Meet Pandas

FinTech

Lesson 3.2

Class Objectives

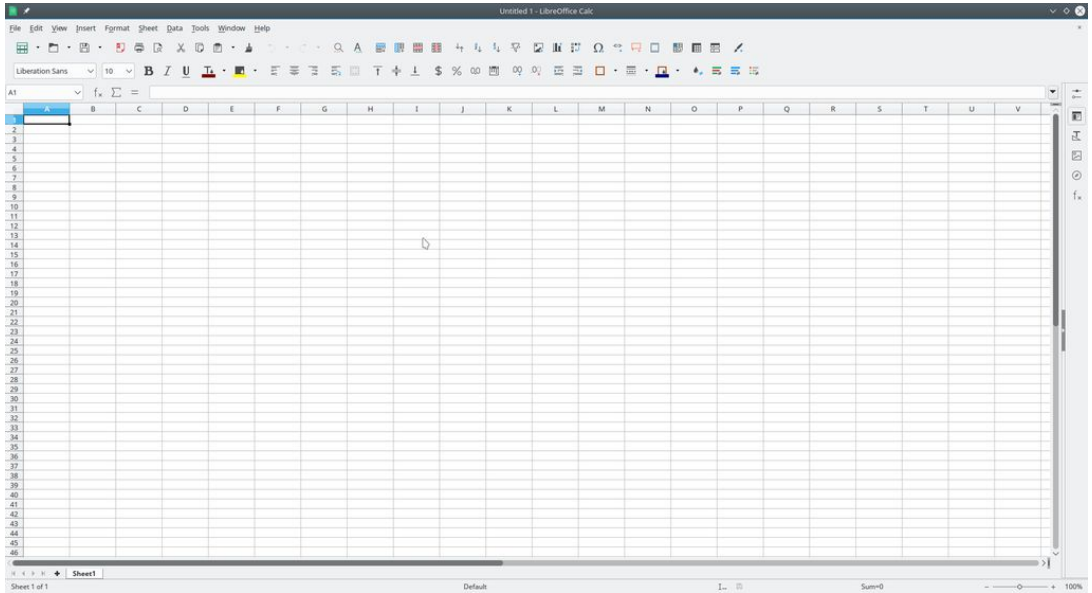
By the end of today's class, you will be able to:

- Describe the benefits of Pandas over spreadsheets to manipulate data on financial use cases.
- Explain what a DataFrame is and how it differs from a series.
- Create DataFrames from CSV files and use basic commands to manipulate them.
- Clean data using built-in commands of DataFrames.
- Manipulate data using DataFrame indexes.
- Describe the basic theory and calculations of returns using Pandas.
- Create basic data visualizations with Pandas' built-in plotting functions.

Why Pandas?

Spreadsheets Are AWESOME.

The Rise of Spreadsheets



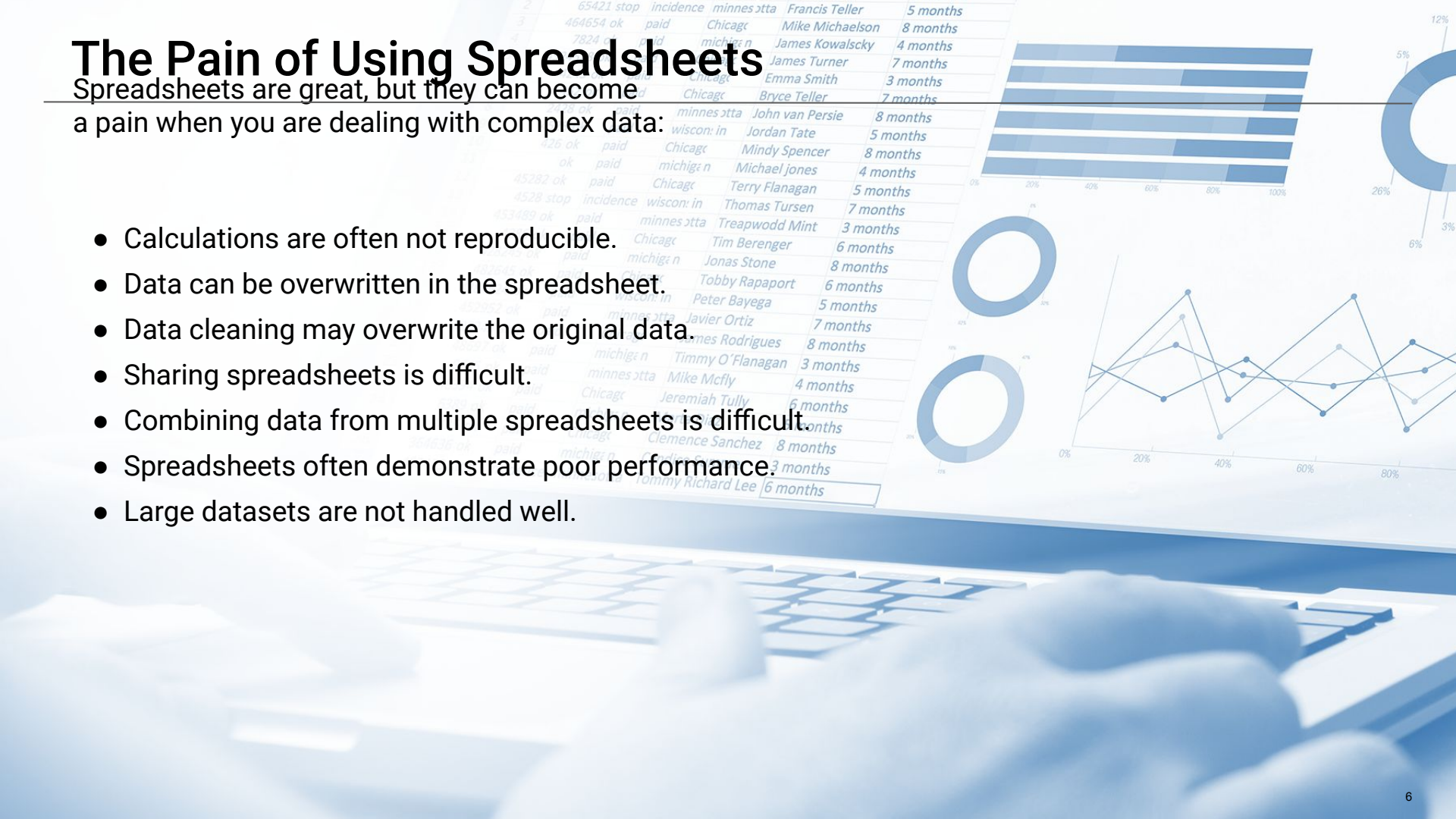
The Pain of Using Spreadsheets

Have you ever felt like this?

The Pain of Using Spreadsheets

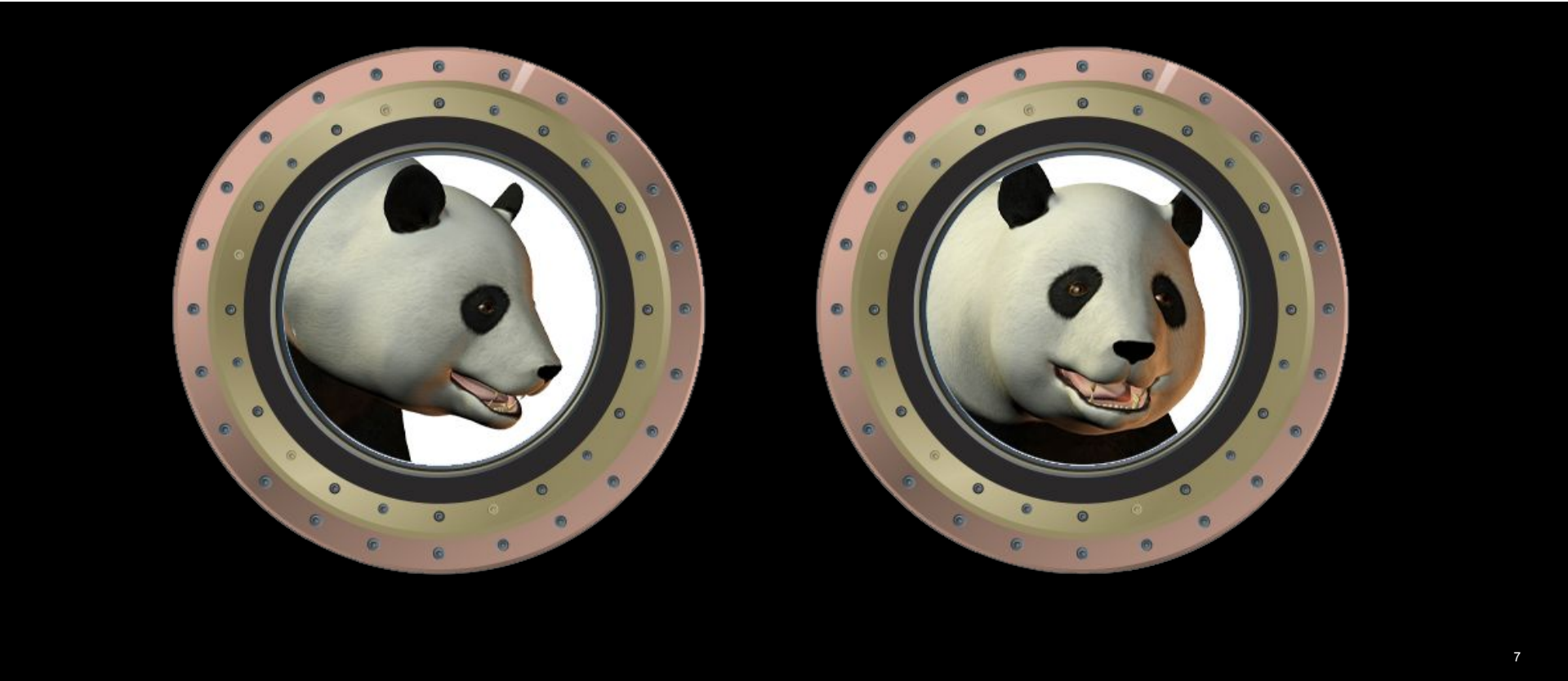
Spreadsheets are great, but they can become a pain when you are dealing with complex data:

- Calculations are often not reproducible.
- Data can be overwritten in the spreadsheet.
- Data cleaning may overwrite the original data.
- Sharing spreadsheets is difficult.
- Combining data from multiple spreadsheets is difficult.
- Spreadsheets often demonstrate poor performance.
- Large datasets are not handled well.



Pandas to the Rescue

Fortunately, we have Pandas to help us mung data on Python.



The Origins of Pandas

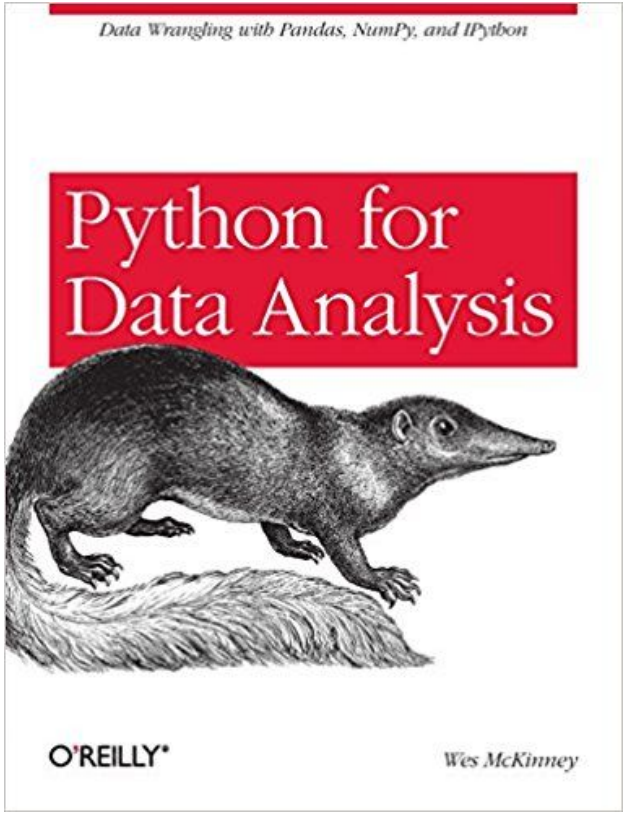
- Pandas is one of the most powerful open source libraries in Python for analyzing and manipulating data.
- This library was born on 2008 at AQR Capital when Wes McKinney was looking for a solution to offer a high-performance and flexible tool to perform quantitative analysis on financial data.
- Etymology: panel data structures

Why Pandas is Great

- Python + Pandas = the perfect combination for small experiments or for implementing large-scale production systems to analyze data and make smarter decisions.
- High-performance data structures:
  - Series (1D labeled vectors)
  - DataFrame (2D structures similar to spreadsheets)
  - Panel (Collection of DataFrames as 3D labeled arrays)
- Built-in time series functionality, which is a must for financial and quants analysis

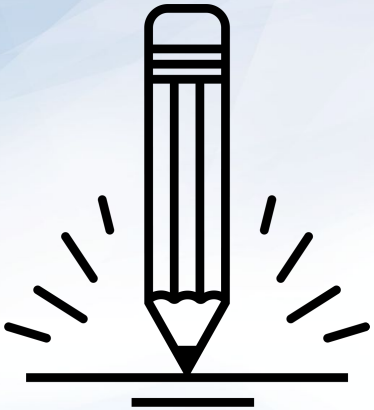
Resources for Learning More About Pandas

- Official website: https://pandas.pydata.org/
- Pandas on GitHub: http://github.com/pydata/pandas
- *Python for Data Analysis* by Wes McKinney



Python for Data Analysis
by Wes McKinney
(O'Reilly Media, 2017)

There is life beyond Excel to analyze data. Let’s find the path!



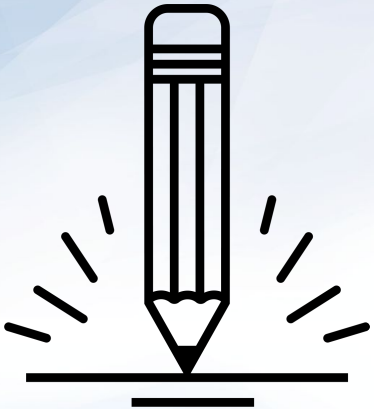
Activity: Reading Stock Data from a CSV File

In this activity, you will get hands-on experience reading CSV files into Pandas. You will use the `read_csv` function, sample data with the `head` function, and create DataFrames with specified column names.

(Instructions sent via Slack.)

Suggested Time:
10 Minutes

Time’s Up! Let’s Review.



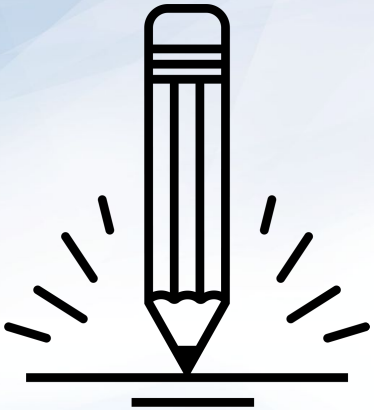
Activity: Spring Cleaning

In this activity, you will be given Harold's stock data and are asked to perform a series of data quality checks to ensure the data is ready for analytical use. The objective of the assignment is for you to learn how to cleanse data using Pandas native functions (`count`, `value_counts`, `isnull`, `sum`, `mean`, `contains`, and `replace`).

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.



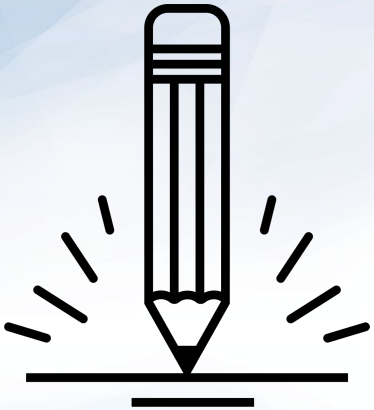
Activity: Three-Year Loans

This activity will test your DataFrame indexing skills. You will slice and dice the `loans.csv` data to generate insightful answers regarding three-year loan customers.

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.



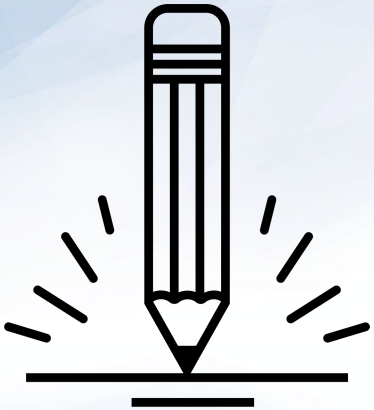
Activity: Market Analysis

In this activity, you will create three different charts using Pandas: pie chart, bar chart, and scatter plot.

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.



Activity:
Returns Over Date Ranges

In this activity, you will work analyze the last 10 years of historical price data for AMD and plot the daily returns over the last 1-, 3-, 5-, and 10-year time periods.

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.

Decompress