Binary Boolean Operators			
The not Operator	 		 36
Mixing Boolean and Comparison Operators			
Elements of Flow Control	 		 37
Conditions			
Blocks of Code			
Program Execution	 		 38
Flow Control Statements	 		 38
if Statements			
else Statements			
elif Statements			
while Loop Statements			
break Statements			
continue Statements			
for Loops and the range() Function			
Importing Modules			
from import Statements	 • • •	• •	 58
Ending a Program Early with sys.exit()	 	• •	 58
Summary	 • • •	• •	 50
Practice Questions			
Fractice Questions	 • • •		 37
3			
FUNCTIONS			61
def Statements with Parameters			40
Return Values and return Statements			
The None Value			
Keyword Arguments and print()			
Local and Global Scope			
Local Variables Cannot Be Used in the Global Scope			
Local Scopes Cannot Use Variables in Other Local Scopes			
Global Variables Can Be Read from a Local Scope			
Local and Global Variables with the Same Name			
The global Statement			
Exception Handling	 		 72
A Short Program: Guess the Number	 		 74
Summary			
Practice Questions			
Practice Projects			
The Collatz Sequence			
Input Validation	 		 77
Δ			
LISTS			79
The List Data Type			
Getting Individual Values in a List with Indexes	 		 80
Negative Indexes			
Getting Sublists with Slices			
Getting a List's Length with len()			
Changing Values in a List with Indexes			83

	List Concatenation and List Replication	
Working	g with Lists	
	Using for Loops with Lists	
	The in and not in Operators	
Augmen	The Multiple Assignment Trickted Assignment Operators	
	Finding a Value in a List with the index() Method	
	Adding Values to Lists with the append() and insert() Methods	
	Removing Values from Lists with remove()	
Evampla	Sorting the Values in a List with the sort() Method	
	Frogram: Magic o Ball Will a List	
LISTING	Mutable and Immutable Data Types	
	The Tuple Data Type	96
	Converting Types with the list() and tuple() Functions	97
Reference	ces	
	Passing References	
Summar	тпе сору модие s соруц ана деерсоруц г инсполь	101
	Questions	
	Projects	
	Comma Code	
	Character Picture Grid	. 103
5		
5 DICTIO	DNARIES AND STRUCTURING DATA	105
DICTIC	DNARIES AND STRUCTURING DATA  ionary Data Type	
DICTIC	ionary Data Type	. 105 . 106
DICTIC	ionary Data Type	. 105 . 106 . 107
DICTIC	ionary Data Type	. 105 . 106 . 107 . 109
DICTIC	ionary Data Type	. 105 . 106 . 107 . 109
The Dict  Pretty Pr	ionary Data Type Dictionaries vs. Lists The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method The setdefault() Method inting	. 105 . 106 . 107 . 109 . 109 . 110
The Dict  Pretty Pr	ionary Data Type Dictionaries vs. Lists The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method The setdefault() Method inting ata Structures to Model Real-World Things	. 105 . 106 . 107 . 109 . 109 . 110 . 111
The Dict  Pretty Pr	ionary Data Type Dictionaries vs. Lists The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method The setdefault() Method inting ata Structures to Model Real-World Things A Tic-Tac-Toe Board	. 105 . 106 . 107 . 109 . 109 . 110 . 111 . 112
DICTIC The Dict Pretty Pr Using Do	ionary Data Type Dictionaries vs. Lists. The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method. The setdefault() Method inting ata Structures to Model Real-World Things. A Tic-Tac-Toe Board. Nested Dictionaries and Lists	. 105 . 106 . 107 . 109 . 109 . 110 . 111 . 112 . 113 . 117
Pretty Pr Using Do	ionary Data Type Dictionaries vs. Lists. The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method. The setdefault() Method inting ata Structures to Model Real-World Things A Tic-Tac-Toe Board. Nested Dictionaries and Lists	. 105 . 106 . 107 . 109 . 110 . 111 . 112 . 113 . 117
Pretty Pr Using Do	ionary Data Type Dictionaries vs. Lists. The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method. The setdefault() Method inting ata Structures to Model Real-World Things A Tic-Tac-Toe Board. Nested Dictionaries and Lists  y Questions	. 105 . 106 . 107 . 109 . 109 . 110 . 111 . 112 . 113 . 117 . 119
Pretty Pr Using Do	ionary Data Type Dictionaries vs. Lists. The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method. The setdefault() Method inting ata Structures to Model Real-World Things A Tic-Tac-Toe Board. Nested Dictionaries and Lists y Questions Projects. Fantasy Game Inventory	. 105 . 106 . 107 . 109 . 109 . 110 . 111 . 112 . 113 . 117 . 119 . 120 . 120
Pretty Pr Using Do	ionary Data Type Dictionaries vs. Lists. The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method. The setdefault() Method inting ata Structures to Model Real-World Things A Tic-Tac-Toe Board. Nested Dictionaries and Lists y Questions Projects.	. 105 . 106 . 107 . 109 . 109 . 110 . 111 . 112 . 113 . 117 . 119 . 120 . 120
Pretty Pr Using Do Summar Practice Practice	ionary Data Type Dictionaries vs. Lists. The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method. The setdefault() Method inting ata Structures to Model Real-World Things A Tic-Tac-Toe Board. Nested Dictionaries and Lists y Questions Projects. Fantasy Game Inventory	. 105 . 106 . 107 . 109 . 109 . 110 . 111 . 112 . 113 . 117 . 119 . 120 . 120
Pretty Pr Using Do Summar Practice Practice	ionary Data Type Dictionaries vs. Lists. The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method. The setdefault() Method inting ata Structures to Model Real-World Things A Tic-Tac-Toe Board. Nested Dictionaries and Lists y Questions Projects. Fantasy Game Inventory	. 105 . 106 . 107 . 109 . 109 . 110 . 111 . 112 . 113 . 117 . 119 . 120 . 120
Pretty Pr Using Do Summar Practice Practice	ionary Data Type Dictionaries vs. Lists. The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method. The setdefault() Method inting ata Structures to Model Real-World Things A Tic-Tac-Toe Board. Nested Dictionaries and Lists y Questions Projects. Fantasy Game Inventory List to Dictionary Function for Fantasy Game Inventory.	. 105 . 106 . 107 . 109 . 110 . 111 . 112 . 113 . 117 . 119 . 120 . 120
Pretty Pr Using Do Summar Practice Practice	ionary Data Type Dictionaries vs. Lists. The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method. The setdefault() Method inting ata Structures to Model Real-World Things A Tic-Tac-Toe Board. Nested Dictionaries and Lists  y Questions Projects. Fantasy Game Inventory List to Dictionary Function for Fantasy Game Inventory.  PULATING STRINGS g with Strings String Literals	. 105 . 106 . 107 . 109 . 110 . 111 . 112 . 113 . 117 . 119 . 120 . 120 . 120
Pretty Pr Using Do Summar Practice Practice	ionary Data Type Dictionaries vs. Lists. The keys(), values(), and items() Methods Checking Whether a Key or Value Exists in a Dictionary The get() Method. The setdefault() Method inting ata Structures to Model Real-World Things A Tic-Tac-Toe Board. Nested Dictionaries and Lists  y Questions Projects. Fantasy Game Inventory List to Dictionary Function for Fantasy Game Inventory.  PULATING STRINGS g with Strings	. 105 . 106 . 107 . 109 . 110 . 111 . 112 . 113 . 117 . 119 . 120 . 120 . 120

Useful String Methods	127
The upper(), lower(), isupper(), and islower() String Methods	
The isX String Methods	129
The startswith() and endswith() String Methods	131
The join() and split() String Methods	
Justifying Text with rjust(), ljust(), and center()	
Removing Whitespace with strip(), rstrip(), and lstrip()	
Copying and Pasting Strings with the pyperclip Module	135
Project: Password Locker	
Step 1: Program Design and Data Structures	
Step 2: Handle Command Line Arguments	
Step 3: Copy the Right Password	
Project: Adding Bullets to Wiki Markup	
Step 1: Copy and Paste from the Clipboard	
Step 2: Separate the Lines of Text and Add the Star	
Step 3: Join the Modified Lines	
Summary	
Practice Questions	
Practice Project	
Table Printer	
PART II: AUTOMATING TASKS	145
PART II: AUTOMATING TASKS	145
PART II: AUTOMATING TASKS	145
7	145 147
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS	147
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions	<b>147</b>
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions	<b>147</b> 148150
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions	<b>147</b> 148150
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions	147 148 150 150
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching	147 148 150 151 152
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions	147 148 150 151 152
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses	147148150151152152
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses Matching Multiple Groups with the Pipe	147
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses Matching Multiple Groups with the Pipe Optional Matching with the Question Mark	147
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses Matching Multiple Groups with the Pipe Optional Matching with the Question Mark Matching Zero or More with the Star.	147
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses Matching Multiple Groups with the Pipe Optional Matching with the Question Mark Matching Zero or More with the Star. Matching One or More with the Plus	147
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses Matching Multiple Groups with the Pipe Optional Matching with the Question Mark Matching Zero or More with the Star Matching One or More with the Plus Matching Specific Repetitions with Curly Brackets	147
7 PATTERN MATCHING WITH REGULAR EXPRESSIONS Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses Matching Multiple Groups with the Pipe Optional Matching with the Question Mark Matching Zero or More with the Star Matching One or More with the Plus Matching Specific Repetitions with Curly Brackets Greedy and Nongreedy Matching	147
PATTERN MATCHING WITH REGULAR EXPRESSIONS  Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching  More Pattern Matching with Regular Expressions Grouping with Parentheses. Matching Multiple Groups with the Pipe. Optional Matching with the Question Mark Matching Zero or More with the Star Matching One or More with the Plus Matching Specific Repetitions with Curly Brackets  Greedy and Nongreedy Matching The findall() Method	147
PATTERN MATCHING WITH REGULAR EXPRESSIONS  Finding Patterns of Text Without Regular Expressions  Finding Patterns of Text with Regular Expressions  Creating Regex Objects  Matching Regex Objects  Review of Regular Expression Matching  More Pattern Matching with Regular Expressions  Grouping with Parentheses.  Matching Multiple Groups with the Pipe.  Optional Matching with the Question Mark  Matching Zero or More with the Star.  Matching One or More with the Plus  Matching Specific Repetitions with Curly Brackets  Greedy and Nongreedy Matching  The findall() Method  Character Classes	147
PATTERN MATCHING WITH REGULAR EXPRESSIONS  Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching  More Pattern Matching with Regular Expressions Grouping with Parentheses. Matching Multiple Groups with the Pipe. Optional Matching with the Question Mark Matching Zero or More with the Star. Matching One or More with the Plus Matching Specific Repetitions with Curly Brackets  Greedy and Nongreedy Matching The findall() Method Character Classes  Making Your Own Character Classes	147
PATTERN MATCHING WITH REGULAR EXPRESSIONS  Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching  More Pattern Matching with Regular Expressions Grouping with Parentheses Matching Multiple Groups with the Pipe Optional Matching with the Question Mark Matching Zero or More with the Star Matching One or More with the Plus Matching Specific Repetitions with Curly Brackets  Greedy and Nongreedy Matching The findall() Method Character Classes Making Your Own Character Classes The Caret and Dollar Sign Characters	147
PATTERN MATCHING WITH REGULAR EXPRESSIONS  Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses. Matching Multiple Groups with the Pipe. Optional Matching with the Question Mark Matching Zero or More with the Star. Matching One or More with the Plus Matching Specific Repetitions with Curly Brackets  Greedy and Nongreedy Matching The findall() Method Character Classes Making Your Own Character Classes The Caret and Dollar Sign Characters The Wildcard Character	147
PATTERN MATCHING WITH REGULAR EXPRESSIONS  Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses Matching Multiple Groups with the Pipe Optional Matching with the Question Mark Matching Zero or More with the Star Matching One or More with the Plus Matching Specific Repetitions with Curly Brackets  Greedy and Nongreedy Matching The findall() Method Character Classes Making Your Own Character Classes The Caret and Dollar Sign Characters The Wildcard Character Matching Everything with Dot-Star	147
PATTERN MATCHING WITH REGULAR EXPRESSIONS  Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses Matching Multiple Groups with the Pipe. Optional Matching with the Question Mark Matching Zero or More with the Star Matching One or More with the Plus Matching Specific Repetitions with Curly Brackets  Greedy and Nongreedy Matching The findall() Method Character Classes Making Your Own Character Classes. The Caret and Dollar Sign Characters The Wildcard Character Matching Newlines with the Dot Character	147
PATTERN MATCHING WITH REGULAR EXPRESSIONS  Finding Patterns of Text Without Regular Expressions Finding Patterns of Text with Regular Expressions Creating Regex Objects Matching Regex Objects Review of Regular Expression Matching More Pattern Matching with Regular Expressions Grouping with Parentheses Matching Multiple Groups with the Pipe Optional Matching with the Question Mark Matching Zero or More with the Star Matching One or More with the Plus Matching Specific Repetitions with Curly Brackets  Greedy and Nongreedy Matching The findall() Method Character Classes Making Your Own Character Classes The Caret and Dollar Sign Characters The Wildcard Character Matching Everything with Dot-Star	147