



From *SAS® Viya®: The Python Perspective*.
Full book available for purchase [here](#).

Contents

Foreword	ix
About This Book.....	xi
About These Authors.....	xv
Chapter 1: Installing Python, SAS SWAT, and CAS	1
Installing Python	1
Installing SAS SWAT	2
Installing CAS.....	3
Making Your First Connection	3
Conclusion.....	3
Chapter 2: The Ten-Minute Guide to Using CAS from Python.....	5
Importing SWAT and Getting Connected.....	5
Running CAS Actions	8
Loading Data	9
Executing Actions on CAS Tables	11
Data Visualization	12
Closing the Connection	14
Conclusion.....	14
Chapter 3: The Fundamentals of Using Python with CAS	15
Connecting to CAS	15
Running CAS Actions	17
Specifying Action Parameters	22
CAS Action Results.....	28
Working with CAS Action Sets	35
Details.....	37
Getting Help.....	37
Dealing with Errors	37
SWAT Options	41
CAS Session Options.....	46
Conclusion.....	48

Chapter 4: Managing Your Data in CAS	49
Overview	50
Getting Started with Caslibs and CAS Tables.....	51
Loading Data into a CAS Table	53
Displaying Data in a CAS Table.....	55
Computing Simple Statistics.....	55
Dropping a CAS Table.....	56
CAS Data Types.....	56
Caslib and CAS Table Visibility	57
The Active Caslib	57
Uploading Data Files to CAS Tables	58
Uploading Data from URLs to CAS Tables.....	61
Uploading Data from a Pandas DataFrame to a CAS Table.....	62
Using Data Message Handlers	63
The HTML Data Message Handler.....	64
The Excel Data Message Handler.....	69
The PandasDataFrame Data Message Handler	71
Using Data Message Handlers with Databases	72
Writing Your Own Data Message Handlers.....	77
Variable Definition Details	79
Adding Data Transformers	79
Managing Caslibs.....	82
Creating a Caslib	82
Setting an Active Caslib.....	82
Dropping a Caslib	83
Conclusion	83
Chapter 5: The CASAction and CASTable Objects	85
Getting Started with the CASAction Objects	85
Setting Nested Parameters	89
Setting Parameters as Attributes.....	90
Retrieving and Removing Action Parameters	92
First Steps with the CASTable Object.....	93
Manually Creating a CASTable Object.....	98
CASTable Action Interface	98
Setting CASTable Parameters.....	99
Managing Parameters Using the Method Interface.....	102

Managing Parameters Using the Attribute Interface	105
Materializing CASTable Parameters	106
Conclusion.....	107
Chapter 6: Working with CAS Tables	109
Using CASTable Objects like a DataFrame	109
CAS Table Introspection	109
Computing Simple Statistics	112
Creating Plots from CASTable Data.....	116
Exporting CASTables to Other Formats	119
Sorting, Data Selection, and Iteration	120
Fetching Data with a Sort Order.....	120
Iterating through Columns and Rows.....	122
Techniques for Indexing and Selecting Data	125
Data Wrangling on the Fly	134
Creating Computed Columns	134
BY-Group Processing.....	136
Conclusion.....	145
Chapter 7: Data Exploration and Summary Statistics	147
Overview	147
Summarizing Continuous Variables	148
Descriptive Statistics.....	148
Histograms	153
Percentiles	159
Correlations	161
Summarizing Categorical Variables	162
Distinct Counts.....	163
Frequency	166
Top K.....	169
Cross Tabulations	172
Variable Transformation and Dimension Reduction.....	176
Variable Binning	177
Variable Imputation.....	181
Conclusion.....	184
Chapter 8: Modeling Continuous Variables	185
Linear Regressions.....	186
Extensions of Ordinary Linear Regression	197
Generalized Linear Models	197

Regression Trees.....	202
Conclusion	205
Chapter 9: Modeling Categorical Variables.....	207
Logistic Regression	207
Decision Trees.....	217
Gradient Boosting, Forests, and Neural Networks.....	226
Conclusion	234
Chapter 10: Advanced Topics	235
Binary vs. REST Interfaces.....	236
The Binary Interface	236
The REST Interface.....	237
The Pros and Cons of Each Interface.....	238
Result Processing Workflows.....	238
The Easy Way	238
Using Response and Result Callback Functions	239
Handling Responses from Multiple Sessions Simultaneously.....	243
Connecting to Existing Sessions.....	247
Communicating Securely	248
Conclusion	248
Appendix A: A Crash Course in Python	249
IPython and Jupyter.....	249
Data Types and Collections	251
Numeric Data Types	251
Character Data Types	252
Booleans.....	253
Lists and Tuples.....	253
Other Types	256
Flow Control	256
Conditional Code	256
Looping.....	257
Functions	260
Classes and Objects	262
Exceptions	263
Context Managers.....	264
Using the Pandas Package	264
Data Structures.....	265
Data Selection.....	266

Creating Plots and Charts	270
Plotting from Pandas DataFrame Methods.....	270
Plotting DataFrames with Plotly and Cufflinks	271
Creating Graphics with Matplotlib	273
Interactive Visualization with Bokeh	275
Conclusion.....	276
Appendix B: Troubleshooting.....	277
Software Version Issues	277
Connection Issues	277
Missing Linux Library Dependencies	277
Incorrect SAS Threaded Kernel Configuration	278
Unable to Import <code>_pyXXswat</code>	278
Refused Connection	279
Authentication Problems.....	280
Index.....	281

From *SAS@ Viya@: The Python Perspective* by Kevin D. Smith and Xiangxiang Meng. Copyright © 2017, SAS Institute Inc., Cary, North Carolina, USA. ALL RIGHTS RESERVED.