BibTeX 101

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Abstract

This paper introduces BibTeX to those having little or no previous BibTeX experience but having at least some familiarity with TeX or LaTeX. It also answers some frequently asked BibTeX questions, from complete novices as well as from experienced users.

Introduction

BibTeX is the bibliography program designed originally to accompany Leslie Lamport's LaTeX; it now works with other incarnations of TeX, too. BibTeX removes the tedium, and adds some flexibility, in producing a reference list.[1] When BibTeX creates your reference list, it's BibTeX, not you, minding the minutiae like ensuring that your reference-list entries are in the correct order, that every comma is in place, and that the information is formatted consistently across entries. Furthermore, a single, simple, change of bibliography-style name lets you convert your reference list from style A (which might order the entries alphabetically, spell out journal names in full, and list all authors as first-name then last-name), to a completely different style B (which might order the entries according to their order of mention in the text, abbreviate journal names), and invert just the first author's first and last names).

The next section of the paper explains how to use BibTeX. The final section answers some frequently asked BibTeX questions.

Getting Started with BibTeX

To use BibTeX, you first put your bibliographic information into a bibliography database file. For example, your file `mybib.bib` (all database file names end with `.bib`) might contain an entry like:

```
@BOOK{knuth:tex,
  author = "Donald E. Knuth",
  title = "The {{\TeX}}book",
  publisher = "Addison-Wesley",
  year = 1984,
}
```

The `@BOOK` tells BibTeX that this is a book entry type. The `knuth:tex` is the database key, which is a sequence of characters to be used as the name for this entry. And the rest of the entry comprises four ⟨field⟩ = ⟨field-value⟩ pairs appropriate for a `BOOK` entry type. In general you will have many such entries in a database file; you might also have multiple database files.

Once you've entered the bibliographic information into the database file(s), the hard part is done. For the easy part, you put into your (LA)TeX[2] source file citations like

```
... in the \TeX{}book~\cite{knuth:tex} ...
```

The `\cite` command's argument here, `knuth:tex`, is called a cite-key, and must match the corresponding database-key. (LA)TeX might typeset this `\cite` command as

   ... in the TeXbook [23] ... or
   ... in the TeXbook[23] ... or
   ... in the TeXbook (Knuth, 1984) ...

depending on the citation style. (LA)TeX's default citation style uses a number in brackets, and for that citation style, together with an appropriate bibliography style, the corresponding reference-list entry might look like:

23. Donald E. Knuth. *The TeXbook*. Addison-Wesley, 1984.

Besides the citation commands, you also put into your (LA)TeX source file two BibTeX-related commands:

```
\bibliography{mybib}
\bibliographystyle{plain}
```

The `\bibliography` command does two things; it tells (LA)TeX to put the reference list at that spot in your document, and it tells BibTeX which file(s) to

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[1] Throughout this paper, the term 'reference list' is used generally to refer to what might also be called a 'bibliography' or a 'list or sources' or anything similar.

[2] The term '(LA)TeX' is used to mean either LaTeX or plain (or other variations of) TeX.

.aux   .bst   .bib
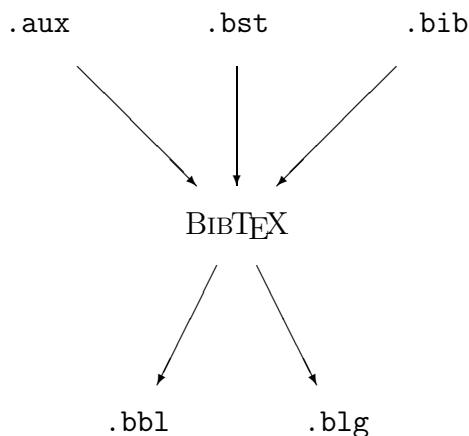
BIBTEX

.bbl   .blg

Figure 1: BIBTEX's input and output files.

use for the bibliographic database, here just the single file `mybib.bib`. The `\bibliographystyle` command tells (LA)TEX nothing, but tells BIBTEX which bibliography style to use, here the standard style `plain`; bibliography style file names end with `.bst`, thus the relevant file is `plain.bst` in this case.

So with your database file(s) and your (LA)TEX source file structured appropriately, your citations are formatted according to the citation style, and your reference list is formatted according to the bibliography style.

To actually produce the typeset document, you run (LA)TEX, BIBTEX, (LA)TEX, (LA)TEX. The first (LA)TEX run writes, to an `.aux` file, information for use by BIBTEX — which bibliography style to use, which database file(s) to use, and which database entries to include. The BIBTEX run reads all that information from the `.aux` file, reads the specified database (`.bib`) file(s), formats the reference list according to the instructions in bibliography style (`.bst`) file, and writes its output onto a `.bbl` file. The next (LA)TEX run reads the `.bbl` file and incorporates the reference list into the document. The final (LA)TEX run fixes the references into the reference list. Figure 1 shows the files that BIBTEX uses. The `.blg` file is BIBTEX's log file, in which BIBTEX records any warning or error messages.

To try using BIBTEX with LATEX, put the six-line `BOOK` entry shown on the previous page into a file called `mybib.bib`, and then, into a file called `mypaper1.tex`, put these six lines of LATEX:

```
\documentclass{article}
\begin{document}
The \TeX{}book~\cite{knuth:tex} is good.
\bibliography{mybib}
\bibliographystyle{plain}
\end{document}
```

Exactly how you run LATEX and BIBTEX is system-dependent, but on my system I type four commands:

```
latex mypaper1
bibtex mypaper1
latex mypaper1
latex mypaper1
```

To try using BIBTEX with plain TEX, create the file `mybib.bib` as above, and then put into a file called `mypaper2.tex` these seven lines of plain TEX:

```
\input btxmac
The \TeX{}book~\cite{knuth:tex} is good.
\medskip
\leftline{\bf References}
\bibliography{mybib}
\bibliographystyle{plain}
\bye
```

To run `mypaper2` through TEX and BIBTEX on my system I simply type

```
tex mypaper2
bibtex mypaper2
tex mypaper2
tex mypaper2
```

But `mypaper2` `\input`s the file `btxmac.tex`, which contains the macros that make BIBTEX work with plain TEX. Those macros are a standard part of most TEX distributions, but if they're not a part of yours, you'll have to go fetch a copy from CTAN in `tex-archive/macros/plain/contrib/`.

That's a brief introduction to BIBTEX. The following sources provide further details. Leslie Lamport's LATEX manual [3] explains how to use BIBTEX with LATEX. In particular, section B.1 describes the `.bib`-file format in detail. The file `btxmac.tex` [1] documents its own use, with or without Karl Berry's `eplain.tex` package (for which the `btxmac` macros were originally written). The "BIBTEXing" document [4], which is distributed along with BIBTEX itself, contains further hints for BIBTEX users. The "Designing BIBTEX Styles" document [5], also distributed with BIBTEX, explains the postfix stack-based language used to write BIBTEX bibliography styles (`.bst`) files. *The LATEX Companion* [2], by Michel Goossens, Frank Mittelbach, and Alexander Samarin, summarizes much of the information contained in the sources above, and it describes some of the tools available for helping with BIBTEX bibliographies. Norman Walsh's *Making TEX Work* [7] also describes such tools. (Many users find the tools for managing bibliographic database files to be particularly useful.) BIBTEX's standard bibliography styles, like `plain`, are based on Mary-Claire van Leunen's *A Handbook for Scholars* [6]. That book is

worthwhile reading for anyone wanting to design a bibliography style.

Frequently Asked BibTeX Questions (FABQs)

The questions in this section are ordered, roughly, by user sophistication, with the earlier questions coming from the least experienced users.

FABQ: Can I include an entry in the reference list without having to give an in-text citation for it?

Answer: Yes. If there's a `\nocite{my-ref}` in your (LA)TeX source file, the entry whose database-key is `my-ref` will appear in the reference list but without a corresponding in-text citation.

FABQ: Can I include all the entries in my database in the reference list without my having to `\cite` or `\nocite` all of them explicitly?

Answer: Yes. Putting a `\nocite{*}` command in your (LA)TeX source file has the effect of putting in that spot of your source file a `\nocite` command for each entry in your database.

FABQ: If I can't find a bibliography style to my liking, how can I make my own bibliography style (`.bst`) file?

Answer: The `.bst` language is fairly flexible, but it's meant to be programmed, except for simple changes, by reasonably experienced programmers. Patrick Daly's `custom-bib/makebst` package, on the other hand, allows nonprogrammers, too, to create their own bibliography styles.

FABQ: How can I have two different database files use the same set of abbreviations without duplicating the abbreviations?

Answer: If you put all your abbreviations, like

```
@STRING{A-W = "Addison-Wesley"}
```

into a database file, say `abrvs.bib`, containing just abbreviations, and if you list that file first in the `\bibliography` command, then all other `.bib` files listed in that command may use the abbreviations in `abrvs.bib`. For example, two files `cs-books.bib` and `math-books.bib` may have entries that use the field

```
    publisher = A-W,
```

if the `\bibliography` command looks like

```
  \bibliography{abrvs,cs-books,math-books}
```

FABQ: How can I keep BibTeX from converting all my journal-article titles to lower case?

Answer: Technically, it's the bibliography style file, not BibTeX itself, that's doing the case conversion. Many bibliography styles (*The Chicago Manual of Style*, for example) say that a reference-list entry for a journal article should have the article title converted to lower case, because it is a smaller thing inside a bigger thing, but should have the title of the bigger thing — the journal title itself — left in uppers-and-lowers form (in which you capitalize the first word, and, in most styles, the first word after a colon — which indicates a subtitle — and all other words except articles and unstressed conjunctions and prepositions). But if you don't like that style, it's a simple change to the `.bst` file to eliminate the case conversion. For example, many `.bst` files will have something like:

```
FUNCTION {format.title}
{ title empty$
    { "" }
    { title "t" change.case$ }
  if$
}
```

That's the function that converts the titles of, for example, journal articles, from uppers-and-lowers form to lowercase. Changing that function to

```
FUNCTION {format.title}
{ title field.or.null
}
```

will eliminate the case conversion.

FABQ: How can I change the citations from using brackets to using parentheses or superscripts.

Answer: Certain bibliography style (`.bst`) files have accompanying (LA)TeX style files; make sure you are using the accompanying (LA)TeX style file if it's required. For example, if you are using the `apalike` bibliography and citation style, which uses parentheses rather than brackets in its citations, you need, in addition to `apalike.bst`, either `apalike.sty` (under LaTeX) or `apalike.tex` (under plain TeX). You invoke those files with a

```
  \usepackage{apalike}
```

command under LaTeX, or a

```
  \input apalike
```

command under plain TeX. If there is no such accompanying (LA)TeX style file for your `.bst` file, you must redefine `\cite` and any other relevant citation command yourself.

FABQ: Sometimes I enter an author in my database file as

```
author = "D.E. Knuth",
```

but in my reference list the author appears without the middle initial, as just 'D. Knuth' — what's going on?

Answer: Probably you are using a bibliography style that automatically abbreviates first names to just initials. In this case, BIBTEX thinks that 'D.E.' is a single name, rather than two initials, because there is no space between the initials, and the style abbreviates this to 'D.' The solution is to, in the database file, insert a space between the initials:

```
author = "D. E. Knuth",
```

If you really want to close up the space between initials in the output, it's a simple matter to change the bibliography style file to do that.

FABQ: How can I have other BIBTEX questions answered?

Answer: Post them to the `comp.text.tex` newsgroup; I've been known to send private email replies to questions that seem to receive inadequate answers in that newsgroup.

References

[1] Karl Berry and Oren Patashnik. `btxmac.tex`. Macros to make BIBTEX work with plain TEX; current version 0.99k, 13 November 1995.

[2] Michel Goossens, Frank Mittelbach, and Alexander Samarin. *The LATEX Companion*. Addison-Wesley, 1994.

[3] Leslie Lamport. *LATEX: A Document Preparation System*. Addison-Wesley, second edition, 1994.

[4] Oren Patashnik. BIBTEXing. General documentation for BIBTEX users, contained in the file `btxdoc.tex`, 8 February 1988.

[5] Oren Patashnik. Designing BIBTEX styles. Documentation for BIBTEX style designers, contained in the file `btxhak.tex`, 8 February 1988.

[6] Mary-Claire van Leunen. *A Handbook for Scholars*. Oxford University Press, revised edition, 1992.

[7] Norman Walsh. *Making TEX Work*. O'Reilly & Associates, 103 Morris Street, Suite A, Sebastopol, CA 95472, 1994.