An Example LaTeX Document*

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Contents

*This is a protected footnote.

List of Figures

1 Basic List Types

In this section, let's look at some basic list constructs of LaTeX 2_ε. They are *enumerate*, *itemize*, *description* ...

You can start a new paragraph either with a blank line or a `\par`.

1.1 Enumeration

An enumeration starts with `\begin{enumerate}`, ends with `\end{enumerate}`. Each item starts with `\item`. The items are labeled with roman numeral by default, but you can change the style to anything you like.

Hey! Here is some very basic things you need to know about LaTeX.

1. Hi, Today is January 14, 2003.
2. You must enter "open quotes" as ` and "close quotes" as '.
3. You must enter the characters $ & % # _ { } ~ ^ as `\$ \& \% \# \_ \{ \} \~{} \^{}`.
4. you can enter verbatim text with `\verb|something|`.
5. Use `\textbf{something}` to enter something with font **Bold Weight**.
6. Use `\textsf{something}` to enter something with font Sans Serif.
7. `\bfseries` can change **all the text follows to bold face, until the group ends.**
8. Font switch commands: tiny scriptsize footnotesize small normalsize(default) large Large LARGE huge Huge.
9. Here are three types of dashes: "emdash", "endash" and "hyphen".
   emdash: He lay there—dead.
   endash: from 10–12
   hyphen: state-of-the-art.
10. Ellipsis should be entered as: `\ldots` (...), `$\cdots$` (⋯) or `$\ddots$` (⋱), even `\dotfill`.....

1.2 Change the style of enumeration

Here you can setup new environments named whitecircleenum and blackcircleenum.

First, we use the package pifont. The we can access the PostScript Dingbats font designed by Hermann Zapf.

```
\usepackage{pifont}
```

Then we renew the command `\labelenumi` to set the new label style.

```
\newcounter{local}
\newenvironment{whitecircleenum}%
{\begingroup\renewcommand{\labelenumi}{%
\setcounter{local}{171+\value{enumi}}%
\ding{\value{local}}}\begin{enumerate}}%
{\end{enumerate}\endgroup}
```

```
\newenvironment{blackcircleenum}%
{\begingroup\renewcommand{\labelenumi}{%
\setcounter{local}{181+\value{enumi}}%
\ding{\value{local}}}\begin{enumerate}}%
{\end{enumerate}\endgroup}
```

① Where is the chaos from?
② Who broke the handrails?
③ Why are you healthy?
④ Is it possible to go to the future?

❶ Where is the chaos from?
❷ Who broke the handrails?
❸ Why are you healthy?
❹ Is it possible to go to the future?

1.3 Itemize

An itemize environment starts with `\begin{itemize}`, ends with `\end{itemize}`. Each item starts with `\item`. The items are labeled with a bullet by default, but you can change the style to anything you like.

Answer the questions: (for hints, refer to 1.4) The reference is created by `\ref{hints}`. You can change the label of items by renewing the command `\labelitemi`. For example:

```
\renewcommand{\labelitemi}{\ding{43}}
```

- Where is the chaos from?
- Who broke the handrails?
- Why are you healthy?
- Is it possible to go to the future?

☞ Where is the chaos from?
☞ Who broke the handrails?
☞ Why are you healthy?
☞ Is it possible to go to the future?

1.4 Description

Here is the label `\label{hints}`.

Descriptions are similiar to enumerate and itemize.

The answers:

Computer Scientist A computer scientist is a person who brings chaos to the world.

Skateboarding Skateboarding is the sports which destroys the handrails.

Vegetable Vegetables are very healthy food.

Science Fiction A science fiction[1] movie is a very interesting movie.

You can redefine `\descriptionlabel` to change the style of description. For example:

```
\renewcommand{\descriptionlabel}[1]%
{\hspace{\labelsep}\bfseries \sffamily #1}
```

results in :

[1] SF by shorthand

Computer Scientist A computer scientist is a person who brings chaos to the world.

Skateboarding Skateboarding is the sports which destroys the handrails.

Vegetable Vegetables are very healthy food.

Science Fiction A science fiction very interesting movie.

1.5 Your own list

You can create you own list as follows:

```
\newcommand{\entrylabel}[1]{\mbox{\bfseries\sffamily #1: }}
\newenvironment{Ventry}[1]%
{\begin{list}{}%
{\renewcommand{\makelabel}{\entrylabel}%
 \settowidth{\labelwidth}{\entrylabel{#1}}%
 \setlength{\leftmargin}{\labelwidth+\labelsep}}}%
{\end{list}}

\begin{Ventry}{Computer Scientist}
\item[Computer Scientist] A computer scientist is a person who brings chaos to
the world.\index{computer scientist}
\item[Skateboarding] Skateboarding is the sports which destroys the
handrails.\index{skateboarding}
\item[Vegetable] Vegetables are very healthy food.\index{vegetable}
\item[Science Fiction] A science fiction
very interesting movie.\index{science fiction}
\end{Ventry}
```

Computer Scientist: A computer scientist is a person who brings chaos to the world.

Skateboarding: Skateboarding is the sports which destroys the handrails.

Vegetable: Vegetables are very healthy food.

Science Fiction: A science fiction very interesting movie.

2 Math Formulae

Math in LaTeXis very easy to enter, simply put you formula between $(pronouced "expensive") For example: $\sum_{p \text{ prime}} f(p) = \int_{t>1} f(t)\,d\pi(t)$.

Or you can put it between $$(very expensive). This results:

$$\sum_{p \text{ prime}} f(p) = \int_{t>1} f(t)\,d\pi(t).$$

Note the difference between the two results is not only in size.

You can enter Greek as `$\lambda,\xi,\pi,\mu,\Phi,\Omega$`.

$\lambda, \xi, \pi, \mu, \Phi, \Omega$

Here is a more complex one:

$$\prod_{j\geq 0}\left(\sum_{k\geq 0} a_{jk} z^k\right) = \sum_{n\geq 0} z^n \left(\sum_{\substack{k_0,k_1,\ldots\geq 0 \\ k_0+k_1+\cdots=n}} a_{0k_0} a_{1k_1} \cdots\right).$$

Please figure out how to type it.

2.1 Aligned Math

$$\mathbf{X} = \begin{pmatrix} x_{11} & x_{12} & \cdots \\ x_{21} & x_{22} & \cdots \\ \vdots & \vdots & \ddots \end{pmatrix}$$

$$y = \begin{cases} a & \text{if } d > c \\ b + x & \text{in the morning} \\ l & \text{all day long} \end{cases}$$

$$\left(\begin{array}{c|c} 1 & 2 \\ \hline 3 & 4 \end{array}\right)$$

$$\begin{aligned} f(x) &= \cos x && (1) \\ f'(x) &= -\sin x && (2) \\ \int_0^x f(y)\,dy &= \sin x && (3) \end{aligned}$$

$$\begin{aligned} \sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \\ - \frac{x^7}{7!} + \cdots \end{aligned} \qquad (4)$$

2.2 Phantoms

$$\Gamma_{ij}{}^{k} \qquad \text{as opposed to} \qquad \Gamma_{ij}^{k}$$

```
\Gamma_{ij}^{\phantom{ij}k} \qquad \textrm{as opposed to} \qquad \Gamma_{ij}^{k}
```

3 Theorems

```
\newtheorem{law}{Law}
\newtheorem{jury}[law]{Jury}
```

Law 1 *Don't hide in the witness box*

Jury 2 (The Twelve) *It could be you! So beware and see law 1*

Law 3 *No, No, No*

4 Tables

Here I inserted a floating table with tabularx and table environments. See Table 1.

You can set your columns raggedleft by defining a new column specifier.

Table 1: 1997 U.S. Injuries Per Selected Activity

Activity	Total Participants*	Total Injured	Treated And Released (%)	Hospital Visits Hospitalized (%)
Ice Hockey	318,000	77,492	98.9 0.9	.244
Baseball	2,033,000	326,569	98.2 1.1	.161
Basketball	4,527,000	644,921	99 0.6	.142
Football	4,414,000	334,420	98 1.4	.076
Soccer	2,825,000	148,913	98.3 1.1	.053
Golf	971,000	39,473	95.6 2.3	.040
Snowboarding	1,037,000	37,638	96.7 2.5	.036
Volleyball	2,732,000	67,340	99.4 0.5	.025
Fishing	3,812,000	72,598	98.8 0.8	.019
Skateboarding	8,238,000	48,186	95.2 3.9	.006

```
\newcommand{\PBS}[1]{\let\temp=\\#1\let\\=\temp}
\newcolumntype{R}[1]{>{\PBS\raggedright\hspace{0pt}}m{#1}}
\newcolumntype{L}[1]{>{\PBS\raggedleft\hspace{0pt}}m{#1}}
```

Then you can change your tabularx settings like this:

```
\renewcommand{\tabularxcolumn}[1]{>{\PBS\raggedleft\hspace{0pt}}m{#1}}
```

You can set the ratio among the columns by changing the `\hsize` in the tabularx preamble.

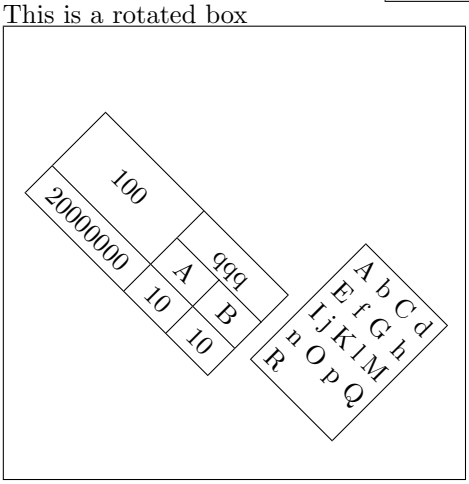
```
\begin{tabularx}{\linewidth}%
{|>{\setlength{\hsize}{.8\hsize}}X|%
>{\setlength{\hsize}{1.2\hsize}}X|}
```

This column is $\frac{2}{3}$ the width of the column to the right	This column is $\frac{3}{2}$ the width of the column to the right

Another table with `\multirow`:

100	qqq	
	A	B
20000000	10	10

This is a rotated box



A table with a thick vertical rule.

A	B	C
100	10	1

```
\setlength{\extrarowheight}{4pt}
```

or your table will look like:

A	**B**	*C*
100	**10**	*1*

as opposed to

A	**B**	*C*
100	**10**	*1*

You can automatically insert math $'s in a column. But you must start math first, so all surroundings are reversed!

$10!^{10!}$	a big number
10^{-999}	a small number

You can change `\arraycolsep` or `\tabcolsep` to control the separation between columns.

```
\setlength{\arraycolsep}{1cm}
```

$10!^{10!}$	a big number
10^{-999}	a small number

You can suppress a column space by a `@{}` in the tabular preamble:

```
\begin{array}{|l|@{}>{$}l<{$}|} \hline
```

$10!^{10!}$	a big number
10^{-999}	a small number

A table with double rules

BOXES	BOXES
BOXES	BOXES

If you set

```
\setlength{\doublerulesep}{4pt}
```

the table will look like

BOXES	BOXES
BOXES	BOXES

4.1 Table aligned with dots

Use the dcolumn package, we can construct tables with entries aligned on a "decimal point" etc.

```
\usepackage{dcolumn}

\newcolumntype{d}[1]{D{.}{\cdot}{#1}}
\newcolumntype{.}{D{.}{.}{-1}}
\newcolumntype{,}{D{,}{,}{2}}

\begin{tabular}{|d{-1}|d{2}|.|,|}
1.2 & 1.2 & 1.2 & 1,2 \\
1.23 & 1.23& 12.5 & 300,2 \\
1121.2 & 1121.2 & 864.13 & 435,234 \\
123 & 343 & 10 & 69 \\
.4 & .4 & & ,4 \\
  &  & .4 &
\end{tabular}
```

1·2	1·2	1.2	1,2
1·23	1·23	12.5	300,2
1121·2	1121·2	864.13	435,234
123	343	10	69
·4	·4		,4
		.4	

4.2 hhline example

a	b	c	d
1	2	3	4
i	j	k	l
w	x	y	z

```
\setlength{\arrayrulewidth}{.8pt}
\begin{tabular}{||cc||c|c||}
\hhline{|t:==:t:==:t|}
a&b&c&d \\\hhline{|:==:|~|~||}
1&2&3&4 \\\hhline{#==#~|=#}
i&j&k&l \\\hhline{||--||--||}
w&x&y&z \\\hhline{|b:==:b:==:b|}
\end{tabular}
```

4.3 Tables inside tables

Tables	with no line commands used	versus tables	with some line commands	used.

4.4 Longtable

Here is a longtable example:

Table 2: Amtrak Atlantic Coast Service: EFFECTIVE OCTOBER 27, 2002

North Carolina Florida Connecting Service					
Charlotte • Greensboro • Raleigh • Charleston					
Carolinian	Piedmont	North Carolina Service Train Name		Piedmont	Carolinian
80	74	◀ Train Number ▶		73	79
Daily	Daily	◀ Days of Operation ▶		Daily	Daily
Read Down		Mile		Read Up	
8 10A	5 40P	0	Charlotte, NC	10 34A	8 16P
8 37A	6 06P	28	Kannapolis, NC	9 53A	7 42P
8 54A	6 23P	43	Salisbury, NC	9 37A	7 26P
9 29A	6 56P	77	High Point, NC	9 05A	6 50P
9 48A	7 10P	89	Greensboro, NC	8 51A	6 37P
8 10A	5 40P	0	Charlotte, NC	10 34A	8 16P
8 37A	6 06P	28	Kannapolis, NC	9 53A	7 42P
8 54A	6 23P	43	Salisbury, NC	9 37A	7 26P
9 29A	6 56P	77	High Point, NC	9 05A	6 50P
9 48A	7 10P	89	Greensboro, NC	8 51A	6 37P
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Charlotte • Greensboro • Raleigh • Charleston					
80	74	◄ Train Number ►		73	79
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9 48A	7 10P	89	Greensboro, NC	8 51A	6 37P

5 color

You must use

```
\usepackage[usenames]{color}
```

in you preamble, or the color names can't be used.
blue red green yellow

6 Shaped Paragraphs

First paragraph from *Beloved*[4] by Toni Morrison.

124 WAS SPITE-
baby's venom. The women
so did the children. For years
his own way, but by 1873 Sethe and
victims. The grandmother, Baby Suggs, was dead, and the sons, Howard and
Buglar, had run away by the time they were thirteen years old — as soon as
merely looking in a mirror shattered it(that was the signal for Buglar); as soon
as two tiny hand prints appeared in the cake (that was it for Howard). Neither
boy waited to see more; another kettleful of chickpeas smoking in a heap on the
floor; soda crackers crumbled and strewn in a line next to the doorsill. Nor did
they wait for one of the relief period: the weeks, months even, when nothing
was disturbed. No. Each one fled at once — the moment the house commit-
ted what was for him the one insult not to be borne or witnessed a second
time. Within two months, in the dead of winter, leaving their grand-
mother, Baby Suggs; Sethe, their mother; and their little sister,
Denver, all by themselves in the gray and white house on Blue-
stone Road. It didn't have a number then, because Cincin-
nati didn't stretch that far. In fact, Ohio had been
calling itself a state only seventy years when first
one brother and then the next stuffed quilt
packing into his hat, snatched up this
shoes, and crept away from
the lively spite the
house felt for
them.
FUL. Full of a
in the house knew it and
each put up with the spite in
her daughter Denver were its only

7 Font

Remember the more **font** you use, **the more beautiful your** **document becomes.**

7.1 family, series, and shapes

`\textrm`	`{\rmfamily}`	Typeset text in roman family
`\textsf`	`{\sffamily}`	Typeset text in sans serif family
`\texttt`	`{\ttfamily}`	Typeset text in `typewriter` family
`\textmd`	`{\mdseries}`	Typeset text in medium series
`\textbf`	`{\bfseries}`	Typeset text in **bold** series
`\textup`	`{\upshape}`	Typeset text in upright shape
`\textit`	`{\itshape}`	Typeset text in *italic* shape
`\textsl`	`{\slshape}`	Typeset text in *slanted* shape
`\textsc`	`{\scshape}`	Typeset text in Small Caps shape
`\emph`	`{\em }`	Typeset text *emphasized*
`\textnormal`	`{\normalfont}`	Typeset text in the document font

7.2 default text fonts

```
\renewcommand{\familydefault}{cmss}
\renewcommand{\seriesdefault}{bold}
\renewcommand{\shapedefault}{sl}
```

7.3 symbol

`\symbol{104}`=h

7.4 MathFonts

You can change the math version with `\mathversion`. Here is a normal math-version:

$$f(x) = \cos x \tag{5}$$
$$f'(x) = -\sin x \tag{6}$$
$$\int_0^x f(y)\,dy = \sin x \tag{7}$$

Here is a **bold** math version:

$$\boldsymbol{f(x) = \cos x} \tag{8}$$
$$\boldsymbol{f'(x) = -\sin x} \tag{9}$$
$$\boldsymbol{\int_0^x f(y)\,dy = \sin x} \tag{10}$$

7.5 font packages

7.5.1 Old German Fonts

gothfamily: Hello, this is gothfamily.
frakfamily: Hello, this is frakfamily.
swabfamily: Hello, this is swabfamily.

7.6 Lucida Bright

Hi, here is some Lucida Bright Font! Test the 'ff' ligature. Test the "fi" ligature. Test the "fl" ligature.

Hi, here is some 30pt Lucida Bright Font!

7.7 Setting font attributes individually

Hello, this is Zapf Chan font.

I'm switching font size to 1in!

Haha!.

7.8 Choose Font Directly

Using we can choose whatever font we want.

```
\usefont{encoding}{family}{series}{shape}
```

For example:

```
\usefont{OT1}{cmdh}{m}{n}
```

We get the result. Computer Modern Dunhill family medium series upright shape.

8 Figure insertion

Now it's time to explain how to insert figures in to your document. First we use the package graphics:

```
\usepackage{graphicx}
```

8.1 Basic Insertion of a EPS figure

A figure can be inserted simply by `\includegraphics{file}`. This file must be a EPS figure file if you use dvips to create PostScript files. But it can be JPEG, PNG, PDF and many others, if you create PDF files.
Here we insert a figure with `\includegraphics{file}`, for example:

Do you know who made TEX? The answer is 

Figure 1: This is me, TEX!

8.2 Floating Figures

But the figure is not floating. It doesn't look right within the paragraphs unless its size if very small. If you want a floatig figure, use the figure environment and you can add caption (`\caption{This is me, \TeX!}`) and label(`\label{tex}`) to it. Centering it with `\centering`. And then you can refer to it as `\ref{tex}`. Note: `\label` must follow `\caption`. See figure 1.

8.3 Insert format other than EPS

If you want to use images other than EPS. You must convert them to EPS.
If you use JPEG. You can convert it to EPS with the program jpeg2ps and then insert the EPS file. Or you can automatically convert it.
To use the automatic conversion. First, you declare some file extension for use:

```
\DeclareGraphicsExtensions{.eps,.eps.gz,.jpg,.jpeg,.png}
```

And then declare a conversion command:

```
\DeclareGraphicsRule{.jpg}{eps}{.bb}{`jpeg2ps -r 100 #1}
```

Later you get the bounding box of you JPEG file into a .bb file with the program ebb.

```
ebb cat.jpg
```

Then you can insert your pic like figure 2.

```
\includegraphics{cat}
```

When the dvi file is converted to PS, dvips will call the program jpeg2ps.

8.4 Rotate and Scale Figures

You can Scale your figure using `\scalebox{h}[v]{object}`. See figure 3.

8.5 Boxed figures

See some boxed figures.
ovalbox doublebox Ovalbox

Figure 2: A JPEG figure

(a) The original figure

(b) clip to viewport=0 0 100 100

(c) clip to viewport=60 60 120 120

(d) trim 10 20 30 40

(e) angle=30

(f) clip and angle=30

Figure 3: Scaled figures.

(a) The original figure

(b) The scaled figure (-1,1)

(d) The scaled figure (0.5,1.2)

(c) The scaled figure (1,-1)

Figure 4: Boxed figures.

(a) fboxed

(b) fboxed with 10pt rules

(c) shadowboxed

8.6 The picins Package

If you use the package picins.

```
\usepackage{picins}
```

Then you can insert a figure as follows (See figure 5). This a paragraph cited from *The TeXbook*[2]

Figure 5: Hi! I'm Meta.

"This is a handbook about TEX, a new typesetting system intended for the creation of beautiful books—and especially for books that contain a lot of mathematics. By preparing a manuscript in TEX format, you will be telling a computer exactly how the manuscript is to be transformed into pages whose typographic quality is comparable to that of the world's finest printers; yet you won't need to do much more work than would be involved if you were simply typing the manuscript on an ordinary typewriter. In fact, your total work will probably be significantly less, if you consider the time it ordinarily takes to revise a typewritten manuscript, since computer text files are so easy to change and to reprocess. (If such claims sound too good to be true, keep in mind that they were made by TEX's designer, on a day when TEX happened to be working, so the statements may be biased; but read on anyway.)"

9 汉字

这一节讨论有关汉字的处理方法。

9.1 首段缩进

通常英语文章在一节开始时的第一段是不缩进的。
而在第二段就会缩进 `\parindent` 的距离。现在的 `\parindent` 大小是: 0.0pt.
如果你设置

```
\setlength{\parindent}{2em}
```

你就可以得到像这样的缩进两个字的效果。但是第一段仍然没有缩进。

9.2 缩进首段

为了让第一段缩进。你可以使用 indentfirst 宏包。它其实只有两句话：

```
\let\@afterindentfalse\@afterindenttrue
\@afterindenttrue
```

如果你只想让你的后面一段首行有缩进，可以这么做：

```
\makeatletter
\let\@afterindentrestore\@afterindentfalse
\let\@afterindentfalse\@afterindenttrue
\@afterindenttrue
\makeatother
```

这样之后的章节第一段都会缩进当前的 `\parindent` 那么多距离。

9.3 回到没有缩进的情况

由于刚才我们用 \@afterindentrestore 存储了 \verbafterindentfalse= 的定义。现在我们使用：

```
\makeatletter
\let\@afterindentfalse\@afterindentrestore
\@afterindentrestore
\makeatother
```

这下第一段又没有缩进了。
现在我恢复段落原来的缩进大小。

9.4 中文粗体测试

粗体变黑体 粗斜体变黑斜体。

9.5 字体间据修改

```
\newcommand\ziju[1]{\renewcommand{\CJKglue}{\hskip #1pt}}

\ziju{2.3}
```

现 在 的 字 距 是 2.3pt.

```
\ziju{1}
```

现在的字距是 1pt.

```
\renewcommand{\CJKglue}{\hskip 2.3pt}
```

现 在 的 字 距 是 2.3pt.

```
\renewcommand{\CJKglue}{\hskip 1em}
```

现 在 的 字 距 是 1em(一 个 汉 字 的 宽 度).

```
\renewcommand{\CJKglue}{\hskip 2.3pt plus 3pt}
```

现 在 的 字 距 是 2.3pt plus 3pt (有 3pt 的 伸 长 容 量).
现 在 的 字 距 是 2.3pt plus 3pt (有 3pt 的 伸 长 容 量).

```
\renewcommand{\CJKglue}{\hskip 2.3pt plus 3pt minus 2.3pt}
```

现 在 的 字 距 是 2.3pt plus 3pt (有 3pt 的 伸 长 容 量 和 2.3pt 的 收 缩 容 量).
现在的字距是 2.3pt plus 3pt minus 2.3pt(有 3pt 的伸长容量和 2.3pt 的收缩容量).

```
\renewcommand{\CJKglue}{\hskip 2.3pt plus 3pt minus 10pt}
```

现在是 2.3pt plus 3pt minus 10pt (有 3pt 的伸长容量和 10pt 的收缩容量).

9.6 中文字体大小

```
\fontsize{5pt}{11pt}\selectfont 5pt 大小的字
\fontsize{10pt}{11pt}\selectfont 10pt 大小的字
\fontsize{15pt}{16pt}\selectfont 15pt 大小的字
\fontsize{20pt}{21pt}\selectfont 20pt 大小的字
\fontsize{25pt}{26pt}\selectfont 25pt 大小的字
\fontsize{30pt}{31pt}\selectfont 30pt 大小的字
\fontsize{40pt}{41pt}\selectfont 40pt 大小的字

\fontsize{100pt}{100pt}\selectfont 100pt 大小的字
```


```
\spaceskip=0pt
```

Hello, welcome to China. China is a great country.

Hello, welcome to China. China is a great country.

```
\spaceskip=10pt
```

Hello, welcome to China. China is a great country.

```
\spaceskip=20pt
```

Hello, welcome to China. China is a great country.

```
\spaceskip=3pt \xspaceskip=40pt
```

Hello, welcome to China. China is a great country.

References

[1] Leslie Lamport. LaTeX: A Document Preparation System. Addison-Wesley, Reading, Massachusetts, second edition, 1994, ISBN 0-201-52983-1.

[2] Donald E. Knuth. The TeXbook, Volume A of Computers and Typesetting, Addison-Wesley, Reading, Massachusetts, second edition, 1984, ISBN 0-201-13448-9.

[3] Michel Goossens, Frank Mittelbach and Alexander Samarin. The LATEX Companion. Addison-Wesley, Reading, Massachusetts, 1994, ISBN 0-201-54199-8.

[4] Beloved, Toni Morrison. Alfred A. Knopf, Inc, 1987.