

Demystifying \LaTeX bibliographies. *

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Abstract In this essay, we will try to explore and understand the vexed problem of including bibliographic references in your documents (reports, papers, theses etc.). There is a huge plethora of literature on this subject. But, these are written by experts of \LaTeX and give mostly a developer's point of view. This current paper will examine bibliographies from a user's point of view. To make it easier for you to learn the concepts, this paper has made some simplifications. For a more rigorous, and thorough understanding, you must refer to the \LaTeX book [lam-1] by Lamport or the companion book [goo-1] by Goossens. There is also an excellent tutorial available on the w-w-web [nic-1] The [nic-1] paper is a very detailed review of the concepts behind \LaTeX bibliographies. It also gives some very good and practical tips, and lots of examples.

This current paper gives only the essentials of this very vast and involved topic. The author hopes that this paper will make \LaTeX enjoyable for more people.

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1 Preamble

It is a common practice to refer to external publications when writing a paper on a complex subject. \LaTeX provides very elegant tools for including details of external publications which you have cited in your main paper. Unfortunately, there is not much material which makes it easy to understand how all this works. This current paper is based on the experiences of a person, who has gone through the pains of understanding how Bibliography works under \LaTeX .

*Published in Practex Journal, Vol. 2007-2. Ask the author for a copy of the \LaTeX source of this document (demystify.tex) . You can try out all the examples yourself, by hacking the source.

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2 Choose the right tool

The first thing, we must remember is that it is not always necessary (or justified) to use an elaborate tool for creating References/Bibliography. You can always make-do with :

1. Footnotes
2. Enumerated lists, combined with `\ref & \label`

These may be clumsy, and cumbersome at times, but they are down-to-earth, and need no special skills. However, there are situations when a more sophisticated approach is necessary. In which case, two alternatives are available :

1. In-built bibliography, using the `\thebibliography` command.
The `\thebibliography` command is simpler. It is part of the main document itself. In this approach, you will have to retype details of all the publications cited by you.
2. Special bibliographic database (usually, BibTeX).
This is an external database (given usually as a `.bib` file). It is much more elaborate than the `\thebibliography` option. You can reuse the database with more than one main document. You do not have to retype details of all the publications cited by you.

This paper uses the in-built bibliography `\thebibliography`, to illustrate the actual use of bibliography tools. However, this paper will examine both the above tools. For the case of BibTeX, you will have to use a different set of files (`horse.tex`, `zebra.bib`) as examples. You can get these two files by sending an email to the author.

3 Terminology and basics

We will introduce some basic terms which will have a special meaning in this paper:

Main document : The document in which you are going to include (cite) references to other documents. You will use the `\cite` mechanism, for identifying and linking to specific external documents. In the rendered version,

each `\cite` will be replaced by a simple number, or a short text (depending upon the choice you make). This same number will appear in the body of your main document, as well as in the bibliographic list.

External document : Documents which are cited in the main document. We are primarily interested in publication details about the document, and not the contents itself.

Bibliographic list : (aka reference list) A consolidated list of external documents cited in the main document, presented at the end of the rendered version of the main document. This list gives essential details (chosen by the user) about each external document cited in the main document. This “shopping list” is usually generated and included at the end of the main document, and printed (or rendered) along with the main document, as a separate section. The section may be titled as **References**, or **Bibliography** (depending on your documentclass). You will also need a “bibliography style”, to specify the style in which the bibliography items will be displayed in the bibliographic list. The style will specify : the sequence/ordering in which details will be given for each external document cited by you, font style and size etc. The bibliography style may be either a standard one defined by L^AT_EX , or a style specifically defined in a special file (.bst file).

Bibliographic database : The bibliographic details of each document to be cited in your main document, can be collected together, and located in two ways :

1. **External :** A data base, external to the main document, giving publication details of various external documents (e.g. BibTeX).
2. **In-built :** In the case of `\thebibliography` environment, this database is part of the main document itself.

In both cases, you will identify each element which you have cited in your main document using the `\cite` command (much like the `\item` command in a list).

The `\bibitem` has an optional argument. If you use this optional argument, you can get a text (in the rendered version) wherever you use `\cite`. If you do NOT use the optional argument, you will get plain numbers (in the rendered version) wherever you use `\bibitem`. This current paper gives

you a simple way to switch between these two options.

Not all documents listed in the database need be cited in the main document. You can include in your bibliographic list, items which you have not explicitly cited in your main document. Each external document (identified by a `\bibitem` command) occupies one record of the data base. Each record of the database may contain several fields e.g.

1. Name (s) of the author (s)
2. Title
3. Journal, book, conference, or other location where the document was published
4. Volume number, issue number etc.
5. Place of publication
6. Name of publisher
7. Date of publication

4 In-built bibliography

Use the `\thebibliography` environment, if you are writing a paper where the external documents are small in number, and when you will not be referring these again in other papers. This is the easiest, and least complex way to include bibliography.

Your main document will look like this :

```
\documentclass{someclassname}
Preamble stuff goes here
\begin{document}
The contents of your main document go here.
You can cite an external document like this:
In \cite{paper1} Partha has given a long lecture
about LaTeX. And in \cite{paper2} he gives examples
about how to use LaTeX. In \cite{shake3},
Mark Anthony said ‘‘Friends, Romans,
```

Countrymen...lend me your ears''.

Details about the above three external documents must be listed in the `\thebibliography` environment, like this

(as part of your main document itself):

```
\begin{thebibliography}{abc}
\bibitem{paper1}Authornameofpaper1, and other details
\bibitem{paper2}Authornameofpaper2, and other details
\bibitem{shake3} William Shakespeare, Julius Caesar,
Pub.: Shakespeare Press,
Stratford-upon-Avon (UK), July 1623.
\end{thebibliography}
\end{document}
```

Run \LaTeX twice on this main document, and you will get your document, including the bibliography, listed at the end of the document (bibliographic list). In the current paper, the bibliographic list is shown as **References**, at the end of the paper. You can also take a look at the source code of this current paper, to get an idea how `\thebibliography` works.

5 External bibliography

\LaTeX provides a standardised way of building an external bibliographic database which you can cite selectively inside your main document. This is the infamous BibTeX database. Do not get discouraged if you do not understand BibTeX in your first go. BibTeX is a complex subject. Even the name is confusing ! BibTeX is the name of a database, the name of a format used by the database, and also the name of the program which is used for processing the data included in a BibTeX database. BibTeX is a very rich program. It has many variants and options. However, the principles of BibTeX are simple.

When you use BibTeX, you will need :

1. A method of specifying where the bibliographic data is stored.
For BibTeX, usually, you store bibliographic data in a `.bib` file.

2. A method of specifying how the data will be displayed in the bibliographic list.

In BibTeX, you can either use one of the many standard bibliography styles defined by L^AT_EX, or use a special style of your own (stored in a .bst file).

In our example for the use of BibTeX, the main document is called horse.tex (horse.tex is similar to the current demystify.tex, except that the in-built \thebibliography environment is replaced by the external bibliographic database zebra.bib). Let us create and use a BibTeX database called zebra.bib (BibTeX files always have the extension .bib)¹. Each record of the database will have an identifier key (used by the \cite), followed by the fields. Each field of each record is built as a name + value pair. The name and the value are separated by an = mark. The name/value pair is used by L^AT_EX to decide the style in which the bibliographic list will be composed (sequence/ordering of fields, fonts style/size etc.). Here is an example of a record from the horse.bib file (the line numbers are not part of the BibTeX record):

```
1. @BOOK{goossens1,
2.   author = "M Goossens and F Mittelbach and A Samarin",
3.   title= "The \LaTeX\ companion",
4.   publisher = "Addison-Wesley",
5.   year = 1984
   }
```

Notice that the author names are separated by “and”. You may get a lot of warnings when you run L^AT_EX on horse.tex for the first time. Never mind, run L^AT_EX again (three times). The warnings will disappear. Notice also, that the .bib file does not have any \bibitem. Actually, L^AT_EX generates a new file with the extension .bbl where it puts the data in a structured list-like form, using the \bibitem (similar to \item in a list)

You will also notice that BibTeX files have a very cumbersome syntax. Creating all your bibliography data as a BibTeX file would be necessarily painful. So, why bother at all ? There are many reasons :

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1. You can get horse.tex and zebra.bib from the author

1. BibTeX is a standardised way of collecting bibliographic data. Many organisations and publishers use this standard. It makes sense to follow such a widely accepted standard.
2. You can cite references from more than one BibTeX file inside your main document. Imagine, you have two BibTeX files : zebra.bib and tiger.bib. You can decide to borrow references from both these databases, into the same document, like this : `\bibliography{zebra,tiger}` Of course, the citekeys you use in `\cite` must uniquely belong to one of the many BibTeX files you have selected in the `\bibliography` command.
3. You can reuse the bibliographic data, in more than one document. Imagine you have created two main documents : horse.tex and mule.tex. In both these documents, you can borrow data from the same database using e.g. `\bibliography{zebra}`

Imagine a research team working on a special project. All the references and bibliography used by the team, can be assembled in one BibTeX file. Every research scholar need not assemble a bibliography for himself, separately. All research scholars can use the same BibTeX file and cite references from this common bibliography, in their individual papers. A research scholar may write more than one paper (several papers). He would like to cite references in each paper he writes. He will not have to collect and type out the bibliographic details each time. All that he has to do, is to select his requirements from the BibTeX database.

Now, imagine that all research teams in the same institution, but working on different subjects, have their own BibTeX files, for their own subject. The Director of the institution can draw references from all these bibliographies, when he writes a paper giving an overview of the institution and all the research activities of the institution. He will not have to collect, and compile, a bibliography of his own. BibTeX comes in as a handy database tool in such cases.

Usually, a researcher publishes his work in different journals and conferences. Each journal/conference has its own standards for presenting the bibliography list. The sequence in which the records are sorted, the sequence in which the fields of each record are presented, the formatting style for presenting each field, is specified by the journal/conference. Using a standard base like BibTeX, you can

easily switch between various presentation styles, just by changing the `\bibliographystyle` command.

In all these case, the effort of creating a database using the clumsy-looking syntax of BibTeX becomes worthwhile.

5.1 Uncited citations

Now, what does that mean ? If there is a reference, in the .bib database, that you want to include in the List of References (bibliography list) but don't actually `\cite` in the text, use the `\nocite{blah}` command in the .tex source. Then the reference labeled by blah will appear at the bibliography list, although there is no place in the rendered main text where you have cited it. The `\nocite{blah}` document is a kind of orphan, who exists in the bibliography list (orphanage), but has no home (in the body of the main text). To give an example, in the bibliography list of the horse.tex file there is a book by Don Knuth, but it has not been mentioned anywhere in the body of the main document. You will need this artefact, if you want to give a list of useful reference documents, but have no specific reason to cite them in the body of the main document.

6 BibTeX tricks

You will find a lot of simple tricks in [nic-1]. Here are some more: You have created, or inherited, a large BibTeX file. You would like to print out a list of all the publications in that file, formatted according to your taste. You dont have to do much. If your BibTeX file is not very big, make a dummy L^AT_EX document with no contents, just add the `\nocite*` command. Remember to invoke the BibTeX file using `\bibliography` command. You must specify the formatting of the rendered version using `\bibliographystyle` command. This trick works for small BibTeX files only. You will run out of memory when you handle larger BibTeX files like this. You must use the **biblist** package (available from CTAN). You have to prepare a LaTeX document which uses the article style and the biblist style option. You may add almost all other style options, as you wish, e.g., twoside, german (or other language style options), a4, etc. This style option must be used with

a ragged bottom; this has the effect, that it cannot be used with twocolumn or multicol.

You must issue a `\bibliography` tag which names all BibTeX databases which you want to print. You may issue a `\bibliographystyle` tag to specify how BibTeX will process its databases. (In fact, you usually must issue it since the default bibliography style is not available on most installations; see below.) You may issue `\nocite` commands if you want to print only selected entries from the databases.

7 Closing remarks

L^AT_EX can be used for producing very elegant looking documents. It gives you tools for making your documents, crisp and compact. It gives you several facilities for referring to other documents and citing them inside your main text. These facilities are also very useful for storing, and presenting your bibliographic data in a standardised way (and reusing them, if necessary).

The author of this paper teaches discrete mathematics in an engineering college near Hyderabad, India. He also runs a specialised enterprise² which uses L^AT_EX extensively.

This paper, predictably, was made using L^AT_EX . It used the Kile front-end provided by Suse Linux. The L^AT_EX source of this paper (`demystify.tex`) can be obtained by sending an email to the author.

Note : The following portion gives the thebibliography database in two forms. You can block any one of the these forms, by using a `verbatim` environment as an envelope. You will see the citations shown as plain numbers or as small texts (in the rendered version) , depending on which portion you decide to leave unblocked. The part which is blocked using `verbatim` will show up as unrendered code, in the rendered version, like this :

```
\begin{thebibliography}{ww}
\bibitem{lampo1}L. Lamport, LaTeX : A document preparation system,
Pub.: Addison Wesley, 1986 (The LaTeX bible)
```

2. Algologic Research and Solutions, 78 Sancharpuri Colony, Bowenpally, Secunderabad 500 011, India WWW-URL – <http://algolog.tripod.com/nupartha.htm>

```
\bibitem{goossens1} M Goossens, F Mittelbach, A Samarin,  
The \LaTeX\ Companion, Pub.: Addison Wesley, 1994. (The LaTeX gospel)  
\bibitem{beast1} Nicolas Markey, Tame the beast,  
URL http://  
http://tug.ctan.org/tex-archive/info/bibtex/tamethebeast/ttb\_en.pdf  
\end{thebibliography}
```

References

- [lam-1] L. Lamport, LaTeX : A document preparation system, Pub.: Addison Wesley, 1986 (The LaTeX bible)
- [goo-1] M Goossens, F Mittelbach, A Samarin, The L^AT_EX Companion, Pub.: Addison Wesley, 1994. (The LaTeX gospel)
- [nic-1] Nicolas Markey, Tame the beast, URL
http://tug.ctan.org/tex-archive/info/bibtex/tamethebeast/ttb_en.pdf

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