

# L<sup>A</sup>T<sub>E</sub>Xfor Publishing

A. Mani

Department of Pure Mathematics, Calcutta University  
9/1B, Jatin Bagchi Road  
Kolkata-700029 India  
E-Mail: [a.mani.cms@gmail.com](mailto:a.mani.cms@gmail.com)  
Homepage: <http://www.logicamani.in>

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# ABSTRACT

L<sup>A</sup>T<sub>E</sub>X is an advanced document preparation and typesetting system. I will introduce basics of L<sup>A</sup>T<sub>E</sub>X and publishing with it in this talk.

# Outline

- 1 Introduction
- 2 Installation
- 3 Basics
- 4 Long Examples
- 5 Mathematics
- 6 More Examples

Introduction

Installation

Basics

Long Examples

Mathematics

More Examples

- Research in Algebra, Logic, Rough Sets, Vagueness and related areas.
- Course development in Machine Learning, Soft Computing.
- Occasionally involved in independent consultancy in KDD, Statistics and Specifications
- GNU/R expert,
- Free Software Activism: Ubuntu Women Project, GLUG Kolkata, (ilug-Cal.info), Fedora, LQ, GNU/R India
- Functional Feminist

# Document Preparation Methods

- Markup- Based
  - Moderate MarkUp
  - Heavy MarkUp
  - Dynamic MarkUp
- WYSIWYG: What You See Is What You Get.
- WYSIWYW: What You See Is What You Want
- Mark Down
- Mark Down + Heavy Post Processing
- Automated Mark up

# WYSIWG

- Libre Office, Open Office, Koffice, AbiWord, MSWord
- Authors will need to waste lot of effort on formatting.
- Quality of documents is never really publication quality.
- Standards of style are very difficult to enforce.
- Libre Office is better than MS Office in far too many ways.
- Machine dependent output.

# Markup

- Generic Markup is ancient: Copy Editor to Typesetter
- First Attempts to Standardize: GML
- Standard Generalized Markup Language: SGML
- XML : Extensible Markup Language: Came Much Later
- SGML, XML: Meta languages for defining other markup languages
- T<sub>E</sub>X: Best for Typesetting - related to Literate Programming

# LaTeX: Generalities

## L<sup>A</sup>T<sub>E</sub>X

- is an Extensible Typesetting System
- has programmable capabilities.
- is part of literate programming projects (web2c)
- is suitable for **most** document preparation/publication contexts.
- is used by all major publishers.
- uses a refined clean markup language over T<sub>E</sub>X.



# Machine Markup

- Refers to machine generated mark up.
- Is usually terrible. Example : M\$Word to xHTML.
- Works better from plain text to markup: txt2tags
- Is incompatible with semantic web and quality.
- Markdown helps.

# TeX - Aspects

- T<sub>E</sub>X: Since 1975+ : Donald Knuth
- Orinally meant for typesetting mathematics.
- T<sub>E</sub>X is too low level.
- L<sup>A</sup>T<sub>E</sub>X: A Macro Typesetting and Programming Language over T<sub>E</sub>X
- ConT<sub>E</sub>X<sub>T</sub> : uses different design principles.
- Now the T<sub>E</sub>X collection can be used for any kind of publishing.

# In GNU/Linux

- Package Manager: `apt-get`, `synaptic`, `dnf`,
- Packages: Part of `TeXlive2016`
- `# sudo apt-get kile` ; Partly Efficient
- `# dnf install kile texlive-recommended`
- Others: GhostScript, Okular, Evince, KDVI, KBibtex
- IDE: Kile, TexMaker, Emacs, Xemacs, Winefish, Vim, Kate

# TeXLive

- Unified distribution for all T<sub>E</sub>X related programs
- Released Annually since 2005
- DVD could be run live till TexLive'2011
- Commands: `# ./install - tl.sh`
- Commands: `# tlmgr --update`

# Some Parts of TeXLive

- **Babel:**(J. Braams et al. ) Multilingual support for L<sup>A</sup>T<sub>E</sub>X.
- **Context:** ( Hans Hagen) Another unified typesetting system over T<sub>E</sub>X.
- **Fontinst:** (Alan Jeffrey et. al.) simplifies installation of PS,TTF fonts for use with TeX.
- **Hyperref:** (Sebastian Rahtz) extends functionality of all L<sup>A</sup>T<sub>E</sub>X cross-referencing commands
- **MetaPost:** (Hobby, John) is very similar to METAFONT except that it outputs PostScript commands instead of bitmaps.
- **Omega:** Aims at improving multilingual capabilities.

# Some Parts of TeXLive (Cont'd)

- **PdfTeX**: Creates Pdfs directly from .tex sources.
- **Pstricks**: For Visualisation, graphics. PostScript-based TEX macros that are compatible with most TEX macro packages.
- **Pdfticks**: Enables Pstricks to be used with pdftex.
- **LaTeX3**: A set of layers including programming layers that permit writing better latex packages and documents.
- **Bibtex**: Handles bibliographic databases and referencing.
- **MusicTeX**: For Music.

# Document Class

- Article: Section, Subsection, Abstract
- Report
- Book: Chapter, Part
- Variations: Koma Script
- Variations: Style Files: llncs.sty
- Letter, CV, etc.

# Simple Example 1

```
line 1 \documentclass[]{}  
line 2 \usepackage{amsmath,fontenc,graphicx}  
line 3 \title{Sample Article}  
line 4 \author{}  
line 5 \begin{document}  
line 6 \maketitle  
line 7 \begin{abstract} abcefg \end{abstract}  
line 81 \section{Introduction}  
line 90 \end{document}}
```



# Structural Elements

**Command** `\usepackage[options]package:` in **Preamble**

**New Command** `\newcommand{\pc}{\mathbf{P}}` : in **Preamble**

**Environment** `\begin{Environment} <Content>`  
`\end{Environment}`

**Mode** Math, Verbatim, Standard, Code, Program

**Sectioning** `\section{ }`, `\section*{ }`, `\subsection{ }`

**Examples** theorem, equation, proposition, remark, abstract, minipage, verbatim, code.

# Lists

- `itemize`, `enumerate`, `description`
- Pre set behavior can be modified.
- Nesting to arbitrary levels is permitted.
- `\begin{itemize}\item {} \end{itemize}`
- `\begin{description}\item []{} \end{description}`

# Basic Steps

- 1 Compose document in IDE
- 2 Save as `filename.tex`
- 3 Run latex or pdflatex on file
- 4 `# latex -interaction=nonstopmode '%source' filename.tex`
- 5 Errors: Do not panic
- 6 Convert to postscript or pdf as is desired.

# Example 1

```
\documentclass{llncs}

\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
\usepackage{latexsym}
<snip>
\newcommand{\br}{\mathbf{b}}
\newcommand{\mt}{\mathbb{M}}
\begin{document}
\setcounter{page}{1}

\title{Antichain Based Semantics for Rough Sets}
\author{\textbf{A. Mani}}
\institute{Department of Pure Mathematics\\
University of Calcutta\\
9/1B, Jatin Bagchi Road\\
Kolkata(Calcutta)-700029, India\\
Email: \email{a.mani.cms@gmail.com}}
```

## Example II

```
Homepage: \url{http://www.logicamani.in}}
```

```
\maketitle
```

```
\section{Introduction}
```

It is well known that sets of rough objects  
(in various senses)

are quasi or partially orderable.

In quasi or partially

```
%<snip>
```

```
\begin{definition}
```

A **\emph{Granular Operator Space}** \$\$\$ will  
be a structure

of the form  $S \setminus, = \setminus, \left \langle \underline{S} \right\rangle$ ,

$\mathcal{G}$ ,  $l$ ,  $u \rangle$  with  $\underline{S}$

## Example III

being a set,  $\mathcal{G}$  an  
`\emph{admissible granulation}`  
(defined below) over  $\mathcal{S}$  and  $\mathcal{L}$ ,  $u$  being operators  
`:\wp(\underline{S})\longmapsto \wp(\underline{S})`  
satisfying the following:

```
\begin{align*}
A^l \subseteq A, \&\, A^{ll} = A^l \, \&\, A^u
\subseteq A^u \\
(A \subseteq B \longrightarrow A^l \subseteq B^l
\, \&\, A^u \subseteq B^u) \\
\emptyset^l = \emptyset \, \&\, \emptyset^u = \emptyset
\, \&\, S^l \subseteq S \, \&\, S^u \subseteq S.
\end{align*}
\end{definition}

\end{document}
```

# Schedule code-0

```
\documentclass[a4paper,12pt]{article}
\usepackage[utf8]{inputenc}
\usepackage{mathdesign}
\usepackage[T1]{fontenc}
\usepackage{amsmath,booktabs,url,tabularx,graphicx}
\title{Workshop on Women in Free Software'2016}
\author{\textbf{Schedule}}
\date{}
\pagestyle{empty}
\begin{document}
\maketitle
\thispagestyle{empty}
\pagestyle{empty}
\section*{}
\subsection*{15.07.2106}

\textbf{Registration: 10:00 to 10:30 hrs}
```

# Schedule code-1

```
\section*{}

\subsection*{15.07.2106}

\textbf{Registration: 10:00 to 10:30 hrs}

\begin{table} [hbt]
\centering
\begin{tabular*}{\linewidth}{lcl}
\toprule
Speaker & Time & Topic \\
\midrule
A Mani & 10:30--11:30 & Free Software, Women and Feminism \\
A Mani & 11:35--12:30 & GNU/Linux, Ubuntu \\
Trishna Guha & 12:30--13:30 & What I do in Fedora... \\
Priyanka Nag & 14:00 --15:00 & Imposter Syndrome \\
Rebeka Mukherjee & 15:05--16:05 & Python Scripting \\
Trupti Kini & 16:05--17:00 & Drupal \\
\bottomrule
\end{tabular*}
\end{table}
```



## Schedule code-2

```
\hrulefill

\subsection*{16.07.2106}

\begin{table}[hbt]
\centering
\begin{tabular*}{\linewidth}{lcl}
\toprule
Speaker & Time & Topic \\
\midrule
Priyanka Sinha & 10:30--11:30 & Parsey Mc Parseface \\
Gunjan Gautam & 11:35--12:30 & GIMP \\
Priyanka Nag & 12:30 --13:30 & How To Contribute to FLOSS? \\
A Mani & 14:00--15:00 & \LaTeX for Publishing \\
Swapna Agarwal & 15:05--16:05 & GNU/Octave \\
Open Session & 16:05--17:00 & Discussion \\
\bottomrule
\end{tabular*}
\end{table}
```

# Code 1

```
\begin{enumerate}
\item {Let  $\underline{K}, =, E(S) \times S^2$ }
\item  $\{\forall \alpha, \beta \in E(S)\}$ 
 $\{\forall x, y, a, b \in S\}$ 
 $\{\equiv, \frac{Q}{Q}\}$ 
\item  $\{u(\alpha, x, y), \stackrel{\text{def}}{=} \}$ 
 $\{\alpha, xy, xy\}$ 
\item  $\{\frac{Q}{Q}, (\alpha, x, y) \otimes$ 
 $(\alpha, z, a)$ 
 $\{\stackrel{\text{def}}{=} \}$ 
 $\{\alpha, xz, ya\}$ 
 $\{\text{partial operation}\}$ 
\end{enumerate}
```

# From My Recent Paper I

- 1 Let  $\underline{K} = E(S) \times S^2$
- 2  $(\forall \alpha, \beta \in E(S))(\forall x, y, a, b \in S) \equiv \Omega$
- 3  $u(\alpha, x, y) \stackrel{\text{def}}{=} (\alpha, xy, xy)$
- 4  $\Omega(\alpha, x, y) \otimes (\alpha, z, a) \stackrel{\text{def}}{=} (\alpha, xz, ya)$  (partial operation)

## Cont'd

$$(\Omega)(\alpha, x, y) \wedge (\beta, a, b) = \begin{cases} (\alpha \wedge \beta, x, y) & \text{if } x = a, y = b \\ \text{undefined,} & \text{else} \end{cases}$$

$$(\Omega)(\alpha, x, y) \Upsilon (\beta, a, b) = \begin{cases} (\alpha \vee \beta, x, y) & \text{if } x = a, y = b \\ \text{undefined,} & \text{else} \end{cases}$$

# References /



Lampport, Leslie

Latex- A Document Preparation System ,  
AW'1994



Mittelbach, Frank et. al

The Latex Companion, 2nd Edition  
Addison Wessley' 2003.



Gratzer, George

More Math inti Latex, 4th Edition  
Springer'2007



<http://ctan.org>



TeX Users Group

<http://www.tug.org>

# QUESTIONS?

Software is a form of  
Knowledge and Knowledge  
ought to be Free!

CHEERS !