A to Z on figures with \LaTeX

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2010 KTS Workshop

This document is of A4 size with landscape orientation.
Terms used herein:

- latex; tex
- pdflatex; pdftex
- xelatex; xetex
- lualatex; lualatex
Moguls:

What do we owe him?

David Carlisle

What are we indebted to him?

Jin-Hwan Cho
To insert a figure file, the only thing you need is:

\includegraphics{foo}

However, not sufficient?
Now, satisfied?

\usepackage{graphicx}
\begin{document}
\includegraphics{foo}
\end{document}
Once upon a time:

\usepackage[dvips]{graphicx}
\begin{document}
\includegraphics{foo.eps}
\end{document}

Then:

#> latex doc.tex
#> dvips doc.dvi
#> pstopdf doc.ps
From \texttt{graphics.sty}:

\DeclareOption{dvips}{\def\Gin@driver{dvips.def}}
\DeclareOption{dvipdfmx}{\def\Gin@driver{dvipdfmx.def}}
\DeclareOption{xetex}{\def\Gin@driver{xetex.def}}
\DeclareOption{pdftex}{\def\Gin@driver{pdftex.def}}

From \texttt{xetex.def}:

\def\Gin@extensions{.pdf,.eps,.ps,\
    .png,.jpg,.bmp,.pict,.tif,.psd,.mac,.sga,.tga,.gif}
% xdvipdfmx is now the default driver, and can support EPS images,
What is a figure to LaTeX?

- Total height
- Height
- Depth
- Reference point
- Baseline
- Width
Now, the best way is:

\usepackage{graphicx}
\begin{document}
\includegraphics{foo}
\end{document}

Then:

#> xelatex doc.tex
Figure file formats in TWO groups:

- Raster: bmp, png, jpg, tif, eps, pdf, · · ·
- Vector: eps, pdf, wmf, emf, · · ·
By what do you get RASTER figures?

- Camera
- Screen capture
- Adobe Photoshop

Figure 1: Adobe Photoshop
By what tool you get VECTOR figures?

- Adobe Illustrator
- Microsoft Visio
- Xfig
- Dia
- Inkscape
- CAD

Figure 2: Adobe Illustrator
Figure 3: 141 mm PDF
Figure 4: 100 DPI JPG
Figure 7: 600 DPI JPG
Figure 8: 100 DPI JPG $\frac{1}{2}$ scaled down

Figure 9: 150 DPI JPG $\frac{1}{2}$ scaled down
Figure 10: 300 DPI JPG $\frac{1}{2}$ scaled down

Figure 11: 600 DPI JPG $\frac{1}{2}$ scaled down
Figure 12: 1680 pixels 72 DPI JPG \(\frac{1}{4}\) scaled down
Figure 13: 1680 pixels 100 DPI JPG $\frac{1}{3}$ scaled down
Figure 14: 1680 pixels 150 DPI JPG $\frac{1}{2}$ scaled down
Some tips for figure file processing:

```bash
#> convert -density 150 foo.bmp foo.jpg
#> for %i in (*.bmp) do convert -density 150 %i %~ni.jpg
#> epstopdf foo.eps
#> for %i in (*.eps) do epstopdf %i
#> pdfcrop foo.pdf
```
Recommendations:

- Keep size ratio.
- Try to use only the `scale` option for `includegraphics`.
- One figure should have only one message.
Where should we put figures on page?
Why floating?

\begin{figure}[!hbt]
\includegraphics{foo}
\caption{blah blah}
\label{xxx}
\end{figure}

A tip to force figures to settle:

\clearpage
If you don’t want floating:

- *caption.sty* (or *ccaption.sty* emulated by *memoir.cls*)
- *minipage* environment

\begin{minipage}{\textwidth}
\centering
\includegraphics[scale=.2]{silver}
\captionof{figure}{Hoze Jr.}
\end{minipage}
Figures in a table:

<table>
<thead>
<tr>
<th>Silver</th>
<th>at</th>
<th>Jeju-do</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>hiking along Olle-gil</td>
</tr>
</tbody>
</table>
\begin{tabular}{ccc}
\includegraphics[scale=.15]{silver} & \includegraphics[scale=.15]{silver} & \includegraphics[scale=.15]{silver} \\
Silver & at & Jeju-do \\
\includegraphics[scale=.15]{silver} & hiking along Olle-gil & \\
& \includegraphics[scale=.15]{silver} \\
\end{tabular}
\newpage

A tip to align figures, or a figure and a text:

\[[-.5\textwidth]

I am happy to join with you today in what will go down in history as the greatest demonstration for freedom in the history of our nation. Five score years ago, a great American, in whose symbolic shadow we stand today, signed the Emancipation Proclamation. This momentous decree came as a great beacon light of hope to millions of Negro slaves, who had been seared in the flames of withering injustice. It came as a joyous daybreak to end the long night of their captivity. But one hundred years later, the Negro still is not free. One hundred years later, the life of the Negro is still sadly crippled by the manacles of segregation and the chains of discrimination. One hundred years later, the Negro lives on a lonely island of poverty in the midst of a vast ocean of material prosperity. One hundred years later, the Negro is still languished in the corners of American society and finds himself an exile in his own land. And so we’ve come here today to dramatize a shameful condition.
I am happy to join with you today in what will go down in history as the greatest demonstration for freedom in the history of our nation. Five score years ago, a great American, in whose symbolic shadow we stand today, signed the Emancipation Proclamation. This momentous decree came as a great beacon light of hope to millions of Negro slaves, who had been seared in the flames of withering injustice. It came as a joyous daybreak to end the long night of their captivity. But one hundred years later, the Negro still is not free. One hundred years later, the life of the Negro is still sadly crippled by the manacles of segregation and the chains of discrimination. One hundred years later, the Negro lives on a lonely island of poverty in the midst of a vast ocean of material prosperity. One hundred years later, the Negro is still languished in the corners of American society and finds himself an exile in his own land. And so we’ve come here today to dramatize a shameful condition.

\begin{strip}
\includegraphics{foo}
\end{strip}

I am happy to join with you today in what will go down in history as the greatest demonstration for freedom in the history of our nation. Five score years ago, a great American, in whose symbolic shadow we stand today, signed the Emancipation Proclamation. This momentous decree came as a great beacon light of hope to millions of Negro slaves, who had been seared in the flames of withering injustice. It came as a joyous daybreak to end the long night of their captivity. But one hundred years later, the Negro still is not free. One hundred years later, the life of the Negro is still sadly crippled by the manacles of segregation and the chains of discrimination. One hundred years later, the Negro lives on a lonely island of poverty in the midst of a vast ocean of material prosperity. One hundred years later, the Negro is still languished in the corners of American society and finds himself an exile in his own land. And so we’ve come here today to dramatize a shameful condition.
Packages related to figures:

- subfigure.sty
- hvfload.sty
- wrapfig.sty
- eso-pic.sty
- wallpaper.sty
- everypage.sty
- flowfram.sty

#> texdoc hvfload
To make text flow around a figure, using \texttt{wrapfig} package:

I am happy to join with you today in what will go down in history as the greatest demonstration for freedom in the history of our nation. Five score years ago, a great American, in whose symbolic shadow we stand today, signed the Emancipation Proclamation. This momentous decree came as a great beacon light of hope to millions of Negro slaves, who had been seared in the flames of withering injustice. It came as a joyous daybreak to end the long night of their captivity. Five score years ago, a great American, in whose symbolic shadow we stand today, signed the Emancipation Proclamation. This momentous decree came as a great beacon light of hope to millions of Negro slaves, who had been seared in the flames of withering injustice. It came as a joyous daybreak to end the long night of their captivity.

Figure 17: Martin Luther King Jr.
\begin{wrapfigure}{l}{0.35\textwidth}
\begin{center}
\includegraphics[scale=.5]{MartinLutherKingSpeaking}
\end{center}
\caption{Martin Luther King Jr.}
\end{wrapfigure}
I am happy to join with you today in what will go down in history as the greatest demonstration for freedom in the history of our nation. Five score years ago, a great American, in whose symbolic shadow we stand today, signed the Emancipation Proclamation. This momentous decree came as a great beacon light of hope to millions of Negro slaves, who had been seared in the flames of withering injustice. It came as a joyous daybreak to end the long night of their captivity.

I am happy to join with you today in what will go down in history as the greatest demonstration for freedom in the history of our nation.
\begin{minipage}[m]{\textwidth}
\begin{minipage}{.475\textwidth}
\includegraphics[scale=.25]{silver}
\end{minipage}\hfill
\end{minipage}
\newpage
How to put a list next to a figure?
Get it out of your mind.

What you need only is:

• The \textit{figure} environment
• The \textit{wrapfig} package
Where to round up the figure files?

\graphicspath{{fig/}{../fig/}{../Eng/fig/}}
An alternative of eps editors, *Tikz*:

\begin{tikzpicture}[-,>=stealth’,shorten >=1pt,node distance=2cm, on grid,semithick,inner sep=2pt,bend angle=50, font=\small\sffamily]
\node (A) {Business};
\node (B) [below=of A] {Planning};
\node (C) [below=of B] {Design};
\node (D) [below left=of C] {Development};
\node (E) [below right=of C] {Support};
\node (F) [below=of E] {Translation};
\path
(B) edge (A)
(C) edge (B)
(D) edge (C)
(D) edge [bend left] (B)
(E) edge (C)
(E) edge [bend right] (B)
(F) edge (E)
(F) edge [bend right] (A);
\end{tikzpicture}
Things you can do with \textit{hzillust.sty} based on \textit{memoir}:

- \texttt{\textbackslash placefigure[...]{figure}}
- \texttt{\textbackslash illustfigure[...]{figure}{text}}
- \texttt{\textbackslash placetable[...]{tabular}}
- \texttt{\textbackslash illusttable[...]{tabular}{text}}
- \texttt{\textbackslash listfig[...]{figure}}
- \texttt{\textbackslash linefig[...]{figure}}
- \texttt{\textbackslash Fenumerate}
Figure 18: Li Bingbing
Li Bingbing (born February 27, 1976) is a Chinese actress and singer. Becoming active in her acting career since 1994, Li has steadily achieved success in both television and film, especially in Mainland China and other Asian countries.
<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>JIS B</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>841x1189</td>
<td>1000x1414</td>
<td>917x1297</td>
<td>1030x1456</td>
</tr>
<tr>
<td>1</td>
<td>594x841</td>
<td>707x1000</td>
<td>648x917</td>
<td>728x1030</td>
</tr>
<tr>
<td>2</td>
<td>420x594</td>
<td>500x707</td>
<td>458x648</td>
<td>515x728</td>
</tr>
<tr>
<td>3</td>
<td>297x420</td>
<td>353x500</td>
<td>324x458</td>
<td>364x515</td>
</tr>
<tr>
<td>4</td>
<td>210x297</td>
<td>250x353</td>
<td>229x324</td>
<td>257x364</td>
</tr>
<tr>
<td>5</td>
<td>148x210</td>
<td>176x250</td>
<td>162x229</td>
<td>182x257</td>
</tr>
<tr>
<td>6</td>
<td>105x148</td>
<td>125x176</td>
<td>114x162</td>
<td>128x182</td>
</tr>
<tr>
<td>7</td>
<td>74x105</td>
<td>88x125</td>
<td>81x114</td>
<td>91x128</td>
</tr>
<tr>
<td></td>
<td>\textbf{A} &amp; \textbf{B} &amp; \textbf{C} &amp; \textbf{JIS B}</td>
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</tr>
<tr>
<td>0</td>
<td>841x1189 &amp; 1000x1414 &amp; 917x1297 &amp; 1030x1456</td>
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</tr>
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<td>1</td>
<td>594x841 &amp; 707x1000 &amp; 648x917 &amp; 728x1030</td>
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<tr>
<td>2</td>
<td>420x594 &amp; 500x707 &amp; 458x648 &amp; 515x728</td>
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<td></td>
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<tr>
<td>3</td>
<td>297x420 &amp; 353x500 &amp; 324x458 &amp; 364x515</td>
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<td>4</td>
<td>210x297 &amp; 250x353 &amp; 229x324 &amp; 257x364</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>148x210 &amp; 176x250 &amp; 162x229 &amp; 182x257</td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>105x148 &amp; 125x176 &amp; 114x162 &amp; 128x182</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>74x105 &amp; 88x125 &amp; 81x114 &amp; 91x128</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\midrule
\bottomrule
\end{tabular}
In computer graphics, a raster graphics image or bitmap is a data structure representing a generally rectangular grid of pixels, or points of color, viewable via a monitor, paper, or other display medium. Raster images are stored in image files with varying formats.

<table>
<thead>
<tr>
<th></th>
<th>raster</th>
<th>vector</th>
</tr>
</thead>
<tbody>
<tr>
<td>eps</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>pdf</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>bmp</td>
<td>O</td>
<td>X</td>
</tr>
<tr>
<td>jpg</td>
<td>O</td>
<td>X</td>
</tr>
<tr>
<td>png</td>
<td>O</td>
<td>X</td>
</tr>
</tbody>
</table>
In computer graphics, a raster graphics image or bitmap is a data structure representing a generally rectangular grid of pixels, or points of color, viewable via a monitor, paper, or other display medium. Raster images are stored in image files with varying formats.
To put a tiny figure in a text line:

While the test is performed, the valid items will be indicated by a ✓ whereas the invalid items will be indicated by a ✗.

While the test is performed, the valid items will be indicated by a ✓ whereas the invalid items will be indicated by a ✗.

While the test is performed, the valid items will be indicated by a \texttt{\linefig{MarkChecked}} whereas the invalid items will be indicated by a \texttt{\linefig{MarkFailed}}.

While the test is performed, the valid items will be indicated by a \texttt{\linefig[\scale=2]{MarkChecked}} whereas the invalid items will be indicated by a \texttt{\linefig[\raise=0pt]{MarkFailed}}.
To add a figure to a list item:

- Unfasten the screw, and lift and remove the stand.

- Attach the wall-mount bracket, and fasten the screws.
\begin{itemize}
\item Unfasten the screw, and lift and remove the stand.
\listfig{WallMount1}
\item Attach the wall-mount bracket, and fasten the screws.
\listfig{WallMount2}
\end{itemize}
To enumerate items with figures:

1. Unfasten the screw, and lift and remove the stand.

2. Attach the wall-mount bracket, and fasten the screws.

\begin{enumerate}
\item Unfasten the screw, and lift and remove the stand.
\end{enumerate}
Attach the wall-mount bracket, and fasten the screws.
To put a watermark:

\usepackage{wallpaper}
\ThisCenterWallPaper(1){MartinLutherKing}.
With \textit{xkeyval.sty}, you can make your own macros with ease.

```
\newcommand\linefigscale{1}
\newlength\linefigraise

\define@key{linefig}{scale}{\renewcommand\linefigscale{#1}}
\define@key{linefig}{raise}{\setlength\linefigraise{#1}}
```

```
\newif\iflinefig@showfilename\linefig@showfilenamefalse
\define@boolkey{linefig}{showfilename}{true}{\ifKV@linefig@showfilename\linefig@showfilename\ifKV@linefig@showfilename\linefig@showfilenametrue\fi}
```

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How to insert a video?

\usepackage{movie15}

\includemovie{12cm}{9cm}{Opening.swf}

However, this is not compatible with XeTeX yet.
A makeshift is:

\hbox{%
\special{pdf:ann width 12cm height 9cm<</Subtype /Movie /Border [1 0 0] /T(movie) /Movie <</F (MyHome.mov)/Aspect [480 320] /Poster true>>/A <</ShowControls true>> >>}%
}
Pieces of advice:

1. Make sure the figure you are to insert to be necessary.
2. Decide what size the figures should be before everything else.
3. Make an effort to only rely on the `figure` environment.
4. If you have to deviate from the conventional typography, `hzillust.sty` could be a solution.
Thank you for your time.