

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

Useful String Methods	127
The upper(), lower(), isupper(), and islower() String Methods	128
The isX String Methods	129
The startswith() and endswith() String Methods	131
The join() and split() String Methods	131
Justifying Text with rjust(), ljust(), and center()	133
Removing Whitespace with strip(),rstrip(), and lstrip()	134
Copying and Pasting Strings with the pyperclip Module.	135
Project: Password Locker.	136
Step 1: Program Design and Data Structures	136
Step 2: Handle Command Line Arguments	137
Step 3: Copy the Right Password	137
Project: Adding Bullets to Wiki Markup.	139
Step 1: Copy and Paste from the Clipboard	139
Step 2: Separate the Lines of Text and Add the Star	140
Step 3: Join the Modified Lines	141
Summary	141
Practice Questions	142
Practice Project	142
Table Printer.	142

PART II: AUTOMATING TASKS

145

7

PATTERN MATCHING WITH REGULAR EXPRESSIONS

147

Finding Patterns of Text Without Regular Expressions	148
Finding Patterns of Text with Regular Expressions	150
Creating Regex Objects	150
Matching Regex Objects	151
Review of Regular Expression Matching.	152
More Pattern Matching with Regular Expressions	152
Grouping with Parentheses.	152
Matching Multiple Groups with the Pipe.	153
Optional Matching with the Question Mark	154
Matching Zero or More with the Star.	155
Matching One or More with the Plus	155
Matching Specific Repetitions with Curly Brackets	156
Greedy and Nongreedy Matching	156
The findall() Method	157
Character Classes	158
Making Your Own Character Classes.	159
The Caret and Dollar Sign Characters	159
The Wildcard Character	160
Matching Everything with Dot-Star.	161
Matching Newlines with the Dot Character	162
Review of Regex Symbols	162
Case-Insensitive Matching	163

Substituting Strings with the sub() Method	163
Managing Complex Regexes.	164
Combining re.IGNORECASE, re.DOTALL, and re.VERBOSE	164
Project: Phone Number and Email Address Extractor	165
Step 1: Create a Regex for Phone Numbers	166
Step 2: Create a Regex for Email Addresses.	166
Step 3: Find All Matches in the Clipboard Text.	167
Step 4: Join the Matches into a String for the Clipboard.	168
Running the Program	169
Ideas for Similar Programs	169
Summary	169
Practice Questions	170
Practice Projects.	171
Strong Password Detection.	171
Regex Version of strip()	171

8 READING AND WRITING FILES 173

Files and File Paths.	173
Backslash on Windows and Forward Slash on OS X and Linux.	174
The Current Working Directory	175
Absolute vs. Relative Paths	175
Creating New Folders with os.makedirs().	176
The os.path Module	177
Handling Absolute and Relative Paths	177
Finding File Sizes and Folder Contents.	179
Checking Path Validity.	180
The File Reading/Writing Process	180
Opening Files with the open() Function	181
Reading the Contents of Files	182
Writing to Files	183
Saving Variables with the shelve Module	184
Saving Variables with the pprint.pformat() Function	185
Project: Generating Random Quiz Files.	186
Step 1: Store the Quiz Data in a Dictionary	187
Step 2: Create the Quiz File and Shuffle the Question Order	188
Step 3: Create the Answer Options.	189
Step 4: Write Content to the Quiz and Answer Key Files	189
Project: Multiclipboard	191
Step 1: Comments and Shelf Setup	192
Step 2: Save Clipboard Content with a Keyword	192
Step 3: List Keywords and Load a Keyword's Content	193
Summary	194
Practice Questions	194
Practice Projects.	194
Extending the Multiclipboard	194
Mad Libs	195
Regex Search	195