```
\documentstyle[12pt]{article}   %  [11pt] or [12pt] are optional:
               % the default (\documentstyle{article}) is 10pt

\setlength{\parskip}{1.2ex}        % space between paragraphs
\setlength{\parindent}{2em}        % amount of indention
\setlength{\textwidth}{6.25in}
\setlength{\oddsidemargin}{0.5in}  % + 1" = margin from left edge
\setlength{\textheight}{8in}
\setlength{\topmargin}{-0.5in}     % + 1.5" = margin from top

               %  ---  define your own commands!! ---

\newcommand{\iii}{\indent \indent \indent}      % triple-depth indent

\title{A Sample \LaTeX\  Document}
\author{Schl\oe ff\d{o}nffl\ae g\"{e}n, \L\"{a}rs}
\date{November 14, 1992}

\begin{document}
\maketitle                              % as defined above.

This document is intended to serve as a mini reference manual for
\LaTeX.  It is produced by the \LaTeX{} software, generated from the
 source text shown at left.  For this and the next three pages, compare
the source text (left side) with \LaTeX' typeset product (right side),
to see how special macros (which always involve the escape
character `\verb9\9') produce the desired effects.

\section{Ordinary Text} % Produces section heading.  Lower-level sections
                        % are begun with similar \subsection and
                        % \subsubsection commands; numbering is automatic!

\subsection{Spacing in the source text}
The ends  of words and sentences are marked
  by   spaces. It  doesn't matter how many
spaces
you
type; one is as good as                         100.
The       end of   a line counts as a space.

One   or more   blank lines denote the  end of  a paragraph.

Since any number of consecutive spaces are treated like a single one, the
formatting of the input file makes no difference to \TeX, but it makes a
difference to you.  When you use \LaTeX, making your input file as easy to
read as possible will be a great help as you write your document and when
you change it.  Keep typed lines {\bf short} in length, and use
\verb9 % comments9.                             % like this!

Because printing is different from typewriting, there are a number of things
that you have to do differently when preparing an input file than if you were
just typing the document directly.  Quotation marks like ``this'' have to
be handled specially.

\subsection{Special characters}
Dashes come in three sizes: an
       intra-word
dash, a medium dash for number ranges like
       1--2,
and a punctuation
       dash---like this.

\TeX\ interprets some common characters as commands, so you must type
special commands to generate them.  These characters include the
following: \$ \& \% \# \{ and \}.               % ...continued!
```


A Sample LaTeX Document

Schlœffonfflægën, Lärs

November 14, 1992

This document is intended to serve as a mini reference manual for LaTeX. It is produced by the LaTeX software, generated from the source text shown at left. For this and the next three pages, compare the source text (left side) with LaTeX' typeset product (right side), to see how special macros (which always involve the escape character '\') produce the desired effects.

1 Ordinary Text

1.1 Spacing in the source text

The ends of words and sentences are marked by spaces. It doesn't matter how many spaces you type; one is as good as 100. The end of a line counts as a space.

One or more blank lines denote the end of a paragraph.

Since any number of consecutive spaces are treated like a single one, the formatting of the input file makes no difference to TeX, but it makes a difference to you. When you use LaTeX, making your input file as easy to read as possible will be a great help as you write your document and when you change it. Keep typed lines **short** in length, and use `% comments`.

Because printing is different from typewriting, there are a number of things that you have to do differently when preparing an input file than if you were just typing the document directly. Quotation marks like "this" have to be handled specially.

1.2 Special characters

Dashes come in three sizes: an intra-word dash, a medium dash for number ranges like 1–2, and a punctuation dash—like this.

TeX interprets some common characters as commands, so you must type special commands to generate them. These characters include the following: $ & % # { and }.

```
\subsection{Fonts}
In printing, text is emphasized by using an {\em italic\/}
type style.     % The \/ command produces the tiny extra space that
                % should be added between a slanted and a following
                % unslanted letter.
\begin{em}
   A long segment of text can also be emphasized in this way.
   Text within such a segment given additional emphasis
         with\/ {\em Roman} type.
\end{em}

Other font types are available:    \\
\indent  {\bf Bold face type,}  \\
\indent  {\tt typewriter style type,} also used as \verb@verbatim@, \\
\indent  {\sf sans-serif type,} \\
\indent  {\sl slanted type,}    \\
\indent  {\sc all caps type.}   \\
Formulae and other mathematical expressions are given
their own ``math mode'' font.   Many special mathematical and
miscellaneous symbols are available in math mode;
$$  \Vert \diamond\star \Vert   ~~~
       \clubsuit\diamondsuit\heartsuit\spadesuit ~~~
       \sharp\flat\natural ~~~ \cap\cup\pm\mp ~~~
       \prod\alpha\beta\gamma ~~~ \oint_Cf(z)dz ~~~
       \Gamma_{\sqrt7}^{v,\upsilon} ~~~ V\bigoplus W $$



\section{Spacing}
A sentence-ending space should be larger than the space between
words within a sentence.  You sometimes have to type special
commands in conjunction with punctuation characters to get this
right, as in the following sentence.
      Gnats, gnus, etc.\    % '\ ' makes an inter-word space.
      all begin with G\@.   % \@ marks end-of-sentence punctuation.
Generating an ellipsis
  \ldots\       % '\ ' needed because TeX ignores spaces after
                % command names like \ldots made from \ + letters.
with the right spacing around the periods requires a special command.

It is sometimes necessary to prevent \TeX\ from breaking a line where
it might otherwise do so.  This may be at a space, as between the
``Mr.'' and ``Jones'' in
``Mr.~Jones'',  %       ~ produces an unbreakable interword space.
or within a word---especially when the word is a symbol like
\mbox{\em itemnum\/} that makes little sense when hyphenated
across lines.

In math mode, \TeX\ ignores the spaces you type and formats the
formula the way it thinks is best.  Though \TeX\  often knows best,
you sometimes have to adjust spacing manually to make a formula look
just right.  One reason is that \TeX\ may not understand the formula's
logical structure, interpreting (for example) ${\bf y\:dx}$ as the
product of three quantities rather than as $y$ times the differential
$dx$, so that it doesn't add the little extra space after the $y$.
You can use these special spacing commands:     \\
\iii \verb2\,2~~~thin space~~~~~~(any mode)  \\         % "verbatim"
\iii \verb9\:9~~~medium space~~~~(math mode only) \\
\iii \verb#\;#~~~thick space~~~~~(math mode only) \\
\iii \verb2\!2~~~thin backspace~~(math mode only) \\
A most precise spacing command can be used in either math or
paragraph modes; the \verb2\kern2 command.  Use it with the
unit ``em'', which is the width of a capital M.  Example:
to print 'R' over an 'I' you might use the command
\verb@I\kern-0.27emR@ to produce ``I\kern-0.27emR''.
```


1.3 Fonts

In printing, text is emphasized by using an *italic* type style. *A long segment of text can also be emphasized in this way. Text within such a segment given additional emphasis with* Roman *type.*

Other font types are available:
Bold face type,
`typewriter style type,` also used as `verbatim`,
sans-serif type,
slanted type,
ALL CAPS TYPE.

Formulae and other mathematical expressions are given their own "math mode" font. Many special mathematical and miscellaneous symbols are available in math mode;

$$\| \diamond\star\| \quad \clubsuit\diamondsuit\heartsuit\spadesuit \quad \sharp\flat\natural \quad \cap\cup\pm\mp \quad \prod\alpha\beta\gamma \quad \oint_C f(z)dz \quad \Gamma_{\sqrt{7}}^{v,\upsilon} \quad V\bigoplus W$$

2 Spacing

A sentence-ending space should be larger than the space between words within a sentence. You sometimes have to type special commands in conjunction with punctuation characters to get this right, as in the following sentence. Gnats, gnus, etc. all begin with G. Generating an ellipsis ... with the right spacing around the periods requires a special command.

It is sometimes necessary to prevent TEX from breaking a line where it might otherwise do so. This may be at a space, as between the "Mr." and "Jones" in "Mr. Jones", or within a word—especially when the word is a symbol like *itemnum* that makes little sense when hyphenated across lines.

In math mode, TEX ignores the spaces you type and formats the formula the way it thinks is best. Though TEX often knows best, you sometimes have to adjust spacing manually to make a formula look just right. One reason is that TEX may not understand the formula's logical structure, interpreting (for example) $y\,dx$ as the product of three quantities rather than as y times the differential dx, so that it doesn't add the little extra space after the y. You can use these special spacing commands:

`\,`	thin space	(any mode)
`\:`	medium space	(math mode only)
`\;`	thick space	(math mode only)
`\!`	thin backspace	(math mode only)

A most precise spacing command can be used in either math or paragraph modes; the `\kern` command. Use it with the unit "em", which is the width of a capital M. Example: to print 'R' over an 'I' you might use the command `I\kern-0.27emR` to produce "$\mathbb{R}$".

```
\section{Displayed Text}
Text is displayed by indenting it from the left margin.
Quotations are commonly displayed.  There are short quotations
\begin{quote}
   This is a short a quotation.  It consists of a
   single paragraph of text.  There is no paragraph
   indentation.
\end{quote}
and longer ones.
\begin{quotation}
   This is a longer quotation.  It consists of two paragraphs
   of text.  The beginning of each paragraph is indicated
   by an extra indentation.

   This is the second paragraph of the quotation.  It is just
   as dull as the first paragraph.
\end{quotation}

Footnotes\footnote{This is an example of a footnote.} pose no
problem.  Likewise, bibliographic references \cite{Lam} are handled
with ease.  \TeX\ can generate almost all the accents and special
symbols used in Western     \cite{Sch}     l\aa nguages; for example,
\'o \`o \^o \v{o} \=o \b{o} \u{o} \~o \.o \d{o} \"o \H{o} \t{oo}
\c{o} \oe{} \OE{} \o{} \O{} \ae{} \AE{} \AA{} \dag{} \ddag{} \P{} \S.

Another frequently-displayed structure is a list.
The following is an example of an {\em itemized} list.
 \begin{itemize}
   \item  This is the first item of an itemized list.  Each item
          in the list is marked with a ''tick''.  The document
          style determines what kind of tick mark is used.

   \item  This is the second item of the list.  Read on.
 \end{itemize}

\section{Mathematical Formulae}
\TeX\ is good at typesetting mathematical formulas like
       $ x-3y = 7 $
or
       $ y_{i+1} = x_{i}^{2n} - \sqrt{5}x_{i}^{n} + 1$.
Remember that a letter like
       \( x \)        % $ ... $  and  \( ... \)  are equivalent
is a formula when it denotes a mathematical symbol, and should
be treated as one.

Mathematical formulas may also be          %  use \[ \]
{\em displayed}.  A displayed formula      %  or  $$  $$
is one-line long; multiline formulas       %  or \begin{equation}
require special formatting instructions.   %  or \begin{eqnarray}
The following formulae demonstrate
many constructions you might find useful.
Equation (\ref{eq:fermat}) is true, but
equations (\ref{eq:dumb}--\ref{eq:realdumb}) are silly.
Note that the \verb9equation9 and \verb9eqnarray9 environments
number the equations, but \verb9eqnarray*9 doesn't.
\[  x_{i+1} ~=~ N^{i+1}(x_{0}) ~=~ N(x_{i}) ~=~
        x_{i} - \frac{f(x_{i})}{f'(x_{i})}      \]
```

(mydoc.tex, page 3)

(document)

3 Displayed Text

Text is displayed by indenting it from the left margin. Quotations are commonly displayed. There are short quotations

> This is a short a quotation. It consists of a single paragraph of text. There is no paragraph indentation.

and longer ones.

> This is a longer quotation. It consists of two paragraphs of text. The beginning of each paragraph is indicated by an extra indentation.
>
> This is the second paragraph of the quotation. It is just as dull as the first paragraph.

Footnotes[1] pose no problem. Likewise, bibliographic references [1] are handled with ease. TEX can generate almost all the accents and special symbols used in Western [2] långuages; for example, ó ò ô ǒ ō o̲ ŏ õ ȯ o̩ ö ő o͡o o̩ œ Œ ø Ø æ Æ Å † ‡ ¶ §.

Another frequently-displayed structure is a list. The following is an example of an *itemized* list.

- This is the first item of an itemized list. Each item in the list is marked with a "tick". The document style determines what kind of tick mark is used.
- This is the second item of the list. Read on.

4 Mathematical Formulae

TEX is good at typesetting mathematical formulas like $x - 3y = 7$ or $y_{i+1} = x_i^{2n} - \sqrt{5}x_i^n + 1$. Remember that a letter like x is a formula when it denotes a mathematical symbol, and should be treated as one.

Mathematical formulas may also be *displayed*. A displayed formula is one-line long; multiline formulas require special formatting instructions. The following formulae demonstrate many constructions you might find useful. Equation (1) is true, but equations (2–4) are silly. Note that the `equation` and `eqnarray` environments number the equations, but `eqnarray*` doesn't.

$$x_{i+1} \;=\; N^{i+1}(x_0) \;=\; N(x_i) \;=\; x_i - \frac{f(x_i)}{f'(x_i)}$$

[1] This is an example of a footnote.

```
$$ \frac{\partial u}{\partial t} + \nabla^{4}u + \nabla^{2}u +
       \frac12    \left| \nabla u \right|^{2}~ =~ c^2   $$

\begin{equation}
       a^{n} + b^n   \neq c^{n} ~~~\mbox{for } n>2
       ~~ \mbox{(see proof in margin)}  \label{eq:fermat}
\end{equation}

$$ \lim_{k \rightarrow \infty}x_{k} \geq \pi ~~~~~~~~~~~~~~~~~~~
   \forall x \in {\cal F} ~~\exists \delta ~~~\mbox{such that}~~~
       |y-x|<\delta ~\Rightarrow ~y \in {\cal F} $$

$$ \Psi' = \frac{d}{d \phi} \left( \begin{array}{c}
       \phi_{2}  \\  \phi_{3}  \\  1 - \phi_{2} - \phi_{1}^{2}/2
\end{array} \right)
                    ~~~~~~~~~~~~~~
\Theta =  \left( \begin{array}{ccc}
       0                       &       1       &   0   \\
(-\theta_{1}\psi_{1}-\psi_{2})  &       0       & \psi_3 \\
     -\phi_{1}                  &       -1      &   0
\end{array}  \right) $$

\begin{eqnarray}
\int_0^{\infty} e^{-x^2}\,dx
 & = &  e^{-\left(\int_0^{\infty}x\,dx\right)^2}
                ~~~~~\mbox{(incorrect)} \label{eq:dumb} \\
 & = &  e^{-\infty} ~~~~~\mbox{(incorrect)} \\
 & = &  0.38-1.7i ~~~~~\mbox{(incorrect)} \label{eq:realdumb}
\end{eqnarray}

\begin{eqnarray*}                       %  "*" = no line numbering
\sum_{k=1}^{n} \frac1k \approx \ln k + \gamma
       & = &           (\ln 10)(\log_{10}k) + \gamma \\
       & \approx &     2.3026\log_{10}k + 0.57772
\end{eqnarray*}

\centerline{
\begin{tabular}{ | c || c   c | c | } \hline    % c = "centered"
 $k$ &   $x_1^k$   &   $x_2^k$  &   $x_3^k$    \\ \hline \hline
   0 & -0.30000000 & 0.60000000 &  0.70000000  \\
   1 &  0.47102965 & 0.04883157 & -0.53345964  \\
   2 &  0.49988691 & 0.00228830 & -0.52246185  \\ \hline
   4 &  0.50000000 & 0.00000307 & -0.52359743  \\
     &    \vdots   &  \vdots    &     \vdots   \\
   9 &  0.50000000 & 0.00000000 & -0.52359877  \\ \hline
\end{tabular}}


\begin{thebibliography}{9}    % 9 = maximum expected references

\bibitem{Lam} Lamport, Leslie.
\LaTeX : A Document Preparation System.  \\
Copyright \copyright 1986, Addison-Wesley Publ.Co.,Inc.

\bibitem{Sch} Schl\oe ff\d{o}nfffl\ae g\"{e}n,
\L\"{a}rs.  Silly Typography.          \\
{\em Journal of Linguistics 19D} (1977), 23-37.

\end{thebibliography}

\end{document}             % End of document.
```


$$\frac{\partial u}{\partial t} + \nabla^4 u + \nabla^2 u + \frac{1}{2}\left|\nabla u\right|^2 \;=\; c^2$$

$$a^n + b^n \neq c^n \quad \text{for } n > 2 \;\; \text{(see proof in margin)} \tag{1}$$

$$\lim_{k\to\infty} x_k \geq \pi \qquad\qquad \forall x \in \mathcal{F} \;\; \exists \delta \quad \text{such that} \quad |y - x| < \delta \;\Rightarrow\; y \in \mathcal{F}$$

$$\Psi' = \frac{d}{d\phi}\begin{pmatrix} \phi_2 \\ \phi_3 \\ 1 - \phi_2 - \phi_1^2/2 \end{pmatrix} \qquad\qquad \Theta = \begin{pmatrix} 0 & 1 & 0 \\ (-\theta_1\psi_1 - \psi_2) & 0 & \psi_3 \\ -\phi_1 & -1 & 0 \end{pmatrix}$$

$$\begin{aligned} \int_0^{\infty} e^{-x^2}\,dx &= e^{-\left(\int_0^{\infty} x\,dx\right)^2} \quad \text{(incorrect)} && (2)\\ &= e^{-\infty} \quad \text{(incorrect)} && (3)\\ &= 0.38 - 1.7i \quad \text{(incorrect)} && (4) \end{aligned}$$

$$\begin{aligned} \sum_{k=1}^{n} \frac{1}{k} \approx \ln k + \gamma &= (\ln 10)(\log_{10} k) + \gamma \\ &\approx 2.3026 \log_{10} k + 0.57772 \end{aligned}$$

k	x_1^k	x_2^k	x_3^k
0	-0.30000000	0.60000000	0.70000000
1	0.47102965	0.04883157	-0.53345964
2	0.49988691	0.00228830	-0.52246185
4	0.50000000	0.00000307	-0.52359743
	⋮	⋮	⋮
9	0.50000000	0.00000000	-0.52359877

References

[1] Lamport, Leslie. LaTeX: A Document Preparation System.
Copyright ©1986, Addison-Wesley Publ.Co.,Inc.

[2] Schlœffonfflægën, Lärs. Silly Typography.
Journal of Linguistics 19D (1977), 23-37.