

L^AT_EX: More Than Just Academic Papers and Theses

(FIRST PRESENTED AT MOSC2011)



LianTze Lim (Ph.D.) (liantze@gmail.com)
<http://liantze.penguinattack.org>

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Illustration by Duane Bibby

Contents

1 What are T_EX, L_AT_EX and Friends?

2 Document Types

3 Special Material

4 Wrapping Up

Contents

1 What are T_EX, L^AT_EX and Friends?

2 Document Types

3 Special Material

4 Wrapping Up



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WWW.PHDCOMICS.COM



WWW.PHDCOMICS.COM

PHD Comics By Jorge Cham

Ever Worried about These?

- Is my literature survey strong enough?
- My bibliography/citation formatting got inconsistent.
- My citation and bibliography aren't synchronised!
- My math equations don't display/print correctly.
- Should this discussion go under this section or that?
- What formatting did I use for my subsection headings again?
- Didn't I set that heading to bold and italic 5 minutes ago?
- My section/figure/page numbering's gone all wrong!
- Does this subsection go together with this section?
- Oops, I forgot to update the TOC.
- What results should I put in this table?
- My figure jumped off the page again!
- The application crashed!
- **MY FILE GOT CORRUPTED!!!**

What are \TeX and \LaTeX , and Friends?

\TeX

- From Greek $\tau\epsilon\chi$
- ASCII \TeX , /tex/, /tek/
- A computer typesetting system created by Donald Knuth
- for ‘the creation of beautiful books’

\LaTeX

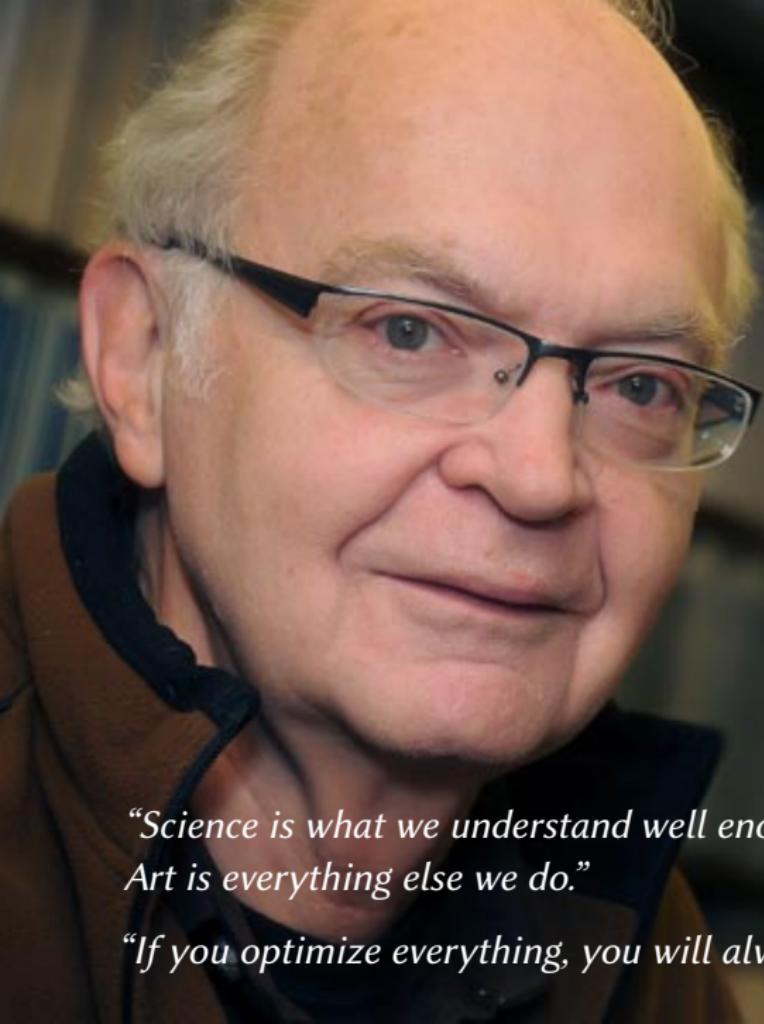
- ASCII \LaTeX , /leitex/, /leitek/, /la:tex/, /la:tek/
- A document preparation system by Leslie Lamport

Binaries

- $\varepsilon\text{-}\text{\TeX}$: additional primitives to \TeX
- $\text{pdf}\text{\TeX}$: additional PDF-related primitives
- $\text{Xe}\text{\TeX}$: native UTF-8 input; can access system fonts
- $\text{Lua}\text{\TeX}$: includes the Lua scripting engine

Friends

- $\text{Bib}\text{\TeX}$, MakeIndex , METAFONT , METAPOST , ...
- http://www.ctan.org/what_is_tex.html



Donald Knuth (1938–)

- American computer scientist, mathematician, and professor emeritus at Stanford University
- Author of the multi-volume work *The Art of Computer Programming*
- “Father of the analysis of algorithms”

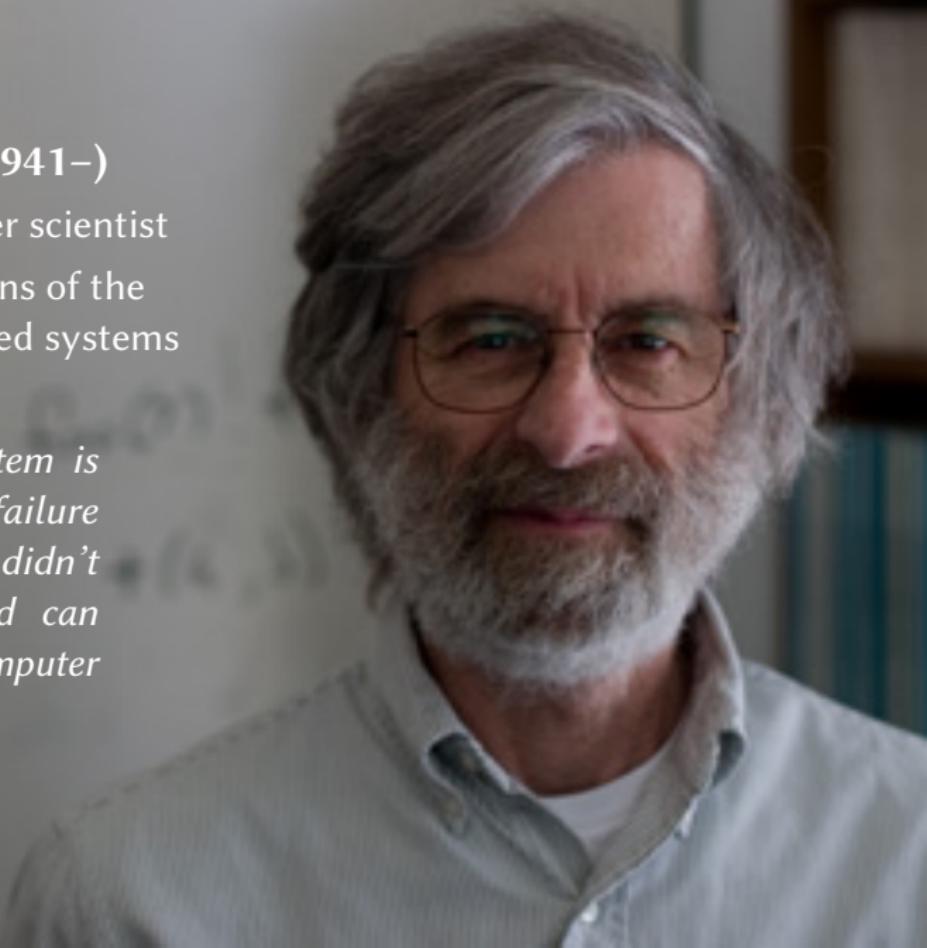
*“Science is what we understand well enough to explain to a computer.
Art is everything else we do.”*

“If you optimize everything, you will always be unhappy.”

Leslie Lamport (1941–)

- American computer scientist
- Laid the foundations of the theory of distributed systems

“A distributed system is one in which the failure of a computer you didn’t even know existed can render your own computer unusable.”



Why?

From http://www.ctan.org/what_is_tex.html

Output Quality

- It has the best output.
- It knows typesetting.

Freedom

- It's free.
- It runs anywhere.

Superior Engineering

- It's fast.
- It's stable.
- It's not rigid (extensible).
- Plain text input.
- Many output types.

Popularity

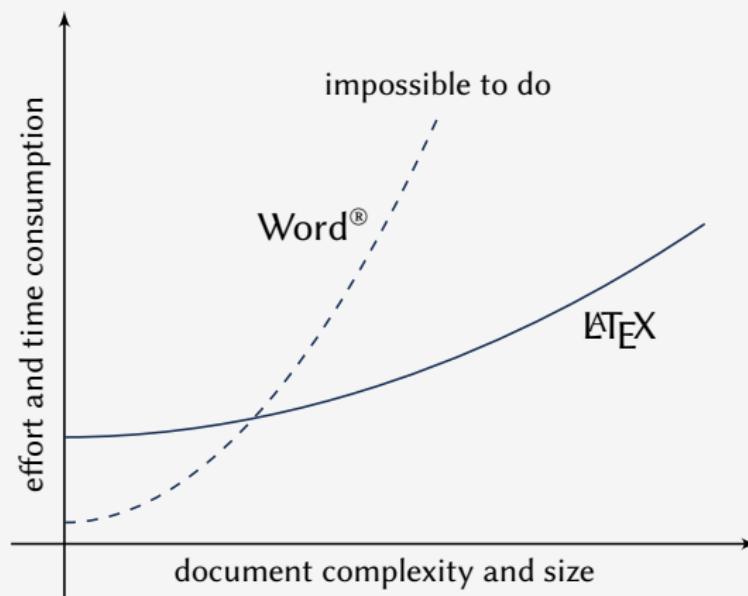
- It's the standard (in academia and science).

Typesetting and Word Processing

Apples and Oranges

- Word processors
 - Replacement of mechanical typewriters
 - Word, OpenOffice, AbiWord, ...
- Typesetting and Desktop publishing
 - For publication and printing
 - InDesign, QuarkXPress, Scribus...

Scalability



Scalability of \LaTeX and Microsoft Word[®] against document size and complexity
(redrawn from Marko Pinteric's original at <http://www.pinteric.com/miktex.html>)

Professional Typesetting Quality Output

■ Typesetting quality and legibility

- good kerning hinting and correct ligatures
- inter-word, line and paragraph spacing
- context-sensitive hyphenation

Table fiery fluffy

This paper outlines an approach to produce a prototype WordNet system for Malay semi-automatically, by using bilingual dictionary data and resources provided by the original English WordNet system. Senses from an English-Malay bilingual dictionary were first aligned to English WordNet senses, and a set of Malay synsets were then derived. Semantic relations between the English WordNet synsets were extracted and re-applied to the Malay synsets, using the aligned synsets as a guide. A small Malay WordNet prototype with 12429 noun synsets and 5805 verb synsets was thus produced. This prototype is a first step towards building a full-fledged Malay WordNet.

Table fiery fluffy

This paper outlines an approach to produce a prototype WordNet system for Malay semi-automatically, by using bilingual dictionary data and resources provided by the original English WordNet system. Senses from an English-Malay bilingual dictionary were first aligned to English WordNet senses, and a set of Malay synsets were then derived. Semantic relations between the English WordNet synsets were extracted and re-applied to the Malay synsets, using the aligned synsets as a guide. A small Malay WordNet prototype with 12429 noun synsets and 5805 verb synsets was thus produced. This prototype is a first step towards building a full-fledged Malay WordNet.

■ Correct mathematical typesetting (spacing etc)

$$W_\psi(f)(a, b) = \frac{1}{\sqrt{a}} \int_{-\infty}^{\infty} f(t) \psi\left(\frac{t-b}{a}\right) dt$$

$$W_\psi(f)(a, b) = \frac{1}{\sqrt{a}} \int_{-\infty}^{\infty} f(t) \psi\left(\frac{t-b}{a}\right) dt$$

Where Would I Want to Use \LaTeX ?

- Beautiful typographic output (OK not everyone cares that much...)
- Documents with complex structures
- Lots of mathematics (or other specific needs)
- When publishers require them
- Batch processing of data into reports, etc.
- Back-end of other applications

This is not a Word Processors vs LATEX debate.

- It's a 'teaser' preview of an alternative tool.
- Some word processors also provide mechanisms to handle same routine tasks (with varying degrees of ease, consistency and stability)
- Use the best tool for the task at hand.
- **You** are the best judge to decide for yourself.

How Do I Use It?

- 1 Write a plain text LATEX file (.tex)
- 2 Run it through pdflatex or xelatex → PDF output
(or latex + dvips + ps2pdf for DVI + PS + PDF)
- 3 Run bibtex and/or makeindex to process bibliographies, indices
- 4 Re-run pdflatex to resolve references and pointers

Example .tex File

```
\documentclass[a4paper,11pt]{article}
\author{Lim Lian Tze}
\title{An Introductory Paper}
\date{\today}
\usepackage[english]{babel}

\begin{document}
\maketitle
\tableofcontents

\begin{abstract}
This paper introduces\ldots
\end{abstract}

\section{Introduction}
We consider\ldots

\section{State of the Art}
We look at\ldots

\subsection{Document Formats}
There are many\ldots
\end{document}
```

pdflatex

An Introductory Paper

Lim Lian Tze

June 7, 2011

Contents

1	Introduction	1
2	State of the Art	1
2.1	Document Formats	1

Abstract

This paper introduces...

1 Introduction

We consider...

2 State of the Art

We look at...

2.1 Document Formats

There are many...

Where Do I Get It?

Online Overleaf (www.overleaf.com)

Windows MikTEX, TEXLive

Un*x, GNU/Linux TEXLive

Mac OS X MacTeX (based on TEXLive)

Installation Use your OS' package manager
(or download manually)

Editors vi, emacs, Texmaker, TeXworks, Texstudio, TeXshop...

LATEX Packages Use MikTEX or TEXLive's package manager

Documentation (Online) <http://texdoc.net/pkg/<packagename>>
(TEXLive) \$ texdoc <package name>
(MikTEX) \$ mthelp <package name>

Easy to Learn, Hard to Master

- Customising may not be straightforward (vs word processors)
- Intentionally so: Style guidelines should be followed strictly
 - Publisher/organisation provides **document class** or **style** files
 - Use these to take care of formatting and styling, focus on the **content**

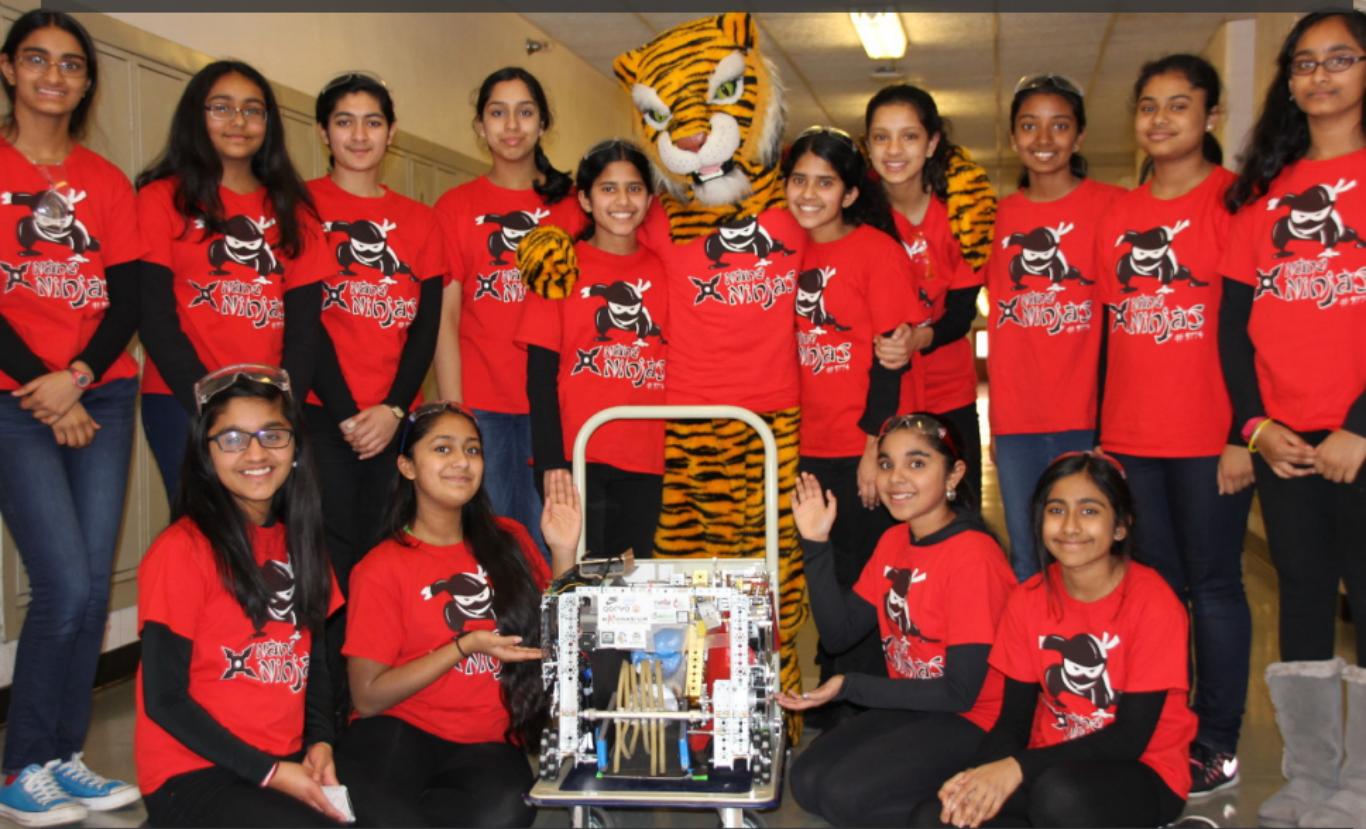
Too hard, only for engineers/mathematicians?

- I once guided a student in the humanities to learn authoring Chinese LATEX documents entirely through e-mail
- Recently a 75-year-old user transitioned to LATEX on Overleaf to write a book (with indices, end notes, cross references)
- Professor in Finance at Trinity College transitioned to LATEX successfully (<https://www.overleaf.com/blog/299>)
- Linguists, psychologists, biostatistics (integrating with R), legal profession...



Prof Brian Lucey, Trinity
College, Dublin

Nano Ninjas – a group of 7th- and 8th-graders from Portland, OR



Collaboratively wrote an engineering notebook with 300+ pages in L^AT_EX as part of their FIRST Tech Challenge win (<https://www.overleaf.com/read/hkxzqcncngyv>)

So, What Can LATEX Do?

Contents

1 What are T_EX, L_AT_EX and Friends?

2 Document Types

3 Special Material

4 Wrapping Up

Basic Types

Books

```
\documentclass{book}
\author{...}
\title{...}

\begin{document}
\maketitle
\chapter{...}
\section{...}
...
\subsection{...}
\end{document}
```

A Wonderful Read

A. Dostoevsky
3rd June 2011

Chapter 1

Heading on level 0 (chapter)

Hello, here is some text without a section. This text should show how a paragraph looks like. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some sentence like "Hello, world!"? No, there is not.

1.1 Heading on level 1 (section)

Hello, here is some text without a section. This text should show how a paragraph looks like. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some sentence like "Hello, world!"? No, there is not. A short text like this gives you information about the selected font, how the letters are written and the implementation of the font. This text should contain all letters of the alphabet and it should be written in the original language. This text is a special sentence, but the length of words should match to the language.

1.1.1 Heading on level 2 (subsection)

Hello, here is some text without a section. This text should show how a paragraph looks like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some sentence like "Hello, world!"? No, there is not.

CHAPTER 1: HEADING ON LEVEL 0 (CHAPTER)

This text and some sentence like "Hello, world!". Right? Now we should have a short text like this gives you information about the selected font, has the letters written in the original language. This text should contain all letters of the alphabet and it should be written in the original language. This text is a special sentence, but the length of words should match to the language.

Heading on level 1 (subsection)

Hello, here is some text without a section. This text should show how a paragraph looks like. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some sentence like "Hello, world!"? No, there is not. A short text like this gives you information about the selected font, how the letters are written and the implementation of the font. This text should contain all letters of the alphabet and it should be written in the original language. This text is a special sentence, but the length of words should match to the language.

Heading on level 2 (paragraph). Hello, here is some text without a section. This text should show how a paragraph looks like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some sentence like "Hello, world!"? No, there is not. A short text like this gives you information about the selected font, how the letters are written and the implementation of the font. This text should contain all letters of the alphabet and it should be written in the original language. This text is a special sentence, but the length of words should match to the language.

1.2 Lists

1.2.1 Example for list (bullet)

- First item in a list
- Second item in a list
- Third item in a list
- Fourth item in a list
- Fifth item in a list

CHAPTER 1: HEADING ON LEVEL 0 (CHAPTER)

Example for list (bullet)

- First item in a list

- First item in a list
- Second item in a list

- Second item in a list

1.2.2 Example for list (enumerate)

1. First item in a list

2. Second item in a list

3. Third item in a list

4. Fourth item in a list

5. Fifth item in a list

Example for list (enumerative)

1. First item in a list

2. Second item in a list

3. First item in a list

4. Second item in a list

5. Second item in a list

Basic Types (cont'd)

Articles

```
\documentclass{article}
```

```
\author{...}
\title{...}
```

```
\begin{document}
```

```
\maketitle
\section{...}
```

```
...
```

```
\subsection{...}
```

```
\end{document}
```

A Wonderful Read

A. Dumas
2d June 2011

1 Heading on level 1 (section)

Holla, here is some text without a section. This text should show, how a printed text will look like at this point. If you read this text, you will get no pleasure from it. It is not interesting. Is there no information? Is there a difference between this text and some someone like effeboes gheenoo. Egh. Never mind. I think we have to add a heading on level 1. Holla, here is some text with a heading on level one and the importance of the look. This text should contain all information about the selected font, how the letters are written and the length of words should match the original language.

1.1 Heading on level 2 (subsection)

Holla, here is some text without a section. This text should show, how a printed text will look like at this point. If you read this text, you will get no pleasure from it. It is not interesting. Is there no information? Is there a difference between this text and some someone like effeboes gheenoo. Egh. Never mind. I think we have to add a heading on level 2. Holla, here is some text with a heading on level two and the importance of the look. This text should contain all information about the selected font, how the letters are written and the length of words should match the original language.

1.1.1 Heading on level 3 (subsubsection)

Holla, here is some text without a section. This text should show, how a printed text will look like at this point. If you read this text, you will get no pleasure from it. It is not interesting. Is there no information? Is there a difference between this text and some someone like effeboes gheenoo. Egh. Never mind.

2.1 Example for list (itemize)

- First item in a list
- Second item in a list
- Third item in a list
- Fourth item in a list
- Fifth item in a list

2.2 Example for list (enumerate)

1. First item in a list
2. Second item in a list
3. Third item in a list
4. Fourth item in a list
5. Fifth item in a list

2.3 Example for list (description)

- First item in a list
 Second item in a list
 Third item in a list
 Fourth item in a list
 Fifth item in a list
- 2.2.1 Example for list (description)
- First item in a list
 First item in a list
 Second item in a list
 Third item in a list
 Fourth item in a list
 Fifth item in a list

A bland text like this gives you information about the selected font, how the letters are written and the importance of the look. This text should contain all information about the selected font, how the letters are written and the length of words should match the original language. There is no need for a special context, but the length of words should match the original language.

Heading on level 4 (paragraph) Holla, here is some text without a section. This text should show, how a printed text will look like at this point. If you read this text, you will get no pleasure from it. It is not interesting. Is there no information? Is there a difference between this text and some someone like effeboes gheenoo. Egh. Never mind. I think we have to add a heading on level 4. Holla, here is some text with a heading on level four and the importance of the look. This text should contain all information about the selected font, how the letters are written and the length of words should match the original language.

2 Lists

2.1 Example for list (itemize)

- First item in a list
 - Second item in a list
 - Third item in a list
 - Fourth item in a list
 - Fifth item in a list
- 2.1.1 Example for list (itemize)
- First item in a list
 - First item in a list
 - Second item in a list
 - Third item in a list
 - Fourth item in a list
 - Fifth item in a list
 - Second item in a list

Second item in a list
 Second item in a list
 Second item in a list
 Second item in a list

Second item in a list

Journal and Conference Proceedings Articles

IEEE

\documentclass{IEEEtran}

ACM

\documentclass{sig-alternate}

LLNCS

\documentclass{llncs}

A Wonderful Read

A. Dummy

Abstract—Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there no information? A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

L. HEADING ON LEVEL 1 (SECTION)

Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

A. Heading on level 2 (subsection)

Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

II. LISTS

- A. Example for list (itemize)
 - First item in a list
 - Second item in a list
 - Third item in a list
 - Fourth item in a list
 - Fifth item in a list
- B. Example for list (enumitem)
 - First item in a list
 - First item in a list
 - First item in a list

A Wonderful Read

A. Dummy

I.1 Heading on level 3 (subsubsection)—Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

ABSTRACT

Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

I.2 Heading on level 4 (paragraph)

Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

I.3 Heading on level 2 (subsection)

Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

I.3.1 Heading on level 3 (subsubsection)

Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

II.1 Example for list (itemize)

- First item in a list
- Second item in a list
- Third item in a list
- Fourth item in a list
- Fifth item in a list

II.1.1 Example for list (subsubsection)

Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

II.1.1.1 Example for list (itemize)

- First item in a list
- Second item in a list
- Third item in a list
- Fourth item in a list
- Fifth item in a list

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(ii) the full name of the author(s) is/are given;

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(iv) a link is made to the original web page;

(v) the full URL is given; and

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A Wonderful Read

A. Dummy

I.1 Heading on level 3 (subsubsection)—Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

A Wonderful Read

A. Dummy

ABSTRACT—Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

Heading on level 1 (section)

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Heading on level 2 (subsection)

Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

Example for list (itemize)

- First item in a list
- Second item in a list
- Third item in a list
- Fourth item in a list
- Fifth item in a list

Example for list (subsubsection)

- First item in a list
- Second item in a list
- Third item in a list
- Fourth item in a list
- Fifth item in a list

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(v) the full URL is given; and

(vi) the full name of the institution or organization is given.

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A Wonderful Read

A. Dummy

No Institute - Clean

Abstract—Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

Heading on level 1 (section)

Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

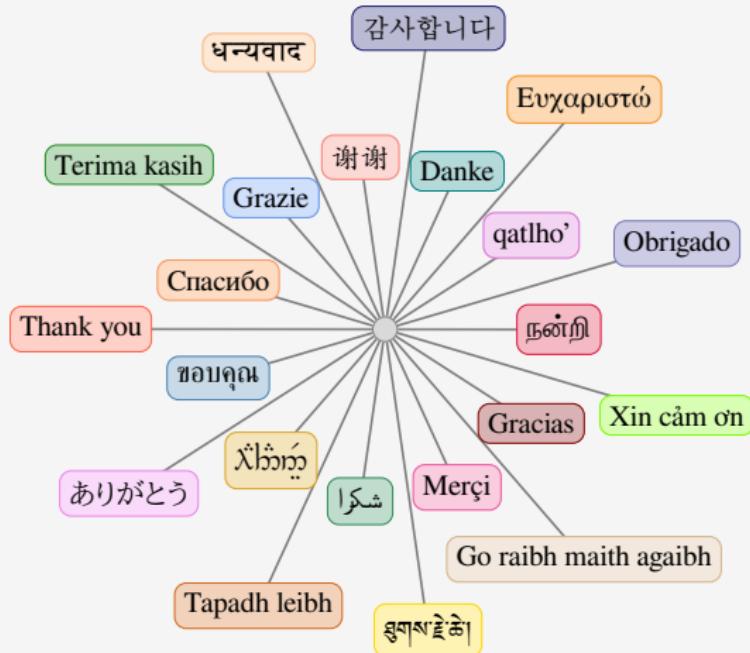
Heading on level 2 (subsection)

Hello, here is some text without a meaning. This text should show, how a plain text will look like at this place. If you read this text, you will get no information. Is there no information? Is there a difference between this text and some nonsense like (blurred gophers). Kjih – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special context, but the length of words should match to the language.

Some Goodies

- Quick language-switching with babel
- Automatic generation of cross-referencing labels:
`\section{Introduction}\label{sec:intro}`
... We saw in section `\ref{sec:intro}`...
- Automatic generation of lists:
`\tableofcontents, \listoffigures, \listoftables`
- Automatic generation of bibliographies and indices:
`\cite{Knuth:1976}...\bibliography{references.bib}`
...the Linux kernel`\index{Linux!kernel}...\printindex`
- Fully hyperlinked PDF with bookmarks: `\usepackage{hyperref}`
- Inclusion of selected pages from other PDFs
(while inserting new page headers/footers!)
`\usepackage{pdfpages}`
`\includepdf[pages={1,3-5,8},pagecommand=\thispagestyle{plain}]{file.pdf}`

Multilingual LATEX



X_ELATEX, LuaLATEX Unicode input

LATEX Various packages (sometimes with transcriptions: nan^ri, salAm)

University Theses

Universiti Sains Malaysia \documentclass{usmthesis}

WRITING YOUR THESIS WITH LATEX

by

LIM LIAN TZE

Thesis submitted in fulfillment of the requirements
for the degree of
Master of Science

December 2007

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CHAPTER I

INTRODUCTION: SAMPLES OF BASIC L^AT_EX COMMANDS

Hello and welcome, fellow Universiti Sains Malaysia (USM) research proposal! The usmthesis package and template files were written in the hope that they may help you prepare your research thesis using L^AT_EX, based on the Semester Project Requirements (SPR) requirements (SPR, 2007). Please note that this version is based on the new guidelines, in force 27 Dec 2007 onwards. (Hong, Cat, Lee and Ca, 2002)

L^AT_EX is powerful and produces beautiful documents. However, there is definitely a learning curve to it – one that is worth the effort. If you find any errors in these templates or documents, or have any suggestions or feedback, do e-mail me about it (liantze@usm.edu.my). The author control always generates prompt response here, even.

M^AK_EX, my recommended D^IX distribution for Windows, is available on the CSE²C²CD. A step-by-step installation walkthrough is available at (Lim, 2007).

1.1 Some Simple Command Usages

There are plenty of free L^AT_EX tutorial online, some of which are listed in the bibliography or available at <http://www.ctan.org>. This sample thesis includes some examples to show some commands. We start with some examples for lists (bulleted

REFERENCES

Changping, X., Wang, J., Lu, L. and Zheng, Y. (2008). A novel framework for semantic annotation and automated retrieval of sports video. *Multimed. IEEE Trans.*, 2008, Vol. 10, No. 1, pp. 21–26.

El Ghazali, T., Lee, M., Agius, P., Mansor, F. L., Mohamad, N., Nasir, M. and Elouedi, A. (2008). An investigation into the use of state-of-the-art sensor fusion algorithm for visual tracking. *IEEE Transactions on Circuits and Systems for Video Technology*, 18(12), 1884–1894.

El Ghazali, T., Lee, M., Agius, P., Nasir, M., Mohamad, N. and Elouedi, A. (2009). A novel framework for visual tracking using multi-camera sensor fusion. *Computer Vision and Image Understanding*, 113(3), 423–432. Computer Vision Department, University of Southern California, Los Angeles, CA, USA. <http://www.vision.usc.edu/researches/track/BIFC/USCIU/index.html>

SPR. (2007). A Guide to the Preparation, Submission and Examination of Theses. Institute of Graduate Studies, Universiti Sains Malaysia, Penang, Malaysia.

Lim, L. T. (2007). L^AT_EX: Essential computing. [Online]. [Accessed January 22, 2010]. Available from World Wide Web: <http://ctan.math.psu.edu/tex/info/guide.pdf>

Mohamad, N., Elouedi, A., Bassem, J., Cahill, D. and Roselli, Z. (2004). The RIGI Camera and Image Sensor for Underwater Imaging. In: *Proceedings of Computer Typesetting 2004*, Edith, Addison Wesley, Reading, MA, USA.

Ortega, J. M., Rheinboldt, W. C. and Schucker, H. (2000). *The Netw. Iter. Method* in L^AT_EX 2^E.

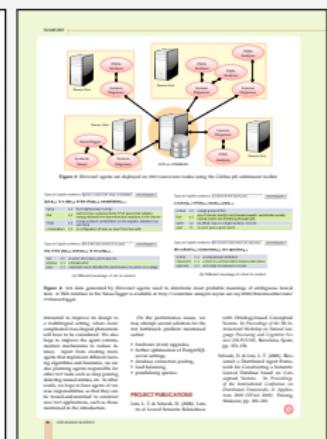
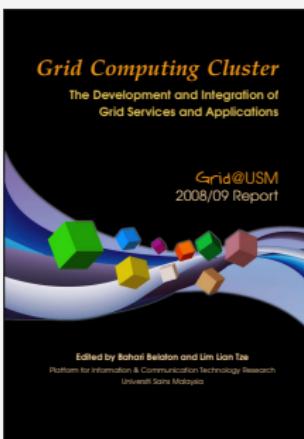
Robots, A. (2005). Getting to grips with L^AT_EX. [Online]. [Accessed January 22, 2010]. Available from World Wide Web: <http://www.aeub.es/~arobots/ctan/lite.html>

Song, J. Q., Cat, M., Lee, M. R. and Cat, X. (2002). A new approach for face recognition in large-scale images using local binarization. *Proceedings of the 30th International Conference on Pattern Recognition*, Vol. 3, pp. 33–36.

Highly Configurable Documents

memoir and KOMA-Script Classes

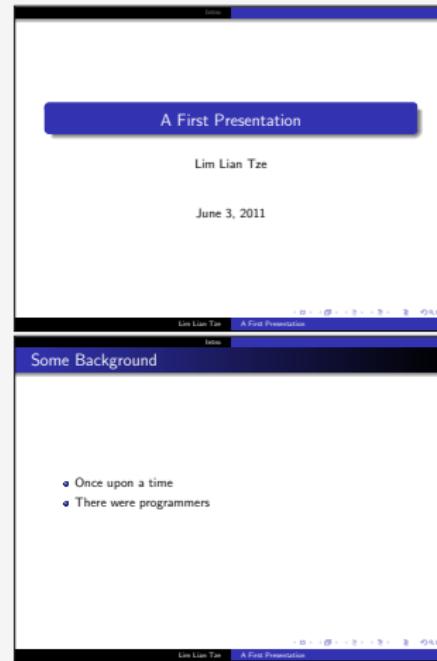
- Sectional headings
 - Running headers and footers
 - Good font, colour and illustration choices
 - <http://latex-my.blogspot.com/search/label/bookdesign>



Presentation Slides

- This presentation was made with LATEX!
- Many possible classes: powerdot, **beamer**

```
\documentclass{beamer}  
\usepackage{Warsaw}  
  
\author ...  
  
\begin{document}  
\titleframe  
  
\section{Intro}  
  
\begin{frame}  
\frametitle{Some Background}  
...  
\end{frame}  
\end{document}
```



Oversized Posters

- Many possible solutions:
sciposter, **flowfram**, **beamerposter**, **tikzposter**

```
\documentclass{beamer}
\usepackage[orientation=portrait,
           size=a0]{beamerposter}
\usestheme{...}
\author{... % Meta-information}

\begin{document}
\begin{frame}
... % Poster contents goes here
\end{frame}
\end{document}
```

Low-Cost Construction of a Multilingual Lexicon from Bilingual Lists

Introduction

- Bilingual MTs are good resources for building multilingual lexicons, but heterogeneous structures
- Lowest common denominator: list of source language item(s) → target language item(s)
- Proposal: Multilingual lexicon construction using only simple bilingual lists

One-time Inverse Consultation [1]

- Generates a bilingual lexicon for new language pair from existing bilingual lists
- JP-EN, EN-MS, MS-EN lexicons ⇒ JP-MS

Japanese English Malay Indonesian

JP EN MS ID

score('vera') = 2 × $\frac{|E| \cap |I|}{|E| + |I|} = 2 \times \frac{2}{3+4} = 0.57$

∴ 'vera' → **Indonesian most likely valid**

Merging Translation Triples into Sets

- (Example: Malay-English-Chinese)
- Retain GTC 'middle' language links
- For each 'head' language X, discuss triples with score < n.X or score < n.X where X = max score of all triples containing that L

Malay English Chinese

(grang, force, ⚡) 0.43 (grang, force, ⚡) 0.43

⋮

► Merge all triples with common bilingual pairs

(grang, force, ⚡) 0.43 (grang, force, ⚡) 0.43

(grang, force, ⚡) 0.43 (grang, force, ⚡) 0.43

(berlang, force, ⚡) 0.43 (berlang, force, ⚡) 0.43

Adding a New Language

- (Example: Malay-English-Chinese + French)
- Construct also French-English-Malay triples
- Add French members to existing M-E-C clusters with common English & Malay members

French Berlang Grang Garang

French Berlang Grang Garang

French Berlang Grang Garang

Precision of 100 Random Translation Sets

Precision generally around 0.70-0.82; max 0.86

F₁ and Rand Index of Selected Translation Sets

Test	Rand Index	F ₁	Best accuracy when used as middle		
Buridil	0.617	0.558	0.632 0.6	0.4	
Blanid	0.918	0.927	0.809 0.913	0.6	0.2
Bargidil	0.621	1.000	0.902 1.000	0.4	0.2
Berzelid	0.709	0.818	0.724 0.792	0.8	0.2

Discussion and Conclusion

- Low thresholds (α, β) → more coverage, low precision
- High thresholds: good precision, low coverage
- $\alpha = 0.4, \beta = 0.2$ gives good trade-off between coverage, precision and recall
- Results are encouraging for such simple input data!
- Future plan: Integrate lexicon into an MT system with WSD

References

[1] J. Bond and K. Ogura. "Combining linguistic resources to create a machine-tractable Japanese-Malay dictionary". In: *Language Resources and Evaluation* 35 (2001), pp. 157-168.

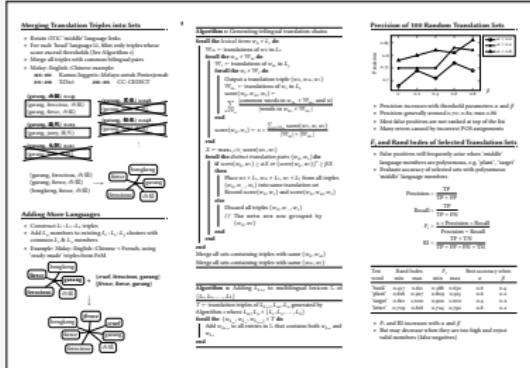
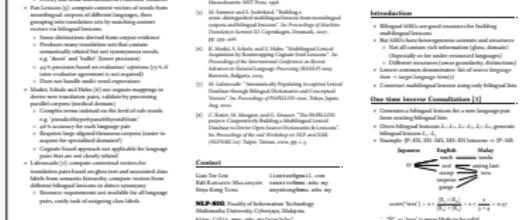
Lian Tze Lim Bali RANAVIO-MALANCON Eanya KONG TANG
liantze@gmail.com ranavio, eanyak@msm.sme.edu.my
 Faculty of Information Technology, Multimedia University, Malaysia

Leaflets

- **leaflet:** arrange contents into 6 pages on a foldable double-sided sheet

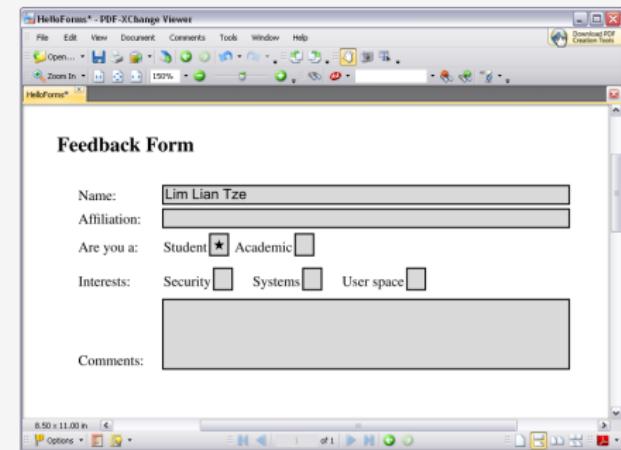
```
\documentclass[foldmark,a4paper]
{leaflet}
\author ... % Meta-information
```

```
\begin{document}
\maketitle
\section ...
... % Leaflet contents
\end{document}
```



Fillable PDF Forms

```
\usepackage{hyperref}  
... % various settings skipped  
\TextField{Name:{}\\  
\TextField{Affiliation:{}\\  
\ChoiceMenu[radio=true]  
{Are you a:}{Student, Academic}\\  
Interest:  
\CheckBox{Security}  
\CheckBox{Systems}  
\CheckBox{User space}\\  
\TextField[multiline=true]  
{Comments:{}\\
```



Fillable PDF Forms (cont'd)

Use with caution!

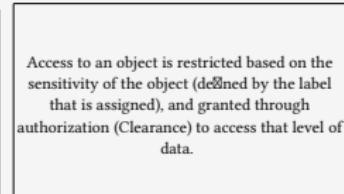
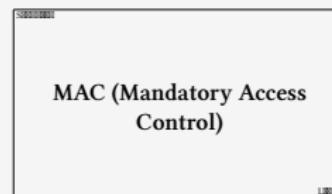
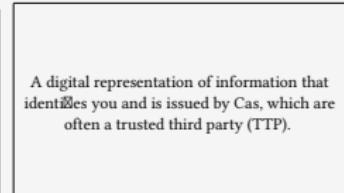
- poppler-based viewers (evince, xpdf, okular)
 - Problem displaying and saving radio/check boxes correctly
 - Saved forms can't be opened by other viewers
- Adobe Reader
 - Cannot save filled form as PDF unless Acrobat is installed
 - Only as field-and-value text file
 - Can provide "Submit" button for submission to a URL
 - Or print hard copy of filled form!
- PDF XChange Viewer
 - Best freeware for filling and saving LATEX-created forms
 - Windows only
 - Not OSS

Flash Cards

```
\documentclass[avery5388,frame]{flashcards}
\cardfrontstyle{headings}
\cardfrontfoot{Linux}

\begin{document}
\begin{flashcard}[Security]
{Certificate}
...
\end{flashcard}

\begin{flashcard}[Security]
{MAC ...}
...
\end{flashcard}
\end{document}
```



Examination Paper

```
\documentclass{exam}
```

```
...
\begin{questions}\printanswers
\question[5]
What is Paul McCartney's middle name?
\begin{oneparchoices}
\choice John \CorrectChoice Paul
\choice Ringo \choice James
\end{oneparchoices}
```

```
\question[10] What was the Beatles' first
↪ single in 1962?
```

```
\begin{solution}Love Me Do\end{solution}
```

```
\question
\begin{parts}
\part[5] What was George's inspiration for
↪ `While My Guitar Gently Weeps'?
```

```
\begin{solution}
He opened a random book and saw the words
↪ ``gently weep''.
```

```
\end{solution}
...
\end{questions}
```

1. What is Paul McCartney's middle name? (5)
A. John **B. Paul** C. Ringo D. James
2. What was the Beatles' first single in 1962? (10)

Solution: Love Me Do

3. (a) What was George's inspiration for 'While My Guitar Gently Weeps'? (5)

Solution: He opened a random book and saw the words "gently weep".

- (b) Who guest-performed for the song and why? (5)

Solution: Eric Clapton; he wanted a spiffy guitar solo.

Contents

1 What are TeX, LATEX and Friends?

2 Document Types

3 Special Material

4 Wrapping Up

Mathematics

(1) relates the golden ratio and the Fibonacci series.

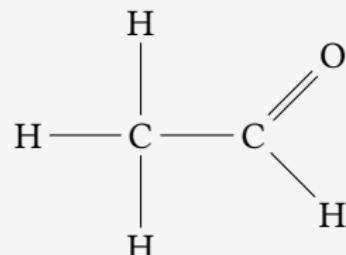
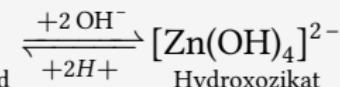
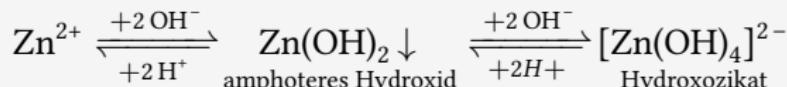
Recall that the golden ratio, $\varphi = \frac{1}{2}(1 + \sqrt{5})$.

$$\varphi = 1 + \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{F_n F_{n+1}} \quad (1)$$

`\eqref{eq:gratio}` relates the golden ratio and the Fibonacci series.
Recall that the golden ratio, $\$ \varphi = \frac{1}{2}(1 + \sqrt{5}) \$$.

```
\begin{equation}\label{eq:gratio}
\varphi = 1 + \sum^{\infty}_{n=1} \frac{(-1)^{n+1}}{F_n F_{n+1}}
\end{equation}
```

Chemical Equations and Molecules



```
\usepackage[version=3]{mhchem}      % sufficient for chemical equations
\usepackage{chemfig}      % for 2-D molecule drawings
...
\ce{Zn^2+ <=>[\ce{+ 2OH-}][\ce{+ 2H+}]}
$ \underset{\text{amphoteres Hydroxid}}{\text{\ce{Zn(OH)2 v}}} $ 
<=> \text{C}[+2\text{OH-}][+\text{2H+}]
$ \underset{\text{Hydroxozikat}}{\text{\cf{[Zn(OH)4]^2-}}} $ }

\chemfig{H-C(-[2]H)(-[6]H)-C(-[7]H)=[1]O}
```

Linguistics

- (1) %^{*}Wen liebt seine Mutter?
 Whom loves his mother
 'Who does his mother'

```
\usepackage{linguex,qtree}
```

```
...
```

```
\ex
```

```
\begin{gl
```

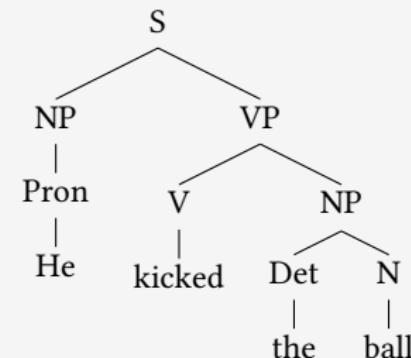
```
\gla \%*Wen liebt seine Mutter?//
```

```
\glb Whom loves his mother//
```

```
\glc `Who does his mother love?'//
```

```
\endgl
```

```
\xe
```



```
\usepackage{qtree}
```

```
...
```

```
\Tree [.S [.NP [.Pron He ] ] [.VP
    \Tree [.V kicked] [.NP [.Det the] [.N ball]]]]]
```

Program Listings

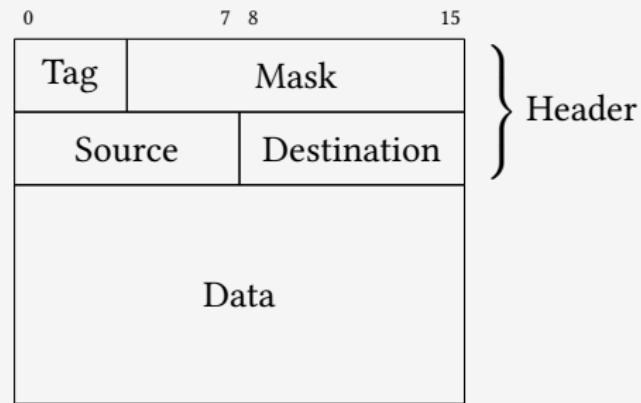
```
\usepackage{listings,xcolor}
...
\begin{lstlisting}
[language=C,columns=fullflexible,
 basicstyle=\ttfamily,
 keywordstyle=\bfseries\color{red},
 commentstyle=\sffamily\color{green},
 stringstyle=\rmfamily\color{orange}]
#include <stdio.h>
/*
 | Prints "hello world"
 */
int main(void)
{
    printf("hello, world\n");
    return 0;
}
\end{lstlisting}
```

```
#include <stdio.h>

/*
 | Prints "hello world"
 */
int main(void)
{
    printf("hello, world\n");
    return 0;
}
```

Network Protocols

```
\usepackage{bytefield}
...
\begin{bytefield}{16}
\bitheader{0,7,8,15} \\
\begin{rightwordgroup}{Header}
\bitbox{4}{Tag} & \bitbox{12}{Mask} \\
\bitbox{8}{Source} &
\bitbox{8}{Destination}
\end{rightwordgroup} \\
\wordbox{3}{Data}
\end{bytefield}
```



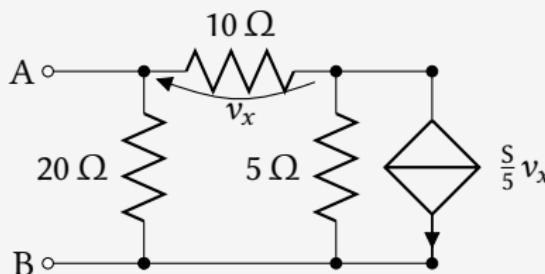
Life Sciences

	<i>first case (see text)</i>	
AQP1.PRO	TLGLLLS CQISI LRAV MYIIIAQC VGAI VASAIL	112
AQP2.PRO	TVACLVGCHVSFLRAAFYVAAQLLGAVAGAAIL	104
AQP3.PRO	TFAMCFLAREPWIKLPIYTLAQTLGAFLGAGIV	112
AQP4.PRO	TVAMVCTRKISIAKSVFYITAQCLGAIIGAGIL	133
AQP5.PRO	TLALLIGNQISLLRAVFYVA AOLVGAIAGAGIL	105

↓
second case (see text)
 ↑

```
\usepackage{texshade} % for nucleotide and peptide alignments
...
\begin{texshade}{AQPPro.MSF.txt}
\shadingmode{similar}
\threshold[80]{50}
\setends{1}{80..112}
\hideconsensus
\feature{top}{1}{93..93}{fill:$\downarrow$}{first case (see text)}
\feature{bottom}{1}{98..98}{fill:$\uparrow$}{second case (see text)}
\end{texshade}
```

Circuits and SI Units



- $3.45 \times 10^4 \text{ V}^2 \text{ lm}^3 \text{ F}^{-1}$
- 40 km/h, 85 km/h and 103 km/h

```
\usepackage{siunitx}
\usepackage[siunitx]{circuitikz}
...
\begin{circuitikz}
\draw (0,0) node[anchor=east] {B}
    to[short, o-*] (1,0)    to[R=20<\ohm>, *-*] (1,2)
    to[R=10<\ohm>, v=$v_{\mathrm{x}}$] (3,2) -- (4,2)
    to[ cI=$\frac{\mathrm{siemens}}{5}$ v_x$, *-*] (4,0) -- (3,0)
    to[R=5<\ohm>, *-*] (3,2)
    (3,0) -- (1,0)    (1,2) to[short, -o] (0,2) node[anchor=east]{A}
\end{circuitikz}

\SI{3.45d4}{\squarevolt\cubiclumen\per\farad}
\SILIST[per-mode=symbol]{40;85;103}{\kilo\metre\per\hour}
```

Meh, What Good is That? Can't Use it Anywhere Else.

Actually, you can.

```
\usepackage[active,tightpage]{preview}
\PreviewEnvironment{texshade}
...
\begin{texshade}
...
\end{texshade}
```

- Run pdflatex → cropped PDF containing *only* contents of texshade
- ImageMagick: convert -depth 150 texshade.pdf texshade.png
- Multiple environments → multi-page PDF and multiple PNGs

Bar Codes



9 781860 742712 >

ISBN 978-3-86541-114-3



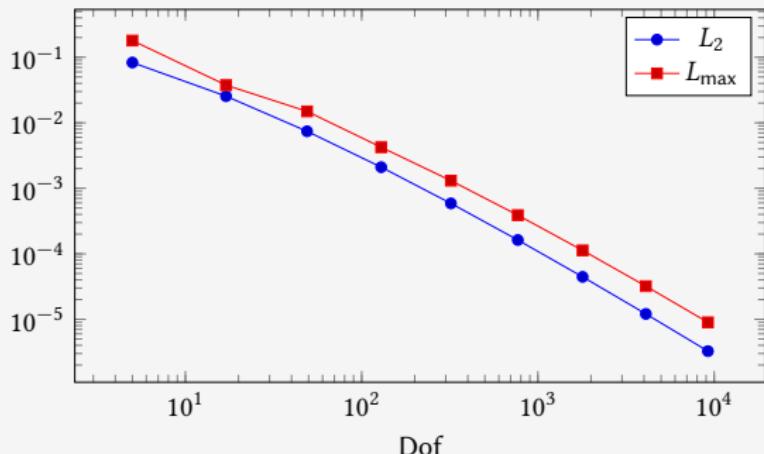
9 783865 411143 >

LE28HS9Z



```
\usepackage{auto-pst-pdf} % Needed if running pdflatex; must use option -shell-escape
\usepackage{pstricks,pst-barcode}
...
\begin{pspicture}
\psbarcode{MECARD:N:Malaysia Open Source Conference...}{eclevel=L}{qrcode}
\psbarcode{9781860742712}{includetext guardwhitespace}{ean13}
\psbarcode{978-3-86541-114}{includetext guardwhitespace}{isbn}
\psbarcode{LE28HS9Z}{includetext}{royalmail}
\psbarcode{^453^178^121^239}{columns=2 rows=10}{pdf417}
\end{pspicture}
```

Graph Plots



```
\usepackage{pgfplots}
...
\begin{tikzpicture}
\begin{loglogaxis}[ xlabel=Dof]
\addplot table[x=dof,y=L2]{datafile.dat}; \addlegendentry{$L_2$};
\addplot table[x=dof,y=Lmax]{datafile.dat}; \addlegendentry{$L_{\max}$};
\end{loglogaxis}
\end{tikzpicture}
```

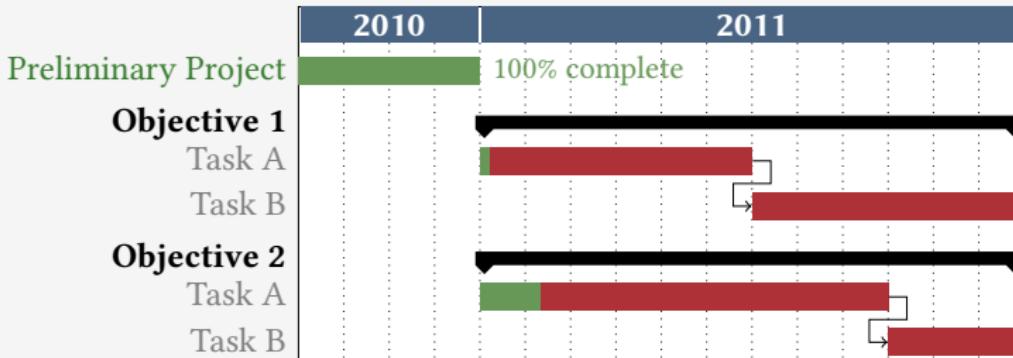
Spreadsheets

(Seriously, use a proper spreadsheet application for complex stuff.)

Year ending Mar 31	2009	2008	2007
Revenue	14580.20	11900.40	8290.30
Cost of sales	6740.20	5650.10	4524.20
<i>Gross profit</i>	7840.00	6250.30	3766.10

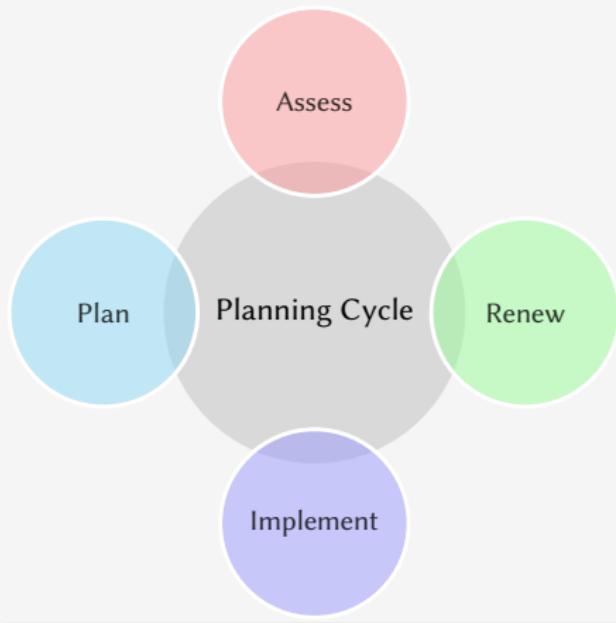
```
\STautoround*{2}
\begin{spreadtab}{{\tabular}{l rrr}}
@Year ending Mar 31 & @2009 & @2008 & @2007\\ \hline
@Revenue & 14580.2 & 11900.4 & 8290.3\\
@Cost of sales & 6740.2 & 5650.1 & 4524.2\\ \cline{2-4}
@\emph{Gross profit} & \STcopy{>}{\b2-\b3} & & \cline{2-4}
\end{spreadtab}
```

Gantt Charts

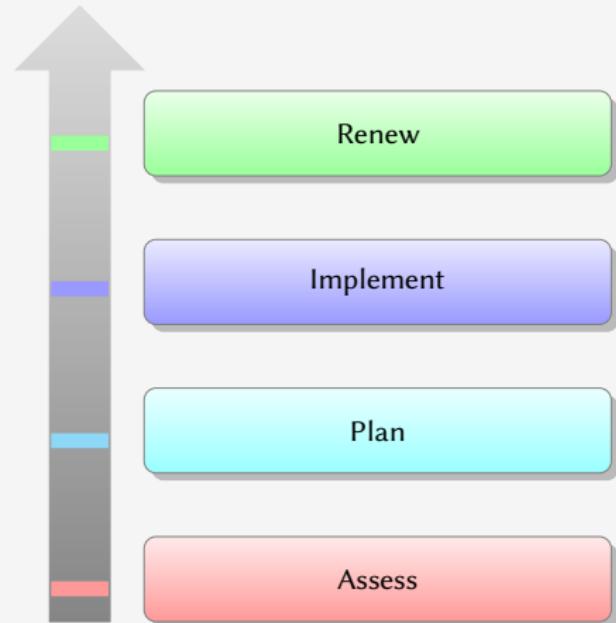


```
\usepackage{pgfgantt}
...
\begin{ganttchart}[...settings...]{1}{16}
\gantttitle{2010}{4} \gantttitle{2011}{12} \\
\ganttbar[progress=100]{Preliminary Project}{1}{4} \\
\ganttgroup{Objective 1}{5}{16} \\
\ganttbar[progress=4, name=T1A]{Task A}{5}{10} \\
\ganttlinkedbar[progress=0]{Task B}{11}{16} \\
...
\end{ganttchart}
```

'Smart Diagrams'



```
\usepackage{smartdiagram}
\smartdiagram[bubble diagram]{
    Planning Cycle, Assess, Plan,
    Implement, Renew}
```

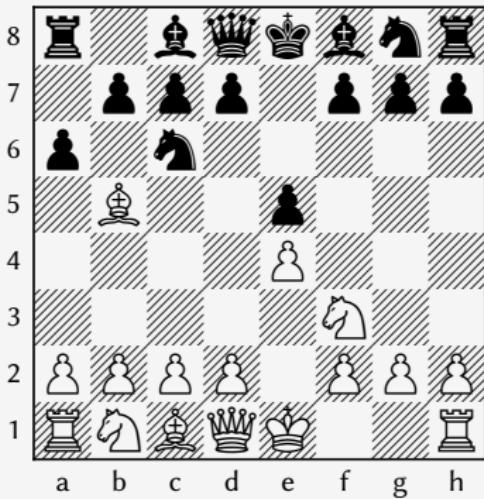


```
\usepackage{smartdiagram}
\smartdiagram
    [priority descriptive diagram]{
        Assess, Plan, Implement, Renew}
```

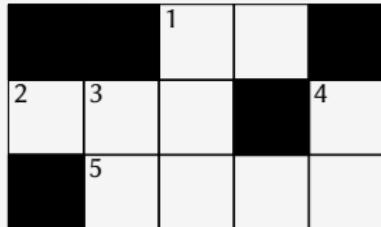
Chess games

1 e4 e5 2 Nf3 Nc6 3 Bb5 a6

```
\usepackage[skaknew]{  
skak, chessboard}  
...  
\newgame  
\mainline{1. e4 e5 2. Nf3 Nc6 3.  
→Bb5 a6}  
\chessboardboard
```



Crossword Puzzles



Across: 1 unit of measure
2 * 5 sectioning unit

Down: 1 η 3 unit of measure
4 nonproportional font

```
\usepackage{cwpuzzle}
...
\begin{Puzzle}{5}{3}
|* |* |[1]E|X |* |.
|[2]A|[3]S|T |* |[4]T|.
|* |[5]P|A |R |T |.
\end{Puzzle}
\begin{PuzzleClues}%
\textbf{Across:} %
\Clue{1}{EX}{unit of measure}
\Clue{2}{AST}{\(\ast\)}
\Clue{5}{PART}{sectioning unit}
\end{PuzzleClues}
\begin{PuzzleClues}%
\textbf{Down:} %
\Clue{1}{ETA}{\(\eta\)}
\Clue{3}{SP}{unit of measure}
\Clue{4}{TT}{nonproportional font}
\end{PuzzleClues}
```

Song Books with Guitar Tabs



C



G



Am



F

Country road, take me home, to the place I belong.



C



G



F



C

West Virginia, mountain momma, take me home, country road.

```
\usepackage{gchords,guitar}
...
\begin{guitar}
\newcommand{\CMaj}{\chord{t}{n,p3,p2,n,p1,n}{C}}
\newcommand{\Amin}{...}
Country [\CMaj]road, take me [\GMaj]home, ...
\end{guitar}
```

Contents

1 What are TeX, LATEX and Friends?

2 Document Types

3 Special Material

4 Wrapping Up

Summary

- LATEX

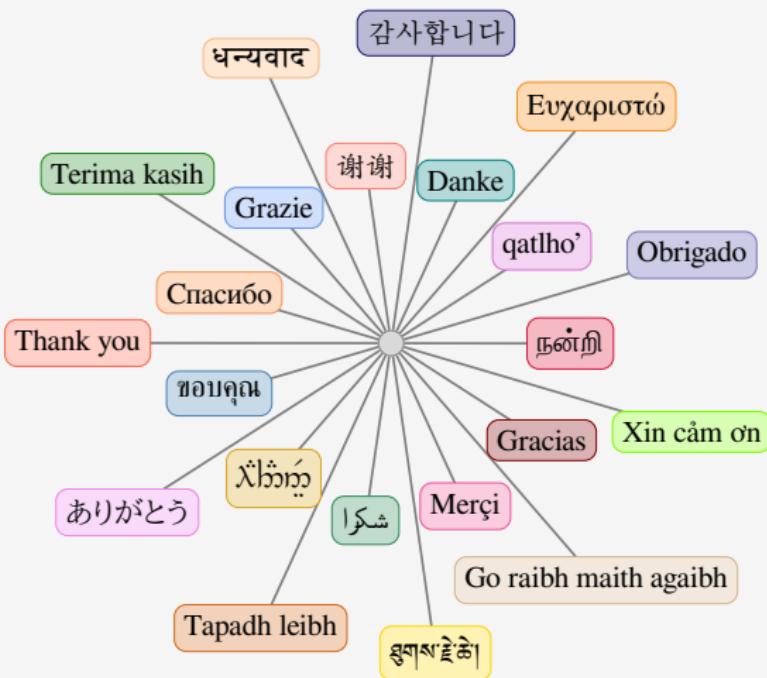
- a document preparation system
 - professional quality typesetting output

- Output artefacts

- Academic: papers, theses, books
 - Dedicated document types
 - Domain-specific material

- Usage scenario

- Direct authoring
 - Automatic generation (via scripts etc)
 - As back-end of other applications



Questions?

lianze@gmail.com, support@overleaf.com
<http://tex.stackexchange.com>

Want to download this deck?

