Reading and cleaning the data

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Case study

- Comparing observed weather data from two sources

	Temperature	DewPoint	Pressure	Date
0	46.2	37.5	1.0	20100101 00:00
1	44.6	37.1	1.0	20100101 01:00
2	44.1	36.9	1.0	20100101 02:00
3	43.8	36.9	1.0	20100101 03:00
4	43.5	36.8	1.0	20100101 04:00

	Date	Wban	...	station_pressure	sea_level_pressure
0	2011-01-01 00:53:00	13904	...	29.42	29.95
1	2011-01-01 01:53:00	13904	...	29.49	30.01
2	2011-01-01 02:53:00	13904	...	29.49	30.01
3	2011-01-01 03:53:00	13904	...	29.51	30.03
4	2011-01-01 04:53:00	13904	...	29.51	30.04

[1] Source: National Oceanic & Atmospheric Administration (www.noaa.gov/climate)

Climate normals of Austin, TX from 1981-2010

	Temperature	DewPoint	Pressure	Date
0	46.2	37.5	1.0	20100101 00:00
1	44.6	37.1	1.0	20100101 01:00
2	44.1	36.9	1.0	20100101 02:00
3	43.8	36.9	1.0	20100101 03:00
4	43.5	36.8	1.0	20100101 04:00
5	43.0	36.5	1.0	20100101 05:00
6	43.1	36.3	1.0	20100101 06:00
7	42.3	35.9	1.0	20100101 07:00
8	42.5	36.2	1.0	20100101 08:00
9	45.9	37.8	1.0	20100101 09:00

Source: National Oceanic & Atmospheric Administration,

www.noaa.gov/climate

Weather data of Austin, TX from 2011

	Date	Wban	date	Time	StationType	...	relative_humidity	wind_speed	wind_direction	station_pressure	sea_level_pressure
0	2011-01-01 00:53:00	13904	20110101	5300	12	...	24.0	15.0	360	29.42	29.95
1	2011-01-01 01:53:00	13904	20110101	15300	12	...	23.0	10.0	340	29.49	30.01
2	2011-01-01 02:53:00	13904	20110101	25300	12	...	22.0	15.0	010	29.49	30.01
3	2011-01-01 03:53:00	13904	20110101	35300	12	...	27.0	7.0	350	29.51	30.03
4	2011-01-01 04:53:00	13904	20110101	45300	12	...	25.0	11.0	020	29.51	30.04
5	2011-01-01 05:53:00	13904	20110101	55300	12	...	28.0	6.0	010	29.53	30.06
6	2011-01-01 06:53:00	13904	20110101	65300	12	...	29.0	7.0	360	29.57	30.10
7	2011-01-01 07:53:00	13904	20110101	75300	12	...	29.0	11.0	020	29.59	30.12
8	2011-01-01 08:53:00	13904	20110101	85300	12	...	25.0	15.0	020	29.62	30.16
9	2011-01-01 09:53:00	13904	20110101	95300	12	...	22.0	18.0	010	29.65	30.19

Source: National Oceanic & Atmospheric Administration

www.noaa.gov/climate

Reminder: read_csv()

- Useful keyword options
- names: assigning column labels
- index_col: assigning index
- parse_dates: parsing datetimes
- na_values: parsing NaNs

Let's practice!

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Statistical exploratory data analysis

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datacamp

Reminder: time series

- Index selection by date time
- Partial datetime selection
- Slicing ranges of datetimes

```
climate2010['2010-05-31 22:00:00'] # datetime

climate2010['2010-06-01'] # Entire day

climate2010['2010-04'] # Entire month

climate2010['2010-09':'2010-10'] # 2 months
```

Reminder: statistics methods

- Methods for computing statistics:
- describe(): summary
- mean(): average
- count(): counting entries
- median(): median
- std(): standard deviation

Let's practice!

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Visual exploratory data analysis

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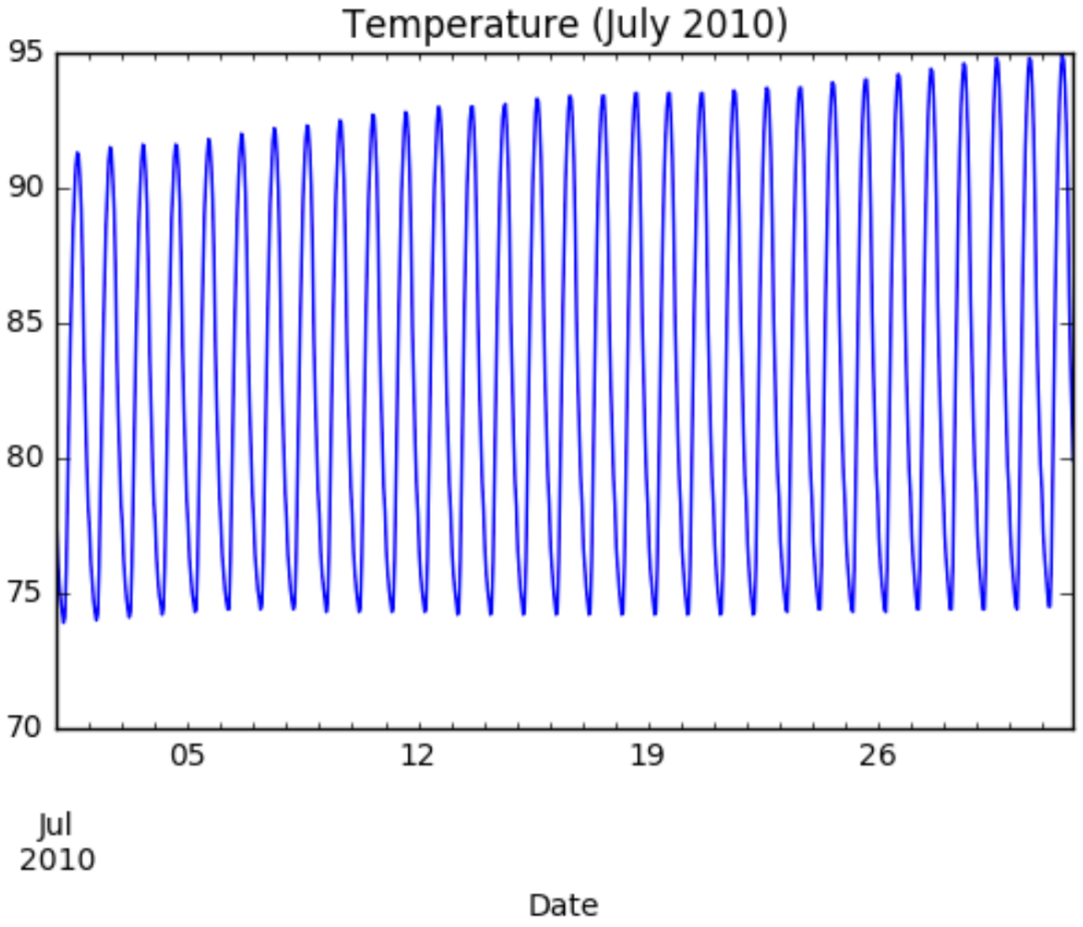
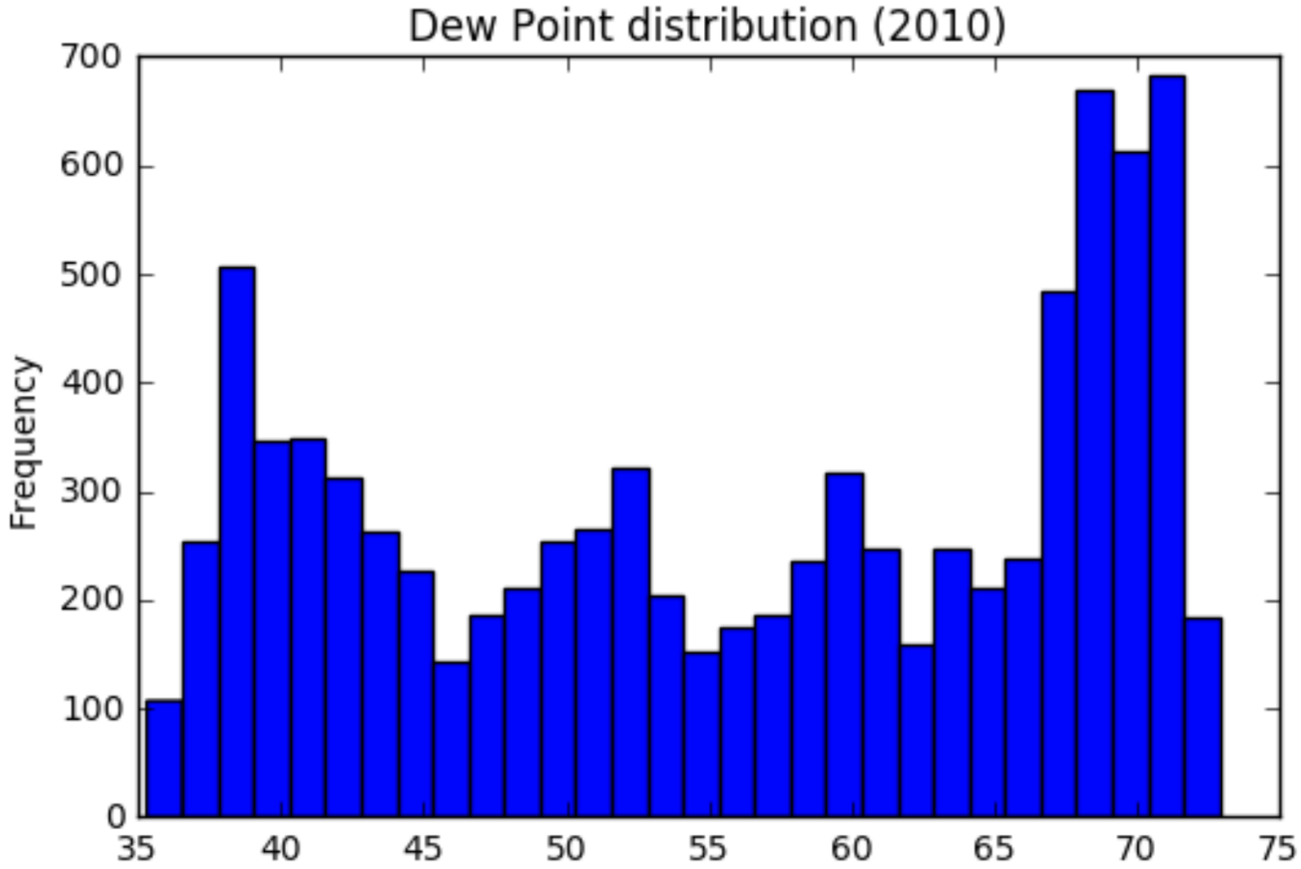
Line plots in pandas



Line plots in pandas

```
import matplotlib.pyplot as plt
climate2010.Temperature['2010-07'].plot()
plt.title('Temperature (July 2010)')
plt.show()
```

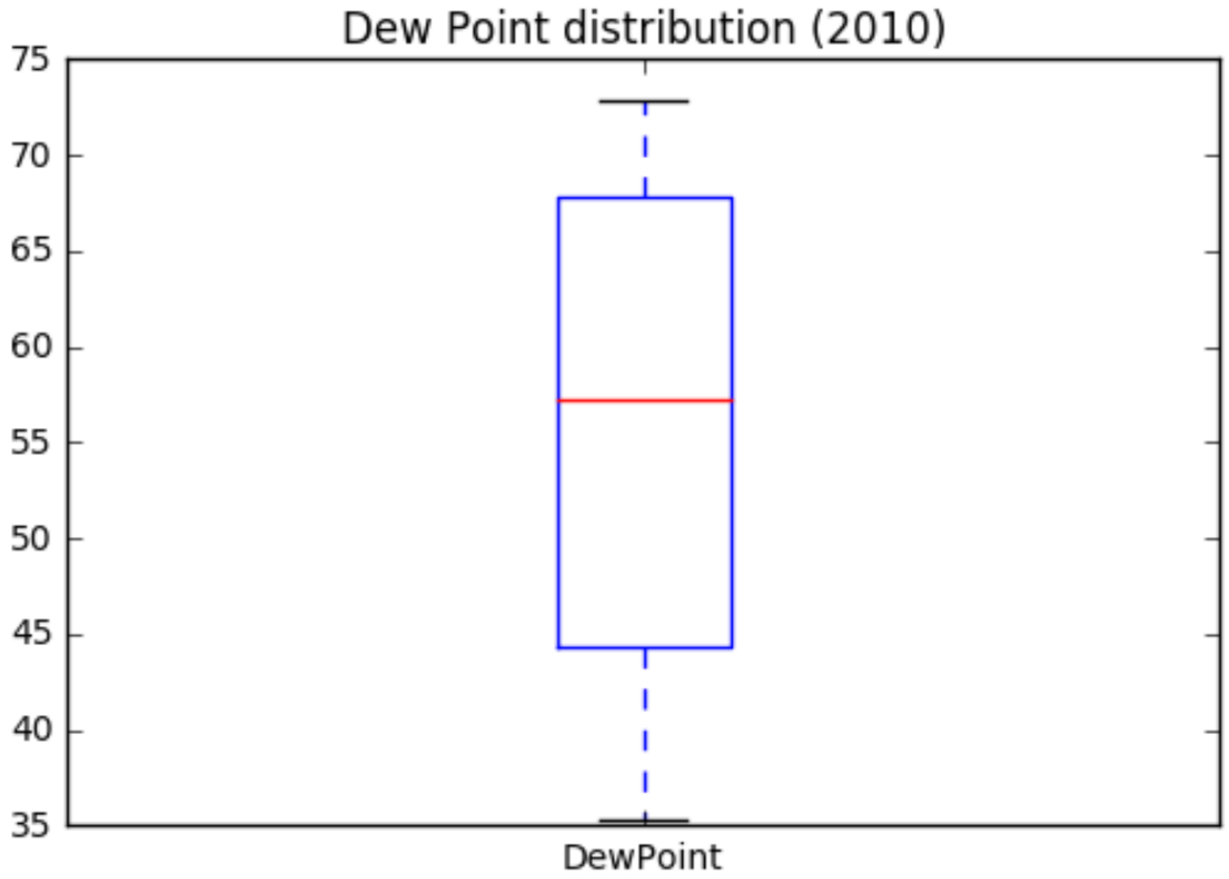
Histograms in pandas



Histograms in pandas

```
climate2010['DewPoint'].plot(kind= 'hist', bins=30)
plt.title('Dew Point distribution (2010)')
plt.show()
```

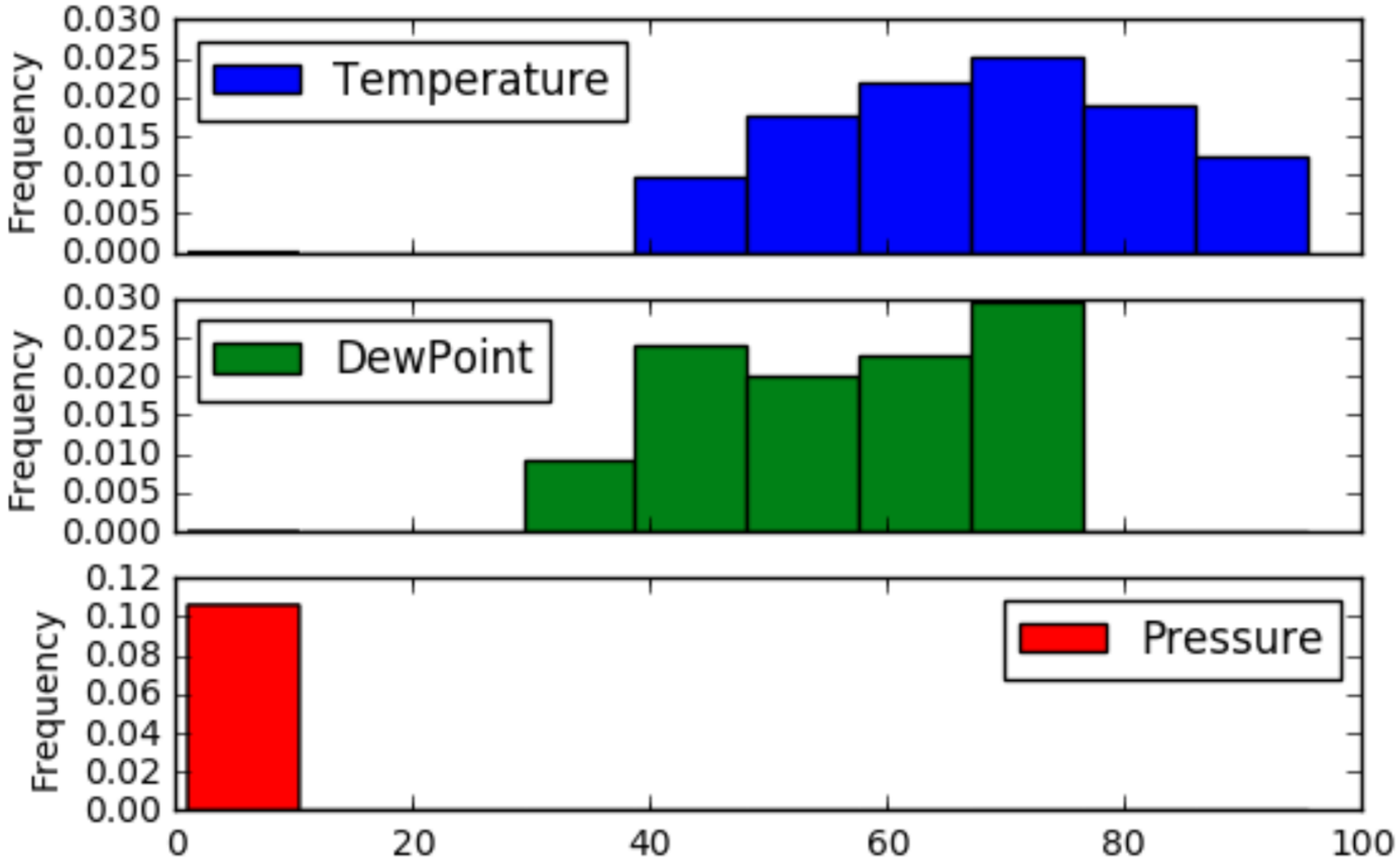
Box plots in pandas



Box plots in pandas

```
climate2010['DewPoint'].plot(kind='box')
plt.title('Dew Point distribution (2010)')
plt.show()
```

Subplots in pandas



Subplots in pandas

```
climate2010.plot(kind='hist', normed=True, subplots=True)
plt.show()
```

Let's practice!

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Final thoughts

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You now can...

- Import many types of datasets and deal with import issues
- Export data to facilitate collaborative data science
- Perform statistical and visual EDA natively in pandas

Let's practice!

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