**Preface (7 pages)**

The preface gives a quick overview of the book and what we will cover. Being a 2ed, we’ll talk a little about the differences between 1ed and 2ed.

* **What is the book about?**
* **What do you need to use pandas?**
* **What assumptions are made in the book?**
* **About the second edition**

**Chapter 1: Up and running with pandas (25 pages)**

This chapter will instruct the reader on obtain and install pandas, and to get introduce a few of the basic concepts in pandas. We will also look at how the examples are presented using iPython and Juypter notebook.

* **Why use Python and Padas for Data Analysis?**
* **What does pandas offer?**
* **Installing and using pandas**
* **Using Jupyter notebooks and the source code of the book**
* **Basic data manipulation and concepts with pandas**

By the end of this chapter the user will understand how to get going with the examples that are presented in the subsequent chapters.

**Chapter 2: Fundaments for pandas: NumPy Arrays (31 pages)**

This chapter will give the reader a fundamental understanding of NumPy arrays. These data structures provide the underpinnings of pandas, and many of the concepts in their user are extended to pandas. It is therefore useful to give a quick overview to set up the next chapter on Series objects.

* **Installing and importing NumPy**
* **Benefits and characteristics of NumPy Arrays**
* **Creating NumPy arrays and performing basic array operations**
* **Selecting array elements**
* **Logical operations on arrays**
* **Slicing arrays**
* **Reshaping arrays**
* **Combining arrays**
* **Splitting arrays**
* **Numerical methods of NumPy arrays**

By the end of this chapter the reader will have a basic understanding of NumPy arrays, which will set them up for the next chapter on the pandas Series. Additionally they will be introduced to concepts such as selection and slicing, which are prevalent in the user of pandas.

the reader will have successfully …9

**Chapter 3: The pandas Series (44 pages)**

This chapter will…

* **Creating and initializing a Series and its index**
* **Determining the shape of a Series object**
* **Heads, tails, uniqueness, and counts of values**
* **Looking up values in a Series object**
* **Boolean selection**
* **Alignment via index labels**
* **Arithmetic operations on a Series object**
* **Reindexing a Series object**
* **Applying arithmetic operations on Series objects**
* **The special case of Not-A-Number (NaN)**
* **Slicing Series objects**

By the end of this chapter…

the reader will have successfully …

**Chapter 4: The pandas DataFrame (66 pages)**

What the chapter is about…

* **Creating a DataFrame from scratch**
* **Loading sample data to demonstrate the capabilities of a DataFrame object**
* **Selecting columns of a DataFrame object**
* **Selecting rows and values of a DataFrame using the index**
* **Selecting rows of a DataFrame using Boolean selection**
* **Adding, replacing, and deleting columns from a DataFrame**
* **Adding, replacing, and deleting rows from a DataFrame**
* **Modifying scalar values in a DataFrame**
* **Arithmetic operations on the DataFrame objects**
* **Resetting and reindexing a DataFrame**
* **Hierarchically indexing a DataFrame**
* **Statistical methods of a DataFrame**
* **Summarized data and statistical methods of a DataFrame**

By the end of this chapter…

the reader will have successfully …

**Chapter 5: Accessing Data (42 pages)**

What the chapter is about…

* **Reading and writing pandas data from files**
* **• Working with data in CSV, JSON, HTML, Excel, and HDF5 formats**
* **• Accessing data on the web and in the cloud**
* **• Reading and writing from/to SQL databases**
* **• Reading data from remote web data services**

By the end of this chapter…

the reader will have successfully …

**Chapter 6: Tidying Up Your Data (36 pages)**

What the chapter is about…

* **The concept of tidy data**
* **How pandas represents unknown values**
* **How to find NaN values in data**
* **How to filter (drop) data**
* **What pandas does with unknown values in calculations**
* **How to find, filter and fix unknown values**
* **How to identify and remove duplicate data**
* **How to transform values using replace, map, and apply**

By the end of this chapter…

the reader will have successfully …

**Chapter 7: Combining and Reshaping Data (30 pages)**

What the chapter is about…

* **Concatenation**
* **Merging and joining**
* **Pivots**
* **Stacking/unstacking**
* **Melting**
* **The potential performance benefits of stacked data**

By the end of this chapter…

the reader will have successfully …

**Chapter 8: Grouping and Aggregating Data (38 pages)**

What the chapter is about…

* **An overview of the split, apply, and combine pattern for data analysis**
* **Grouping by column values**
* **Accessing the results of a grouping**
* **Grouping using index levels**
* **Applying functions to groups to create aggregate results**
* **Transforming groups of data using filtering to selectively remove groups of data**
* **The discretization of continuous data into bins**

By the end of this chapter…

the reader will have successfully …

**Chapter 9: Time-series Data (53 pages)**

What the chapter is about…

* **Converting string-based dates and time into objects**
* **Standardizing date and time values to specific time zones**
* **Generating sequences of fixed-frequency dates and time intervals**
* **Efficiently reading/writing the value at a specific time in a series**
* **Converting an existing time series to another with a new frequency of sampling**
* **Computing relative dates, not only taking into account time zones, but also dealing with specific calendars based upon business days**
* **Identifying missing samples in a time series and determining appropriate substitute values**
* **Shifting dates and time forward or backward by a given amount**
* **Calculating aggregate summaries of values as time changes**

By the end of this chapter…

the reader will have successfully …

**Chapter 10: Visualization (48 pages)**

What the chapter is about…

* **Bar plots**
* **Histograms**
* **Box and whisker charts**
* **Area plots**
* **Scatter plots**
* **Density plots**
* **Scatter plot matrixes**
* **Heatmaps**
* **D3.JS**

By the end of this chapter…

the reader will have successfully …

**Chapter 11: Financial Applications (30 pages)**

What the chapter is about…

* **Fetching and organizing stock data from Yahoo!**
* **Plotting time-series prices**
* **Plotting volume-series data**
* **Calculating simple daily percentage change**
* **Calculating simple daily cumulative returns**
* **Resampling data from daily to monthly returns**
* **Analyzing distribution of returns**
* **Performing a moving-average calculation**
* **Comparing average daily returns across stocks**
* **Correlating stocks based on the daily percentage change of closing price**
* **Volatility calculation**
* **Determining risk relative to expected returns**

By the end of this chapter…

the reader will have successfully …

**Chapter 12: Applications to Data Science and Analysis (35 pages)**

What the chapter is about…

By the end of this chapter…

the reader will have successfully …

**Summary**

Preface: (5 Pages)

Chapter 1: Getting Started with Pandas (10 Pages)

Chapter 2: Examples of Manipulating Data with Pandas (30 pages)

Chapter 3: Using IPython and NumPy: Foundations for Pandas (35 pages)

Chapter 4: Using DataFrame and Indexes (35 pages)

Chapter 5: Accessing data with Pandas (30 pages)

Chapter 6: Manipulating Data (25 pages)

Chapter 7: Deriving results from manipulated data (25 pages)

Chapter 8: Time Series Operations (40 pages)

Chapter 9: Data Visualization (30 pages)

Chapter 10: Applications to Financial, Economic and Social Network Analysis (30 pages)

**Total Pages: 295**