Contents

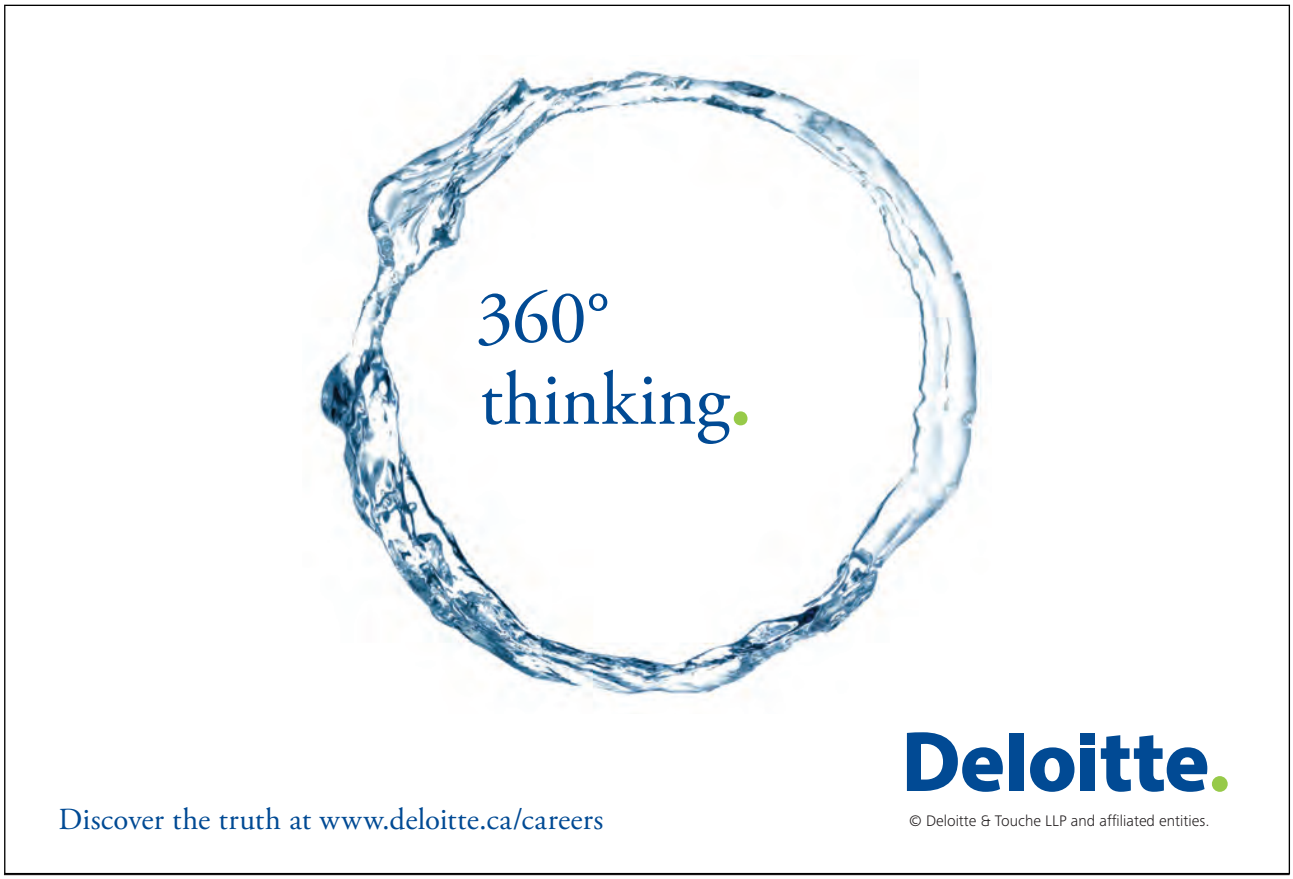
	Preface	**11**
1	**Accumulator Technique**	**13**
1.1	A Simple Example	13
1.2	Hand Computations	14
1.3	Further Examples	14
1.4	Pseudocodes	23
1.5	Generalization	26
1.6	Case Study: The Perceptron Training Algorithm	27
1.6.1	Classification Problem	27
1.6.2	Algorithm	27
1.6.3	Implementation	29
2	**Difference Lists**	**37**
2.1	Implementations of List Concatenation	37
2.2	Implementations of List Flattening	42
2.2.1	Project: Lists as Trees & *flatten/2*	43
2.2.2	Flattening Lists by *append/3*	48
2.2.3	*flatten/2* by the Difference List Technique	49
2.2.4	Comparing Different Versions	49
2.3	Implementations of List Reversal	50
2.3.1	Program Transformations	51

Download free eBooks at bookboon.com

Click on the ad to read more

2.3.2 Difference Lists as Accumulators 57
2.4 Case Study: Dijkstra's Dutch Flag Problem 57
2.4.1 Basic Implementation Using *append/3* 58
2.4.2 A More Concise Version 58
2.4.3 Using Difference Lists 59
2.5 Rotations 61
2.5.1 Rotating a List 61
2.5.2 The Perceptron Training Algorithm Revisited 64
2.5.3 Planar Rotations 65
2.5.4 Application: The Gauss–Seidel Method 69

3 Program Manipulations 75
3.1 Simple Database Operations 75
3.1.1 Basic Database Manipulation 79
3.1.2 Changing the Database 80
3.1.3 File Modifications 85
3.1.4 Updating *right_to/2* and `people.pl` 87
3.1.5 Automated Saving of Selected Predicates 87
3.1.6 Miniproject: Modelling a Stamp Collection 91
3.2 Case Study: Automated Unfolding 95
3.2.1 Elementary Unfolding 95
3.2.2 Complete One Step Unfolding 104
3.2.3 Rearranging Clauses 106
3.3 Dijkstra's Dutch Flag Problem Revisited 108



Download free eBooks at bookboon.com

Click on the ad to read more

3.3.1 Problem Generalization and First Solution 108
3.3.2 Enhanced Implementations 111

4 Exploratory Code Development 117
4.1 A Nursery Rhyme 117
4.1.1 First Preliminary Implementation 119
4.1.2 Another Preliminary Implementation 124
4.1.3 The Final Version 125
4.1.4 Other Approaches 127
4.2 Project: '*One Man Went to Mow . . .*' 132
4.3 Chapter Notes 139

A Solutions of Selected Exercises 141
A.1 Chapter 1 Exercises 141
A.2 Chapter 2 Exercises 145
A.3 Chapter 3 Exercises 157
A.4 Chapter 4 Exercises 167

B Software 177

C Glossary 179

References 183

Index 185

SIMPLY CLEVER
ŠKODA

Do you like cars? Would you like to be a part of a successful brand?
We will appreciate and reward both your enthusiasm and talent.
Send us your CV. You will be surprised where it can take you.

Send us your CV on
www.employerforlife.com

Download free eBooks at bookboon.com

Click on the ad to read more

List of Figures

1.1 Hand Computations for *new sum/2* 15
1.2 Hand Computations for *rev/2* 16
1.3 Hand Computations for *min/2* 17
1.4 Suggested Hand Computations for from *to/3* 18
1.5 Hand Computations for *cnt/3* 19
1.6 Hand Computations for *palin/1 — success* 21
1.7 Hand Computations for *palin/1 — failure* 21
1.8 Typical Clause Structures of a Predicate with an Accumulator 27
1.9 Generalized Clause Structures 27
1.10 A Linearly Separable Data Set 28
1.11 Classifying a Point 29
1.12 A Single Updating Step 30
1.13 Applying the Perceptron Training Algorithm 31

2.1 Difference List 39
2.2 List Concatenation by Difference Lists 40
2.3 Tree Representation of *[a,[b,[],[c,a],e]]* 44
2.4 Declarative Reading of (P-2.3) 50
2.5 Illustrating Clause (b2) in (P-2.6) 56
2.6 Illustrating Exercise 2.9 57
2.7 Rotating by Difference Lists 61
2.8 Hand Computations for *averages/2* 62

Download free eBooks at bookboon.com

Click on the ad to read more

2.9 Rotating a List with Four Entries 64
2.10 The Original List and its Rotated Image 65
2.11 The Original Matrix **A** and its Rotated Image $\mathbf{A}^{(rot)}$ 66
2.12 Hand Computations for Rotation in the Plane 67

3.1 The Initial Seating Arrangement 76
3.2 Rectangular Table 77
3.3 After George's Departure 81
3.4 After Tracy's and Joe's arrival 82
3.5 File Organization for the Round Table Example 85
3.6 The File `people.pl` *after* the Interactive Session 87
3.7 The File `committee.pl` 89
3.8 The File `committee.pl` 89
3.9 Interactive Prolog–Assisted Program Transformation: Session I 97
3.10 Interactive Prolog–Assisted Program Transformation: Session II 98
3.11 Unfolding, Experiment 1: Disassembling clause 4 of *a/5* 99
3.12 Unfolding, Experiment 2: Disassembling clause 3 of *c/2* 99
3.13 Unfolding, Experiment 3: Experiments 1 & 2 followed by appropriate unification 100
3.14 Unfolding, Experiment 4: Experiment 3 followed by new clause creation and database update 101
3.15 Illustrative Example of Intended Database Updates 111
3.16 Top Level Definition of *def_encolour dl/1* 112
3.17 Example Session for Exercise 3.19 116

Download free eBooks at bookboon.com

Click on the ad to read more

4.1 The Rhyme's Simplified Pattern 118
4.2 Exploring Details of the Rhyme's Structure 124
4.3 Desired Behaviour of *song/0* 133

A.1 Annotated Hand Computations for from *to/3* 141
A.2 Hand Computations for *mult/3* 144
A.3 Illustrating the Second Clause of *dl/2* 154
A.4 The Last Two Customers Swap Places 159
A.5 Automated Solution of Exercise 2.9, Part (c) 163
A.6 Database Changes Brought About by *cosu/3* 166
A.7 Search Tree of the Query *?- int(1,I)* 172

Download free eBooks at bookboon.com

Click on the ad to read more

List of Tables

1.1	Algorithm 1.4.1 and Related Hand Computations (Fig. 1.2)	24
1.2	Algorithm 1.4.2 and Related Hand Computations (Fig. 1.5)	26
1.3	Algorithm 1.4.3 and Related Hand Computations (Figs. 1.6 & 1.7)	26
1.4	Co-ordinates of Points in the Plane with Class Labels	27
2.1	Gauss–Seidel Iterations	70
3.1	Cases for *swap_neighbours/2*	84
4.1	Rhyme Structure	127
4.2	CPU Times for Versions of the Query *?- rhyme_prel(V, R)*	129
A.1	Algorithm A.1.1 & Prolog Clause Correspondence (Example 1.6)	144

Download free eBooks at bookboon.com

Click on the ad to read more