

CONTENTS IN DETAIL

ACKNOWLEDGMENTS

xxiii

INTRODUCTION	1
Whom Is This Book For?	2
Conventions	2
What Is Programming?	3
What Is Python?	4
Programmers Don't Need to Know Much Math	4
Programming Is a Creative Activity	5
About This Book.	5
Downloading and Installing Python	6
Starting IDLE	7
The Interactive Shell.	8
How to Find Help.	8
Asking Smart Programming Questions	9
Summary	10

PART I: PYTHON PROGRAMMING BASICS 11

1	
PYTHON BASICS	13
Entering Expressions into the Interactive Shell.	14
The Integer, Floating-Point, and String Data Types	16
String Concatenation and Replication.	17
Storing Values in Variables	18
Assignment Statements.	18
Variable Names	20
Your First Program	21
Dissecting Your Program.	22
Comments	23
The print() Function	23
The input() Function	23
Printing the User's Name	24
The len() Function	24
The str(), int(), and float() Functions	25
Summary	28
Practice Questions	28

2	
FLOW CONTROL	31
Boolean Values	32
Comparison Operators	33
Boolean Operators.	35

Binary Boolean Operators	35
The not Operator	36
Mixing Boolean and Comparison Operators	36
Elements of Flow Control	37
Conditions	37
Blocks of Code	37
Program Execution	38
Flow Control Statements	38
if Statements	38
else Statements	39
elif Statements	40
while Loop Statements	45
break Statements	49
continue Statements	50
for Loops and the range() Function	53
Importing Modules	57
from import Statements	58
Ending a Program Early with sys.exit()	58
Summary	58
Practice Questions	59

3

FUNCTIONS

61

def Statements with Parameters	63
Return Values and return Statements	63
The None Value	65
Keyword Arguments and print()	65
Local and Global Scope	67
Local Variables Cannot Be Used in the Global Scope	67
Local Scopes Cannot Use Variables in Other Local Scopes	68
Global Variables Can Be Read from a Local Scope	69
Local and Global Variables with the Same Name	69
The global Statement	70
Exception Handling	72
A Short Program: Guess the Number	74
Summary	76
Practice Questions	76
Practice Projects	77
The Collatz Sequence	77
Input Validation	77

4

LISTS

79

The List Data Type	80
Getting Individual Values in a List with Indexes	80
Negative Indexes	82
Getting Sublists with Slices	82
Getting a List's Length with len()	83
Changing Values in a List with Indexes	83

List Concatenation and List Replication	83
Removing Values from Lists with del Statements	84
Working with Lists	84
Using for Loops with Lists	86
The in and not in Operators	87
The Multiple Assignment Trick	87
Augmented Assignment Operators	88
Methods	89
Finding a Value in a List with the index() Method	89
Adding Values to Lists with the append() and insert() Methods	89
Removing Values from Lists with remove()	90
Sorting the Values in a List with the sort() Method	91
Example Program: Magic 8 Ball with a List	92
List-like Types: Strings and Tuples	93
Mutable and Immutable Data Types	94
The Tuple Data Type	96
Converting Types with the list() and tuple() Functions	97
References	97
Passing References	100
The copy Module's copy() and deepcopy() Functions	100
Summary	101
Practice Questions	102
Practice Projects	102
Comma Code	102
Character Picture Grid	103

5 **DICTIONARIES AND STRUCTURING DATA** **105**

The Dictionary Data Type	105
Dictionaries vs. Lists	106
The keys(), values(), and items() Methods	107
Checking Whether a Key or Value Exists in a Dictionary	109
The get() Method	109
The setdefault() Method	110
Pretty Printing	111
Using Data Structures to Model Real-World Things	112
A Tic-Tac-Toe Board	113
Nested Dictionaries and Lists	117
Summary	119
Practice Questions	119
Practice Projects	120
Fantasy Game Inventory	120
List to Dictionary Function for Fantasy Game Inventory	120

6 **MANIPULATING STRINGS** **123**

Working with Strings	123
String Literals	124
Indexing and Slicing Strings	126
The in and not in Operators with Strings	127