

Contents

Preface / xi

Acknowledgements / xxi

chapter 1 **Focusing on problems / 1**

1.1 Problem before solution / 1

1.2 The computer and the world / 3

1.3 Initial problem focus / 4

1.4 The problem is not at the interface / 7

1.5 The challenge of describing the world / 9

1.6 Seamless development / 13

1.7 Some resolutions / 15

1.8 The scope of this book / 16

chapter 2 **Locating and bounding the problem / 20**

2.1 The context diagram / 20

2.2 The context diagram bounds the problem / 24

2.3 The real problem / 29

2.4 Domain interfaces / 33

2.5 Handling a larger context / 41

2.6 Machine domains / 43

chapter 3 **Problems and subproblems / 48**

3.1 Problem diagrams / 48

3.2 Realistic problems / 57

3.3 Subproblem examples / 62

- chapter 4 **Basic problem classes and frames / 76**
- 4.1 Problem classes / 76
 - 4.2 About phenomena and domains / 78
 - 4.3 Problem frames / 85
- chapter 5 **Frame concerns and development descriptions / 105**
- 5.1 The frame concern / 105
 - 5.2 Required behaviour frame concern / 105
 - 5.3 Commanded behaviour frame concern / 112
 - 5.4 Information display frame concern / 120
 - 5.5 Simple workpieces frame concern / 125
 - 5.6 Transformation frame concern / 133
 - 5.7 Two comments / 140
- chapter 6 **Frame flavours and development descriptions / 143**
- 6.1 Frames and flavours / 143
 - 6.2 Static flavours / 146
 - 6.3 Dynamic flavours / 152
 - 6.4 Control flavours / 156
 - 6.5 Informal flavours / 162
 - 6.6 Conceptual flavours / 169
- chapter 7 **Model domains and real worlds / 175**
- 7.1 Information problems / 175
 - 7.2 A first example / 176
 - 7.3 Introducing a model domain / 182
 - 7.4 Another model example / 192
 - 7.5 Control and definition in models / 198
 - 7.6 Some model concerns / 202
- chapter 8 **Variant frames / 207**
- 8.1 Frames and variants / 207
 - 8.2 Description variants / 208
 - 8.3 Operator variants / 214
 - 8.4 Connection variants / 219
 - 8.5 Control variants / 229

-
- chapter 9 **Particular concerns / 237**
- 9.1 Frame concerns and others / 237
 - 9.2 The overrun concern / 238
 - 9.3 The initialisation concern / 241
 - 9.4 The reliability concern / 248
 - 9.5 The identities concern / 257
 - 9.6 The completeness concern / 263
- chapter 10 **Decomposition revisited / 269**
- 10.1 Introduction / 269
 - 10.2 The package router problem – 1 / 269
 - 10.3 The package router problem – 2 / 282
 - 10.4 Decomposition heuristics / 292
- chapter 11 **Composite frames / 301**
- 11.1 Introduction / 301
 - 11.2 Composite problems / 304
 - 11.3 Composite concerns / 313
- chapter 12 **Grown-up software development / 333**
- 12.1 The immaturity of software development / 333
 - 12.2 Risks of development failure / 337
 - 12.3 Shallow requirements / 339
 - 12.4 Non-functional requirements / 341
 - 12.5 Amateurism / 342
 - 12.6 Drowning in complexity / 344
 - 12.7 Focused attention / 346
 - 12.8 Problem frames in perspective / 350
- Appendix 1: notations / 354**
- Appendix 2: glossary / 361**
- References / 373**
- Index / 379**