

$\mathcal{M}\mathcal{S}$ - \LaTeX Reference Card #1

See the \TeX Reference Card for additional commands.

Required packages are indicated as (package).

Document Structure

• Preamble

```
\documentclass[option(s)]{class}  
\usepackage[option(s)]{package(s)}  
\begin{document}
```

• Body

- **Front Matter** (`\frontmatter` in book classes)
 - **Top Matter**
 - `\title{...}`
 - `\title[running head]{...}` alternative headline
 - `\date{...}`
 - `\date{\today}` gives current date
 - `\author{...}`
 - `\maketitle` (not in book classes)
 - **Additional items — ams classes only**
 - `\translator{...}`
 - `\dedicatory{...}`
 - `\address[optional name]{...}`
 - `\curaddress{...}`
 - `\email[optional name]{...}`
 - `\thanks{...}`
 - `\subjclass{Primary: XXX; Secondary: XXX}`
 - `\keywords{...}`
 - `\thanks{...}`
 - `\tableofcontents`
 - `\chapter{Introduction}` (in book classes)
- **Abstract** (not in book classes)
 - `\begin{abstract}... \end{abstract}`
- **Main Matter** (`\mainmatter` in book classes)
 - `\chapter{...}`
 - `\section{...}`
 - `\subsection{...}`
 - `\appendix`
- **Back Matter** (`\backmatter` in book classes)
 - `\begin{thebibliography}{99}... \end{...}`

```
\end{document}
```

Page Style

```
\pagestyle{style} set page style to one of:  
plain          empty header, page number in footer  
empty          empty header and footer  
headings       header filled by doc class, empty footer  
myheadings     empty footer, fill header with info in  
                \markboth{lefthead}{righthead}  
                and \markright{righthead}
```

```
\thispagestyle{style} set \pagestyle, only current page  
\enlargethispage{\baselineskip} force an extra line  
\renewcommand{\baselinestretch}{2} doublespaced
```

`fancyheadings` package allows custom headers and footers

• Page Style Parameters

```
\hoffset, \voffset move page right, down  
\paperwidth, \paperheight, \textheight, \textwidth  
\topmargin, \headheight, \headsep, \footskip  
\pagenumbering{...} e.g., arabic, roman
```

Classes and Packages

```
\documentclass[option(s)]{class}  
\usepackage[option(s)]{package(s)}  
\NeedsTeXFormat{LaTeX2e}[1994/12/01]
```

• Document Classes

`article`, `book`, `letter`, `report`, `slides`
`amsart`, `amsbook`, `amsproc` (all autoload `amsmath`)

• Useful Packages

`amsmath`, `amsthm`, `amscd`, `amssymb`, `latexsym`
`fancyheadings` allows custom headers and footers
`alltt` all teletype, even `\,{\,}`
`makeidx`, `showidx` create index, show in margin
`graphics`, `graphicx` inclusion of graphics
`enumerate` extends the `enumerate` environment
`layout` shows page layout of doc class
`multicol` flexible multicolumn typesetting
`showkeys` print label keys in margin
`verbatim` extends `verbatim` environment
`url` typeset URLs allowing line breaks
`graphpap` `\graphpaper` command for `\picture` environ.

• Document and Package Options

Font Size

`8pt`, `9pt`, `10pt`, `11pt`, `12pt`

Paper Size

`a4paper`, `a5paper`, `b5paper`, `legalpaper`, `letterpaper`

Document Preparation

`draft`, `final`, `notitlepage`, `titlepage`

Page Formatting

`onecolumn`, `twocolumn`, `oneside`, `twoside`, `openany`, `openright`

Equation Numbering

`fleqn`, `leqno`, `reqno`, `centertags`, `tbtags`

Equation Limits

`intlimits`, `sumlimits`, `nonamlimits`

AMS (Postscript) Fonts

`psamsfonts`, `noamsfonts`

Bibliography (see also \BIBTeX)

```
\begin{thebibliography}{99}... \end{...}  
bibliography with widest label specified  
\bibitem{name} named bibliography item  
\bibitem[label]{name} with alternative label to print  
\bysame use long line for same author  
\renewcommand{\bibname}{title} use custom title  
\cite{name} print number of named bib item  
\cite[text]{name} with extra text
```

Cross Referencing and Numbering

```
\label{name} assign label name to numbered item  
\ref{name} print number of named item  
\eqref{name} print number in parentheses (amsmath)  
\pageref{name} print page location of named item  
\cite{name} print number of named bibliography item  
\cite[text]{name} with extra text  
\numberwithinsection{equation}{section} number by section
```

Sectioning and Table of Contents

• Sectioning commands

<code>\command{title}</code>	sectioning command with title	
<code>\command[head]{title}</code>	with alternative running head	
<code>\command*{title}</code>	with number suppressed	
<code>\part</code>	<code>\section</code>	<code>\paragraph</code>
<code>\chapter</code>	<code>\subsection</code>	<code>\subparagraph</code>
	<code>\subsubsection</code>	
<code>\appendix</code>	start appendix	

• Table of Contents

<code>\tableofcontents</code>	create and print contents
<code>filename.toc</code>	contents associated to <code>filename.tex</code>
<code>\addcontentsline{toc}{section}{line to add}</code>	
<code>\addtocontents{toc}{material to add}</code>	
<code>\setcounter{tocdepth}{...}</code>	set amount to print

Tables and Figures

<code>\begin{table} ... \caption{text} \label{name} \end{table}</code>	
<code>\listoftables</code>	create and print list of tables
<code>\begin{figure} ... \caption{text} \label{name} \end{figure}</code>	
<code>\includegraphics{filename}</code>	include image (graphics)
<code>\scaledbox{.5}{\includegraphics{filename}}</code>	scaled graphic
<code>\listoffigures</code>	create and print list of figures

Lists

<code>\item</code>	item within list
<code>\item[label]</code>	item with label
<code>\begin{enumerate}... \end{...}</code>	numbered items
<code>\begin{itemize}... \end{...}</code>	bulleted items
<code>\begin{description}... \end{...}</code>	captioned items
<code>\setlength{itemsep}{0pt}</code>	move items closer
enumerate package	extends <code>enumerate</code>

Displayed Text Material

<code>\begin{center}... \end{...}</code>	centered material
<code>\begin{flushright}... \end{...}</code>	flush right material
<code>\begin{flushleft}... \end{...}</code>	flush left material
<code>\begin{quote}... \end{...}</code>	short quote
<code>\begin{quotation}... \end{...}</code>	long quote
<code>\begin{verse}... \end{...}</code>	poetry
<code>\begin{verbatim}... \end{...}</code>	verbatim material
<code>\verb ... </code>	verbatim material
<code>\verb* ... </code>	verbatim with spaces marked
verbatim package	extends <code>verbatim</code>

Footnotes, Comments, Other Stuff

<code>\footnote{text}</code>	numbered footnote
<code>%</code>	comment out a line
<code>\begin{comment}... \end{...}</code>	long comment (verbatim)
<code>\typeout{text}</code>	print to terminal
<code>\typein{text}</code>	get input from keyboard
<code>\typein[cmd]{text}</code>	assign input to <code>cmd</code>
<code>\protect</code>	protects fragile commands
<code>\-</code>	optional hyphen
<code>\hyphenation{hyphenated words}</code>	extra hyphenated words

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Math. Dept., Brown Univ., Providence, RI 02912 USA

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Dimensions, Spacing, and Glue

Dimensions are specified as `<number><unit of measure>`.

Glue is specified as `<dimen> plus<dimen> minus<dimen>`.

point	pt	pica	pc	inch	in	centimeter	cm
m width	em	x height	ex	math unit	mu	millimeter	mm
1 pc	= 12 pt	1 in	= 72.72 pt	2.54 cm	= 1 in	18 mu	= 1 em

<code>\quad</code>	<code>\qquad</code>	white space (1 space, 1 em, 2 em)
<code>\hspace{10pt}</code>		specified horizontal space
<code>\hspace*{10pt}</code>		space even at line start
Horizontal Spacing (Math): <code>\</code> , thin space <code>\:</code> med space		
<code>\;</code>	thick space	<code>\!</code> neg. thin space <code>\mspace{muglue}</code>

<code>\strut, \mathstrut</code>	invisible vertical space
<code></code>	invisible space
<code>\vphantom{...}</code>	invisible vertical space
<code>\smash[bt]{...}</code>	typeset w/zero height, depth
<code>\hfill</code>	fill with space
<code>\dotfill</code>	fill with dots
<code>\hrulefill</code>	fill with rule (line)
<code>\par</code>	new paragraph
<code>\newline</code> or <code>\\</code>	force a new line
<code>*</code>	new line, prohibit page break
<code>\\[5pt]</code>	new line skipping 5 pts
<code>\vspace{1in}</code>	specified vertical space
<code>\vspace*{1in}</code>	space even at page start
<code>\newpage</code>	force a new page

• Length Variables

<code>\newlength{<length>}</code>	create length variable <code>\length</code>
<code>\setlength{<length>}{<dimen>}</code>	set value of <code>\length</code>
<code>\addtolength{<length>}{<dimen>}</code>	increase <code>\length</code>

• Useful Length Assignments

<code>\enlargethispage{<baselineskip>}</code>	force extra line
<code>\setlength{<hangindent>}{30pt}</code>	indentation
<code>\setlength{<hangafter>}{3}</code>	indent after
<code>\renewcommand{<baselinestretch>}{2}</code>	doublespaced

Accents

Type	Example	In Math	In Text
hat	\hat{a}	<code>\hat</code>	<code>\^</code>
expanding hat	\widehat{abc}	<code>\widehat</code>	none
check	\check{a}	<code>\check</code>	<code>\v</code>
tilde	\tilde{a}	<code>\tilde</code>	<code>\~</code>
expanding tilde	\widetilde{abc}	<code>\widetilde</code>	none
acute	\acute{a}	<code>\acute</code>	<code>\'</code>
grave	\grave{a}	<code>\grave</code>	<code>\`</code>
dot	\dot{a}	<code>\dot</code>	<code>\.</code>
double dot	\ddot{a}	<code>\ddot</code>	<code>\"</code>
breve	\breve{a}	<code>\breve</code>	<code>\u</code>
bar	\bar{a}	<code>\bar</code>	<code>\=</code>
vector	\vec{a}	<code>\vec</code>	none
cedilla	\S	none	<code>\c</code>

Additional Text Symbols

<code>\dag</code>	†	<code>\copyright</code>	©	<code>\pounds</code>	£
<code>\ddag</code>	‡	<code>\textcircled{r}</code>	⒓		
<code>\P</code>	¶	<code>\textvisiblespace</code>	␣		
<code>\S</code>	§	<code>\textbullet</code>	•		

Fonts

• Text Fonts

`\textnormal{...}` `{\normalfont...}` document font
`\textrm{...}` `{\rmfamily...}` roman
`\textsf{...}` `{\sffamily...}` sans serif font
`\texttt{...}` `{\ttfamily...}` typewriter style
`\textbf{...}` `{\bfseries...}` **bold**
`\textup{...}` `{\upshape...}` upright
`\textit{...}` `{\itshape...}` *italic*
`\textsl{...}` `{\slshape...}` *slanted*
`\textsc{...}` `{\scshape...}` SMALL CAPITALS
`\emph{...}` `{\em...}` *emphasize*
`\fbox{...}` framed text

• Font Environments exist for above types, e.g.,

`\begin{ttfamily}... \end{...}`

• Changing Font Sizes

`\tiny`, `\scriptsize`, `\footnotesize`, `\small`
`\normalsize`, `\large`, `\Large`, `\LARGE`, `\huge`, `\Huge`

• Math Fonts

`\mathrm{...}` roman
`\mathbf{...}` **bold** (letters)
`\boldsymbol{...}` **bold** (symbol) (amsmath)
`\mathit{...}` *italic*
`\mathcal{...}` calligraphic *A, B, C*
`\usepackage{eucal}` redefine `\mathcal` to script *A, B, C*
`\mathfrak{...}` Fraktur *A, a, B, b* (amsfonts)
`\mathbb{...}` Blackboard bold *A, B, C* (amsfonts)
`\boxed{...}` framed math

• Math Font Sizes

`\displaystyle` display size
`\textstyle` text size
`\scriptsize` sub/superscript size
`\scriptscriptsize` doubly sub/superscripted size

Boxes

`\mbox{...}` one line of text
`\text{...}` one line of text (amsmath)
`\parbox{width}{text}` paragraph of text
`\parbox[align][height]{inner align}{width}{text}`
`\marginpar{...}` marginal comment
`\rule[-1pt]{20pt}{10pt}` solid box
`\raisebox{5pt}{text}` raised box
`\makebox[width][alignment]{text}` box of text
`\framebox[width][alignment]{text}` framed text
`\setlength{\fboxsep}{5pt}` space around text
`\setlength{\fboxrule}{3pt}` width of box borders

Overfull and Underfull Boxes

`draft` document class marks overfulls
`\overfullrule` width of overfull marker
`\begin{setlength}{\hfuzz}{2pt}... \end{...}`
allow small overfulls

Multicolumn Printing

`\twocolumn` double column on new page
`\onecolumn` single column on new page
`\begin{multicols}{n}[title]... \end{...}`
multicolumn environment (`multicol`)

Array and Tabular Environments

`\begin{tabular}[POS]{COLS}... \end{...}`
`\begin{array}[POS]{COLS}... \end{...}`
Use `tabular` for text, `array` for mathematics
`&`, `\` column and row separators
POS aligns top (t), bottom (b), center (default)
COLS gives formats for columns:
`l, c, r` left, center, right justified
`|` vertical rule
`@{...}` material between columns
`@{}` no space between columns
`*{n}{...}` *n* copies of material
`p{width}` set column width
`\hline` horizontal line between rows
`\cline{i-j}` line across columns *i* to *j*
`\multicolumn{n}{COLS}{...}`

span *n* columns using format in COLS

`\setlength{\tabcolsep}{0pt}` set column separation
`\setlength{\itemsep}{0pt}` set item separation
`\renewcommand{\arraystretch}{1.25}` open up array

• Example of a table using `\tabular`

`\begin{table}`
`\begin{center}`
`\begin{tabular}{|l|c|c|} \hline`
Name & Exam & Grade `\` `\hline`
Dan & 97% & A `\` `\hline`
`\end{tabular}`
`\caption{Math 101 Final Grades}`
`\label{GradeTable}`
`\end{center}`
`\end{table}`

Name	Exam	Grade
Dan	97%	A

Math 101 Final Grades

Tabbing Environment

`\begin{tabbing}... \end{...}` tabbing environment
`\=` set tab
`\` end line
`\>` move to next tab
`\kill` do not print line

File Suffixes and Types

• L^AT_EX Source Files

`.tex` File containing a L^AT_EX document
`.sty`, `.cls` L^AT_EX style and document class files
`.fd` Font definition file

• Files Written by L^AT_EX

(See also BIB_TE_X and MAKEINDEX)
`.aux` cross-referencing and list information
`.dvi` device independent typeset file
`.glo` list of glossary entries
`.lof` list of figures (read by `\listoffigures`)
`.lot` list of tables (read by `\listoftables`)
`.toc` table of contents (read by `\tableofcontents`)
`.log` L^AT_EX log file
`\nofiles` suppresses all except `.log` and `.dvi`

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Send comments and corrections to J.H. Silverman, Math. Dept., Brown Univ., Providence, RI 02912 USA. (jhs@math.brown.edu)

AMS-TEX Reference Card #2

See the T_EX Reference Card for additional commands.
The notation (package) indicates a required package.

Math Environments

$\langle \dots \rangle$ or $\$ \dots \$$ inline math
 $[\dots]$ or $\$ \$ \dots \$ \$$ displayed math
 $\begin{equation} \backslash label{eqname} \dots \end{equation}$ numbered and labeled equation
 \ref{eqname} refer to labeled eqn
 $\mbox{...}$ text in math
• The following require amsmath
 ... text in math
 $\begin{equation*} \dots \end{equation*}$ unnumbered eqn
 \tag{eqtag} use eqtag instead of number
 \notag suppress equation tag
 \eqref{eqname} ref with parens
 $\begin{subequations} \dots \end{subequations}$ group equations for numbering
 $\numberwithin{equation}{section}$ number equations within sections

Theorems, Lemmas, Etc.

• **Defining Theorem-Like Environments**
 $\newtheorem{name}{label}$ theorem environment
 $\newtheorem*{name}{label}$ unnumbered (amsthm)
 $\newtheorem{name}[other name]{label}$ numbered consecutively with other environment
 $\newtheorem{name}{label}[section]$ numbered by section (or chapter, etc.)
 \swapnumbers put numbers on left
• **Theorem-Like Environment Styles (amsthm)**
 \theoremstyle{plain} most emphatic
 $\theoremstyle{definition}$ medium emphasis
 \theoremstyle{remark} least emphatic
• **Invoking Theorem-Like Environments**
 $\begin{name} \dots \end{...}$ invoke environment
 $\begin{name}[label] \dots$ invoke with new label
If proclamation starts with a list, put in \hfill
 $\begin{proof} \dots \end{...}$ proof environment
 $\begin{proof}[label] \dots \end{...}$ proof with label
 \qedsymbol end of proof marker
 $\renewcommand{\qedsymbol}{...}$ redefine marker

Commutative Diagrams (amscd)

Separate lines with \backslash , do not use $\&$ s
 $\begin{CD} \dots \end{CD}$ commutative diagram
 $@>\#1>\#2>$ right arrow with labels
 $@<\#1<\#2<$ left arrow with labels
 $@V\#1V\#2V$ down arrow with labels
 $@A\#1A\#2A$ up arrow with labels
 $@=$ long horizontal equal sign
 $@|$ long vertical equal sign
 $@.$ leave out an arrow

Multiline Math Displays (amsmath)

Use as $\backslash begin{command} \dots \backslash end{command}$
Separate items with $\&$, separate lines with \backslash
No \backslash on last line, $\backslash[dim]$ to skip space
• **Full Math Environments (full line)**
 $gather$ centered, numbered equations
 $gather*$ centered, unnumbered equations
 $multline$ first line left, last line right, rest centered
 $multline*$ same as multline, but unnumbered
 $align$ formulas aligned at $\&$ signs
 $align*$ same as align, but unnumbered
 $flalign$ flush left and right align
 $alignat$ align without space, needs argument $\backslash begin{alignat}{\# \text{ of cols}}$
 $\intertext{...}$ text between lines
 \shoveleft, \shoveright move multline line left, right
 \allowdisplaybreaks allow page breaks (\backslash * prohibits)
 \displaybreak force page break (before \backslash)
• **Math Subenvironments (within math display)**
 $gathered$ centered equations
 $aligned$ formulas aligned at $\&$ signs
 $split$ split long formula within other environment
 $cases$ cases, with $\{$ on left
 $matrix$ matrix (of up to 10 columns)
 $\pmatrix, \bmatrix, \vmatrix, \Vmatrix$ matrix variants enclosed by $(\dots), [\dots], |\dots|, \|\dots\|$
 $\setcounter{MaxMatrixCols}{12}$ increase number of matrix columns
 \hdotsfor{num} dots across columns

Overlines, Underlines, and Arrows

$\underline{...}$ underline
 $\overline{...}$ overline
 $\overbrace{...}^{\sim \{...}}$ overbrace
 $\underbrace{...}_{\{...}}$ underbrace
 $\overrightarrow{...}$ over right arrow
 $\overleftarrow{...}$ over left arrow
 $\overleftrightarrow{...}$ over left-right arrow
 $\underrightarrow{...}, \underleftarrow{...}$, etc.
 $\xrightarrow[bot]{top}$ stretchable w/sub/supscripts
 $\xleftarrow[bot]{top}$ stretchable w/sub/supscripts

Operator Names

$\arccos \quad \cos \quad \csc \quad \exp \quad \ker \quad \liminf \quad \min \quad \sinh$
 $\arcsin \quad \cosh \quad \deg \quad \gcd \quad \lg \quad \limsup \quad \Pr \quad \sup$
 $\arctan \quad \cot \quad \det \quad \hom \quad \lim \quad \log \quad \sec \quad \tan$
 $\arg \quad \coth \quad \dim \quad \inf \quad \ln \quad \max \quad \sin \quad \tanh$
 $a \equiv b \pmod{m} \quad a \equiv b \pmod{m}$
 $a \equiv b \pmod{m} \quad a \equiv b \pmod{m}$
 $a \bmod m \quad a \bmod m$
 $\DeclareMathOperator{\cmd}{opname}$ create operator
 $\DeclareMathOperator*{\cmd}{opname}$ with limits
 $\operatorname{...}$ typeset as an operator
 $\operatorname*{...}$ with limits

\sum	\bigcap	\bigodot
\prod	\bigcup	\bigotimes
\coprod	\bigsqcup	\bigoplus
\int	\bigvee	\biguplus
\oint	\bigwedge	
<code>\substack{xxx\\ yyy}</code>	stacked sub or superscripts	
<code>\limits, \nolimits</code>	force or forbid displayed limits	
<code>\oint, \iint, \iiint, \iiint, \idotsint</code>	integral variants (amsmath)	

[\lbrack or \l	{ \lbrace or \{	< \angle
] \rbrack or \]	} \rbrace or \}	> \rangle
\vert or \l	\lfloor	\lceil
\Vert or \l	\rfloor	\rceil
\uparrow	\Uparrow	\updownarrow
\downarrow	\Downarrow	\Updownarrow
\left(\right)	expanding delimiters	
\left. \right.	empty delimiters	
\bigl(\bigr)	big delimiters	
\Bigl(\Bigr)	bigger delimiters	
\biggl(\biggr)	even bigger delimiters	
\bigm \bigm	big binary relation delimiters	

<code>\sqrt{...}</code>	square root $\sqrt{}$
<code>\sqrt[n]{...}</code>	n th root $\sqrt[n]{}$
<code>\leftroot{2}, \uproot{2}</code>	move root left or up

<code>\ldots,\cdots,\dots</code>	ellipses
<code>\vdots,\ddots</code>	vertical and diagonal dots
<code>\dotsc.\dotssb.\dotssm.\dotssi</code>	more ellipses (amsmath)

<code>\frac{n}{d}</code>	fraction $\frac{n}{d}$
<code>\dfrac{n}{d}</code>	displaystyle fraction
<code>\tfrac{n}{d}</code>	textstyle fraction
<code>\binom{n}{d}</code>	binomial coefficient $\binom{n}{d}$
<code>\genfrac{ldelim}{rdelim}{thick}{style}{num}{den}</code>	generalized fraction
<code>\cfrac{...}{...}</code>	continued fraction
<code>\stackrel{top}{bot}</code>	stacked relation
<code>\overset{top}{bot}</code>	stacked symbol (amsmath)
<code>\underset{bot}{top}</code>	stacked relation (amsmath)
<code>\sideset{_{ll}}{_{ul}}{_{lr}}{_{ur}}{largeop}</code>	large operator with left/right sub/supscripts

<code>\not</code>	negate a relation
<code>\ne</code>	not equal \neq
<code>\notin</code>	not a member of \notin
<code>\nmid</code>	not divisible \nmid

<code>\newcommand{\name}{replacement text}</code>	new command
<code>\newcommand{\name}[n]{text with #1,#2,...,#n}</code>	new command with n arguments
Example: <code>\newcommand{\vect}[2]{#1_1,\ldots,#1_{#2}}</code>	
<code>\newcommand{\name}[n][default]{...}</code>	command with args and default value for #1
<code>\renewcommand{...}{...}</code>	redefine existing command
<code>\providecommand{...}{...}</code>	define if doesn't exist
<code>\newcommand*{...}{...}</code>	command with one par arg
<code>\ensuremath{...}</code>	forces math mode
<code>\show\command</code>	print definition of <code>\command</code>
<code>\showthe\parameter</code>	print value of a parameter

```
\newenvironment{name}{pretext}{posttext}
    new environment with material before and after
\newenvironment[n]{name}{...}{...}
    environment with n arguments
\newenvironment[n]{default}{name}{...}{...}
    environment with default value for #1
\renewenvironment{name}{...}{...}
    redefine envrment
```

- **MakeIndex** File Suffixes
 - .idx, .ind, .ilg entry listing, index file, log file
- **MakeIndex** Commands in Document File
 - \usepackage{makeidx} use indexing package
 - (Do not include this line if using AMS packages.)
 - \makeindex tell L^AT_EX to create an .idx file
 - \printindex tell L^AT_EX to print index here
 - \nofiles suppresses creation of .idx and .glo files
- **Creating MakeIndex .idx File**
 - \index{entry} main entry
 - \index{entry!entry} subentry
 - \index{entry!entry!entry} subsubentry
 - \index{text@entry} with placement info
 - \index{entry|see{entry}} cross referenced entry
 - \index{entry|modifier} entry with page modifier
 - e.g. \index{gnats|textbf} give bold page number
 - \index{entry|}{... \index{entry|}} page range
- Special Characters: " ! " @ " | " "
- **Creating An Index With MakeIndex**
 - (1) Typeset document containing \makeindex command.
 - (2) Run MakeIndex on .idx file to create .ind file.
 - (3) Typeset document containing \printindex command.

```
\makeglossary      tell LATEX to create a .glo file
\glossary{entry}   create a glossary entry
\glossaryentry{entry}{page no.}  entries in .glo file
\input filename.glo  read glossary file
User must define \makeglossary, e.g.,
\newcommand{\glossaryentry}[2]{\#1, page \#2\par}
```

`\today` current date
 Use `\the` to display the following items
`\day`, `\month`, `\year`, `\time` (minutes since midnight)

Counters

`\newcounter{cnt}` create new counter named `cnt`
`\newcounter{cnt}[cnt1]` reset `cnt` when `cnt1` changes
`\setcounter{cnt}{value}` set value of `cnt`
`\stepcounter{cnt}` increment `cnt`
`\refstepcounter{cnt}` increment and reset `\label`
`\addtocounter{cnt}{n}` increment by n
`\value{cnt}` value stored in `cnt`
`\thecnt` the value of `cnt`
`calc` package to do counter arithmetic

• Counter Styles

`\arabic{}` `\roman{}` `\Roman{}` `\alph{}` `\Alph{}`

• Standard Counters

`equation` `footnote` `figure` `page` `table`
`part` `chapter` `section` `subsection` `subsubsection`
`paragraph` `subparagraph` `enumi` `enumii` `enumiii` `enumiv`
`secnumdepth` depth to which sections are numbered
`tocdepth` depth to which sections are put into `toc`

Customized List Environments

`\begin{list}{default label}{declarations}`
`\item` item 1 text
`\item` item 2 text
`\end{list}`
`\begin{trivlist}... \end{trivlist}`
list with no labels or declarations, trivial lengths

• Declarations

`\setlength{length parameter}{length}`

`\usecounter{counter name}`

[Create counter first using `\newcounter{counter name}`.]

• Length Parameters (see page 113 of Lamport for more)

`\topsep` separate preceding text and first item
`\itemsep` separate items
`\leftmargin` indent of item box from left margin
`\labelwidth` width of box for item label
`\labelsep` separate label box from item box

The picture Environment

`\begin{picture}(w,h)...\end{picture}` picture
`\begin{picture}(w,h)(\Delta x,\Delta y)...` with offset
`\put(x,y){picture object}` place object
`\multiput(x,y)(\Delta x,\Delta y){n}{object}` n times

Picture Objects:

`\makebox(x,y)[tblr]{text}` box with text
`\line(\Delta x,\Delta y){x length}` line of slope $\Delta y/\Delta x$
`\vector(\Delta x,\Delta y){x length}` arrow of slope $\Delta y/\Delta x$
`\circle{r}` circle of radius r
`\circle*{r}` filled circle
`\oval(x,y)[lrbt]` oval (part or whole)
`\shortstack{abc\backslash xyz\backslash}` stacked text
`\framebox(x,y)[tblr]{text}` framed text
`\frame{text},fbox{text}` other framed boxes
`\dashbox{d}(x,y){text}` dashed box
`\qbezier(x_1,y_1)(x_2,y_2)(x_3,y_3)` quadratic curve
`\savebox{name}(x,y){...}` store material
`\usebox{name}` retrieve material
`\graphpaper[n]{x,y}{w,h}` print grid (`graphpap`)
`\setlength{\unitlength}{1pt}` change size of picture
`\thinlines,\thicklines` adjust line thickness

Color (color)

`\color{color}` change color
`\textcolor{color}{text}` colored text
`\colorbox{color}{text}` colored background
`\fcolorbox{col1}{col2}{text}` colored border & background
`\setlength{\fboxsep}{5pt}` put space around text
`\setlength{\fboxrule}{3pt}` width of border of box
`\pagecolor{color}` set background color of page
`\definecolor{name}{rgb}{r,g,b}` define an RGB color
`\definecolor{name}{cmk}{c,m,y,k}` define a CMYK color

Predefined Colors

black, white, red, green, blue, yellow, cyan, magenta

BIB_{TEX}

• BIB_{TEX} File Suffixes

`.bib` BIB_{TEX} bibliographic database file
`.bst` BIB_{TEX} bibliographic style file
`.blg` BIB_{TEX} log file
`.bbl` BIB_{TEX} document bibliography file

• BIB_{TEX} Commands in Document File

`\bibliographystyle{bib style file}`

Examples: `plain`, `amsplain`, `unsrt`, `alpha`, `abbrv`

`\bibliography{bib database file(s)}`

`\cite{label}` cite a reference

`\nocite{label}` include ref in bib without citation

`\nocite{*}` include all references in bibliography

• Creating BIB_{TEX} Database File

`@STRING{name = "text"}` define an abbreviation

Put braces around non-initial capitalized title words.

Use `and` to separate multiple authors in `author` field

• General Format of a Database Entry

`@ENTRYTYPE{label,`
`fieldtype1 = {entry1},`
`fieldtype2 = {entry2},`
`...`
`}`

• Database Entry Types

`@ARTICLE{...}` `@MASTERSTHESIS{...}`
`@BOOK{...}` `@MISC{...}`
`@BOOKLET{...}` `@PHDTHESIS{...}`
`@INBOOK{...}` `@PROCEEDINGS{...}`
`@INCOLLECTION{...}` `@TECHREPORT{...}`
`@INPROCEEDINGS{...}` `@UNPUBLISHED{...}`
`@MANUAL{...}` `@COMMENT{...}`

• Field Types Within Entries

<code>address</code>	<code>editor</code>	<code>month</code>	<code>school</code>
<code>author</code>	<code>howpublished</code>	<code>note</code>	<code>series</code>
<code>booktitle</code>	<code>institution</code>	<code>number</code>	<code>title</code>
<code>chapter</code>	<code>journal</code>	<code>organization</code>	<code>type</code>
<code>crossref</code>	<code>key</code>	<code>pages</code>	<code>volume</code>
<code>edition</code>	<code>language</code>	<code>publisher</code>	<code>year</code>

• Creating Document Bibliography With BIB_{TEX}

- (1) Typeset document to get new `.aux` file.
- (2) Run BIB_{TEX} on `.aux` file to create `.bbl` file.
- (3) Retypeset document twice.

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Send comments and corrections to J.H. Silverman, Math. Dept., Brown Univ., Providence, RI 02912 USA. (jhs@math.brown.edu)