

Contents

1	Introduction	1
1.1	Introduction	1
1.2	The Aim of this Book	2
1.3	The Organisation of this Book	3
2	Object-Oriented Programming	5
2.1	Introduction	5
2.2	Encapsulation and Abstraction	5
2.3	Classes and Inheritance	8
2.3.1	Classes	8
2.3.2	Inheritance	9
2.4	Abstract and Concrete Classes	12
2.5	Methods and Overloading	12
2.6	Static and Dynamic Binding	17
2.7	Building Object-Oriented Programs	18
3	An Example Dylan Program	21
3.1	Introduction	21
3.2	Specification	22
3.3	Amounts and Time	24
3.4	Quantities	35
3.5	Foodstuffs	39
3.6	The Database Structure	50
3.7	The Shopping Database	56
3.8	The Shopping List	61
3.9	Main	69
4	Basic Types	71
4.1	Introduction	71
4.2	Booleans	72
4.3	Characters	74
4.4	Strings	75
4.5	Symbols	76
4.6	Numbers	77

4.6.1	Properties	78
4.6.2	Arithmetic Functions	78
4.7	Vectors	79
4.8	Lists	82
4.9	Comparison Operations	84
5	Expressions and Assignment	87
5.1	Introduction	87
5.2	Types and Variables	88
5.2.1	Types	88
5.2.2	Variables	89
5.3	Assignment Expressions	91
5.4	Conditional Expressions	93
5.4.1	If	93
5.4.2	Unless	96
5.4.3	Case	97
5.4.4	Select	98
5.5	Iteration	101
5.5.1	While	101
5.5.2	Until	102
5.5.3	For	104
5.6	Local Bindings	110
5.7	Multiple Values	112
5.7.1	Returning Multiple Values	112
5.7.2	Binding Multiple Values	113
5.8	Blocks and Exits	115
5.8.1	Begin-End Blocks	115
5.8.2	Blocks	115
5.8.3	Restrictions on Non-Local Exits	117
6	Methods and Generic Functions	119
6.1	Introduction	119
6.2	The Reason for Using Methods	120
6.3	Named Methods	121
6.3.1	Syntax	121
6.3.2	Methods—Examples	124
6.3.3	Parameters	140
6.4	Bare Methods	148
6.5	Local Methods	151
6.6	Higher-Order Methods	155
6.7	Generic Functions	159
6.7.1	Syntax	160
6.7.2	Parameter List Congruency	160
6.8	Operations on Functions	163

7	Classes, Instances and Inheritance	165
7.1	Introduction	165
7.2	A Simple Example	166
7.3	Class Definitions	174
7.3.1	Class Definition: Basics	174
7.3.2	Slot Definitions: Details	176
7.4	Instance Creation	183
7.4.1	Basic Mechanisms	183
7.4.2	Keyword Initialisation	186
7.4.3	Class Allocated Slots	188
7.4.4	Testing the Initialisation of a Slot	188
7.5	Inheritance	189
7.5.1	Inheritance and the Class Precedence List	189
7.5.2	Singletons	190
7.5.3	Method Specificity	191
7.5.4	Calling More General Methods	192
7.6	Classes and Types	194
7.7	Introspecting on Classes and Functions	196
7.8	Control of Dynamism	201
8	Conditions and Errors	205
8.1	Introduction	205
8.2	The Dylan Exception Facility	205
8.3	Specification	207
8.3.1	Format Strings	207
8.3.2	Condition Classes	207
8.3.3	The signal Function	210
8.3.4	Basic Handler	210
8.3.5	Other Signalling Operators	212
8.3.6	Introspection on Conditions and Handlers	213
9	Modules and Libraries	215
9.1	Introduction	215
9.2	Modules	216
9.3	Libraries	220
A	Example Program Listing	223
A.1	Introduction	223
A.2	Money	223
A.3	Time	226
A.4	Physical Quantities	230
A.5	Foodstuffs	232
A.6	Food-table and The Database	238
A.7	Shopping	241
A.8	Shopping Lists	244
A.9	The Main Method	249