

# LATEX

## A Document Preparation System

### User's Guide and Reference Manual

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ADDISON-WESLEY, Publishers, Amsterdam, 1993, 272p.

ISBN 0-201-52983-1

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The first edition of this book appeared in 1985. It described LATEX2.09, the first widely used version of LATEX. Since then, LATEX has become extremely popular, with many thousands of users around the world. Its functionality has grown through the efforts of many people. The time has come for a new version, LATEX2, which is described in this edition. LATEX2 includes many of the enhancements that were made to LATEX2.09, as well as some new ones.

LATEX is a system for typesetting documents. Over the years, various non-standard enhancements were made to Latex 2.09 to overcome some of its limitations. LATEX input that made use of these enhancements would not work properly at all sites. LATEX needed a new version. The current version of LATEX, with the somewhat less mysterious number 2, was released in 1994. LATEX2 contains an improved method for handling different styles of type, commands for including graphics and producing colours, and many other new features.

Almost all standard LATEX2.09 input files will work with LATEX2. However, to take advantage of the new features, users must learn a few new LATEX2 conventions. LATEX2.09 users should read Appendix D to find out what has been changed.

LATEX is available for just about any computer made today. The versions that run on these different systems are essentially the same; an input file created according to the directions in this book should produce the same output with any of them.

LATEX's input is a file containing the document's text together with commands that describe the document's structure; its output is a file of typesetting instructions. Another program must be run to convert these instructions into printed output. With a high-resolution printer, LATEX can generate book-quality typesetting.

This book tells you how to prepare a LATEX input file. **Chapter 1** discusses the philosophy underlying LATEX.

**Chapter 2** explains what you should know to handle most simple documents and to read the rest of the book. Section 2.5 contains a summary of everything in the chapter; it serves as a short reference manual.

**Chapter 3** describes logical structures for handling a variety of formatting problems. Section 3.4 explains how to define your own commands, which can save typing when you write the document and retyping when you change it. It's good idea to read the introduction - up to the beginning of Section 3.1 - before reading any other part of the chapter.

**Chapter 4** contains features especially useful for large documents, including automatic cross-referencing and commands for splitting a large file into smaller pieces. Section 4.7 discusses sending your document electronically.

**Chapter 5** is about making books, slides and letters (the kind you send by post).

**Chapter 6** describes the visual formatting of the text. It has information about changing the style of your document, explains how to correct bad line and page breaks, and tells how to do your own formatting of structures not explicitly handled by LATEX.

**Chapter 7** discusses pictures - drawing them yourself and inserting ones prepared with other programs - and colour.

**Chapter 8** explains how to deal with errors. This is where you should look up when LATEX prints an error message that you do not understand.

**Appendix A** describes how to use the *MakeIndex* program to make an index.

**Appendix B** describes how to make a bibliographic database for use with *BIBTEX*, a separate program that provides an automatic bibliography feature for LATEX.

**Appendix C** is a reference manual that compactly describes all LATEX's features, including many advanced ones not described in the main text. If a command introduced in the earlier chapters seems to lack some necessary capabilities, check its description here to see if it has them. This appendix is a convenient place to refresh your memory of how something works.

**Appendix D** describes the differences between the current version of LATEX and the original version, LATEX 2.09.

- **Document Styles and Style Options**

Documents prepared for Latex2 begin with a `\documentclass` command (Section 2.2.2). LATEX2 realizes it is processing a LATEX2.09 input file and enters *compatibility mode* when it encounters a LATEX 2.09 `\documentstyle` command. The document style of LATEX2.09 has become document classes. SLITEX has been

eliminated; **slides** are produced using the slides document class. Standard document-style options that controlled formatting, such as `twoside`, have become document-class options, and are specified as optional arguments to the `\documentclass` command. Other document-style options have become packages, loaded with the `\usepackage` command (Section 2.2.2). Most nonstandard document-style options will work as LATEX2 packages.

- **Type Styles and Sizes**

The LATEX2.09 commands for changing type style, such as `\tt`, will still work more or less the same as before. The major difference is that `\sc` and `\sl` can no longer be used in math mode (except when LATEX2 is in compatibility mode). However, instead of using these commands, you should switch to the more rational commands described in Sections 3.1 and 3.3.8 for changing type style. The new commands treat the different aspects of type style separately - for example, allowing you easily to specify bold sans serif type. The commands for changing type size are the same, but they no longer change the type style (except in compatibility mode). The `\boldmath` command now works better (Section 3.3.8).

- **Pictures and Colour**

The `picture` environment has been enhanced by the addition of the `\qbezier` command for drawing curves (Section 7.1.3). The `pict2e` package also removes many restrictions on `picture` environment commands, such as limitations on the slopes of lines and arrows. The `graphics` package allows you to insert pictures produced by other programs (Section 7.2). It also defines commands for producing coloured text (Section 7.3).

- **Other New Features**

You can now define a command or environment that has an optional argument. The `\ensurermath` command is useful for defining a command that can appear in or out of math mode. See Section 3.4.

Control of the placement of floats (figures and tables) has been enhanced with a new float-location option ! that encourages LATEX to print the float as soon as possible, and with the `\suppressfloats` command to prevent additional floats on the current page.

When sending your document electronically, you can bundle other files along with your input file using the `filecontents` environment (Section 4.7).

Analogues of the `\settowidth` command have been added for determining the dimensions of text other than the width (Section 6.4.1). In the

length arguments of various box-making commands, it is now possible to refer to the dimensions of the text argument using commands such as `\width` (Section C.13.3).

The `ifthen` package defines commands for writing simple programs (Section C.8.5).

The `\enlargethispage` command has been added to help in correcting bad page breaks (Section 6.2.2). The `\samepage` command still works, but is now of little use.

A few commands and options have been added to the book document class (Section 5.1).

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