

CONTENTS

Preface	v
Contents	ix
Acknowledgements	xv

PART I: Object-Oriented Methodology

1. Introduction	1
1.1 Why object-oriented modeling and implementation?	1
1.2 Background of object-oriented methodology	3
1.3 Key concepts of object-oriented methodology	5
1.4 Breadth-first approach to object-oriented methodology	7
 2. Overview of Different Object-Oriented Approaches.....	 19
2.1 Common characteristics of different OO approaches	19
2.2 A simple example for illustration purposes	21
2.3 Booch's object-oriented method	24
2.4 The object modeling technique (OMT)	28
2.5 Coad's object-oriented method	42

2.6 The unified modeling language (UML).....	47
2.7 Objects and patterns	57
2.8 An evaluation of OO approaches	64
 3. Fundamentals of Object-Oriented Models.....	69
3.1 Introduction: How to start and finish OO models?.....	69
3.2 Classes and objects	78
3.3 Object-oriented analysis (OOA).....	81
3.4 Class and object connections.....	86
3.5 Class and object attributes	89
3.6 Class and object operations	91
 PART II: Building Models with Objects and Patterns	
 4. Dynamic Matrix Processor in Visual Basic.....	93
4.1 Introduction to matrix processing.....	93
4.2 Object-oriented analysis and design.....	96
4.3 Implementation of the designed model	98
4.4 Patterns used in this application	107
4.5 Testing the application	109

5. 2D Dynamic Data Plotter in Visual Basic.....	113
5.1 Introduction to 2D graphics in Visual Basic.....	113
5.2 Object-oriented analysis and design	117
5.3 Implementation of the designed model.....	121
5.4 Patterns used in this application	130
5.5 Testing the application	131
6. 3D Data Visualizer in Visual Basic	135
6.1 Introduction to 3D graphics.....	135
6.2 Object-oriented analysis and design	138
6.3 Implementation of the designed model.....	141
6.4 Patterns used in this application	154
6.5 Testing the application	155
6.6 Data animation examples.....	161
7. Interactive Window Shell for Exe-Files in Visual Basic.....	163
7.1 Introduction to updating legacy software	163
7.2 Object-oriented analysis and design	165
7.3 Implementation of the designed model.....	170
7.4 Patterns used in this application	180
7.5 Testing the application	181

8. Image Digitizer with a Database in Visual Basic	185
8.1 Introduction to relational databases	185
8.2 Object-oriented analysis and design	188
8.3 Implementation of the designed model	192
8.4 Patterns used in this application	200
8.5 Testing the application	201
 9. City Map Java Applet with a Road Finder	 205
9.1 Overview of Java	205
9.2 Introduction to Java Applets	206
9.3 Creating a simple “Hello World” applet	209
9.4 Creating a city map applet with a road finder	212
9.5 Object-oriented analysis and design	213
9.6 Implementation of the designed model	216
9.7 Patterns used in this application	226
9.8 Testing the application	229
 10. Parallel Computing of Satellite Orbits using Java Threads	 233
10.1 Introduction to parallel computing	233
10.2 Introduction to multi-threading in Java	239
10.3 Two simple Java applets to compute number pi	247
10.4 Creating a Java applet to compute satellite orbits	252
10.5 Object-oriented analysis and design	260

10.6 Implementation of the designed model.....	263
10.7 Patterns used in this application	270
10.8 Testing the application.....	273
 List of Abbreviations.....	 275
List of Figures	277
List of Tables.....	281
Bibliography.....	285
Glossary.....	289
Index.....	301



<http://www.springer.com/978-3-540-20877-8>

Spatial Modeling in Natural Sciences and Engineering
Software Development and Implementation

Friedrich, J.

2004, XV, 305 p. 36 illus. in color., Hardcover

ISBN: 978-3-540-20877-8