

Indian T_EX Users Group

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On-line Tutorial on L^AT_EX

The Tutorial Team

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2 Some Conventions

As a well developed programming language, T_EX has certain conventions that might be worth understanding. It might appear cryptic to learn such nitty-gritty things just to typeset a document, but it will eventually become known to you that it is worth understanding. As in other mainstream programming languages, T_EX has data types, booleans, input/output operations, etc. Apart from this T_EX has a highly structured directory tree popularly called T_EX Directory Structure (TDS), a font setup that is specific to T_EX alone, a mechanism of reading and digesting characters that come across on its way and not found in other languages, etc. We shall examine one by one.

2.1. T_EX Directory Structure

All implementation-dependent T_EX system files (`.pool`, `.fmt`, `.base`, `.mem`) are stored by default directly in `texmf/web2c`. The configuration file `texmf.cnf` and various subsidiary `MakeTeX...` scripts used as subroutines are also stored there.

Non-T_EX specific files are stored following the GNU coding standards. Given a root directory prefix (`/usr/local` by default), we have default locations as follows:



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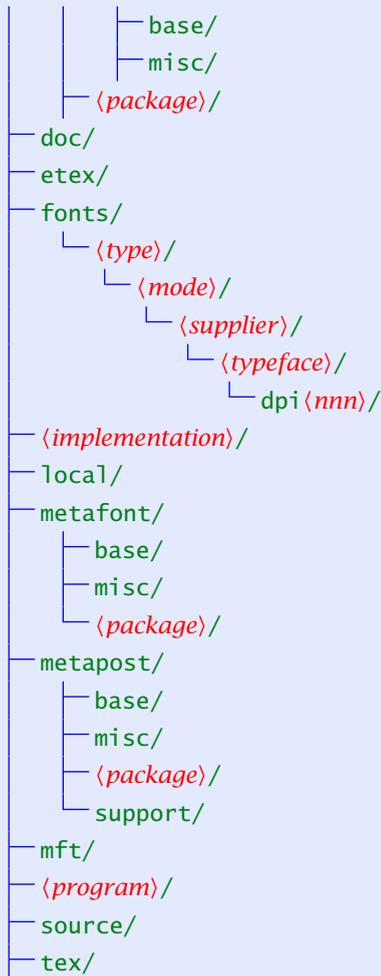
<code><prefix>/</code>	installation root (<code>/usr/local</code> by default)
<code>bin/</code>	executables
<code>man/</code>	man pages
<code>info/</code>	info files
<code>lib/</code>	libraries (<code>libkpathsea.*</code>)
<code>share/</code>	architecture-independent files
<code>texmf/</code>	TDS root
<code>web2c/</code>	implementation-dependent files (<code>.pool</code> , <code>.fmt</code> , <code>texmf.cnf</code> , etc.)

See <ftp://ftp.gnu.org/pub/gnu/standards.text> for the rationale behind and descriptions of this arrangement. A site may of course override these defaults; for example, it may put everything under a single directory such as `/usr/local/texmf`.

2.1.1. A skeleton of a TDS

This is not to imply these are the only entries allowed. For example, `local` may occur at any level. Given below is the standard setup followed in `web2c` TeX implementations distributed along with GNU operating systems.

<code>texmf</code>	Top level TeX directory
<code>bibtex/</code>	BibTeX input files
<code>bib/</code>	BibTeX databases
<code>base/</code>	base distribution (e.g., <code>xampl.bib</code>)
<code>misc/</code>	single-file databases
<code><package>/</code>	name of a package
<code>bst/</code>	BibTeX style files



base distribution (e.g., `plain.bst`, `acm.bst`)

single-file styles

name of a package

Documentation

as with \TeX , below

font-related files

file type (e.g., `pk`)

type of output device (for `pk` and `gf` only)

name of a font supplier (e.g., `public`)

name of a typeface (e.g., `cm`)

font resolution (for `pk` and `gf` only)

\TeX implementations, by name (e.g., `em \TeX`)

files created or modified at the local site

METAFONT (non-font) input files

base distribution (e.g., `plain.mf`)

single-file packages (e.g., `modes.mf`)

name of a package (e.g., `mfpic`)

MetaPost input and support files

base distribution (e.g., `plain.mp`)

single-file packages

name of a package

support files for MetaPost-related utilities

MFT inputs (e.g., `plain.mft`)

\TeX -related programs, by name (e.g., `dvips`)

program source code by name (e.g., `L \TeX` , `web2c`)

\TeX input files





It arises a problem, when one tries to access third party fonts supplied by various foundries, for instance, Adobe. Foundries do not supply TeX font metric file. However, this can easily be generated with `afm2tfm` program supplied with your TeX distribution and is a trivial process. We will learn about these in subsequent chapters.

2.3. Characters

Not all the characters of your document is seen by TeX in the same way as we see them. The following characters have special meaning, `\`, `#`, `$`, `%`, `^`, `&`, `_`, `{`, `}`.

<code>\</code>	escape character, TeX functions or control sequences start with this character, e.g., <code>\alpha</code> , <code>\section</code> , <code>\bf</code> , etc.
<code>#</code>	parameter character used in TeX macros (we will learn this later on)
<code>\$</code>	math shift character, i.e., <code>\$</code> character starts math mode and the next <code>\$</code> character stops it
<code>%</code>	comment character, TeX will ignore the characters after <code>%</code> till the end of that line
<code>^</code>	superscript character in math, e.g., <code>\$a^2\$</code> $\Rightarrow a^2$
<code>_</code>	subscript character in math, e.g., <code>\$a_2\$</code> $\Rightarrow a_2$
<code>{</code>	group open character used to open a local group
<code>}</code>	group close character used to close a local group
<code>~</code>	unbreakable space

The obvious question arises, what will we do if we want the above characters got printed. The table below will show you how to accomplish it:



Character	Math mode	Text mode
<code>\</code>	<code>\backslash</code>	<code>\textslash</code>
<code>#</code>	<code>\#</code>	<code>\#</code>
<code>\$</code>	<code>\\$</code>	<code>\\$</code>
<code>%</code>	<code>\%</code>	<code>\%</code>
<code>^</code>	<code>\^</code>	<code>\^</code>
<code>_</code>	<code>_</code>	<code>_</code>
<code>{</code>	<code>\{</code>	<code>\{</code>
<code>}</code>	<code>\}</code>	<code>\}</code>
<code>~</code>	<code>\tilde</code>	<code>\texttilde</code>

2.3.1. Alphabets and numerals

Ordinary alphabets, numerals, punctuations, parentheses, square brackets, and characters other than what listed above are entered as in any other program or word processor and the result will exactly match what you have entered.

2.3.2. Mathematical symbols and notations

Greek letters, various math operators including negated operators, arrows, stretchy delimiters, etc., which are normally not available in a keyboard are entered to the computer with a set of special control sequences specifically designed for this purpose. There are around 2500 control sequences available, at least half of them are not in regular use. The numbers need not make you awe-struck, since you know most of them. Knuth designed all the control sequences in such a way that it is nothing but what you ordinarily pronounce in your classroom. For instance, if you want a Greek alpha character entered into your document, you need to give



as `\alpha`, this during compilation will give you ‘ α ’. Given below is an equation composed of such control sequences:

$$(\alpha + \beta)^2 = \alpha^2 + \beta^2 + 2\alpha\beta \quad (2.1)$$

The following code generates the above equation which is not at all difficult for any academic to undertake.

```
\begin{equation}
(\alpha + \beta)^2 = \alpha^2 + \beta^2 + 2\alpha\beta
\end{equation}
```

Similarly, a wide variety of symbols are accessed with names similar to what we ordinarily denote them. For instance, \swarrow , ψ , \rightarrow , \sum , \subseteq , \notin are generated with `\swarrow`, `\psi`, `\longrightarrow`, `\sum`, `\subteq`, `\not\subteq`. The point is that symbols in TeX is extremely logical to follow and not much extra effort is needed to understand and remember them. We will learn more about math symbols, formulae and their spatial arrangement and constructs during the second phase of our tutorial.

2.3.3. Accented characters

Languages other than English have a variety of accents and special symbols. TeX provides commands to generate accents and symbols to put small pieces of non-English text in an English document. See this sentence:

El señor está bien, garçon, Él está aquí

generated by the following code:

```
El se~nor est\'a bien, gar\c{c}on, \'El est\'a aq\'u\'{i}
```

List of commands for accents and special symbols

<code>\`{o}</code>	⇒	ò	<code>\~{o}</code>	⇒	õ
<code>\' {o}</code>	⇒	ó	<code>\={o}</code>	⇒	ō
<code>\^ {o}</code>	⇒	ô	<code>\. {o}</code>	⇒	ô
<code>\" {o}</code>	⇒	ö	<code>\u {o}</code>	⇒	ö
<code>\v {o}</code>	⇒	ö	<code>\c {o}</code>	⇒	ø
<code>\H {o}</code>	⇒	ő	<code>\d {o}</code>	⇒	ø
<code>\t {oo}</code>	⇒	oö	<code>\b {o}</code>	⇒	o
<code>\oe</code>	⇒	œ	<code>\aa</code>	⇒	å
<code>\OE</code>	⇒	Œ	<code>\AA</code>	⇒	Å
<code>\ae</code>	⇒	æ	<code>\AE</code>	⇒	Æ
<code>\o</code>	⇒	ø	<code>\O</code>	⇒	Ø
<code>\l</code>	⇒	ł	<code>\L</code>	⇒	Ł
<code>\ss</code>	⇒	ß			
<code>\dag</code>	⇒	†	<code>\ddag</code>	⇒	‡
<code>\S</code>	⇒	§	<code>\P</code>	⇒	¶
<code>\copyright</code>	⇒	©	<code>\pounds</code>	⇒	£

2.4. Epilog

With this chapter, we conclude the preliminaries and introductory part of the tutorial. Next chapter onwards, we get into the real meat of the learning process. The chapters have been written not from a programmer's point of view, but rather a qualitative treatment of the language from a functional point of view is undertaken. In case, any one needs any theoretical explanation of any of the functions described or its underlying mechanism in a \TeX run to accomplish it, you are gladly welcomed to query that at appropriate time. The tutorial team is only happy to



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explain that in great detail. So we start the \LaTeX document classes in the next chapter.



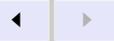
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