

Session 7: $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ and $\text{X}_{\text{E}}\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$



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PCRE Lookaround

Positive lookahead	<code>foo(?=bar)</code>
Negative lookahead	<code>foo(?!bar)</code>
Positive lookbehind	<code>(?<=bar)foo</code>
Negative lookbehind	<code>(?<!=bar)foo</code>

Vim Lookaround

Function	Syntax
Positive lookahead	\@=
Negative lookahead	\@!
Positive lookback	\@<=
Negative lookback	\@<!

Syntax	Matches
/child\(hood\) \@=	“child” where followed by “hood”
/child\(hood\) \@!	“child” where not followed by “hood”
/\(child\) \@<=hood	“hood” where preceded by “child”
/\(child\) \@<!hood	“hood” where not preceded by “child”

- ▶ See :help /\@= ff.

Zoom Anchors

A simpler solution to matching part of a pattern.

Syntax	Function
<code>\ze</code>	End the match here
<code>\zs</code>	Start the match here

Syntax	Action
<code>:s/child\zehood/mother/g</code>	Replace “child” with “mother” where followed by “hood”
<code>:s/child\zshood/lessness/g</code>	Replace “hood” with “lessness” where preceded by “child”

Vim's global Command

```
:range g[lobal]/pattern/command
```

The default range is all lines (%).

Command Options

- ▶ s[ubstitute]
- ▶ co[py]
- ▶ d[ele]te
- ▶ etc.

Examples

```
:g/friend/s//foe/g      # same as ":%s/friend/foe/g"  
:g/^$/d                # deletes all empty lines
```

Word Processing

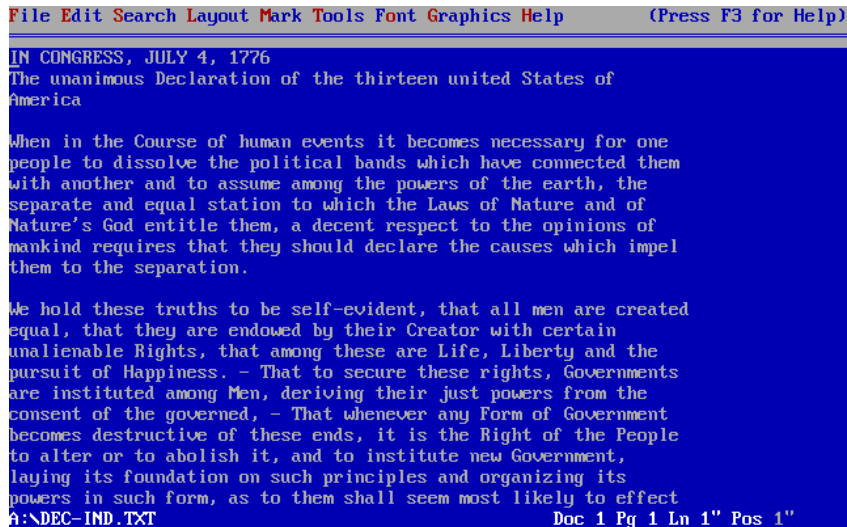


Figure: WordPerfect 5.1 for DOS (public domain)

WYSIWYG and WYSIWYM

WYSIWYG: What You See Is What You Get

Display emulates print output; explicit formatting is hidden from view.

- ▶ Pros: intuitive, little training required
- ▶ Cons: users don't learn to use structural formatting (styles) and wrestle with implicit formatting

WYSIWYG and WYSIWYM

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WYSIWYM: What You See Is What You Mean

Display shows text content enriched by structure commands; output not shown.

- ▶ Pros: Separation of content and formatting; explicit formatting control; plaintext may be grepped
- ▶ Cons: Requires separate viewer for output

Formatting and Content

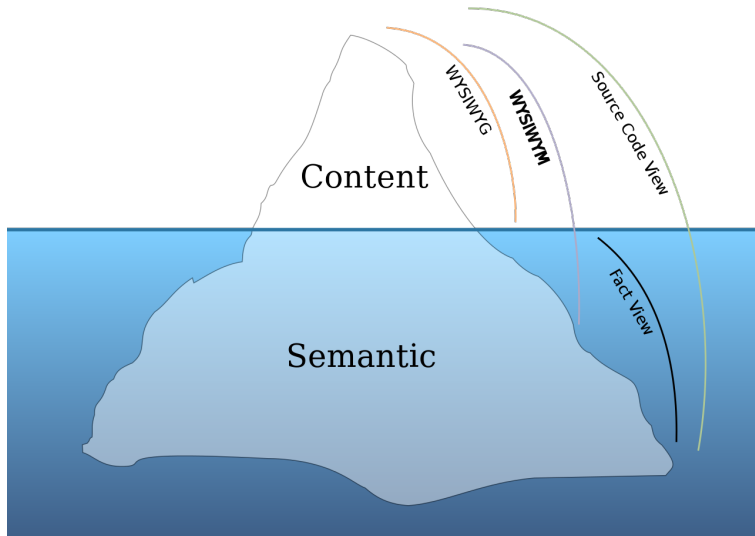


Figure: Views for Content Authoring (CC-BY-SA **WMC** user)

HTML and CSS

```
1 2 3 4 5 + style.css (~/html/echoe) - VIM1 en 477% b29% p515G R221G +91 4° Sun 25 Nov 08:07
<p>Because we cannot expect our users to learn Ker's manuscript index by heart, the navigation panel and item headings furthermore include short call numbers such as "CCCC 201" or "Hatton 114." The full call number can always be found in the topright information panel once an item has been selected.</p>

<h3>§3 Item Navigation and Comparison</h3>
<p>Once one or more items have been selected, activating <strong>item view</strong>, the following features aid in navigation and comparison:</p>
<ul>
  <li>Highlighting on mouseover (not available on touch interfaces) indicates the presence of at least one further sentence in the current selection of texts genetically related to the one hovered.</li>
  <li>Clicking or tapping a sentence <em>number</em> lines up the first matching sentence of each text currently open at the top of the window.<@@@
213,2          21%
color:#ffffff;
}
#sidenav a:hover, #sidenav a:active, #topleftnav a:hover, #topleftnav a:active, #toprightnav a:hover, #toprightnav a:active {
  color:#BAE1FB;
}
#text {
  position:relative;
  width: -moz-calc(100% - 10px);
  width: -webkit-calc(100% - 10px);
  width: calc(100% - 10px);
  margin: -4px 5px 12px 10px;
  background-color:#ffffff;
  z-index:8;
}
#motifsDiv {
width:100%;
196,1          38%
```

Figure: HTML and CSS

A WYSIWYM typesetting engine intended to produce publication-level design and identical output on any system.

Released in 1978 by Donald Knuth along with the Computer Modern font family. (Since supplanted by the Latin Modern font family.)

A high-level scripting language for preparing documents using the T_EX typesetting engine.

Ships as a distribution containing T_EX, user-contributed packages, and a management system. (We'll use T_EX Live.)

Shortcomings of All L^AT_EX

Some elements of L^AT_EX (e.g. automated citations) cannot be converted to e.g. docx.

This is why we'll learn to write in Pandoc Markdown later this term.

Shortcomings of Plain L^AT_EX

Uses a limited character set, not unicode; diacritics require the use of commands.

Command	Glyph
<code>\"a</code>	ä
<code>\'a</code>	á
<code>\ss</code>	ß
<code>\dh</code>	ð

Bei der morphologischen Untersuchung der Sagahandschrift `{\it M\"o\dh{}ruvallab\'ok\}` des 14. Jahrhunderts wurde deutlich, da`\ss{} diese Sammlung der Hochbl\"ute der Isl\"andersagas einen doch ziemlich begrenzten Wortschatz hat. Das ermuntert!`

(Andrea de Leeuw van Weenen, *Grundwortschätz Altisländisch* [1999])

L^AT_EX scripting using the X_ƎT_EX engine instead of the T_EX engine.

The X_ƎT_EX engine permits any unicode characters to be directly input, and allows the use of any system font.

L^AT_EX Strengths: Kerning and Justification

Once upon a time there was a dear little girl who was loved by every one who looked at her, but most of all by her grandmother, and there was nothing that she would not have given to the child. Once she gave her a little cap of red velvet, which suited her so well that she would never wear anything else; so she was always called ‘Little Red-Cap.’

One day her mother said to her, ‘Come, Little Red-Cap, here is a piece of cake and a bottle of wine; take them to your grandmother, she is ill and weak, and they will do her good. Set out before it gets hot, and when you are going, walk nicely and quietly and do not run off the path, or you may fall and break the bottle, and then your grandmother will get nothing; and when you go into her room, don’t forget to say, ‘Good-morning,’ and don’t peep into every corner before you do it.’

‘I will take great care,” said Little Red-Cap to her mother, and gave her hand on it. (Hunt, trans., *Grimm’s Household Tales*)

L^AT_EX Strengths: Automated Citations

Syntax

```
\autocites[114--125]{hug94the}{cro03med}{kre04med}  
  {lin05sum}{nor06sur}{man08pro}{jor09arc}{knu09pal}  
  {cro10med}
```

Output

- ⁴⁴ Malcolm K. Hughes and Henry F. Diaz, 'Was There a "Medieval Warm Period", and If So, Where and When?', *Climatic Change* 26 (1994): 114–25; T.M. Cronin et al., 'Medieval Warm Period, Little Ice Age and 20th Century Temperature Variability from Chesapeake Bay', *Global and Planetary Change* 36 (2003): 17–29; K.V. Kremenetski et al., 'Medieval Climate Warming and Aridity as Indicated by Multiproxy Evidence from the Kola Peninsula, Russia', *Palaeogeography, Palaeoclimatology, Palaeoecology* 209 (2004): 113–25; Hans W. Linderholm and Björn E. Gunnarson, 'Summer Temperature Variability in Central Scandinavia During the Last 3600 Years', *Geografiska Annaler* 87a1 (2005): 231–41; Gerald R. North et al., *Surface Temperature Reconstructions for the last 2,000 Years* (Washington, D.C.: National Academic Press, 2006), accessed 11 December 2014, <http://www.nap.edu/catalog/11676.html>; Michael E. Mann et al., 'Proxy-Based Reconstructions of Hemispheric and Global Surface Temperature Variations Over the Past Two Millennia', *PNAS* 105, no. 36 (September 2008): 13252–57; Jordan, 'Arctic Climate'; Karen Knudsen et al., 'Palaeoceanography and Climate Changes Off North Iceland During the Last Millennium: Comparison of Foraminifera, Diatoms and Ice-Rafted Debris With Instrumental and Documentary Data', *Journal of Quaternary Science* 24 (2009): 457–68; T.M. Cronin et al., 'The Medieval Climate Anomaly and Little Ice Age in Chesapeake Bay and the North Atlantic Ocean', *Palaeogeography, Palaeoclimatology, Palaeoecology* 297 (2010): 299–310.

L^AT_EX Strengths: Formulae

Syntax

```
$y = \frac{x}{\pi}\sqrt{\frac{p}{q + 3}}$
```

Output

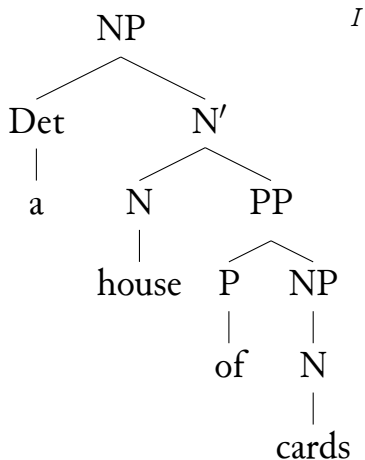
$$y = \frac{x}{\pi} \sqrt{\frac{p}{q+3}}$$

L^AT_EX Strengths: Trees and Graphs

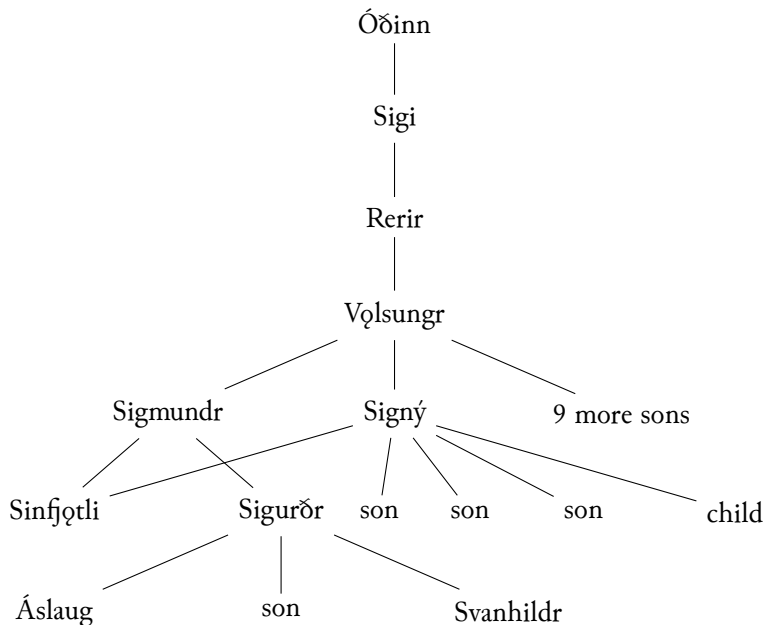
Syntax

```
\Tree [.NP [.Det a ] [.N\1 [.N house ] [.PP [.P of ]  
  [.NP [.N cards ] ] ] ] ]
```

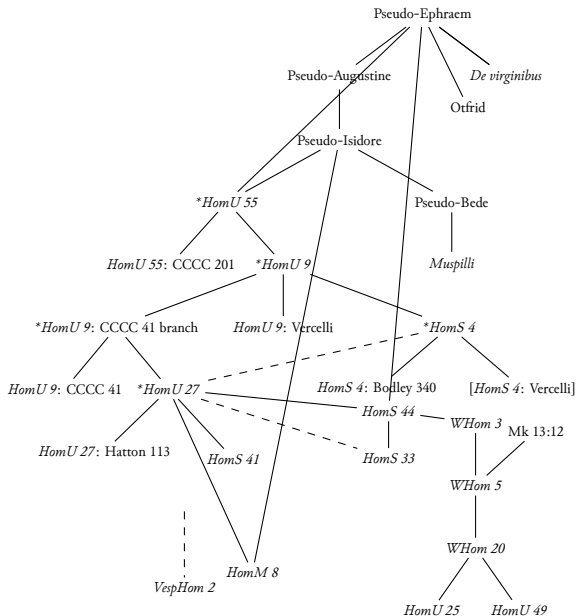
Output



L^AT_EX Strengths: Trees and Graphs



L^AT_EX Strengths: Trees and Graphs



L^AT_EX Strengths: Trees

```
\begin{tikzpicture}
\node (Eph) {Pseudo-Ephraem}[sibling distance=2cm]
  child {node {Pseudo-Augustine}[sibling distance=5cm]}
  child {node {Pseudo-Isidore}[sibling distance=2.7cm]}
    child { node (HomU55) {\emph{*HomU 55}}
      child { node {\emph{HomU 55}: CCCC 201}[solid] }
      child { node {\emph{*HomU 9}}[solid][sibling distance=4cm]}
      child { node {\emph{*HomU 9}: CCCC 41 branch}[sibling distance=4cm]}
        child { node {\emph{HomU 9}: CCCC 41} }
      child { node (HomU27) {\emph{*HomU 27}}[sibling distance=4cm]}
        child { node {\emph{HomU 27}: Hatton 113} }
        child { node[yshift=-2mm] {\emph{HomS 41}} }
      }
    }
  child { node {\emph{HomU 9}: Vercelli} }
  child { node (HomS4) {\emph{*HomS 4}}[sibling distance=4cm]}
    child { node {\emph{HomS 4}: Bodley 340} }
    child { node {\emph{HomS 4}: Vercelli} }
```

L^AT_EX Strengths: Enumerated Linguistics Examples

- (1) Linguists like numbering their example sentences.
- (2) They set them off like so.

L^AT_EX Strengths: Runes

Syntax

```
\textara{fuparkgwhnijpRstbemln}
```

Output

F N Þ F R ʌ X P H † | * C 4 ↑ B M P A †

Minimal X_YL^AT_EX Document Structure

```
\documentclass{article}      % or "book", "memoir", "beamer"
```

```
\begin{document}
```

```
Content goes here.          % comments like so
```

```
Leave a blank line to start a new paragraph.
```

```
\end{document}
```

L^AT_EX Command Structure

Commands

```
\commandname[option1,option2]{mandatoryargument}
```

Environments

```
\begin{environmentclass}[option1,option2]
```

Content

```
\end{environmentclass}
```

Variables

```
\setlength{\variableName}{newvalue}
```

```
\addtolength{\variableName}{marginalvalue}
```

```
\setcounter{variablename}{value}
```

% Typically permitted in body as well as preamble.

Commands

Valid for remainder of current scope:

```
\begin{figure}
```

This text is justified

```
\centering
```

This text is centered

```
\end{figure}
```

```
\begin{figure}
```

This text is justified

```
\end{figure}
```

Environments

Allow you to define their scope:

```
\begin{center}
```

This text is centered

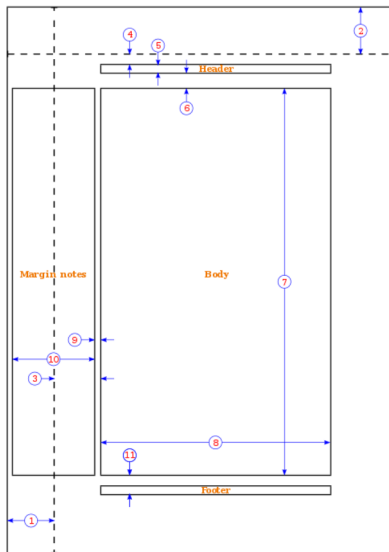
```
\end{center}
```

documentclass Options

```
\documentclass[12pt,a4paper,draft,twocolumn,twoside,  
notitlepage]{book}
```

- ▶ Standard classes
 - ▶ book
 - ▶ article
 - ▶ report
 - ▶ memoir
- ▶ KOMA package classes
 - ▶ scrbook
 - ▶ scrartcl
 - ▶ scrreprt
- ▶ Paper size options
 - ▶ a4paper
 - ▶ letterpaper
 - ▶ etc.
- ▶ Regular font size options
 - ▶ 10pt
 - ▶ 11pt (default)
 - ▶ 12pt
- ▶ twocolumn: use multicol package for more options
- ▶ twoside: typeset for binding
- ▶ anypage: allow chapter to start on even page
- ▶ Each class has its own defaults

Page Layout



1. one inch + `\hoffset`
 2. one inch + `\voffset`
 3. `\oddsidemargin` = 31pt
 4. `\topmargin` = 20pt
 5. `\headheight` = 12pt
 6. `\headsep` = 25pt
 7. `\textheight` = 592pt
 8. `\textwidth` = 390pt
 9. `\marginparsep` = 10pt
 10. `\marginparwidth` = 35pt
 11. `\footskip` = 30pt
- `\marginparpush` = 7pt (not shown)
 - `\hoffset` = 0pt
 - `\voffset` = 0pt
 - `\paperwidth` = 597pt
 - `\paperheight` = 845pt

Figure: A4 Page Dimensions (CC-BY-SA Wikibooks)

Compiling X_YL^AT_EX, 1: On the Command Line

```
xelatex --interaction=nonstopmode filename
```

- ▶ No need to specify the `.tex` extension;
- ▶ You'll often want to run it a couple times over.

Compiling X_YL^AT_EX, 2: Using vimtex

- ▶ `\ll` starts continuous compilation and opens the PDF;
 - ▶ Any subsequent “save” command (`:w`) recompiles;
 - ▶ Multiple compilation is automated;
 - ▶ `\ll` (or quitting Vim) ends continuous compilation.
- ! On ssh, opening the PDF requires X11 forwarding!

Basic \LaTeX Document Structure With Title Data

```
\documentclass{article}

\title{Document Title}
\author{Firstname Lastname}
\date{\today}

\begin{document}

\maketitle

Content goes here.

\end{document}
```

Content Structure

```
\documentclass{book}
```

```
\begin{document}
```

```
\chapter{An Unexpected Party} % for the "book" class only
```

```
\section{Riddles in the Dark}
```

```
\subsection{From the Frying-Pan Into the Fire}
```

```
\subsubsection{On the Doorstep}
```

```
\end{document}
```

Basic X_YL^AT_EX Document Structure With Table of Contents

```
\documentclass{article}

\title{Document Title}
\author{Firstname Lastname}
\date{\today}

\begin{document}

\maketitle

\tableofcontents

Content goes here.

\end{document}
```

Using L^AT_EX Packages

Packages are loaded in the preamble, i.e. after `\documentclass` but before `\begin{document}`:

```
\documentclass{article}
\usepackage[options]{packagename}
```

```
\title{Document Title}
\author{Firstname Lastname}
\date{\today}
```

```
\begin{document}
```

```
\maketitle
```

Content goes here.

```
\end{document}
```

Package Documentation

From the command line, run

```
texdoc packagename
```

Global Settings

Global settings likewise go in the preamble, following (affected) packages:

```
\documentclass{article}
```

```
\usepackage[options]{packagename}
```

```
\setsomesetting{value}
```

```
\title{Document Title}
```

```
\author{Firstname Lastname}
```

```
\date{\today}
```

```
\begin{document}
```

```
\maketitle
```

Content goes here.

```
\end{document}
```

Using X_YL^AT_EX Font Specification

```
\documentclass{article}
\usepackage{fontspec}

\setmainfont{Junicode}

\title{Document Title}
\author{Firstname Lastname}
\date{\today}

\begin{document}

\maketitle

Content goes here.

\end{document}
```

Basic Text Formatting

Available by Default

- ▶ `\emph` for *emphasis* (italics);
- ▶ `\textbf` for **boldface**;
- ▶ `\textsc` for SMALL CAPITALS (use lowercase);
- ▶ `\texttt` for monospace;
- ▶ `\textsuperscript` for ^{superscript}.

With the ulem Package

- ▶ `\uline` for underlining;
- ▶ `\dashuline` for -----;
- ▶ `\uwave` for wavy;
- ▶ `\sout` for ~~strikethrough~~;
- ▶ `\xout` for ~~crossed out~~;
- ▶ etc. (see texdoc ulem)

! Load as `\usepackage[normalem]{ulem}`.

Quotation Marks

L^AT_EX

```Thus''` for double quotes;  
``Thus'` for single quotes.

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

- ▶ If you build a keybinding, you can insert rounded quotes directly.
- ▶ Better: use the `csquotes` package and the following syntax:

Introducing `\enquote{csquotes}`.

## Benefits of the csquotes Package

- ▶ Automatically selects single or double quotes (nesting);
- ▶ Changes quotation style with a single preamble setting.

# The csquotes Package

## Preamble

```
\usepackage{fontspec}
\usepackage{polyglossia}
\usepackage[style=american]{csquotes} % or "british",
 % "german", etc.
\setdefaultlanguage[variant=american]{english}
```

## Syntax

The most basic command is used `\enquote{thus}`.

```
\textquote[][,]{She said, \textquote{This ensures correct
punctuation}} he laughed mysteriously.
```

# csquotes Output

## Syntax

This is a `\textquote[] [.] {quotation}`

## With `style=american`

This is a “quotation.”

## With `style=british`

This is a ‘quotation.’

(NB positioning incorrect)

## With `style=german`

This is a „quotation.“

## Tables 1a: Basic Tables

### Syntax

```
\begin{tabular}{lcr}
 Left-Aligned & Centered & Right-Aligned\\
 Second row & Second column & Third column\\
\end{tabular}
```

### Output

Left-Aligned	Centered	Right-Aligned
Second row	Second column	Third column

## Tables 1b: Basic Tables with Borders

### Syntax

```
\begin{tabular}{|l|c|r|}
 \hline
 Left-Aligned & Centered & Right-Aligned\\
 \hline
 Second row & Second column & Third column\\
 \hline
\end{tabular}
```

### Output

Left-Aligned	Centered	Right-Aligned
Second row	Second column	Third column

# Tables 1c: Basic Float Tables with Borders and Caption

## Syntax

```
\begin{table}
 \begin{tabular}{|l|c|r|}
 \hline
 Left-Aligned & Centered & Right-Aligned\\
 \hline
 Second row & Second colum & Third column\\
 \hline
 \end{tabular}
\end{table}
```

## Output

Left-Aligned	Centered	Right-Aligned
Second row	Second colum	Third column

Table: Caption goes here

## Tables 1d: Pretty Tables with the booktabs package

```
\begin{table}
 \begin{tabular}{lcr}
 \toprule
 \bfseries{Left-Aligned} & \bfseries{Centered} &
 \bfseries{Right-Aligned}\\
 \midrule
 Second row & second colum & third column\\
 \bottomrule
 \end{tabular}
\end{table}
```

<b>Left-Aligned</b>	<b>Centered</b>	<b>Right-Aligned</b>
Second row	Second colum	Third column

Table: Caption goes here



## Tables 1e: Fixed-Width Columns

```
\begin{table}
 \begin{tabular}{lcp{22mm}}
 \toprule
 \bfseries{Left-Aligned} & \bfseries{Centered} & \bfseries{Fixed-Width} \\
 \midrule
 Second row & Second colum & Now you can keep typing
 because lines will wrap\\
 \bottomrule
 \end{tabular}
\end{table}
```

Left-Aligned	Centered	Fixed-Width
Second row	Second colum	Now you can keep typing because lines will wrap

## Tables 1f: Raggedright Fixed-Width Columns

```
\begin{table}
 \begin{tabular}{lc>{\raggedright\arraybackslash}p{22mm}}
 \toprule
 \bfseries{Left-Aligned} & \bfseries{Centered} & \bfseries{Fixed-Width} \\
 \midrule
 Second row & Second colum & Now you can keep typing
 because lines will wrap\\
 \bottomrule
 \end{tabular}
\end{table}
```

---

Left-Aligned	Centered	Fixed-Width
Second row	Second colum	Now you can keep typing because lines will wrap

---

## Tables 2: The tabularx Package

```
\begin{table}
 \begin{tabularx}{\textwidth}{lX}
 \toprule
 \bfseries{Required Width} & \bfseries{Required Width}
 & \bfseries{Remaining Width}\\
 \midrule
 Some text & Some text & Now you can keep typing
 because lines will wrap\\
 \bottomrule
 \end{tabularx}
\end{table}
```

---

Required Width	Required Width	Remaining Width
Some text	Some text	Now you can keep typing be- cause lines will wrap

---

## Tables 3: The longtable Package

```
\begin{table}
 \begin{longtable}{ll}
 \toprule
 \bfseries{Column 1} & \bfseries{Column 2}\\
 \midrule
 This table & can extend\\
 over multiple & pages.\\
 \bottomrule
 \end{longtable}
\end{table}
```

<b>Column 1</b>	<b>Column 2</b>
This table over multiple	can extend pages.

# The multicol Package

## Syntax

```
\begin{multicols}{2}
 \lipsum[1]
\end{multicols}
```

## Output

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus

ultrices. Phasellus eu tellus sit amet tortor gravida placerat.

Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis

## Dedicated L<sup>A</sup>T<sub>E</sub>X Editors (Cross-Platform)

- ▶ Texmaker
- ▶ TeXstudio

# Overleaf: Online Collaborative L<sup>A</sup>T<sub>E</sub>X Editor

<https://www.overleaf.com>

## Bibliography

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Kottwitz, Stefan.  *$\text{\LaTeX}$ : Beginners Guide*. Birmingham: Packt, 2011.

———.  *$\text{\LaTeX}$  Cookbook*. Birmingham: Packt, 2015.