

Dirk Draheim
Gerald Weber

Form-Oriented Analysis

A New Methodology to Model
Form-Based Applications

 Springer

Contents

Part I Modeling Form-Based Systems

1	Introduction	3
1.1	Enterprise Systems	4
1.2	Modeling Enterprise Systems	5
1.3	High-Level Transactional Programming	6
1.4	A Parsimonious Relational Notation	6
1.5	A Descriptive Approach to the Software Development Process	7
2	The Form-Based System Paradigm	9
2.1	The Submit/Response Style Interface	10
2.2	A Message-Based Model of Data Interchange	20
3	Exploring the Online Bookshop	23
3.1	The Dialogue Model	24
3.2	The Persistent Data Model	30
3.3	An Exemplary Submit/Response Style System	32
4	Form Storyboarding	35
4.1	Page Diagrams	36
4.2	Form Storyboards	41
5	Formcharts and Dialogue Specification	49
5.1	Form-Oriented Information System Models	49
5.2	The Dialogue Model	55
5.3	The Layered Data Model	59
5.4	Dialogue Specification	66
5.5	The Bookstore Formchart and Data Model	74

6	Model Decomposition and Refinement	97
6.1	Model Union	97
6.2	Formchart Decomposition	98
6.3	Formchart Hierarchies	100
6.4	A Feature-Driven Approach	102
6.5	State Sets and State Specialization	104
6.6	Decomposition of Page Diagrams and Form Storyboards	107
6.7	Model Refinement	107
7	Data Modeling	109
7.1	The Parsimonious Data Modeling Language	111
7.2	The Data Access Language DAL	114
7.3	The Transaction Data Access Language TDAL	121
7.4	Constraints	125
7.5	Style Formats	141
8	Message-Based Modeling of Data Interchange	147
8.1	Connectivity of Enterprise Systems	147
8.2	The Message-Based System Viewpoint	150
8.3	Data Interchange Model	152
8.4	Data Interchange Specification	156
8.5	The Relation to Data Flow Diagrams	160
8.6	The Interplay of Formcharts and Data Interchange Diagrams ..	162
8.7	Topic Bundles	164
9	A Descriptive Approach	165
9.1	Descriptiveness, Prescriptiveness, and the Software Process ...	168
9.2	Metaphor A Posteriori	170
9.3	On Desktop Metaphors	172
9.4	On Real-World Modeling	173
9.5	Visual Modeling De-emphasized	175
9.6	Artifact Orientation	176
9.7	The High-Level Programming Viewpoint	177
9.8	Advanced Systems Modeling Approaches	180

Part II Tool Support

10	Forward Engineering and Reverse Engineering	187
10.1	Forward Engineering	188
10.2	Reverse Engineering	193
10.3	Source-Code-Opaque Reverse Engineering	196

11 Typed Server Pages	199
11.1 Type-Safe Interplay of Forms and Scripts	200
11.2 Functional Decomposition of Server Pages	214
11.3 Higher-Order Server Pages	221
11.4 A Comparison of Web Technologies	224

Part III Semantics

12 The Integrated Source Code Paradigm	229
12.1 Towards Structured Collaborative Work	229
12.2 Structured Artifacts	232
12.3 The Syntax Model Approach	233
12.4 A Closer Look at Languages	235
12.5 The Integrated Source Code Paradigm	237
12.6 A Flexible Generic Textual Format for Data	241
12.7 Generative Programming	244
13 State History Diagrams	249
13.1 State History Diagrams and Class Diagrams	249
13.2 Discussion of Formchart Semantics	258
13.3 Semantics of Dialogue Constraints	260
13.4 Path Expressions	267
14 Semantics of the Data Model	271
14.1 Semantics of the Temporal Model	271
14.2 Alternative Fundamental Models	274
14.3 Discussion	279
15 Semantics of Web Signatures	283
15.1 Formal Semantics of Web Signature Recovery	283
15.2 Coding Guidelines for Typed Server Pages	287
15.3 Formal Definition of the NSP Type System	299

Part IV Conclusion

16 A Comparison of Modeling Methods	325
16.1 User Interface Modeling	325
16.2 Web Site Modeling	326
16.3 Data Modeling	328
16.4 Model-Oriented Specification Languages	329
16.5 Structured Analysis	331
16.6 Object-Oriented Analysis and Design	335
16.7 Model-Driven Architecture	338

XIV Contents

17 Summary	343
17.1 Contributions to Modeling Form-Based Systems	343
17.2 Contributions to Modeling in General	347
References	351
Index	367