Introduction to time series

GENERAL ASSEMBLY

Learning Objectives

- Understand how time series data is different from non-time series data
- Relate properties of time series data to modeling challenges
- Handle time series data in pandas

Time series data

"A *time series* is a sequence of observations taken sequentially in time. Many sets of data appear as time series: a monthly sequence of the quantity of goods shipped from a factory, a weekly series of the number of road accidents, daily rainfall amounts, hourly observations made on the yield of a chemical process, and so on."

- Box et al, *Forecasting and Control 4th ed. (2015)*

Time series data

- Time series data are ordered throughout time
- We will consider only data collected at **equally spaced intervals**
- Observations are dependent, and we care about this dependency a lot
- Often **univariate**

Notation

Modeling

- Observations are no longer **independent**
- In the univariate case, we may need to predict y based on previous values of y
- This makes time series modeling a challenge

What will we cover?

- Identifying trends and seasonality
- Autocorrelation and partial autocorrelation
- ARIMA models
- VAR models
- RNN models

