

Table of Contents

PREFACE	11
ABOUT THE AUTHOR.....	11
ACKNOWLEDGMENTS.....	12
WHO SHOULD BUY THIS BOOK?.....	12
CONVENTIONS USED IN THIS BOOK.....	12
HOW TO REPORT ERRATA.....	14
WHERE TO DOWNLOAD MATERIAL ABOUT THIS BOOK.....	14
CHAPTER 1 HOW A COMPUTER WORKS	15
1.1 INTRODUCTION	15
1.2 WHAT IS HARDWARE?.....	15
1.3 WHAT IS SOFTWARE?.....	16
1.4 HOW A COMPUTER EXECUTES (RUNS) A PROGRAM.....	16
1.5 COMPILERS AND INTERPRETERS.....	17
1.6 WHAT IS SOURCE CODE?.....	18
1.7 REVIEW QUESTIONS: TRUE/FALSE.....	18
1.8 REVIEW QUESTIONS: MULTIPLE CHOICE	19
1.9 REVIEW QUESTIONS.....	20
CHAPTER 2 PYTHON AND INTEGRATED DEVELOPMENT ENVIRONMENTS (IDES)	23
2.1 WHAT IS PYTHON?.....	23
2.2 HOW PYTHON WORKS.....	23
2.3 HOW TO SET UP PYTHON.....	23
2.4 INTEGRATED DEVELOPMENT ENVIRONMENTS.....	24
2.5 IDLE.....	24
2.6 HOW TO SET UP IDLE.....	24
2.7 VISUAL STUDIO	24
2.8 HOW TO SET UP VISUAL STUDIO CODE ON WINDOWS.....	25
2.9 REVIEW QUESTIONS.....	29
CHAPTER 3 BASIC ALGORITHMIC CONCEPTS	31
3.1 WHAT IS AN ALGORITHM?	31
3.2 THE ALGORITHM FOR MAKING A CUP OF TEA.....	31
3.3 OKAY ABOUT ALGORITHMS. BUT WHAT IS A COMPUTER PROGRAM ANYWAY?	32
3.4 THE THREE PARTIES!	32
3.5 THE THREE MAIN STAGES INVOLVED IN CREATING AN ALGORITHM.....	32
3.6 WHAT ARE “RESERVED WORDS”?.....	33
3.7 YOUR FIRST PYTHON PROGRAM.....	34
3.8 WHAT IS THE DIFFERENCE BETWEEN A SYNTAX ERROR, A LOGIC ERROR, AND A RUNTIME ERROR?	34
3.9 WHAT DOES “DEBUGGING” MEAN?.....	35
3.10 COMMENTING YOUR CODE.....	35
3.11 REVIEW QUESTIONS: TRUE/FALSE.....	36
3.12 REVIEW QUESTIONS: MULTIPLE CHOICE	37
3.13 REVIEW QUESTIONS.....	38
CHAPTER 4 VARIABLES	39

4.1	WHAT IS A VARIABLE?	39
4.2	HOW MANY TYPES OF VARIABLES EXIST?	41
4.3	RULES FOR NAMING VARIABLES IN PYTHON	41
4.4	WHAT DOES THE PHRASE “DECLARE A VARIABLE” MEAN?	42
4.5	REVIEW QUESTIONS: TRUE/FALSE	42
4.6	REVIEW QUESTIONS: MULTIPLE CHOICE.....	43
4.7	REVIEW EXERCISES.....	44
4.8	REVIEW QUESTIONS	44
CHAPTER 5	HANDLING INPUT AND OUTPUT	45
5.1	HOW TO OUTPUT MESSAGES AND RESULTS TO A USER’S SCREEN?	45
5.2	HOW TO ALTER THE DEFAULT BEHAVIOR OF A PRINT STATEMENT	47
5.3	HOW TO PROMPT THE USER TO ENTER DATA?.....	49
5.4	REVIEW QUESTIONS: TRUE/FALSE	51
5.5	REVIEW QUESTIONS: MULTIPLE CHOICE.....	51
5.6	REVIEW QUESTIONS	52
CHAPTER 6	OPERATORS.....	53
6.1	THE VALUE ASSIGNMENT OPERATOR	53
6.2	ARITHMETIC OPERATORS.....	54
6.3	WHAT IS THE PRECEDENCE OF ARITHMETIC OPERATORS?	55
6.4	COMPOUND ASSIGNMENT OPERATORS	56
	<i>Exercise 6.4.1 Which Python Statements are Syntactically Correct?</i>	<i>57</i>
	<i>Exercise 6.4.2 Finding Variable Types</i>	<i>57</i>
6.5	STRING OPERATORS	58
	<i>Exercise 6.5.1 Concatenating Names.....</i>	<i>58</i>
6.6	REVIEW QUESTIONS: TRUE/FALSE	59
6.7	REVIEW QUESTIONS: MULTIPLE CHOICE.....	59
6.8	REVIEW EXERCISES.....	61
6.9	REVIEW QUESTIONS	62
CHAPTER 7	USING IDLE	63
7.1	INTRODUCTION	63
7.2	IDLE – WRITING AND EXECUTING A PYTHON PROGRAM.....	63
7.3	IDLE – FINDING RUNTIME AND SYNTAX ERRORS	66
CHAPTER 8	USING VISUAL STUDIO CODE	69
8.1	INTRODUCTION.....	69
8.2	VS CODE – WRITING AND EXECUTING A PYTHON PROGRAM	69
8.3	VS CODE – FINDING RUNTIME AND SYNTAX ERRORS.....	71
CHAPTER 9	WRITING YOUR FIRST REAL PROGRAMS	73
9.1	INTRODUCTION.....	73
	<i>Exercise 9.1.1 Calculating the Area of a Rectangle.....</i>	<i>74</i>
	<i>Exercise 9.1.2 Calculating the Area of a Circle</i>	<i>74</i>
	<i>Exercise 9.1.3 Fahrenheit to Celsius.....</i>	<i>75</i>
9.2	REVIEW EXERCISES.....	76
9.3	REVIEW QUESTIONS	77
CHAPTER 10	MANIPULATING NUMBERS	79

10.1	INTRODUCTION	79
10.2	USEFUL MATHEMATICAL FUNCTIONS (SUBPROGRAMS)	79
10.3	REVIEW QUESTIONS: TRUE/FALSE	83
10.4	REVIEW EXERCISES	83
10.5	REVIEW QUESTIONS	84
CHAPTER 11	MANIPULATING STRINGS	85
11.1	INTRODUCTION	85
11.2	RETRIEVING INDIVIDUAL CHARACTERS FROM A STRING	85
11.3	USEFUL STRING FUNCTIONS/METHODS (SUBPROGRAMS) AND MORE	86
	<i>Exercise 11.3.1</i> <i>Displaying a String Backward</i>	91
	<i>Exercise 11.3.2</i> <i>Switching the Order of Names</i>	92
	<i>Exercise 11.3.3</i> <i>Creating a Login ID</i>	93
	<i>Exercise 11.3.4</i> <i>Creating a Random Word</i>	93
11.4	REVIEW QUESTIONS: TRUE/FALSE	94
11.5	REVIEW QUESTIONS: MULTIPLE CHOICE	95
11.6	REVIEW EXERCISES	96
11.7	REVIEW QUESTIONS	96
CHAPTER 12	MAKING QUESTIONS	97
12.1	INTRODUCTION	97
12.2	WHAT IS A BOOLEAN EXPRESSION?	97
12.3	HOW TO WRITE SIMPLE QUESTIONS	97
	<i>Exercise 12.3.1</i> <i>Filling in the Table</i>	98
12.4	LOGICAL OPERATORS AND COMPLEX BOOLEAN EXPRESSIONS	99
12.5	PYTHON'S MEMBERSHIP OPERATORS	101
12.6	ASSIGNING THE RESULT OF A BOOLEAN EXPRESSION TO A VARIABLE	101
12.7	WHAT IS THE ORDER OF PRECEDENCE OF LOGICAL OPERATORS?	102
12.8	WHAT IS THE ORDER OF PRECEDENCE OF ARITHMETIC, COMPARISON, AND LOGICAL OPERATORS?	102
	<i>Exercise 12.8.1</i> <i>Filling in the Truth Table</i>	103
12.9	CONVERTING ENGLISH SENTENCES TO BOOLEAN EXPRESSIONS	104
12.10	REVIEW QUESTIONS: TRUE/FALSE	107
12.11	REVIEW QUESTIONS: MULTIPLE CHOICE	108
12.12	REVIEW EXERCISES	108
12.13	REVIEW QUESTIONS	110
CHAPTER 13	ASKING QUESTIONS – THE IF STRUCTURE	111
13.1	THE IF STRUCTURE	111
	<i>Exercise 13.1.1</i> <i>Find Out What is Displayed</i>	113
	<i>Exercise 13.1.2</i> <i>Are you Allowed to Drive a Car?</i>	113
	<i>Exercise 13.1.3</i> <i>Finding Minimum and Maximum Values with if Structures</i>	114
	<i>Exercise 13.1.4</i> <i>Finding the Name of the Heaviest Person</i>	115
13.2	REVIEW QUESTIONS: TRUE/FALSE	116
13.3	REVIEW QUESTIONS: MULTIPLE CHOICE	116
13.4	REVIEW EXERCISES	117
13.5	REVIEW QUESTIONS	118
CHAPTER 14	ASKING QUESTIONS - THE IF-ELSE STRUCTURE	119
14.1	THE IF-ELSE STRUCTURE	119
	<i>Exercise 14.1.1</i> <i>Finding the Output Message</i>	120

	<i>Exercise 14.1.2</i>	<i>Who is the Greatest?</i>	120
	<i>Exercise 14.1.3</i>	<i>Is it an Integer?</i>	121
	<i>Exercise 14.1.4</i>	<i>Converting Gallons to Liters, and Vice Versa</i>	122
14.2	REVIEW QUESTIONS: TRUE/FALSE		122
14.3	REVIEW QUESTIONS: MULTIPLE CHOICE.....		123
14.4	REVIEW EXERCISES.....		124
CHAPTER 15	ASKING QUESTIONS - THE IF-ELIF STRUCTURE.....		127
15.1	THE IF-ELIF STRUCTURE.....		127
	<i>Exercise 15.1.1</i>	<i>Find Out What is Displayed</i>	128
	<i>Exercise 15.1.2</i>	<i>Counting the Digits</i>	129
	<i>Exercise 15.1.3</i>	<i>The Days of the Week</i>	130
	<i>Exercise 15.1.4</i>	<i>Where is the Tollkeeper?</i>	131
15.2	REVIEW QUESTIONS: TRUE/FALSE		132
15.3	REVIEW EXERCISES.....		132
CHAPTER 16	ASKING QUESTIONS - NESTED STRUCTURES.....		137
16.1	NESTED DECISION STRUCTURES		137
	<i>Exercise 16.1.1</i>	<i>Find Out What is Displayed</i>	138
	<i>Exercise 16.1.2</i>	<i>Positive, Negative, or Zero?</i>	139
	<i>Exercise 16.1.3</i>	<i>The Most Scientific Calculator Ever!</i>	139
16.2	REVIEW QUESTIONS: TRUE/FALSE		140
16.3	REVIEW EXERCISES.....		140
16.4	REVIEW QUESTIONS		141
CHAPTER 17	DOING LOOPS		143
17.1	WHAT IS A LOOP STRUCTURE?.....		143
17.2	FROM SEQUENCE TO LOOP STRUCTURE.....		143
17.3	REVIEW QUESTIONS: TRUE/FALSE		145
CHAPTER 18	DOING LOOPS - THE WHILE STRUCTURE.....		147
18.1	THE WHILE STRUCTURE.....		147
	<i>Exercise 18.1.1</i>	<i>Counting the Total Number of Iterations</i>	148
	<i>Exercise 18.1.2</i>	<i>Finding the Sum of Four Numbers</i>	148
	<i>Exercise 18.1.3</i>	<i>Finding the Sum of Positive Numbers</i>	149
	<i>Exercise 18.1.4</i>	<i>Finding the Sum of N Numbers</i>	150
	<i>Exercise 18.1.5</i>	<i>Finding the Sum of an Unknown Quantity of Numbers</i>	151
	<i>Exercise 18.1.6</i>	<i>Finding the Product of Five Numbers</i>	151
18.2	REVIEW QUESTIONS: TRUE/FALSE		152
18.3	REVIEW QUESTIONS: MULTIPLE CHOICE.....		153
18.4	REVIEW EXERCISES.....		154
CHAPTER 19	DOING LOOPS - THE FOR STRUCTURE.....		157
19.1	THE FOR STRUCTURE.....		157
	<i>Exercise 19.1.1</i>	<i>Find Out What is Displayed</i>	159
	<i>Exercise 19.1.2</i>	<i>Find Out What is Displayed</i>	159
	<i>Exercise 19.1.3</i>	<i>Finding the Sum of Four Numbers</i>	160
	<i>Exercise 19.1.4</i>	<i>Finding the Average Value of N Numbers</i>	160
19.2	REVIEW QUESTIONS: TRUE/FALSE		161
19.3	REVIEW QUESTIONS: MULTIPLE CHOICE.....		161

19.4	REVIEW EXERCISES	163
CHAPTER 20	DOING LOOPS – NESTED STRUCTURES	165
20.1	NESTED LOOP STRUCTURES	165
	<i>Exercise 20.1.1</i> <i>Counting the Total Number of Iterations.</i>	166
	<i>Exercise 20.1.2</i> <i>Find Out What is Displayed</i>	167
20.2	REVIEW QUESTIONS: TRUE/FALSE	167
20.3	REVIEW QUESTIONS: MULTIPLE CHOICE	168
20.4	REVIEW EXERCISES	169
CHAPTER 21	TIPS AND TRICKS WITH LOOP STRUCTURES	173
21.1	INTRODUCTION	173
21.2	CHOOSING A LOOP STRUCTURE	173
21.3	THE “ULTIMATE” RULE	174
21.4	BREAKING OUT OF A LOOP	176
21.5	ENDLESS LOOPS AND HOW TO AVOID THEM	177
21.6	THE “FROM INNER TO OUTER” METHOD	178
21.7	REVIEW QUESTIONS: TRUE/FALSE	179
21.8	REVIEW QUESTIONS: MULTIPLE CHOICE	179
21.9	REVIEW EXERCISES	180
CHAPTER 22	MORE EXERCISES WITH LOOP STRUCTURES	183
22.1	EXERCISES OF A GENERAL NATURE WITH LOOP STRUCTURES	183
	<i>Exercise 22.1.1</i> <i>Finding the Sum of $1 + 2 + 3 + \dots + 100$</i>	183
	<i>Exercise 22.1.2</i> <i>Finding the Product of $2 \times 4 \times 6 \times 8 \times 10$</i>	184
	<i>Exercise 22.1.3</i> <i>Finding the Average Value of Positive Numbers</i>	185
	<i>Exercise 22.1.4</i> <i>Counting the Numbers According to Which is Greater</i>	185
	<i>Exercise 22.1.5</i> <i>Counting the Numbers According to Their Digits</i>	186
	<i>Exercise 22.1.6</i> <i>How Many Numbers Fit in a Sum</i>	187
	<i>Exercise 22.1.7</i> <i>Iterating as Many Times as the User Wishes</i>	187
	<i>Exercise 22.1.8</i> <i>Finding Minimum Value with Loop Structures</i>	188
	<i>Exercise 22.1.9</i> <i>Fahrenheit to Kelvin, from 0 to 100</i>	189
	<i>Exercise 22.1.10</i> <i>Rice on a Chessboard</i>	190
	<i>Exercise 22.1.11</i> <i>Game - Find the Secret Number</i>	191
22.2	REVIEW EXERCISES	192
CHAPTER 23	TURTLE GRAPHICS	195
23.1	INTRODUCTION	195
23.2	THE X-Y PLANE	195
23.3	WHERE IS THE TURTLE?	197
23.4	MOVING FORWARD AND BACKWARD	198
23.5	TURNING LEFT AND RIGHT	200
	<i>Exercise 23.5.1</i> <i>Drawing a Rectangle</i>	202
	<i>Exercise 23.5.2</i> <i>Drawing a Rectangle of Custom Size</i>	203
23.6	SET THE ORIENTATION TO A SPECIFIED ANGLE	204
23.7	SETTING THE DELAY	205
23.8	CHANGING PEN’S COLOR AND SIZE	206
23.9	PULLING TURTLE’S PEN UP OR DOWN	208
	<i>Exercise 23.9.1</i> <i>Drawing a House</i>	208
23.10	MOVING A TURTLE DIRECTLY TO A SPECIFIED POSITION	210

23.1.1	USING DECISION AND LOOP STRUCTURES WITH TURTLES.....	212
	<i>Exercise 23.11.1 Drawing Squares of Different Sizes</i>	215
	<i>Exercise 23.11.2 Drawing Houses of Different Sizes</i>	217
	<i>Exercise 23.11.3 Drawing Polygons</i>	219
	<i>Exercise 23.11.4 Drawing a Star</i>	220
	<i>Exercise 23.11.5 Drawing Random Stars at Random Positions</i>	221
	<i>Exercise 23.11.6 Using Decision Structures to Draw Stars</i>	223
23.1.2	REVIEW EXERCISES.....	224
CHAPTER 24	DATA STRUCTURES IN PYTHON.....	229
24.1	INTRODUCTION TO DATA STRUCTURES.....	229
24.2	WHAT IS A LIST?.....	230
	<i>Exercise 24.2.1 Designing a Data Structure</i>	231
	<i>Exercise 24.2.2 Designing Data Structures</i>	231
24.3	CREATING LISTS IN PYTHON.....	232
24.4	HOW TO GET A VALUE FROM A LIST.....	234
	<i>Exercise 24.4.1 Find What is Displayed</i>	235
	<i>Exercise 24.4.2 Using a Non-Existing Index in Lists</i>	236
24.5	HOW TO ALTER THE VALUE OF A LIST ELEMENT.....	236
24.6	HOW TO ITERATE THROUGH A LIST.....	236
	<i>Exercise 24.6.1 Finding the Sum</i>	238
24.7	HOW TO ADD USER-ENTERED VALUES TO A LIST.....	239
	<i>Exercise 24.7.1 Displaying Words in Reverse Order</i>	239
	<i>Exercise 24.7.2 Displaying Positive Numbers in Reverse Order</i>	240
	<i>Exercise 24.7.3 Finding the Average Value</i>	241
	<i>Exercise 24.7.4 Displaying Reals Only</i>	242
	<i>Exercise 24.7.5 Displaying Elements with Odd-Numbered Indexes</i>	242
24.8	WHAT IS A DICTIONARY?.....	243
24.9	CREATING DICTIONARIES IN PYTHON.....	243
24.10	HOW TO GET A VALUE FROM A DICTIONARY.....	244
	<i>Exercise 24.10.1 Using a Non-Existing Key in Dictionaries</i>	245
24.11	HOW TO ALTER THE VALUE OF A DICTIONARY ELEMENT.....	245
	<i>Exercise 24.11.1 Assigning a Value to a Non-Existing Key</i>	245
24.12	HOW TO ITERATE THROUGH A DICTIONARY.....	246
24.13	USEFUL LIST FUNCTIONS/METHODS (SUBPROGRAMS).....	247
24.14	REVIEW QUESTIONS: TRUE/FALSE.....	250
24.15	REVIEW QUESTIONS: MULTIPLE CHOICE.....	253
24.16	REVIEW EXERCISES.....	257
24.17	REVIEW QUESTIONS.....	259
CHAPTER 25	MORE EXERCISES WITH DATA STRUCTURES.....	261
25.1	SIMPLE EXERCISES WITH DATA STRUCTURES.....	261
	<i>Exercise 25.1.1 Creating a List with the Greatest Values</i>	261
	<i>Exercise 25.1.2 On Which Days Was There a Possibility of Snow?</i>	262
	<i>Exercise 25.1.3 Was There Any Possibility of Snow?</i>	262
25.2	HOW TO USE MORE THAN ONE DATA STRUCTURES IN A PROGRAM.....	264
	<i>Exercise 25.2.1 Finding the Average Value</i>	264
	<i>Exercise 25.2.2 Using a List Along with a Dictionary</i>	265
25.3	FINDING MINIMUM AND MAXIMUM VALUES IN LISTS.....	266
	<i>Exercise 25.3.1 Which Depth is the Greatest?</i>	266

	<i>Exercise 25.3.2</i>	<i>Which Lake is the Deepest?</i>	267
	<i>Exercise 25.3.3</i>	<i>Which Lake, in Which Country, Having Which Average Area, is the Deepest?</i>	268
	<i>Exercise 25.3.4</i>	<i>Which Students are the Shortest?</i>	270
25.4	SEARCHING ELEMENTS IN DATA STRUCTURES.....		271
	<i>Exercise 25.4.1</i>	<i>Searching in a List That May Contain the Same Value Multiple Times</i>	271
	<i>Exercise 25.4.2</i>	<i>Display the Last Names of All Those People Who Have the Same First Name</i>	271
	<i>Exercise 25.4.3</i>	<i>Searching in a Data Structure that Contains Unique Values</i>	272
	<i>Exercise 25.4.4</i>	<i>Searching for a Given Social Security Number</i>	272
25.5	REVIEW QUESTIONS: TRUE/FALSE.....		273
25.6	REVIEW EXERCISES.....		274
CHAPTER 26	INTRODUCTION TO SUBPROGRAMS.....		277
26.1	WHAT EXACTLY IS A SUBPROGRAM?.....		277
26.2	WHAT IS PROCEDURAL PROGRAMMING?.....		277
26.3	WHAT IS MODULAR PROGRAMMING?.....		278
26.4	REVIEW QUESTIONS: TRUE/FALSE.....		279
26.5	REVIEW QUESTIONS.....		279
CHAPTER 27	USER-DEFINED SUBPROGRAMS.....		281
27.1	SUBPROGRAMS THAT RETURN VALUES.....		281
27.2	HOW TO MAKE A CALL TO A FUNCTION.....		282
27.3	SUBPROGRAMS THAT RETURN NO VALUES.....		285
27.4	HOW TO MAKE A CALL TO A VOID FUNCTION.....		285
27.5	FORMAL AND ACTUAL ARGUMENTS.....		287
27.6	HOW DOES A SUBPROGRAM EXECUTE?.....		287
27.7	CAN TWO SUBPROGRAMS USE VARIABLES OF THE SAME NAME?.....		289
27.8	CAN A SUBPROGRAM CALL ANOTHER SUBPROGRAM?.....		290
27.9	DEFAULT ARGUMENT VALUES (OPTIONAL ARGUMENTS) AND KEYWORD ARGUMENTS.....		290
27.10	THE SCOPE OF A VARIABLE.....		291
27.11	REVIEW QUESTIONS: TRUE/FALSE.....		294
27.12	REVIEW EXERCISES.....		295
27.13	REVIEW QUESTIONS.....		296
CHAPTER 28	MORE EXERCISES WITH SUBPROGRAMS.....		299
28.1	SOME MORE EXERCISES FOR EXTRA PRACTICE.....		299
	<i>Exercise 28.1.1</i>	<i>Back to Basics – Calculating the Sum of Two Numbers</i>	299
	<i>Exercise 28.1.2</i>	<i>Calculating the Sum of Two Numbers Using Fewer Lines of Code!</i>	299
	<i>Exercise 28.1.3</i>	<i>A Simple Currency Converter</i>	300
	<i>Exercise 28.1.4</i>	<i>A More Complete Currency Converter</i>	301
	<i>Exercise 28.1.5</i>	<i>Finding the Average Values of Positive Integers</i>	303
	<i>Exercise 28.1.6</i>	<i>Roll, Roll, Roll the... Dice!</i>	304
28.2	REVIEW EXERCISES.....		305
CHAPTER 29	OBJECT-ORIENTED PROGRAMMING.....		307
29.1	WHAT IS OBJECT-ORIENTED PROGRAMMING?.....		307
29.2	CLASSES AND OBJECTS IN PYTHON.....		308
29.3	THE CONSTRUCTOR AND THE KEYWORD SELF.....		310
29.4	PASSING INITIAL VALUES TO THE CONSTRUCTOR.....		312
29.5	CLASS VARIABLES VS INSTANCE VARIABLES.....		314
29.6	GETTER AND SETTER METHODS VS PROPERTIES.....		316

	<i>Exercise 29.6.1</i>	<i>The Roman Numerals</i>	319
29.7		CAN A METHOD CALL ANOTHER METHOD OF THE SAME CLASS?	321
	<i>Exercise 29.7.1</i>	<i>Doing Math</i>	322
29.8		CLASS INHERITANCE	323
29.9		REVIEW QUESTIONS: TRUE/FALSE	326
29.10		REVIEW EXERCISES	326
29.11		REVIEW QUESTIONS	331
CHAPTER 30		FILES	333
30.1		INTRODUCTION	333
30.2		OPENING A FILE	333
30.3		CLOSING A FILE	335
30.4		WRITING TO A FILE	335
30.5		READING FROM A FILE	337
30.6		ITERATING THROUGH THE CONTENTS OF A FILE	338
30.7		REVIEW QUESTIONS: TRUE/FALSE	340
30.8		REVIEW EXERCISES	342
30.9		REVIEW QUESTIONS	343
CHAPTER 31		MORE EXERCISES WITH FILES	345
31.1		SOME MORE EXERCISES FOR EXTRA PRACTICE	345
	<i>Exercise 31.1.1</i>	<i>Calculating the Sum of 10 Numbers</i>	345
	<i>Exercise 31.1.2</i>	<i>Calculating the Average Value of an Unknown Quantity of Numbers</i>	345
	<i>Exercise 31.1.3</i>	<i>Finding Minimum and Maximum Values</i>	346
	<i>Exercise 31.1.4</i>	<i>Concatenating Files</i>	347
	<i>Exercise 31.1.5</i>	<i>Searching in a File</i>	348
	<i>Exercise 31.1.6</i>	<i>Combining Files with Subprograms</i>	349
31.2		REVIEW EXERCISES	350
		SOME FINAL WORDS FROM THE AUTHOR	353
		INDEX	355
		SOME OF MY BOOKS	359