

# L<sup>A</sup>T<sub>E</sub>X: More Than Just Academic Papers and Theses

(FIRST PRESENTED AT MOSC2011)



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<http://liantze.penguinattack.org>

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Illustration by Duane Bibby

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- 1 What are T<sub>E</sub>X, L<sup>A</sup>T<sub>E</sub>X and Friends?
- 2 Document Types
- 3 Special Material
- 4 Wrapping Up

# Contents

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1 What are T<sub>E</sub>X, L<sup>A</sup>T<sub>E</sub>X and Friends?

2 Document Types

3 Special Material

4 Wrapping Up

# What are T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X, and Friends?

## T<sub>E</sub>X

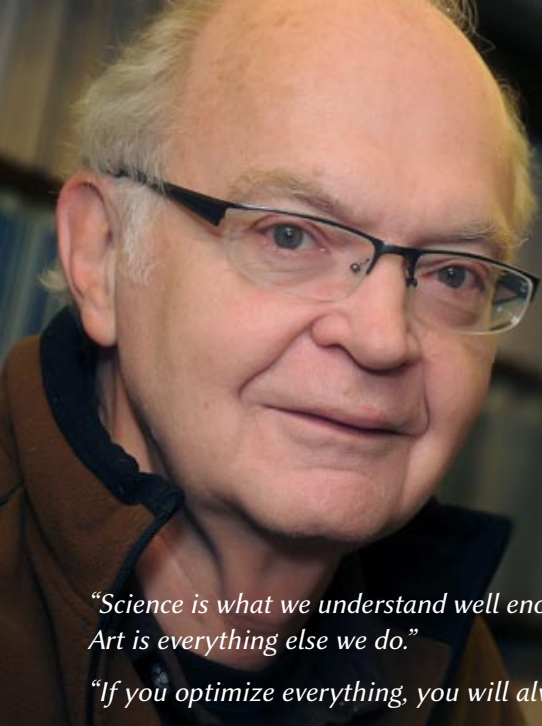
- From Greek  $\tau\epsilon\chi$
- ASCII TeX, /tex/, /tek/
- A **computer typesetting system** created by Donald Knuth
- for ‘the creation of beautiful books’

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

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

## Friends

- BibT<sub>E</sub>X, MakeIndex, METAFONT, METAPOST, ...
- [http://www.ctan.org/what\\_is\\_tex.html](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”

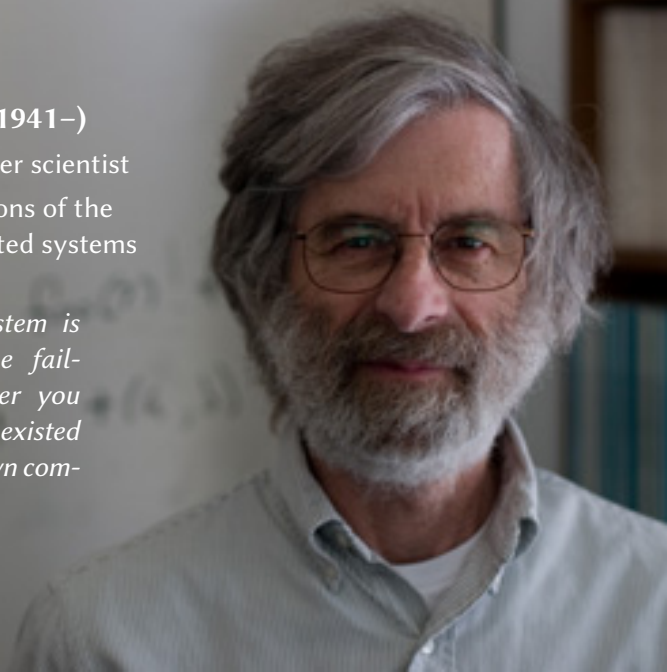
*“Science is what we understand well enough to explain to a computer.  
Art is everything else we do.”*

*“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.”*

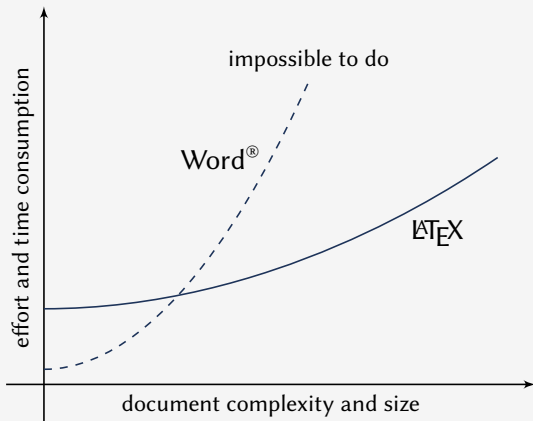


# Typesetting and Word Processing

## 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)

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

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

## This is not a Word Processors vs L<sup>A</sup>T<sub>E</sub>X 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 L<sup>A</sup>T<sub>E</sub>X 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}
    
```

pdf<sub>l</sub>at<sub>e</sub>x



An Introductory Paper

Lim Lian Tze  
June 7, 2011

**Contents**

<b>1</b>	Introduction	1
<b>2</b>	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...

1

# Where Do I Get It?

**Online** Overleaf ([www.overleaf.com](http://www.overleaf.com))

**Windows** MikT<sub>E</sub>X, T<sub>E</sub>X Live

**Un\*x, GNU/Linux** T<sub>E</sub>X Live

**Mac OS X** MacT<sub>E</sub>X (based on T<sub>E</sub>X Live)

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

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

**L<sup>A</sup>T<sub>E</sub>X Packages** Use MikT<sub>E</sub>X or T<sub>E</sub>X Live's package manager

**Documentation** (Online) <http://texdoc.net/pkg/<packagename>>  
(T<sub>E</sub>X Live) \$ texdoc <package name>  
(MikT<sub>E</sub>X) \$ 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**

# So, What Can LaTeX Do?

# Contents

---

1 What are T<sub>E</sub>X, L<sup>A</sup>T<sub>E</sub>X and Friends?

2 Document Types

3 Special Material

4 Wrapping Up



# Basic Types

## Books

```

\documentclass{book}

\author{...}

\title{...}

\begin{document}

\maketitle

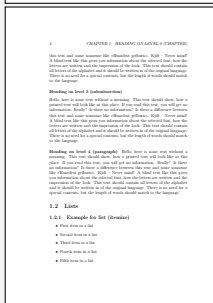
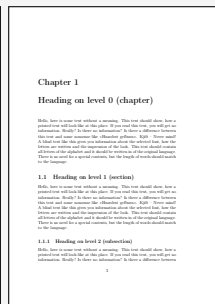
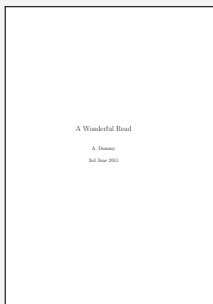
\chapter{...}

\section{...}

...

\subsection{...}

\end{document}
    
```



# Basic Types (cont'd)

## Articles

```
\documentclass{article}
```

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

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

```
\begin{document}
```

```
\maketitle
```

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

```
...
```

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

```
\end{document}
```

### A Wonderful Read

A. Dimsay  
2nd June 2011

#### 1 Heading on level 1 (section)

Hi!s, here is some text without a section. This text should have a general text will look like at this place. If you read this text, you will get an information. Really? Is there an information? Is there a difference between the text and some content like (theoretical problems). Right. There is! A link text like this gives you information about the selected text, how the letters are written and the appearance of the link. This text should contain all letters of the alphabet and it should be written in the original language. There is a word for a special content, but the length of words should match to the language.

#### 1.1 Heading on level 2 (subsection)

Hi!s, here is some text without a section. This text should have a general text will look like at this place. If you read this text, you will get an information. Really? Is there an information? Is there a difference between the text and some content like (theoretical problems). Right. There is! A link text like this gives you information about the selected text, how the letters are written and the appearance of the link. This text should contain all letters of the alphabet and it should be written in the original language. There is a word for a special content, but the length of words should match to the language.

#### 1.1.1 Heading on level 3 (subsubsection)

Hi!s, here is some text without a section. This text should have a general text will look like at this place. If you read this text, you will get an information. Really? Is there an information? Is there a difference between the text and some content like (theoretical problems). Right. There is! A

1

A link text like this gives you information about the selected text, how the letters are written and the appearance of the link. This text should contain all letters of the alphabet and it should be written in the original language. There is a word for a special content, but the length of words should match to the language.

**Heading on level 4 (paragraph)** Hi!s, here is some text without a section. This text should have a general text will look like at this place. If you read this text, you will get an information. Really? Is there an information? Is there a difference between the text and some content like (theoretical problems). Right. There is! A link text like this gives you information about the selected text, how the letters are written and the appearance of the link. This text should contain all letters of the alphabet and it should be written in the original language. There is a word for a special content, but the length of words should match to the language.

## 2 Lists

### 2.1 Example for list (enumerate)

- 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 (Powerset)

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

2

### 2.2 Example for list (multicols)

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

### 2.2.1 Example for list (Powerset)

1. First item in a list
  - (a) First item in a list
  - (b) First item in a list
  - (c) Second item in a list
  - (d) Second item in a list
2. Second 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

### 2.3.1 Example for list (Powerset)

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

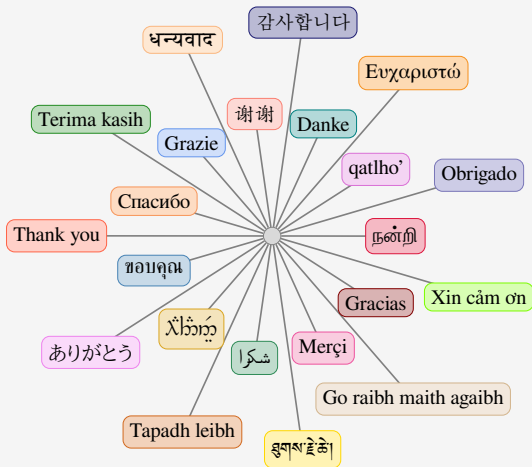
3

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

4



# Multilingual LaTeX



X<sub>Y</sub>LaTeX, LuaLaTeX Unicode input

LaTeX Various packages (sometimes with transcriptions: nan<sup>^</sup>ri, salAm)

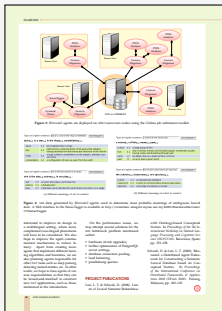
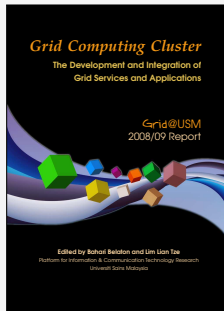
## Universiti Sains Malaysia \documentclass{usmthesis}

<p>WRITING YOUR THESIS WITH L<sup>A</sup>T<sub>E</sub>X</p> <p>by</p> <p><b>LIM LIAN TZE</b></p> <p>Thesis submitted in fulfillment of the requirements for the degree of Master of Science</p> <p>December 2007</p>	<p><b>TABLE OF CONTENTS</b></p> <p>Acknowledgements ..... iii</p> <p>Table of Contents ..... iii</p> <p>List of Tables ..... iv</p> <p>List of Figures ..... iv</p> <p>List of Plates ..... iv</p> <p>List of Abbreviations ..... viii</p> <p>List of Symbols ..... ix</p> <p>Abstract ..... x</p> <p>Abstract ..... xi</p> <p><b>CHAPTER 1 – INTRODUCTION: SAMPLES OF BASIC L<sup>A</sup>T<sub>E</sub>X COMMANDS</b></p> <p>1.1 Basic Single Command Usage ..... 1</p> <p>1.2 Special Characters ..... 3</p> <p>1.3 Double Backslash ..... 4</p> <p><b>CHAPTER 2 – CITATIONS AND BIBLIOGRAPHY</b></p> <p>2.1 The “bib” file ..... 5</p> <p>2.2 Creating using the workfile package ..... 6</p> <p>2.2.1 Author Year System ..... 6</p> <p>2.2.2 Numeric System ..... 7</p> <p><b>CHAPTER 3 – FIGURES, TABLES, EQUATIONS, ALGORITHMS, ETC</b></p> <p>3.1 Inserting Figures ..... 8</p> <p>3.2 Inserting Tables ..... 12</p> <p>3.3 Inserting Tables ..... 12</p> <p style="text-align: center;">iii</p>	<p><b>CHAPTER 1</b></p> <p><b>INTRODUCTION: SAMPLES OF BASIC L<sup>A</sup>T<sub>E</sub>X COMMANDS</b></p> <p>The book and software, <i>Writing Your Thesis with L<sup>A</sup>T<sub>E</sub>X</i> (WYTL) research program<sup>1</sup>. The book and software package and template files were written in the hope that they may help you prepare your research thesis using L<sup>A</sup>T<sub>E</sub>X, based on the <i>LaTeX Project Source</i> (L<sup>A</sup>T<sub>E</sub>X) components (L<sup>A</sup>T<sub>E</sub>X 2007). <b>Please note that this version is based on the new guidelines, to issue 07 Dec 2007 onwards.</b> (Using C<sub>1</sub> Typo and C<sub>1</sub> 2007)</p> <p>L<sup>A</sup>T<sub>E</sub>X 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 (<a href="mailto:liantze@usm.my">liantze@usm.my</a>). The author cannot always guarantee prompt responses, however.</p> <p>MSL<sup>A</sup>T<sub>E</sub>X, my recommended L<sup>A</sup>T<sub>E</sub>X distribution for Windows, is available on the C<sub>1</sub>PDFTEX. A step-by-step installation walkthrough is available at (<a href="http://liantze.usm.my">Lian, 2009</a>).</p> <p><b>1.1 Basic Single Command Usage</b></p> <p>There are plenty of new L<sup>A</sup>T<sub>E</sub>X research codes, some of which are listed in the table. Templates are available at <a href="http://liantze.usm.my">http://liantze.usm.my</a>. This template includes some examples to do some common tasks. We start with some examples for the first (table) but</p> <p style="text-align: center;">1</p>	<p><b>REFERENCES</b></p> <p>Changchun, X., Wang, J., Lu, L. and Zhang, Y. (2005). A novel framework for automatic annotation and grammatical correction of open tables. <i>Mathematics, 2005</i>. Document no. 05-11, 221-226.</p> <p>D’Orazio, T., Lee, M., Spagnolo, P., Marano, P. L., Minna, N., Nink, M. and Di Stefano, A. (2009). An investigation into the feasibility of real-time remote office education from a multiplatform system. <i>IEEE TRANSACTIONS ON SYSTEMS AND CYBERNETICS: AN INTERNATIONAL JOURNAL</i> 39(10), 2088-2094.</p> <p>D’Orazio, T., Lee, M., Spagnolo, P., Nink, M., Minna, N. and Di Stefano, A. (2009). A virtual system for real-time education of global students during remote sessions. <i>Computer Vision and Image Understanding</i> 113(3), 422-432. Computer Vision World, Hyderabad in India.</p> <p>IEEE. <a href="http://www.ieee.org/conferences_standards/publications/rights_center.html">http://www.ieee.org/conferences_standards/publications/rights_center.html</a>. IEEE, 452-453.</p> <p>IPS (2007). <i>A Guide to the Preparation, Submission and Examination of Thesis</i>, Institute of Distance Studies, Universiti Kebangsaan Malaysia, Putrajaya, Malaysia.</p> <p>Lian, L. T. (2009). <i>MSL<sup>A</sup>T<sub>E</sub>X: Beautifully Formatting (Tables)</i> [Unpublished January 22, 2009]. Available from World Wide Web: <a href="http://www.usm.my/liantze/mstlathesis/">http://www.usm.my/liantze/mstlathesis/</a></p> <p>Mishchenko, P., Gerasimov, M., Buzanov, I., Cuffield, D. and Rowley, C. (2004). <i>The L<sup>A</sup>T<sub>E</sub>X Companion</i>. Addison Wesley, Boston, MA, USA.</p> <p>O’Reilly, T., Pratt, H., Horen, J. and Walke, R. (2006). <i>The Way to LaTeX Introduction</i>. No Starch Press, CA, USA.</p> <p>Rubinfeld, A. (2005). <i>Getting to grips with L<sup>A</sup>T<sub>E</sub>X (Tables)</i> [Unpublished January 22, 2011]. Available from World Wide Web: <a href="http://www.usm.my/liantze/mstlathesis/">http://www.usm.my/liantze/mstlathesis/</a></p> <p>Song, J. Q., Cai, M., Luo, M. R. and Cao, S. J. (2002). A new approach for line recognition in large size images using rough methods. <i>Proceedings of the 2002 International Conference on Pattern Recognition</i>, Vol. 1, pp. 39-46.</p> <p style="text-align: center;">22</p>
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# 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`

```

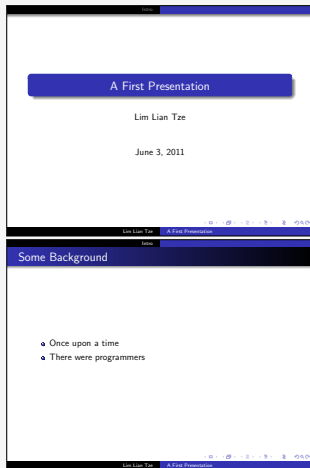
\documentclass{beamer}
\usetheme{Warsaw}

\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}
\usetheme{...}
\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 lists are good resources for building multilingual lexicons, but heterogeneous structures
- Lowest common denominator: list of source language item → 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-DN lexicons ⇒ JP-MS

Example:  $\text{score}(\text{'tera'}) = 2 \times \frac{|\{E, \{E, E\}\}|}{|\{E, \{E, E\}\}| + 2} = 2 \times \frac{2}{3+4} = 0.57$   
 $\therefore \text{'99'} \leftrightarrow \text{'tera'}$  is most likely valid

**Merging Translation Triples into Sets**

- Example: Malay-English-Chinese
- Retain OTIC 'middle' language links
- For each 'head' language L, discard triples with score <  $\alpha X$  or score <  $\beta Y$ , where  $X = \text{max score of all triples containing that L}$

**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

**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 word	Rand Index		F1		Best accuracy when	
	min	max	min	max	$\alpha$	$\beta$
'bank'	0.417	0.411	0.538	0.432	0.6	0.4
'plant'	0.819	0.827	0.800	0.913	0.6	0.2
'target'	0.821	1.000	0.922	1.000	0.4	0.2
'tercer'	0.709	0.818	0.724	0.792	0.8	0.2

**Discussion and Conclusion**

- Low thresholds ( $\alpha, \beta$ ): more coverage, low precision
- High thresholds: good precision, low coverage
- $\alpha = 0.6, \beta = 0.2$  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] E. Baud & K. Ogino. "Combining linguistic resources to create a machine tractable Japanese-Malay dictionary". In: *Language Resources and Evaluation 42* (2008), pp. 127-136.

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 Faculty of Information Technology, Universiti Kebangsaan 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}
    
```

**References**

- 1. Lee, H. (2010). *Leaflet: A new LaTeX class for creating leaflets*. Retrieved from <http://www.ctan.org/tex/latex/leaflet/leaflet.dtx>
- 2. Lee, H. (2010). *Leaflet: A new LaTeX class for creating leaflets*. Retrieved from <http://www.ctan.org/tex/latex/leaflet/leaflet.dtx>

**Meta-Work**

- 1. Lee, H. (2010). *Leaflet: A new LaTeX class for creating leaflets*. Retrieved from <http://www.ctan.org/tex/latex/leaflet/leaflet.dtx>
- 2. Lee, H. (2010). *Leaflet: A new LaTeX class for creating leaflets*. Retrieved from <http://www.ctan.org/tex/latex/leaflet/leaflet.dtx>

**References**

- 1. Lee, H. (2010). *Leaflet: A new LaTeX class for creating leaflets*. Retrieved from <http://www.ctan.org/tex/latex/leaflet/leaflet.dtx>
- 2. Lee, H. (2010). *Leaflet: A new LaTeX class for creating leaflets*. Retrieved from <http://www.ctan.org/tex/latex/leaflet/leaflet.dtx>

**Meta-Work**

- 1. Lee, H. (2010). *Leaflet: A new LaTeX class for creating leaflets*. Retrieved from <http://www.ctan.org/tex/latex/leaflet/leaflet.dtx>
- 2. Lee, H. (2010). *Leaflet: A new LaTeX class for creating leaflets*. Retrieved from <http://www.ctan.org/tex/latex/leaflet/leaflet.dtx>

**Low-Cost Construction of a Multilingual Lesson from Bilingual Lists**

Lian Tze Lim  
 EdS, EdM, EdD, EdS  
 MLP-ERG, Faculty of Education Technology  
 Multimedia University, Malaysia

**Introduction**

- Bilingual lists are good resources for building multilingual lessons
- But still have limitations and issues
- Difficult to create good quality multilingual lessons
- Lesson construction is not straightforward
- Construct multilingual lessons using only bilingual lists

**How to Access Contributions [1]**

- Construct multilingual lessons from a bilingual list
- Construct multilingual lessons from a bilingual list

**Impact**

Impact	English	Malay
Number of lessons	10	10
Number of pages	10	10
Number of words	10	10
Number of images	10	10

100% = 100% = 100% = 100%

\*100% = 100% = 100% = 100%

**Merging Translation Triples into Sets**

- Remove (1,2) words' language links
- Use word 'tree' to merge words into sets
- Merge all words into one set
- Merge all words into one set

**Adding More Languages**

- Extend (1,2) to (1,2,3)
- Add (3) words to existing (1,2) sets with common 1, 2, & 3, members
- Example: Malay, English, Chinese + French using word 'tree'

**Algorithm for Building Sets**

Algorithm for building sets in multilingual lessons

Algorithm for building sets in multilingual lessons

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**Precision of 100 Random Translation Sets**

Precision increases with word count and number of languages

Precision generally around 0.5 - 0.6

More data points are not added at top of list

More common words are added at top of list

More common words are added at top of list

# 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:}\

```

The screenshot shows a PDF viewer window titled "HelloForms - PDF-XChange Viewer". The form displayed is titled "Feedback Form" and contains the following fields:

- Name:
- Affiliation:
- Are you a:  Student  Academic
- Interests:  Security  Systems  User space
- Comments:

The viewer interface includes a menu bar (File, Edit, View, Document, Comments, Tools, Window, Help), a toolbar with navigation and zoom controls, and a status bar at the bottom showing "6.50 x 11.00 in" and "1 of 1" pages.

# 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}

```

<div style="text-align: center;"> <small>Security</small>   <b>Certificate</b>   <small>Linux</small> </div>	<p>A digital representation of information that identifies you and is issued by Cas, which are often a trusted third party (TTP).</p>
<div style="text-align: center;"> <small>Security</small>   <b>MAC (Mandatory Access Control)</b>   <small>Linux</small> </div>	<p>Access to an object is restricted based on the sensitivity of the object (defined by the label that is assigned), and granted through authorization (Clearance) to access that level of data.</p>

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

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

**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, `\$ \phi = \frac{1}{2} (1 + \sqrt{5}) \$`.

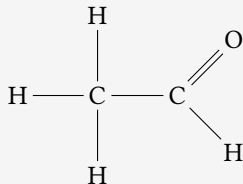
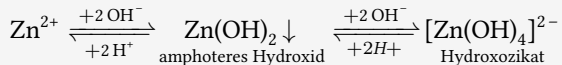
`\begin{equation}\label{eq:gratio}`

`\phi = 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+ <=>[+ 2OH-][+ 2H+]}
```

```
\underset{\text{amphoterer Hydroxid}}{\ce{Zn(OH)2 v}}$
```

```
<=> C[+2OH-][+ 2H+]
```

```
\underset{\text{Hydroxozikat}}{\cf{[Zn(OH)4]^2-}}$ }
```

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

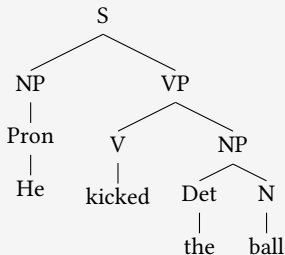
# Linguistics

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

```

\usepackage{linguex, qtree}
...
\ex
\beginl
\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 [ .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;
}

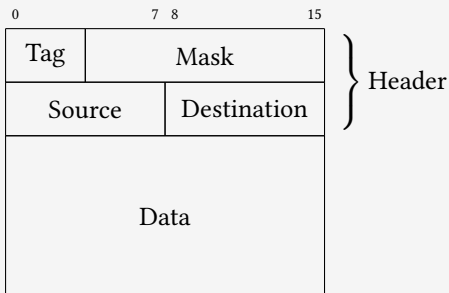
```

# 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

*first case (see text)*

AQP1.PRO	TLGLLLS	COISILRAVMYII	QAQCVGAI	VASAIL	112
AQP2.PRO	TVACL	VGCHVSFLRAAFYV	AAQL	LGAVAGAA	104
AQP3.PRO	TFAMCFLAREPW	IKLPIYITL	AQTLGAFL	GAGIV	112
AQP4.PRO	TVAMV	CTRKISIAKSVFYIT	QAQCLGAI	IAGIL	133
AQP5.PRO	TLALLI	GNQISLLRAVFYV	AAQL	LVGAIAGAGIL	105

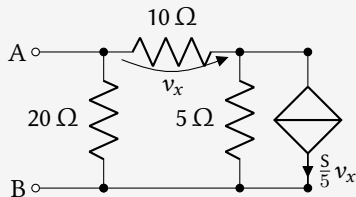
*second case (see text)*

```

\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=$v_x$] (3,2) -- (4,2)
  to[ cI=$\frac{\si{\siemens}}{5} v_x$, *-*) (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}{\square\volt\cubic\lumen\per\farad}
\SIlist[per-mode=symbol]{40;85;103}{\kilo\metre\per\hour}

```

# Bar Codes

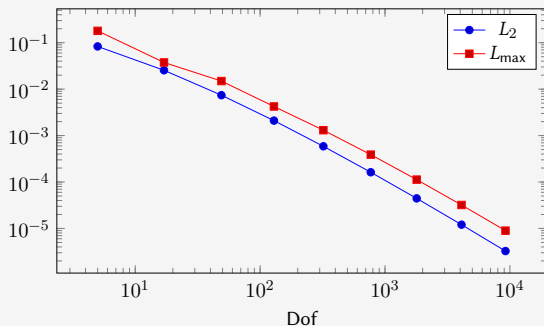


```

\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

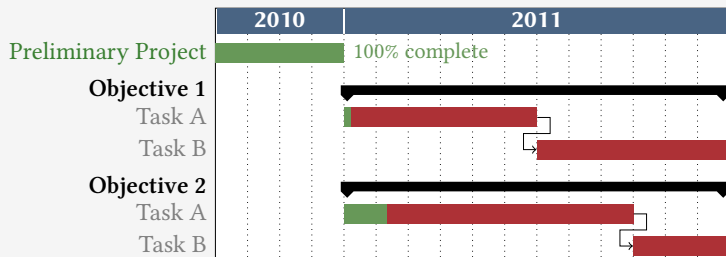


```

\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_\text{max}\$};
\end{loglogaxis}
\end{tikzpicture}

```

# Gantt Charts

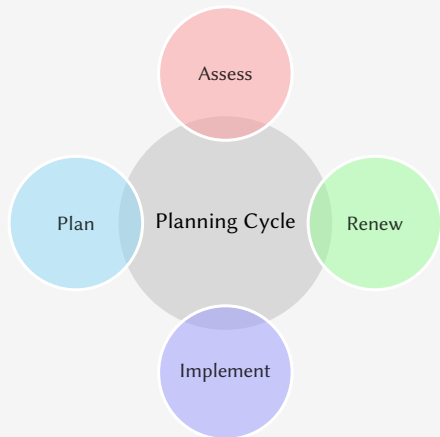


```

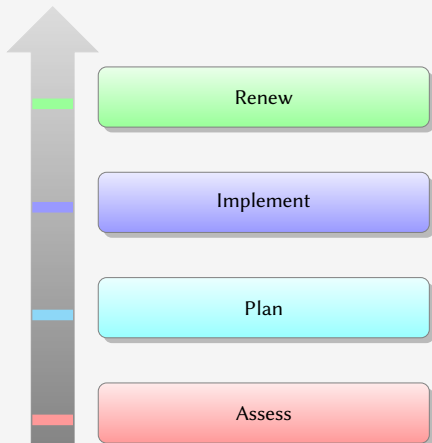
\usepackage{pgfgantt}
...
\begin{ganttchart}[...settings...]{1}{16}
\gantttitle{2010}{4} \gantttitle{2011}{12} \\
\ganttbar[progress=100]{Preliminary Project}{1}{4} \\
\ganttgroup{Objective 1}{5}{16} \\
\ganttbar[progress=4, name=T1A]{Task A}{5}{10} \\
\ganttlinkedbar[progress=0]{Task B}{11}{16} \\
...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

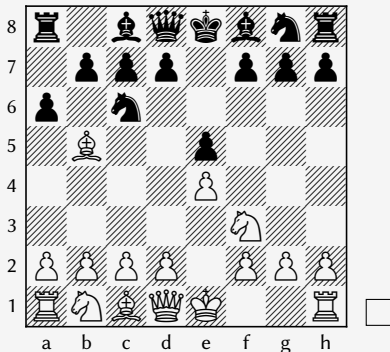


# Chess games

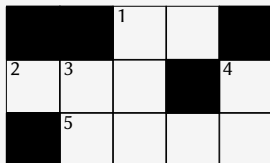
```

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

1 e4 e5 2 Nf3 Nc6 3 Bb5 a6



# Crossword Puzzles



**Across:** 1 unit of measure  
2 \* 5 sectioning unit

**Down:** 1  $\eta$  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 T<sub>E</sub>X, L<sup>A</sup>T<sub>E</sub>X and Friends?

2 Document Types

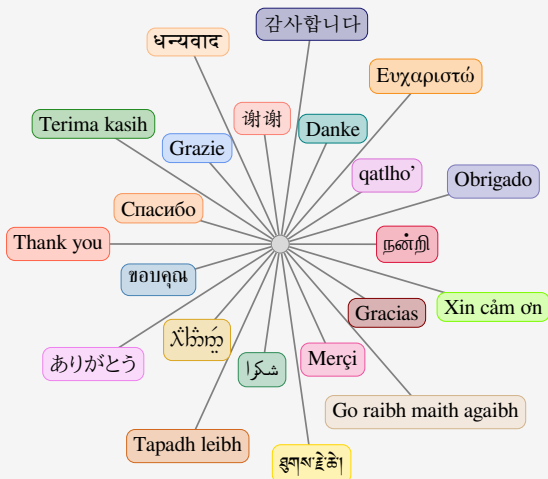
3 Special Material

4 Wrapping Up

# Summary

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- L<sup>A</sup>T<sub>E</sub>X
  - 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?

[liantze@gmail.com](mailto:liantze@gmail.com), [support@overleaf.com](mailto:support@overleaf.com)

<http://tex.stackexchange.com>

# Want to download this deck?

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