Contents

Acknowledgements xi

Part 1 – The topics 1

1 Introduction 3

1.1 Is this book for you? 3
1.2 Know the beast 4
1.3 Does requirements engineering really matter? 5
1.4 The nature of requirements engineering 7
1.5 The problem domain (and other domains) 8
1.6 Requirements 14
1.7 Exercises 20

2 The requirements engineering process 23

2.1 Analysis 24
2.2 Elicitation 26
2.3 Specification 27
2.4 Human to machine interface design 29
2.5 Validation 29
2.6 A requirements engineering process model 30
2.7 Design (and 'analysis and design') 34
2.8 Problem data vs solution data 36
2.9 Modelling static data 37
2.10 Other activities 38
2.11 Exercises 39

3 Elicitation 41

3.1 The information to elicit 42
3.2 Sources of information 42
3.3 Elicitation techniques 44

3.4 Elicitation strategy 45
3.5 Exercises 49

4 Analysis **51**

4.1 The trouble with analysis 52
4.2 Approaches to analysis 53
4.3 Structured analysis 54
4.4 Object oriented analysis 77
4.5 Problem domain oriented analysis 92
4.6 Writing requirements 127
4.7 Summary of analysis 128
4.8 The requirements document 129
4.9 Exercises 133

5 Specification **135**

5.1 Introduction 135
5.2 External design (edesign) 140
5.3 Documenting behaviour 144
5.4 The specification document 160
5.5 Approaches to specification 171
5.6 Specification techniques and mechanisms 184
5.7 Specification examples 185
5.8 Exercises 203

6 Validation **210**

6.1 Simple checks 210
6.2 Review 211
6.3 Logical analysis 211
6.4 Prototypes, use-cases, etc. 212
6.5 Functional test design 212
6.6 User manual development 213

7 Where next? **214**

Part 2 – Technology **217**

8 Techniques **219**

8.1 Notations 219
8.2 Methods 220
8.3 Tools 221
8.4 Technique selection 221

9 Elicitation techniques **223**

9.1 Background reading 223
9.2 Interviewing 224
9.3 Questionnaires 229
9.4 Document inspection 229
9.5 Task observation 230
9.6 Ethnography 232
9.7 Use-cases and scenarios 232
9.8 Brainstorming 233
9.9 Requirements stripping 234

10 Modelling techniques **235**

10.1 Representational modelling 235
10.2 Behavioural modelling 236
10.3 Structural modelling 237
10.4 Modelling technique classification 237

11 Representational modelling **239**

11.1 Indications for use 239
11.2 Static representational modelling 239
11.3 Dynamic representational modelling (prototypes) 241

12 Behavioural (functional) modelling **245**

12.1 Function statements and functional decomposition 245
12.2 Task analysis 249
12.3 Use-cases and scenarios 250
12.4 Decision tables 259
12.5 State-based techniques 266
12.6 Finite state machines 266
12.7 Petri nets 283

13 Internal modelling **291**

13.1 Process oriented techniques 291
13.2 Algorithmic techniques 301
13.3 Data structure oriented techniques 302
13.4 Process/data combination 311

14 Text-based definition **318**

14.1 Formality of text 319
14.2 Natural language 319

14.3 'Unnatural' language 323
14.4 Means and ends 329
14.5 Data dictionary 334

Part 3 – Case studies 335

15 The yacht racing results (YRR) case study 337

15.1 Elicitation plan 337
15.2 Elicitation notes 337
15.3 Requirements document 340
15.4 Specification 346

16 The lift controller case study 357

16.1 Elicitation notes 357
16.2 Requirements document 358
16.3 Specification 365

17 The F2K drill file translation case study 371

17.1 Requirements document 371
17.2 Specification 374

18 The Petri net diagram tool case study 376

18.1 Requirements document 376
18.2 Specification 379

19 References 385

20 Bibliography 391

21 Glossary 394

22 Abbreviations 400

23 Index 403