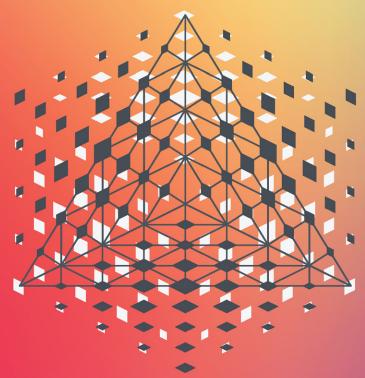


## FOUNDATIONAL PYTHON FOR DATA SCIENCE





KENNEDY BEHRMAN

# Foundational Python for Data Science

#### **Foundational Python for Data Science**

#### **Table of Contents**

(	`	$\sim$	١.	,	۵	r
ı		( )	W	4	_	ı

Half Title

Title Page

Copyright Page

Dedication

Contents at a Glance

**Table of Contents** 

**Preface** 

#### I: Learning Python in a Notebook Environment

1 Introduction to Notebooks

**Running Python Statements** 

Jupyter Notebooks

Google Colab

Colab Text Cells

Colab Code Cells

Colab Files

Managing Colab Documents

Colab Code Snippets

**Existing Collections** 

System Aliases

Magic Functions

Summary

Questions

2 Fundamentals of Python



#### Basic Types in Python

High-Level Versus Low-Level Languages

Statements

Performing Basic Math Operations

Using Classes and Objects with Dot Notation

Summary

Questions

#### 3 Sequences

#### **Shared Operations**

**Testing Membership** 

Indexing

Slicing

Interrogation

Math Operations

#### Lists and Tuples

Creating Lists and Tuples

Adding and Removing List Items

Unpacking

Sorting Lists

Strings

Ranges

Summary

Questions

#### 4 Other Data Structures

#### Dictionaries

Creating Dictionaries

Accessing, Adding, and Updating by Using Keys

Removing Items from Dictionaries

**Dictionary Views** 

Checking to See If a Dictionary Has a Key

The get Method

Valid Key Types



The hash Method

Sets

Set Operations

Frozensets

Summary

Questions

#### 5 Execution Control

#### Compound Statements

Compound Statement Structure

Evaluating to True or False

if Statements

while Loops

for Loops

break and continue Statements

Summary

Questions

#### 6 Functions

#### **Defining Functions**

Control Statement

**Docstrings** 

**Parameters** 

Return Statements

Scope in Functions

**Decorators** 

**Anonymous Functions** 

Summary

Questions

#### II: Data Science Libraries

#### 7 NumPy

Installing and Importing NumPy



**Creating Arrays** 

Indexing and Slicing

**Element-by-Element Operations** 

Filtering Values

Views Versus Copies

Some Array Methods

Broadcasting

NumPy Math

Summary

Questions

#### 8 SciPy

SciPy Overview

The scipy.misc Submodule

The scipy.special Submodule

The scipy.stats Submodule

Discrete Distributions

Continuous Distributions

Summary

Questions

#### 9 Pandas

**About DataFrames** 

#### Creating DataFrames

Creating a DataFrame from a Dictionary

Creating a DataFrame from a List of Lists

Creating a DataFrame from a File

#### Interacting with DataFrame Data

Heads and Tails

**Descriptive Statistics** 

Accessing Data

**Bracket Syntax** 

Optimized Access by Label



Optimized Access by Index

Masking and Filtering

Pandas Boolean Operators

Manipulating DataFrames

Manipulating Data

The replace Method

Interactive Display

Summary

Questions

#### 10 Visualization Libraries

#### matplotlib

Styling Plots

Labeled Data

Plotting Multiple Sets of Data

Object-Oriented Style

#### Seaborn

Seaborn Themes

**Plotly** 

Bokeh

Other Visualization Libraries

Summary

Questions

#### 11 Machine Learning Libraries

Popular Machine Learning Libraries

How Machine Learning Works

Transformations

Splitting Test and Training Data

Training and Testing

Learning More About Scikit-learn

Summary

Questions



#### 12 Natural Language Toolkit

**NLTK Sample Texts** 

Frequency Distributions

**Text Objects** 

Classifying Text

Summary

**Exercises** 

#### III: Intermediate Python

#### 13 Functional Programming

#### Introduction to Functional Programming

Scope and State

Depending on Global State

Changing State

Changing Mutable Data

Functional Programming Functions

#### List Comprehensions

List Comprehension Basic Syntax

Replacing map and filter

Multiple Variables

**Dictionary Comprehensions** 

#### Generators

Generator Expressions

Generator Functions

Summary

Questions

#### 14 Object-Oriented Programming

#### Grouping State and Function

Classes and Instances

Private Methods and Variables

Class Variables

Special Methods



Representation Methods

Rich Comparison Methods

Math Operator Methods

Inheritance

Summary

Questions

#### 15 Other Topics

Sorting

Lists

Reading and Writing Files

**Context Managers** 

datetime Objects

#### Regular Expressions

**Character Sets** 

**Character Classes** 

Groups

Named Groups

Find All

Find Iterator

Substitution

Substitution Using Named Groups

Compiling Regular Expressions

Summary

Questions

### A: Answers to End-of-Chapter Questions Index

