

# Tables and Figures\*

Boris Veytsman

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# 1. Floating Bodies

## 1.1. Structure

Figures and tables do not follow text flow. They separately *float* in it. Therefore they are called *floats*.

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*Tabular Material*

*Graphics in L<sup>A</sup>T<sub>E</sub>X*



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# 1. Floating Bodies

## 1.1. Structure

Figures and tables do not follow text flow. They separately *float* in it. Therefore they are called *floats*.

Figures and tables have the same structure:

```
\begin{figure}[options]
  GRAPHICS
  \caption{This is a figure}
  \label{fig:figure}
\end{figure}

\begin{table}[options]
  TABULAR STUFF
  \caption{This is a table}
  \label{tab:figure}
\end{table}
```

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## 1.2. Where to Put a Float?

Good compositors try to put floats “beautifully”: not too far from the place where they are mentioned, the page must be not too empty, etc. This is a difficult task.

Four possibilities:

**Here:** Just put a float in the middle of the page.

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Four possibilities:

**Here:** Just put a float in the middle of the page.

**Top:** Put a float on the top of the page.

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Four possibilities:

**Here:** Just put a float in the middle of the page.

**Top:** Put a float on the top of the page.

**Bottom:** Put a float on the bottom of the page.

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Good compositors try to put floats “beautifully”: not too far from the place where they are mentioned, the page must be not too empty, etc. This is a difficult task.

Four possibilities:

**Here:** Just put a float in the middle of the page.

**Top:** Put a float on the top of the page.

**Bottom:** Put a float on the bottom of the page.

**Page:** Put a float on a separate page (maybe shared with other floats).





## 1.2. Where to Put a Float?

Good compositors try to put floats “beautifully”: not too far from the place where they are mentioned, the page must be not too empty, etc. This is a difficult task.

Four possibilities:

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**Top:** Put a float on the top of the page.

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**Page:** Put a float on a separate page (maybe shared with other floats).

You can tell L<sup>A</sup>T<sub>E</sub>X your preferences using options: h, t, b, p. I dislike h, so for me it is

```
\begin{figure}[tbp]
...
\end{figure}
```

But L<sup>A</sup>T<sub>E</sub>X does not always listen. . .



### 1.3. Too Many Unprocessed Floats

L<sup>A</sup>T<sub>E</sub>X has all floats in memory until it outputs them—and memory is not infinite!

Sometimes you find the error `Too many unprocessed floats`.

Solution: `\clearpage` typesets and flushes all floats. Just put it before the error!

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## 1.4. Caption

Caption gives a figure or table a name. L<sup>A</sup>T<sub>E</sub>X automatically numbers figures and tables.

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## 1.4. Caption

Caption gives a figure or table a name. L<sup>A</sup>T<sub>E</sub>X automatically numbers figures and tables.

There is an optional argument—it goes to list of tables or figures:

```
\caption[Melting Temperatures]{Melting Temperatures, As Measured By  
Mercury Thermometer With 2 Hours Intervals}
```



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## 1.5. Label

The `\label` command must go *after* caption. This is a common source of errors. It is *caption* that increments the counter!



## 2. Tabular Material

L<sup>A</sup>T<sub>E</sub>X has tabular environment to put everything aligned:

```
\begin{tabular}{|l|l|l|r|l|}
\hline\hline
Item & Who is responsible & & Cost\\
\hline\hline
Bus fare & John Smith & & \$23.20 \\
\hline
Meals & Mary Smith & & \$143.17 \\
\hline
Lodging & John Smith & & \$1234.08\\
\hline\hline
\end{tabular}
```

Item	Who is responsible	Cost
Bus fare	John Smith	\$23.20
Meals	Mary Smith	\$143.17
Lodging	John Smith	\$1234.08

The argument `{|l|l|l|r|l|}` lists columns and alignment (center, left, right), cells are separated by `&`, and rows by `\\`.

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Too many lines are ugly. This looks much better:

```

\begin{tabular}{llr}
\hline
Item & Who is responsible & Cost\\
\hline
Bus fare & John Smith & \$23.20 \\
Meals & Mary Smith & $143.17 \\
Lodging & John Smith & $1234.08\\
\hline
\end{tabular}

```

Item	Who is responsible	Cost
Bus fare	John Smith	\$23.20
Meals	Mary Smith	\$143.17
Lodging	John Smith	\$1234.08

Package *booktabs*<sup>1</sup> helps to typeset better tables.

<sup>1</sup>Simon Fear, Publication Quality Tables in  $\text{\LaTeX}$ , April 2005, <http://ctan.tug.org/tex-archive/macros/latex/contrib/booktabs>.



**Exercise 1.** Typeset the following file:

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```

table.tex

\documentclass{article}

\begin{document}

The list of expenses can be found in table~\ref{tab:expenses}.

\begin{table}[tbp]
  \centering
  \begin{tabular}{lll}
    \hline
    Item    & Who is responsible & Cost\\
    \hline
    Bus fare & John Smith        & \$23.20 \\
    Meals    & Mary Smith         & \$143.17 \\
    Lodging  & John Smith         & \$1234.08 \\
    \hline
  \end{tabular}
  \caption{The list of Expenses}
  \label{tab:expenses}
\end{table}

\end{document}

```



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### 3. Graphics in L<sup>A</sup>T<sub>E</sub>X

There are two packages: `graphics` (simple) and `graphicx` (extended). Extended package can scale and rotate graphics.

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### 3. Graphics in L<sup>A</sup>T<sub>E</sub>X

There are two packages: `graphics` (simple) and `graphicx` (extended). Extended package can scale and rotate graphics.

The use is very simple

```
\includegraphics{xterm.eps}  
\includegraphics[width=5cm]{xterm.eps}  
\includegraphics[width=1cm]{xterm.eps}
```

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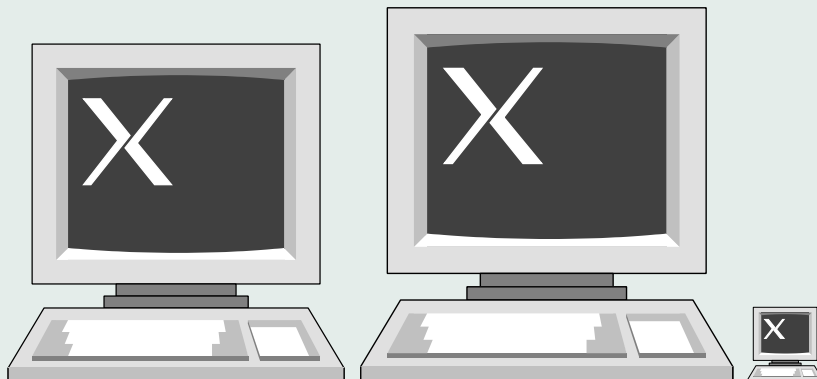
Quit

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```
\includegraphics[height=2cm]{xterm.eps}  
\includegraphics[width=1cm, height=2cm]{xterm.eps}
```

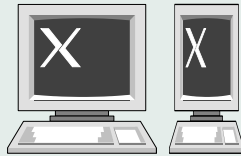
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```
\includegraphics[height=2cm]{xterm.eps}  
\includegraphics[width=1cm, height=2cm]{xterm.eps}
```



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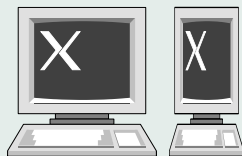
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```
\includegraphics[height=2cm]{xterm.eps}  
\includegraphics[width=1cm, height=2cm]{xterm.eps}
```



Since `latex` understands PS and EPS, and `pdflatex` understands PNG, JPG, PDF, you may want to keep two versions of a graphic file and drop the extension. The program will pick the right file.



**Exercise 2.** Typeset the file:

graphics.tex

```
\documentclass{article}
\usepackage{graphicx}
\begin{document}

\begin{figure}[tbp]
  \centering
  \includegraphics[height=5cm]{xterm}
  \caption{An X-Terminal}
  \label{fig:xterm}
\end{figure}

A simple X-Terminal is shown on Figure~\ref{fig:xterm}.

\end{document}
```

using graphics files from the `examples` directory. Which file is used?



## References

Fear, Simon. Publication Quality Tables in L<sup>A</sup>T<sub>E</sub>X. April 2005. <http://ctan.tug.org/tex-archive/macros/latex/contrib/booktabs>.

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