

X.media.publishing 

For further volumes:
<http://www.springer.com/series/5175>

M.R.C. van Dongen

L^AT_EX and Friends

Dr M.R.C. van Dongen
Computer Science Department
University College Cork
Cork
Ireland

ISSN 1612-1449
ISBN 978-3-642-23815-4 e-ISBN 978-3-642-23816-1
DOI 10.1007/978-3-642-23816-1
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2011945089

© Springer-Verlag Berlin Heidelberg 2012

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilm or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Foreword

NEARLY TWENTY YEARS after the first ideas for L^AT_EX₂_ε emerged, the use of L^AT_EX to produce high-quality technical documents shows no sign of waning. Indeed, over the past 5 or so years there has been if anything an *upturn* in interest in using L^AT_EX. Better editors, faster computers and the range of powerful L^AT_EX packages have all contributed to this increased uptake.

For the new user, this vibrancy can appear intimidating. The range of packages available for use with L^AT_EX is vast, and it is not always obvious which is the ‘best of breed.’ What new users need therefore is a guide not just to the basics of the L^AT_EX approach, but also help in navigating this ecosystem so that they can produce the documents they need as rapidly as possible.

Creating well-designed documents is about more than the technical detail of any typesetting system, and so as well as learning L^AT_EX it is also necessary to understand the wider ideas of good writing and good design if one is to create truly ‘beautiful’ material.

In *L^AT_EX and Friends*, Marc van Dongen provides an integrated solution to these inter-related requirements. Treating the presentation of beautiful documents as the key aim of the reader, it offers advice on good practice (both in L^AT_EX terms and beyond) in the relevant context for the beginner. It also avoids the problem seen in many texts, which fall short in supporting the transition from beginner to advanced user. Thus while new L^AT_EX users will find the information they need here, so will more established users, making this not only a beginners’ guide but also a reference manual for day-to-day L^AT_EX users.

Joseph Wright

Contents

Foreword	v
Preface	xxi
Book Outline	xxiii
Acknowledgements	xxv

I Basics	1
1 Introduction to L^AT_EX	3
1.1 Pros and Cons	4
1.2 Basics	6
1.2.1 The T _E X Processors	6
1.2.2 From tex to dvi and Friends	6
1.2.3 The Name of the Game	8
1.2.4 Staying in Sync	8
1.2.5 Writing a L ^A T _E X Input Document	8
1.2.6 The Abstract	11
1.2.7 Spaces, Comments, and Paragraphs	12
1.3 Document Hierarchy	12
1.3.1 Minor Document Divisions	13
1.3.2 Major Document Divisions	14
1.3.3 The Appendix	15
1.4 Document Management	15
1.5 Labels and Cross-references	16
1.6 Controlling the Style of References	18
1.7 The Bibliography	19
1.7.1 The bibtex Program	23
1.7.2 The biblatex Package	25
1.7.3 End-of-Chapter Bibliographies	27
1.7.4 Classified Bibliographies	28
1.8 Table of Contents and Lists of Things	29
1.8.1 Controlling the Table of Contents	30
1.8.2 Controlling the Sectional Unit Numbering	30
1.8.3 Indexes and Glossaries	30
1.9 Class Files	32

1.10	Packages	34
1.11	Useful Classes and Packages	35
1.12	Errors and Troubleshooting	35
II Basic Typesetting		39
2	Running Text	41
2.1	Special Characters	41
2.1.1	Tieing Text	41
2.1.2	Grouping	43
2.2	Diacritics	44
2.3	Ligatures	44
2.4	Quotation Marks	45
2.5	Dashes	46
2.6	Full Stops	46
2.7	Ellipsis	47
2.8	Emphasis	48
2.9	Borderline Punctuation	48
2.10	Footnotes and Marginal Notes	48
2.11	Displayed Quotations and Verses	49
2.12	Line Breaks	49
2.13	Controlling the Size	50
2.14	Seriffed and Sans Serif Typefaces	51
2.15	Small Caps Letters	52
2.16	Controlling the Type Style	53
2.17	Abbreviations	53
2.17.1	Initialisms	53
2.17.2	Acronyms	54
2.17.3	Shortenings	54
2.17.4	Introducing Abbreviations	55
2.17.5	British and American Spelling	55
2.17.6	Latin Abbreviations	56
2.17.7	Units	56
2.18	Phantom Text	57
2.19	Alignment	58
2.19.1	Centred Text	58
2.19.2	Flushed/Ragged Text	58
2.19.3	Basic tabular Constructs	58
2.19.4	The booktabs Package	61
2.19.5	Advanced tabular Constructs	61
2.19.6	The tabbing Environment	63
2.20	Language Related Issues	65
2.20.1	Hyphenation	65
2.20.2	Foreign Languages	65
2.20.3	Spell-Checking	66
3	Lists	67
3.1	Unordered Lists	67

3.2	Ordered Lists	68
3.3	The enumerate Package	69
3.4	Description Lists	69
3.5	Making your Own Lists	70
III Tables, Diagrams, and Data Plots		73
4	Presenting External Pictures	75
4.1	The figure Environment	75
4.2	Special Packages	76
4.2.1	Floats	76
4.2.2	Legends	77
4.3	External Picture Files	77
4.4	The graphicx Package	77
4.5	Setting Default Key Values	78
4.6	Setting a Search Path	79
4.7	Graphics Extensions	79
5	Presenting Diagrams	81
5.1	Why Specify your Diagrams?	81
5.2	The tikzpicture Environment	82
5.3	The \tikz Command	82
5.4	Grids	83
5.5	Paths	83
5.6	Coordinate Labels	84
5.7	Extending Paths	85
5.8	Actions on Paths	88
5.8.1	Colour	89
5.8.2	Drawing the Path	91
5.8.3	Line Width	91
5.8.4	Dash Patterns	91
5.8.5	Predefined Styles	92
5.8.6	Line Cap and Join	92
5.8.7	Arrows	93
5.8.8	Filling a Path	94
5.8.9	Path Filling Rules	95
5.9	Nodes and Node Labels	96
5.9.1	Predefined Nodes Shapes	97
5.9.2	Node Options	98
5.9.3	Connecting Nodes	99
5.9.4	Special Node Shapes	100
5.10	The spy Library	101
5.11	Trees	101
5.12	Logic Circuits	103
5.13	Commutative Diagrams	104
5.14	Coordinate Systems	105
5.15	Coordinate Calculations	108
5.15.1	Relative and Incremental Coordinates	108

5.15.2	Complex Coordinate Calculations	109
5.16	Options	111
5.17	Styles	111
5.18	Scopes	112
5.19	The <code>\foreach</code> Command	113
5.20	The <code>let</code> Operation	114
5.21	The <code>To Path</code> Operation	115
6	Presenting Data in Tables	117
6.1	Why Use Tables?	117
6.2	Table Taxonomy	117
6.3	Table Anatomy	118
6.4	Table Design	119
6.5	Aligning Columns with Numbers	121
6.5.1	Aligning Columns by Hand	122
6.5.2	The <code>dcolumn</code> Package	123
6.5.3	The <code>siunitx</code> Package	124
6.6	The <code>table</code> Environment	124
6.7	Wide Tables	125
6.8	Multi-page Tables	125
6.9	Databases and Spreadsheets	126
7	Presenting Data with Plots	129
7.1	The Purpose of Data Plots	129
7.2	Pie Charts	129
7.3	Introduction to <code>pgfplots</code>	131
7.4	Bar Graphs	132
7.5	Paired Bar Graphs	134
7.6	Component Bar Graphs	135
7.7	Coordinate Systems	136
7.8	Line Graphs	137
7.9	Scatter Plots	139
IV	Mathematics and Algorithms	143
8	Mathematics	145
8.1	The $\mathcal{A}\mathcal{M}\mathcal{S}$ - $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ Platform	145
8.2	$\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$'s Math Modes	146
8.3	Ordinary Math Mode	146
8.4	Subscripts and Superscripts	147
8.5	Greek Letters	147
8.6	Display Math Mode	149
8.6.1	The <code>equation</code> Environment	149
8.6.2	The <code>split</code> Environment	150
8.6.3	The <code>gather</code> Environment	151
8.6.4	The <code>align</code> Environment	151
8.6.5	Interrupting a Display	153
8.6.6	Low-level Alignment Building Blocks	153
8.6.7	The <code>eqnarray</code> Environment	154

8.7	Text in Formulae	154
8.8	Delimiters	154
8.8.1	Scaling Left and Right Delimiters	155
8.8.2	Bars	156
8.8.3	Tuples	157
8.8.4	Floors and Ceilings	157
8.8.5	Delimiter Commands	158
8.9	Fractions	158
8.10	Sums, Products, and Friends	159
8.10.1	Basic Typesetting Commands	159
8.10.2	Overriding Text and Display Style	160
8.10.3	Multi-line Limits	160
8.11	Existing Functions and Operators	161
8.12	Integration and Differentiation	162
8.12.1	Integration	162
8.12.2	Differentiation	163
8.13	Roots	164
8.14	Changing the Style	164
8.15	Symbol Tables	165
8.15.1	Operator Symbols	165
8.15.2	Relation Symbols	165
8.15.3	Arrows	166
8.15.4	Miscellaneous Symbols	166
9	Advanced Mathematics	169
9.1	Declaring New Operators	169
9.2	Managing Content with the cool Package	170
9.3	Arrays and Matrices	170
9.4	Accents, Hats, and Other Decorations	171
9.5	Braces	172
9.6	Case-based Definitions	172
9.7	Function Definitions	173
9.8	Theorems	174
9.8.1	Theorem Taxonomy	174
9.8.2	Styles for Theorem-like Environments	175
9.8.3	Defining Theorem-like Environments	175
9.8.4	Defining Theorem-like Styles	177
9.8.5	Proofs	177
9.9	Mathematical Punctuation	178
9.10	Spacing and Linebreaks	179
9.10.1	Line Breaks	179
9.10.2	Conditions	180
9.10.3	Physical Units	181
9.10.4	Sets	181
9.10.5	More Spacing Commands	182
10	Algorithms and Listings	183
10.1	Presenting Pseudo-Code with algorithm2e	183
10.1.1	Loading algorithm2e	183

10.1.2	Basic Environments	184
10.1.3	Describing Input and Output	185
10.1.4	Conditional Statements	185
10.1.5	The Switch Statement	187
10.1.6	Iterative Statements	188
10.1.7	Comments	189
10.2	The listings Package	190
 V Automation		193
 11 Commands and Environments		195
11.1	Some Terminology	195
11.2	Advantages and Disadvantages	195
11.3	User-defined Commands	197
11.3.1	Defining Commands Without Parameters	197
11.3.2	Defining Commands With Parameters	198
11.3.3	Fragile and Robust Commands	199
11.3.4	Defining Robust Commands	200
11.4	Commands and Parameters	200
11.5	Defining Commands with \TeX	202
11.6	Tweaking Existing Commands with $\backslash\text{let}$	206
11.7	Using More than Nine Parameters	206
11.8	Using Environments	207
 12 Branching		209
12.1	Counters, Switches, and Lengths	209
12.1.1	Counters	209
12.1.2	Switches	210
12.1.3	Lengths	211
12.1.4	Scoping	213
12.2	The ifthen Package	213
12.3	The calc Package	215
12.4	Looping	215
12.5	Tail Recursion	216
 13 Option Parsing		217
13.1	What is a $\langle\text{Key}\rangle=\langle\text{Value}\rangle$ Interface?	217
13.2	Why Use a $\langle\text{Key}\rangle=\langle\text{Value}\rangle$ Interface?	218
13.3	The pgfkeys Package	218
13.4	Providing and Using the Values	218
13.5	Traversing the Key Tree	219
13.6	Executing Keys	220
13.7	Error Handling	220
13.8	Storing Values in Macros	221
13.9	Decisions	221
13.10	Choice Keys	222

VI	Miscellany	223
14	Beamer Presentations	225
14.1	Frames	225
14.2	Modal Presentations	227
14.3	Incremental Presentations	229
14.4	Visual Alerts	231
14.5	Adding Some Style	231
15	Writing Classes and Packages	237
15.1	The Structure of Classes and Packages	237
15.2	Dependencies	237
15.3	Identification	238
15.4	Defining and Parsing the Options	238
15.5	Loading Existing Classes and Packages	239
15.6	Final Configuration	240
16	Using OpenType Fonts	243
16.1	OpenType Font Features	244
16.2	L ^A T _E X Font Selection Mechanism	246
16.3	Overview of Functionality	249
16.4	Inspecting the Font	250
16.5	Current Alternatives	252
16.6	Designing the Font Families	252
16.7	Extracting the Fonts	253
16.8	Font Definition Files	255
16.9	Creating the Font Definition Files	256
16.10	Implementing a Font Package	257
16.10.1	Parsing the Point Size	257
16.10.2	Loading the Font	260
16.10.3	Changing the Features	261
16.11	Using the Fonts	263
VII	References and Bibliography	265
	Typographic Jargon	267
	Bibliography	273
	Acronyms and Abbreviations	279
	Indexes	281
	L ^A T _E X and T _E X Commands	283
	Environments	293
	Classes	295
	Packages	297
	Languages and External Commands	299

List of Figures

1.1	Typical L ^A T _E X program	9
1.2	Defining comments	12
1.3	Coarse document divisions	14
1.4	Closed fold in folding editor.	15
1.5	Open fold in folding editor.	15
1.6	the Using <code>\includeonly</code> and <code>\include</code> commands . . .	16
1.7	Using <code>\label</code> and <code>\ref</code>	17
1.8	Using <code>\pageref</code>	17
1.9	Using the <code>prettyref</code> package	19
1.10	A minimal bibliography	20
1.11	The <code>\cite</code> command	21
1.12	Using <code>\cite</code> with an optional argument	22
1.13	Including a bibliography	24
1.14	Some B _I B _T E _X entries	24
1.15	Using <code>biblatex</code>	25
1.16	Textual and parenthetical citations	26
1.17	Getting the author and year of a citation	26
1.18	Using <code>biblatex</code> 's citation commands	27
1.19	Including reference lists	30
1.20	Minimal letter	34
2.1	Quotes	45
2.2	Nested quotations	45
2.3	Dashes	47
2.4	Good borderline punctuation	48
2.5	Poor borderline punctuation	48
2.6	Using footnotes	49
2.7	The <code>quote</code> environment	50
2.8	The <code>verse</code> environment	50
2.9	Controlling the size	51
2.10	Finer points of typesetting abbreviations	54
2.11	The <code>\phantom</code> command	57
2.12	The <code>center</code> environment	58
2.13	The <code>flushleft</code> environment	59
2.14	Using the <code>tabular</code> environment	60
2.15	Input of <code>booktabs</code> package	62
2.16	Output of <code>booktabs</code> package	62
2.17	Controlling column widths with an <code>@</code> -expression . . .	63

2.18	The tabbing environment	64
2.19	Advanced tabbing	64
2.20	Using the babel package	65
3.1	The itemize environment	68
3.2	Changing the item label	68
3.3	The enumerate environment	69
3.4	Using the enumerate package	70
3.5	Using the description environment	70
3.6	Lengths that affect list formatting	71
3.7	A user-defined list	72
3.8	A user-defined environment for lists	72
4.1	Using the dpfloat package	77
4.2	Including an external graphics file	78
5.1	Drawing a grid	83
5.2	Creating a path	84
5.3	Cubic spline in tikz	86
5.4	Using a dash pattern	91
5.5	Using a dash phase	91
5.6	Using the miter option	93
5.7	Using the nonzero rule	96
5.8	Using the even odd rule	96
5.9	Nodes and implicit labels	97
5.10	Low-level node control	98
5.11	Node placement	99
5.12	Drawing lines between node shapes	100
5.13	The circle split node style	100
5.14	A node with rectangle style and several parts	101
5.15	Using the spy library	102
5.16	Drawing a tree	102
5.17	Using implicit node labels in trees	102
5.18	Controlling the node style	103
5.19	A tree with a ‘missing’ node	103
5.20	Drawing a half adder with tikz	105
5.21	Input of commutative diagram	106
5.22	Commutative diagram	106
5.23	Using four coordinate systems	107
5.24	Computing the intersection of perpendicular lines	107
5.25	Absolute, relative, and incremental coordinates	108
5.26	Computations with partway modifiers	109
5.27	Computations with partway and distance modifiers	109
5.28	Computations with projection modifiers	109
5.29	Predefining options with the \tikzset command	112
5.30	Using scopes	113
5.31	The \foreach command	113
5.32	Simple to path example	116
5.33	User-defined to path	116

6.1	Components of a demonstration table	118
6.2	Aligning columns with the <code>dcolumn</code> package	124
6.3	Aligning columns with the <code>siunitx</code> package	124
6.4	Creating a table	125
6.5	Using the <code>longtable</code> package	126
7.1	A pie chart	130
7.2	Using the <code>axis</code> environment	131
7.3	Sample output of the <code>axis</code> environment	131
7.4	A bar graph	133
7.5	Creating a bar graph	133
7.6	A paired bar graph	135
7.7	Creating a paired bar graph	135
7.8	A component bar graph	137
7.9	Creating a component bar graph	137
7.10	A line graph	138
7.11	Creating a line graph	139
7.12	A scatter plot	140
7.13	Creating a scatter plot	140
8.1	The equation environment	150
8.2	The <code>split</code> environment	151
8.3	The <code>gather</code> environment	151
8.4	Using the <code>align</code> environment	152
8.5	Output of input in Figure 8.4	152
8.6	The <code>align</code> environment	153
8.7	Output of input in Figure 8.6	153
8.8	Using the <code>\shortintertext</code> command	153
8.9	The aligned environment	154
8.10	Angular delimiters	157
8.11	The <code>\substack</code> command with centred lines	161
8.12	The <code>subarray</code> environment with different alignments	161
8.13	Limit of a log-like function	162
9.1	The <code>array</code> environment	170
9.2	The <code>smallmatrix</code> environment	171
9.3	Typesetting an underbrace	173
9.4	Using the <code>amsthm</code> package	177
9.5	Using the mathematical punctuation commands	179
10.1	Algorithm style	184
10.2	Using <code>algorithm2e</code>	185
10.3	Typesetting conditional statements	187
10.4	Using <code>algorithm2e</code> 's switch statements	188
10.5	Creating a partial listing with the <code>listings</code> package	191
10.6	Listing created from input in Figure 10.5	191
10.7	Setting new defaults with the <code>\lstset</code> command	192
11.1	User-defined commands	199
11.2	A program with user-defined combinators	202

11.3	Using the <code>\expandafter</code> command	205
11.4	Defining commands with default parameters	205
11.5	A sectional unit environment	206
11.6	Accessing parameters by defining commands	207
11.7	Accessing parameters with a nested definition	207
11.8	User-defined environment	208
12.1	Tail recursion	216
14.1	Creating a titlepage with the <code>beamer</code> class	226
14.2	Creating frame titles	226
14.3	Using the <code>beamerarticle</code> package	228
14.4	Using modes	228
14.5	Using the <code>\pause</code> command	230
14.6	Using overlay specifications	231
14.7	Adding visual alerts	231
14.8	Sample output of <code>beamer</code> 's default theme	233
14.9	Sample output of <code>beamer</code> 's <code>Boadilla</code> theme	233
14.10	Sample output of <code>beamer</code> 's <code>Antibes</code> theme	234
14.11	Sample output of <code>beamer</code> 's <code>Goettingen</code> theme	234
14.12	Using a <code>beamer</code> theme	235
15.1	Declaring class options	239
15.2	Loading auxiliary classes and packages	240
16.1	Stylistic alternates	245
16.2	A typical font encoding file	248
16.3	Glyph sample	251
16.4	Partial font definition file	255
16.5	<code>Nexus</code> font definition file	256
16.6	Sample <code>\fonttable</code> output	258
16.7	Baseline and mean line	268
16.8	Bounding boxes	268
16.9	Word formation	268
16.10	Computing the point size	268
16.11	Kerning	269
16.12	Ligatures	269
16.13	Seriffed versus sans serif letters	270

List of Tables

1.1	Depth values of sectional unit commands	31
1.2	Using the <code>\index</code> command	33
2.1	Ten special characters	42
2.2	Common diacritics	44
2.3	Other special characters	44
2.4	Foreign ligatures	45
2.5	Size-affecting declarations and environments	51
2.6	Type style affecting declarations and commands	53
2.7	Latin abbreviations	56
5.1	The <code>xcolor</code> colours	90
5.2	Line width and dash pattern styles	92
5.3	Arrow head types	94
5.4	Node shapes provided by logic gate shape libraries	104
5.5	Shorthand notation for the <code>\foreach</code> command	114
6.1	A poorly designed table	119
6.2	An improved version of Table 6.1	120
7.1	Allowed values for <code>mark</code> option	141
8.1	Lowercase Greek letters	148
8.2	Uppercase Greek letters	149
8.3	Variable-size delimiters	158
8.4	Variable-sized symbols	160
8.5	Log-like functions	162
8.6	Integration signs	163
8.7	Binary operation symbols	165
8.8	Relation symbols	166
8.9	Additional relational symbols	166
8.10	Fixed-size arrow symbols	167
8.11	Extensible arrow symbols provided by <code>amsmath</code>	167
8.12	Extensible <code>mathtools</code> -provided arrow symbols	167
8.13	Options for <code>mathtools</code> -provided arrow symbols	168
8.14	Miscellaneous math mode symbols	168
9.1	Math mode accents, hats, and other decorations	172
9.2	The <code>\overbrace</code> and <code>\underbrace</code> commands	172

9.3	Math mode dot-like symbols	178
9.4	Positive and negative spacing	182
11.1	\TeX 's Expansion Processor	203
12.1	Length units	211
16.1	OpenType font features	244
16.2	Figure feature combinations	245
16.3	<i>Nexus</i> font features	253

Preface

THIS BOOK PROVIDES students with an introduction to technical writing and computer presentations with L^AT_EX, which is the de-facto standard in computer science and mathematics. The book may also be used as a reference for seasoned L^AT_EX users.

The book offers techniques for writing large and complex documents, preparing computer presentations, and creating complex graphics in an integrated manner. The book's website, which may be found at <http://cswb.ucc.ie/~dongen/LAF>, has three separate chapters explaining how to use a widely used L^AT_EX distribution on Windows, on Unix, and on the Mac. These chapters also provide an introduction to some selected integrated development environments (IDES).

I have tried to minimise the number of classes and style files the reader has to know. This is one of the main reasons why I decided to use the `amsmath` package for the presentation of mathematics, and decided to use `tikz`, `pgfplots`, and `beamer` for the creation of diagrams, data plots, and computer presentations. Another advantage of this approach is that it simplifies the process of creating a viewable/printable output file because everything should work with `pdflatex`, which is a program that turns L^AT_EX into pdf.

The book avoids the use of what is known in the L^AT_EX community as “verbatim” commands and environments, except when it comes to including, well, verbatim program listings. The main reason for this decision is that verbatim commands in the hands of beginners often lead to errors that are difficult to find and are not always so easy to resolve. By no means should the decision to omit verbatim commands be a limitation; this book was written without verbatim commands, so why should you need them when you're writing a thesis or dissertation?

M.R.C. van Dongen
Cork
2011

Book Outline

THIS BOOK has seven parts, some of which are more technical than others. The following is a short outline.

The first two parts are called *Basics* and *Basic Typesetting*. These parts introduce the reader to the basic L^AT_EX commands for typesetting and cross-referencing. They also explain how to create one or several bibliographies and one or several indexes or glossaries.

The next part is *Tables, Diagrams, and Data Plots*, which is about presenting data in tables, diagrams with the `tikz` package, and data plots with the `pgfplots` package.

Mathematics and Algorithms is the next part. It explains how to typeset mathematics, how to typeset algorithms in pseudo-code, and how to present program listings.

This is followed by *Automation*, which explains how to implement user-defined commands, how to implement option parsing, and how to implement conditional branching. Some readers may wish to skip this part because it is more technical than the other parts.

Miscellany is the next part. It is a collection of optional chapters, some of which are of a more technical nature than others. The first, relatively easy, chapter explains how to create computer presentations with the `beamer` package. It continues with two more technical chapters that explain how to implement user-defined classes and packages and how to use OpenType fonts.

The last part is *References and Bibliography*, which is a collection of indexes, a list of acronyms, a bibliography, and a short typographic jargon reference. Readers not familiar with notions such as characters, glyphs, ligatures, serifs, kerning, fonts, typefaces, points, point size and leading, ems, and ens, are invited to start with the jargon reference before reading the rest of the book.

Overall, the chapters are well balanced but the chapters about typesetting mathematics and presenting diagrams with `tikz` are a bit longer and more detailed. This is why it was decided to split the presentation on typesetting mathematics into two separate chapters. The first of these chapters should be sufficient for most readers. The chapter about presenting diagrams with `tikz` was not split because it was felt that most readers who are interested in some of this chapter would also be interested in the rest.

Acknowledgements

THIS BOOK would not have been possible without the help of many. First of all, I should like to thank Don Knuth for writing $\text{T}_{\text{E}}\text{X}$ and Leslie Lamport for writing $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ —without them the landscape of computer-based typesetting would have been dominated by Bill. I should like to thank Eddie Kohler for writing `otftotfm` and for his help. I am grateful to Till Tantau and colleagues for writing the beautiful `tikz` package and the `beamer` class. Both of them are stars in terms of functionality, productivity, and documentation. Thanks to David Farley and Dario Taraborelli for letting me include the pictures in [Figures 4.2](#) and [16.1](#). Many thanks to Billy Foley and the University College Cork Art Collection for letting me include the pictures at the back of the part titlepages. I should like to thank Frank Böhme, George Boyle, Tom Carroll, Hans Hagen, Taco Hoekwater, Finbarr Holland, Rik Kabel, Mico Loretan, Ben McKay, Luca Merciadri, Oliver Nash, Oleg Paraschenko, Jason Quinlan, Lisa Swenson, and Uwe Ziegenhagen for useful comments on early drafts. I should also like to thank Paul Blaga, Robin Fairbairns, Peter Flynn, Francisco A. F. Reinaldo, and Boris Veytsman for reviewing the book. Special thanks to Joseph Wright who was so kind to proofread the entire book and to write the foreword. His critical eye spotted many known and unknown errors. Many thanks to Mr Engesser, Ms Glaunsinger, and Ms Fisher at Springer for providing the opportunity to publish this book and for helping me bring this project to a successful end. Finally, I should like to thank all those who have worked on $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ and friends, all those who have supported $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ and friends, and all who have answered all my $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ and `METAPOST` questions over the last two decades or so. The following are but a few: André Heck, Barbara Beeton, Cristian Feuer-sänger, Dan Luecking, David Carlisle, David Kastrup, Denis Roegel, Donald Arseneau, D. P. Story, Frank Mittelbach, Frank van Raalte, Hans Hagen, Heiko Oberdiek, Jim Hefferon, John Hobby, Jonathan Fine, Jonathan Kew, Karl Berry, Kees van der Laan, Keith Reckdahl, Kjell Magne Fauske, Mark Wibrow, Nelson Beebe, Peter Wilson, Philipp Lehman, Rainer Schöpf, Ross Moore, Scot Pakin, Sebastian Rahtz, Stephan Hugel, Taco Hoekwater, Thomas Esser, Ulrike Fisher, Victor Eijkhout, Vincent Zoonekynd, Will Robertson, and all the many, many others. Without them the $\text{T}_{\text{E}}\text{X}$ community would have been much worse off.

