze      3
          Rain,Haze                  3
          Thunderstorms,Rain         3
          Thunderstorms,Rain Showers,Fog 3
          Freezing Rain,Haze         2
          Drizzle,Snow               2
          Rain Showers,Snow Showers  2
          Thunderstorms              2
          Moderate Snow,Blowing Snow 2
          Rain Showers,Fog           1
          Thunderstorms,Moderate Rain Showers,Fog 1
          Snow Pellets               1
          Rain,Snow,Fog              1
          Moderate Rain,Fog           1
          Freezing Rain,Ice Pellets,Fog 1
          Drizzle,Ice Pellets,Fog     1
          Thunderstorms,Rain,Fog      1
          Rain,Ice Pellets            1
          Rain,Snow Grains            1
          Thunderstorms,Heavy Rain Showers 1
          Freezing Rain,Snow Grains   1
          Name: Weather, dtype: int64

```

```
In [13]: 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
```

Q1)

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

```
Out[15]: 34
```

```
In [16]: data['Wind Speed_km/h'].unique()
```

```
Out[16]: 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)
```

Q2)

```
In [18]: #value_counts()
data.Weather.value_counts()
```

```

Out[18]: Mainly Clear                2106
          Mostly Cloudy             2069
          Cloudy                    1728
          Clear                     1326
          Snow                      390
          Rain                      306
          Rain Showers              188
          Fog                      150
          Rain,Fog                  116
          Drizzle,Fog               80
          Snow Showers              60
          Drizzle                   41
          Snow,Fog                  37
          Snow,Blowing Snow         19
          Rain,Snow                 18
          Thunderstorms,Rain Showers 16
          Haze                      16
          Drizzle,Snow,Fog          15
          Freezing Rain              14
          Freezing Drizzle,Snow     11
          Freezing Drizzle           7
          Snow,Ice Pellets           6
          Freezing Drizzle,Fog       6
          Snow,Haze                  5
          Freezing Fog               4
          Snow Showers,Fog           4
          Moderate Snow              4
          Rain,Snow,Ice Pellets      4
          Freezing Rain,Fog          4
          Freezing Drizzle,Haze      3
          Rain,Haze                  3
          Thunderstorms,Rain         3
          Thunderstorms,Rain Showers,Fog 3
          Freezing Rain,Haze         2
          Drizzle,Snow               2
          Rain Showers,Snow Showers  2
          Thunderstorms              2
          Moderate Snow,Blowing Snow 2
          Rain Showers,Fog           1
          Thunderstorms,Moderate Rain Showers,Fog 1
          Snow Pellets               1
          Rain,Snow,Fog              1
          Moderate Rain,Fog           1
          Freezing Rain,Ice Pellets,Fog 1
          Drizzle,Ice Pellets,Fog     1
          Thunderstorms,Rain,Fog      1
          Rain,Ice Pellets            1
          Rain,Snow Grains            1
          Thunderstorms,Heavy Rain Showers 1
          Freezing Rain,Snow Grains   1
          Name: Weather, dtype: int64

```

```

In [21]: #Filtering
          #data.head(2)
          #data.Weather == 'clear' will give data in boolean
          data[data.Weather == 'Clear']

```

Out[21]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
67	1/3/2012 19:00	-16.9	-24.8	50	24	25.0	101.74	Clear
114	1/5/2012 18:00	-7.1	-14.4	56	11	25.0	100.71	Clear
115	1/5/2012 19:00	-9.2	-15.4	61	7	25.0	100.80	Clear
116	1/5/2012 20:00	-9.8	-15.7	62	9	25.0	100.83	Clear
117	1/5/2012 21:00	-9.0	-14.8	63	13	25.0	100.83	Clear
...
8646	12/26/2012 6:00	-13.4	-14.8	89	4	25.0	102.47	Clear
8698	12/28/2012 10:00	-6.1	-8.6	82	19	24.1	101.27	Clear
8713	12/29/2012 1:00	-11.9	-13.6	87	11	25.0	101.31	Clear
8714	12/29/2012 2:00	-11.8	-13.1	90	13	25.0	101.33	Clear
8756	12/30/2012 20:00	-13.8	-16.5	80	24	25.0	101.52	Clear

1326 rows × 8 columns

```
In [24]: #grouping
#data.head(2)
data.groupby('Weather').get_group('Clear')
```

Out[24]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
67	1/3/2012 19:00	-16.9	-24.8	50	24	25.0	101.74	Clear
114	1/5/2012 18:00	-7.1	-14.4	56	11	25.0	100.71	Clear
115	1/5/2012 19:00	-9.2	-15.4	61	7	25.0	100.80	Clear
116	1/5/2012 20:00	-9.8	-15.7	62	9	25.0	100.83	Clear
117	1/5/2012 21:00	-9.0	-14.8	63	13	25.0	100.83	Clear
...
8646	12/26/2012 6:00	-13.4	-14.8	89	4	25.0	102.47	Clear
8698	12/28/2012 10:00	-6.1	-8.6	82	19	24.1	101.27	Clear
8713	12/29/2012 1:00	-11.9	-13.6	87	11	25.0	101.31	Clear
8714	12/29/2012 2:00	-11.8	-13.1	90	13	25.0	101.33	Clear
8756	12/30/2012 20:00	-13.8	-16.5	80	24	25.0	101.52	Clear

1326 rows × 8 columns

Q3)

In [25]: `data.head(2)`

Out[25]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog

In [27]: `data[data['Wind Speed_km/h']==4] #answer`

Out[27]:

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

474 rows × 8 columns



Q4)

In [30]: data.isnull().sum()

Out[30]: Date/Time 0
Temp_C 0
Dew Point Temp_C 0
Rel Hum_% 0
Wind Speed_km/h 0
Visibility_km 0
Press_kPa 0
Weather 0
dtype: int64

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

Out[31]: Date/Time 8784
Temp_C 8784
Dew Point Temp_C 8784
Rel Hum_% 8784
Wind Speed_km/h 8784
Visibility_km 8784
Press_kPa 8784
Weather 8784
dtype: int64

In [32]: `#there are no null values in columnn.`

Q5)

In [33]: `data.head(2)`

Out[33]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog

In [39]: `data.rename(columns={"Weather" : "Weather Condition"},inplace=True) #syntax as dic`

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

Out[40]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog
2	1/1/2012 2:00	-1.8	-3.4	89	7	4.0	101.26	Freezing Drizzle,Fog
3	1/1/2012 3:00	-1.5	-3.2	88	6	4.0	101.27	Freezing Drizzle,Fog
4	1/1/2012 4:00	-1.5	-3.3	88	7	4.8	101.23	Fog

Q6)

In [41]: `data.head(2)`

Out[41]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog

In [42]: `data.Visibility_km.mean()`

Out[42]: 27.66444672131151

Q7)

In [43]: `data.Press_kPa.std()`

Out[43]: 0.8440047459486474

Q8)

In [46]: data['Rel Hum_%'].var()

Out[46]: 286.2485501984998

Q9)

In [47]: data.head(2)

Out[47]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog

In [48]: #value_counts()
data['Weather Condition'].value_counts()

```

Out[48]: Mainly Clear                2106
         Mostly Cloudy              2069
         Cloudy                     1728
         Clear                      1326
         Snow                       390
         Rain                       306
         Rain Showers               188
         Fog                       150
         Rain,Fog                  116
         Drizzle,Fog               80
         Snow Showers              60
         Drizzle                   41
         Snow,Fog                  37
         Snow,Blowing Snow         19
         Rain,Snow                 18
         Thunderstorms,Rain Showers 16
         Haze                      16
         Drizzle,Snow,Fog          15
         Freezing Rain              14
         Freezing Drizzle,Snow      11
         Freezing Drizzle           7
         Snow,Ice Pellets           6
         Freezing Drizzle,Fog       6
         Snow,Haze                  5
         Freezing Fog               4
         Snow Showers,Fog           4
         Moderate Snow              4
         Rain,Snow,Ice Pellets      4
         Freezing Rain,Fog          4
         Freezing Drizzle,Haze      3
         Rain,Haze                  3
         Thunderstorms,Rain         3
         Thunderstorms,Rain Showers,Fog 3
         Freezing Rain,Haze         2
         Drizzle,Snow               2
         Rain Showers,Snow Showers  2
         Thunderstorms              2
         Moderate Snow,Blowing Snow 2
         Rain Showers,Fog           1
         Thunderstorms,Moderate Rain Showers,Fog 1
         Snow Pellets               1
         Rain,Snow,Fog              1
         Moderate Rain,Fog          1
         Freezing Rain,Ice Pellets,Fog 1
         Drizzle,Ice Pellets,Fog    1
         Thunderstorms,Rain,Fog     1
         Rain,Ice Pellets           1
         Rain,Snow Grains           1
         Thunderstorms,Heavy Rain Showers 1
         Freezing Rain,Snow Grains  1
         Name: Weather Condition, dtype: int64

```

```

In [50]: #Filtering
         data[data['Weather Condition'] == 'Snow']

```

Out[50]:

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

390 rows × 8 columns



```
In [51]: #str.contains
data[data['Weather Condition'].str.contains('Snow')] #this will include all data
#head is used to see data from top while tail cmd is used to see data from bottom
```

Out[51]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
41	1/2/2012 17:00	-2.1	-9.5	57	22	25.0	99.66	Snow Showers
44	1/2/2012 20:00	-5.6	-13.4	54	24	25.0	100.07	Snow Showers
45	1/2/2012 21:00	-5.8	-12.8	58	26	25.0	100.15	Snow Showers
47	1/2/2012 23:00	-7.4	-14.1	59	17	19.3	100.27	Snow Showers
48	1/3/2012 0:00	-9.0	-16.0	57	28	25.0	100.35	Snow Showers
...
8779	12/31/2012 19:00	0.1	-2.7	81	30	9.7	100.13	Snow
8780	12/31/2012 20:00	0.2	-2.4	83	24	9.7	100.03	Snow
8781	12/31/2012 21:00	-0.5	-1.5	93	28	4.8	99.95	Snow
8782	12/31/2012 22:00	-0.2	-1.8	89	28	9.7	99.91	Snow
8783	12/31/2012 23:00	0.0	-2.1	86	30	11.3	99.89	Snow

583 rows × 8 columns



Q10)

In [52]: data.head(2)

Out[52]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog

In [54]: data[(data['Wind Speed_km/h'] > 24) & (data['Visibility_km']==25)]

Out[54]:

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

308 rows × 8 columns



Q11)

```
In [55]: data.groupby('Weather Condition').mean() #shows mean va;ue against each type of wea
```

Out[55]:

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

	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa
Weather Condition						
Rain,Snow Grains	1.900000	-2.100000	75.000000	26.000000	25.000000	100.60000
Rain,Snow,Fog	0.800000	0.300000	96.000000	9.000000	6.400000	100.73000
Rain,Snow,Ice Pellets	1.100000	-0.175000	91.500000	23.250000	6.000000	100.10500
Snow	-4.524103	-7.623333	79.307692	20.038462	11.171795	100.53610
Snow Pellets	0.700000	-6.400000	59.000000	35.000000	2.400000	99.70000
Snow Showers	-3.506667	-7.866667	72.350000	19.233333	20.158333	100.96350
Snow Showers,Fog	-10.675000	-11.900000	90.750000	13.750000	7.025000	101.29250
Snow,Blowing Snow	-5.410526	-7.621053	84.473684	34.842105	4.105263	99.70473
Snow,Fog	-5.075676	-6.364865	90.675676	17.324324	4.537838	100.68864
Snow,Haze	-4.020000	-6.860000	80.600000	5.000000	4.640000	100.78200
Snow,Ice Pellets	-1.883333	-3.666667	87.666667	23.833333	7.416667	100.54833
Thunderstorms	24.150000	19.750000	77.000000	7.500000	24.550000	100.23000
Thunderstorms,Heavy Rain Showers	10.900000	9.000000	88.000000	9.000000	2.400000	100.26000
Thunderstorms,Moderate Rain Showers,Fog	19.600000	18.500000	93.000000	15.000000	3.200000	100.01000
Thunderstorms,Rain	20.433333	18.533333	89.000000	15.666667	19.833333	100.42000
Thunderstorms,Rain Showers	20.037500	17.618750	86.375000	18.312500	15.893750	100.23375
Thunderstorms,Rain Showers,Fog	21.600000	18.700000	84.000000	19.666667	9.700000	100.06333
Thunderstorms,Rain,Fog	20.600000	18.600000	88.000000	19.000000	4.800000	100.08000

Q12)

```
In [57]: data.groupby('Weather Condition').min()
```

Out[57]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Weather Condition							
Clear	1/11/2012 1:00	-23.3	-28.5	20	0	11.3	
Cloudy	1/1/2012 17:00	-21.4	-26.8	18	0	11.3	
Drizzle	1/23/2012 21:00	1.1	-0.2	74	0	6.4	
Drizzle,Fog	1/23/2012 20:00	0.0	-1.6	85	0	1.0	
Drizzle,Ice Pellets,Fog	12/17/2012 9:00	0.4	-0.7	92	20	4.0	1
Drizzle,Snow	12/17/2012 15:00	0.9	0.1	92	9	9.7	1
Drizzle,Snow,Fog	12/18/2012 21:00	0.3	-0.1	92	7	2.4	
Fog	1/1/2012 0:00	-16.0	-17.2	80	0	0.2	
Freezing Drizzle	1/13/2012 10:00	-9.0	-12.2	78	6	4.8	
Freezing Drizzle,Fog	1/1/2012 2:00	-6.4	-9.0	82	6	3.6	
Freezing Drizzle,Haze	2/1/2012 11:00	-5.8	-8.3	81	9	2.0	1
Freezing Drizzle,Snow	1/13/2012 3:00	-8.3	-10.4	79	6	2.4	
Freezing Fog	1/22/2012 6:00	-19.0	-22.9	71	0	0.2	1
Freezing Rain	1/13/2012 11:00	-6.5	-9.0	81	7	2.8	
Freezing Rain,Fog	1/17/2012 23:00	-6.1	-8.7	82	7	2.8	
Freezing Rain,Haze	2/1/2012 14:00	-4.9	-7.5	82	6	2.0	1
Freezing Rain,Ice Pellets,Fog	12/17/2012 3:00	-2.6	-3.7	92	28	8.0	1
Freezing Rain,Snow Grains	1/13/2012 9:00	-5.0	-7.3	84	32	4.8	
Haze	1/22/2012 12:00	-11.5	-16.0	68	0	4.8	1
Mainly Clear	1/10/2012 11:00	-22.8	-28.0	20	0	12.9	
Moderate Rain,Fog	12/10/2012 8:00	1.7	0.8	94	17	6.4	

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres_kPa
Weather Condition							
Moderate Snow	1/12/2012 15:00	-6.3	-7.6	83	26	0.6	
Moderate Snow,Blowing Snow	12/27/2012 10:00	-5.5	-6.6	92	39	0.6	1013.2
Mostly Cloudy	1/1/2012 16:00	-23.2	-28.5	18	0	11.3	
Rain	1/1/2012 18:00	0.3	-5.7	40	0	4.0	
Rain Showers	1/1/2012 22:00	1.6	-7.2	37	0	6.4	
Rain Showers,Fog	10/20/2012 3:00	12.8	12.1	96	13	6.4	
Rain Showers,Snow Showers	11/4/2012 8:00	2.1	-1.8	75	17	19.3	1013.2
Rain,Fog	1/23/2012 18:00	0.0	-1.2	83	0	2.0	
Rain,Haze	3/13/2012 7:00	4.0	1.0	81	7	4.0	1013.2
Rain,Ice Pellets	12/18/2012 5:00	0.6	-0.6	92	24	9.7	1013.2
Rain,Snow	1/10/2012 5:00	0.6	-1.7	81	13	2.4	
Rain,Snow Grains	12/21/2012 0:00	1.9	-2.1	75	26	25.0	1013.2
Rain,Snow,Fog	12/8/2012 21:00	0.8	0.3	96	9	6.4	1013.2
Rain,Snow,Ice Pellets	12/21/2012 1:00	0.9	-0.7	88	17	4.8	
Snow	1/10/2012 1:00	-16.7	-24.6	41	0	1.0	
Snow Pellets	11/24/2012 15:00	0.7	-6.4	59	35	2.4	
Snow Showers	1/12/2012 7:00	-13.3	-19.3	52	0	2.4	
Snow Showers,Fog	12/26/2012 9:00	-11.3	-12.7	89	7	4.0	1013.2
Snow,Blowing Snow	1/13/2012 21:00	-12.0	-16.2	70	24	0.6	
Snow,Fog	12/16/2012 15:00	-10.1	-12.0	77	4	1.2	
Snow,Haze	2/1/2012 17:00	-4.3	-7.2	80	0	4.0	1013.2

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Weather Condition							
Snow,Ice Pellets	12/10/2012 3:00	-4.3	-5.9	76	19	2.8	
Thunderstorms	7/16/2012 1:00	21.6	19.4	67	0	24.1	
Thunderstorms,Heavy Rain Showers	5/29/2012 6:00	10.9	9.0	88	9	2.4	1
Thunderstorms,Moderate Rain Showers,Fog	7/17/2012 6:00	19.6	18.5	93	15	3.2	1
Thunderstorms,Rain	5/25/2012 20:00	19.4	18.2	83	4	16.1	1
Thunderstorms,Rain Showers	5/29/2012 16:00	11.0	7.0	68	7	6.4	
Thunderstorms,Rain Showers,Fog	6/29/2012 3:00	19.5	16.1	80	7	9.7	
Thunderstorms,Rain,Fog	7/17/2012 5:00	20.6	18.6	88	19	4.8	1



```
In [58]: data.groupby('Weather Condition').max()
```

Out[58]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres_kPa
Weather Condition							
Clear	9/9/2012 5:00	32.8	20.4	99	33	48.3	101.3
Cloudy	9/9/2012 23:00	30.5	22.6	99	54	48.3	101.3
Drizzle	9/30/2012 3:00	18.8	17.7	96	30	25.0	101.3
Drizzle,Fog	9/30/2012 2:00	19.9	19.1	100	28	9.7	101.3
Drizzle,Ice Pellets,Fog	12/17/2012 9:00	0.4	-0.7	92	20	4.0	101.3
Drizzle,Snow	12/19/2012 18:00	1.2	0.2	95	19	11.3	101.3
Drizzle,Snow,Fog	12/22/2012 3:00	1.1	0.6	98	32	9.7	101.3
Fog	9/22/2012 0:00	20.8	19.6	100	22	9.7	101.3
Freezing Drizzle	2/1/2012 5:00	-2.3	-3.3	93	26	12.9	101.3
Freezing Drizzle,Fog	12/10/2012 5:00	-0.3	-2.3	94	33	8.0	101.3
Freezing Drizzle,Haze	2/1/2012 13:00	-5.0	-7.7	83	11	4.0	101.3
Freezing Drizzle,Snow	3/2/2012 12:00	-3.3	-4.6	94	24	12.9	101.3
Freezing Fog	3/17/2012 6:00	-0.1	-0.3	99	9	0.8	101.3
Freezing Rain	2/1/2012 7:00	0.3	-1.7	92	28	16.1	101.3
Freezing Rain,Fog	12/17/2012 1:00	0.1	-0.9	93	26	9.7	101.3
Freezing Rain,Haze	2/1/2012 15:00	-4.9	-7.4	83	9	2.8	101.3
Freezing Rain,Ice Pellets,Fog	12/17/2012 3:00	-2.6	-3.7	92	28	8.0	101.3
Freezing Rain,Snow Grains	1/13/2012 9:00	-5.0	-7.3	84	32	4.8	101.3
Haze	3/13/2012 23:00	14.1	11.1	86	17	9.7	101.3
Mainly Clear	9/9/2012 9:00	33.0	21.2	99	63	48.3	101.3
Moderate Rain,Fog	12/10/2012 8:00	1.7	0.8	94	17	6.4	101.3

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Weather Condition							
Moderate Snow	12/27/2012 9:00	-4.9	-6.7	93	39	0.8	1
Moderate Snow,Blowing Snow	12/27/2012 12:00	-5.4	-6.4	93	41	0.6	1
Mostly Cloudy	9/9/2012 2:00	32.4	24.4	100	83	48.3	1
Rain	9/5/2012 2:00	22.8	20.4	99	52	48.3	1
Rain Showers	9/8/2012 16:00	26.4	23.0	97	41	48.3	1
Rain Showers,Fog	10/20/2012 3:00	12.8	12.1	96	13	6.4	1
Rain Showers,Snow Showers	12/5/2012 10:00	2.2	-1.2	78	28	24.1	1
Rain,Fog	9/30/2012 23:00	21.7	19.5	100	46	9.7	1
Rain,Haze	3/13/2012 9:00	5.5	2.9	86	17	9.7	1
Rain,Ice Pellets	12/18/2012 5:00	0.6	-0.6	92	24	9.7	1
Rain,Snow	4/23/2012 3:00	1.7	0.5	94	52	25.0	1
Rain,Snow Grains	12/21/2012 0:00	1.9	-2.1	75	26	25.0	1
Rain,Snow,Fog	12/8/2012 21:00	0.8	0.3	96	9	6.4	1
Rain,Snow,Ice Pellets	12/21/2012 5:00	1.3	0.1	94	28	6.4	1
Snow	4/27/2012 9:00	3.7	0.3	96	57	25.0	1
Snow Pellets	11/24/2012 15:00	0.7	-6.4	59	35	2.4	1
Snow Showers	3/4/2012 21:00	2.9	-0.7	94	37	48.3	1
Snow Showers,Fog	12/29/2012 13:00	-10.0	-11.1	92	22	9.7	1
Snow,Blowing Snow	2/25/2012 9:00	-1.4	-2.9	91	48	9.7	1
Snow,Fog	3/14/2012 19:00	1.1	0.8	99	35	9.7	1
Snow,Haze	2/1/2012 21:00	-3.6	-6.4	81	15	6.4	1

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Pres
Weather Condition							
Snow,Ice Pellets	3/3/2012 4:00	0.8	-1.7	92	33	11.3	1
Thunderstorms	7/4/2012 16:00	26.7	20.1	87	15	25.0	1
Thunderstorms,Heavy Rain Showers	5/29/2012 6:00	10.9	9.0	88	9	2.4	1
Thunderstorms,Moderate Rain Showers,Fog	7/17/2012 6:00	19.6	18.5	93	15	3.2	1
Thunderstorms,Rain	7/23/2012 18:00	21.3	19.1	93	30	24.1	1
Thunderstorms,Rain Showers	9/8/2012 4:00	25.5	23.1	98	32	25.0	1
Thunderstorms,Rain Showers,Fog	7/31/2012 20:00	22.9	21.3	91	35	9.7	1
Thunderstorms,Rain,Fog	7/17/2012 5:00	20.6	18.6	88	19	4.8	1

Q13)

```
In [60]: data[data['Weather Condition']=='Fog']
```

Out[60]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
0	1/1/2012 0:00	-1.8	-3.9	86	4	8.0	101.24	Fog
1	1/1/2012 1:00	-1.8	-3.7	87	4	8.0	101.24	Fog
4	1/1/2012 4:00	-1.5	-3.3	88	7	4.8	101.23	Fog
5	1/1/2012 5:00	-1.4	-3.3	87	9	6.4	101.27	Fog
6	1/1/2012 6:00	-1.5	-3.1	89	7	6.4	101.29	Fog
...
8716	12/29/2012 4:00	-16.0	-17.2	90	6	9.7	101.25	Fog
8717	12/29/2012 5:00	-14.8	-15.9	91	4	6.4	101.25	Fog
8718	12/29/2012 6:00	-13.8	-15.3	88	4	9.7	101.25	Fog
8719	12/29/2012 7:00	-14.8	-16.4	88	7	8.0	101.22	Fog
8722	12/29/2012 10:00	-12.0	-13.3	90	7	6.4	101.15	Fog

150 rows × 8 columns



Q14)

```
In [61]: data[(data['Weather Condition']=='Clear') | (data['Visibility_km']>40)]
```


Out[61]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
67	1/3/2012 19:00	-16.9	-24.8	50	24	25.0	101.74	Clear
106	1/5/2012 10:00	-6.0	-10.0	73	17	48.3	100.45	Mainly Clear
107	1/5/2012 11:00	-5.6	-10.2	70	22	48.3	100.41	Mainly Clear
108	1/5/2012 12:00	-4.7	-9.6	69	20	48.3	100.38	Mainly Clear
109	1/5/2012 13:00	-4.4	-9.7	66	26	48.3	100.40	Mainly Clear
...
8749	12/30/2012 13:00	-12.4	-16.2	73	37	48.3	100.92	Mostly Cloudy
8750	12/30/2012 14:00	-11.8	-16.1	70	37	48.3	100.96	Mainly Clear
8751	12/30/2012 15:00	-11.3	-15.6	70	32	48.3	101.05	Mainly Clear
8752	12/30/2012 16:00	-11.4	-15.5	72	26	48.3	101.15	Mainly Clear
8756	12/30/2012 20:00	-13.8	-16.5	80	24	25.0	101.52	Clear

3027 rows × 8 columns



15)

```
In [63]: data[((data['Weather Condition']=='Clear') & (data['Rel Hum_%']>50)) | (data['Visil
```

Out[63]:

	Date/Time	Temp_C	Dew Point Temp_C	Rel Hum_%	Wind Speed_km/h	Visibility_km	Press_kPa	Weather Condition
106	1/5/2012 10:00	-6.0	-10.0	73	17	48.3	100.45	Mainly Clear
107	1/5/2012 11:00	-5.6	-10.2	70	22	48.3	100.41	Mainly Clear
108	1/5/2012 12:00	-4.7	-9.6	69	20	48.3	100.38	Mainly Clear
109	1/5/2012 13:00	-4.4	-9.7	66	26	48.3	100.40	Mainly Clear
110	1/5/2012 14:00	-5.1	-10.7	65	22	48.3	100.46	Mainly Clear
...
8749	12/30/2012 13:00	-12.4	-16.2	73	37	48.3	100.92	Mostly Cloudy
8750	12/30/2012 14:00	-11.8	-16.1	70	37	48.3	100.96	Mainly Clear
8751	12/30/2012 15:00	-11.3	-15.6	70	32	48.3	101.05	Mainly Clear
8752	12/30/2012 16:00	-11.4	-15.5	72	26	48.3	101.15	Mainly Clear
8756	12/30/2012 20:00	-13.8	-16.5	80	24	25.0	101.52	Clear

2921 rows × 8 columns



In []: