

A to Z on figures with L^AT_EX

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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; luatex

Moguls:



David Carlisle

What do we owe him?

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
```

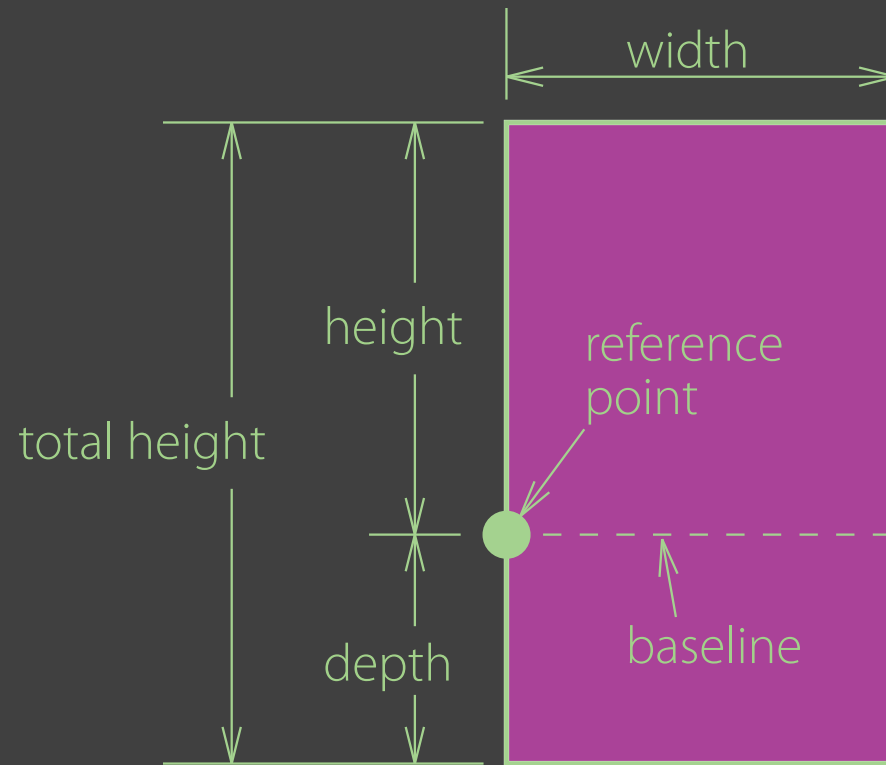
From *graphics.sty*:

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

From *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 L^AT_EX?



Now, the best way is:

```
\usepackage{graphicx}
```

```
\begin{document}
```

```
\includegraphics{foo}
```

```
\end{document}
```

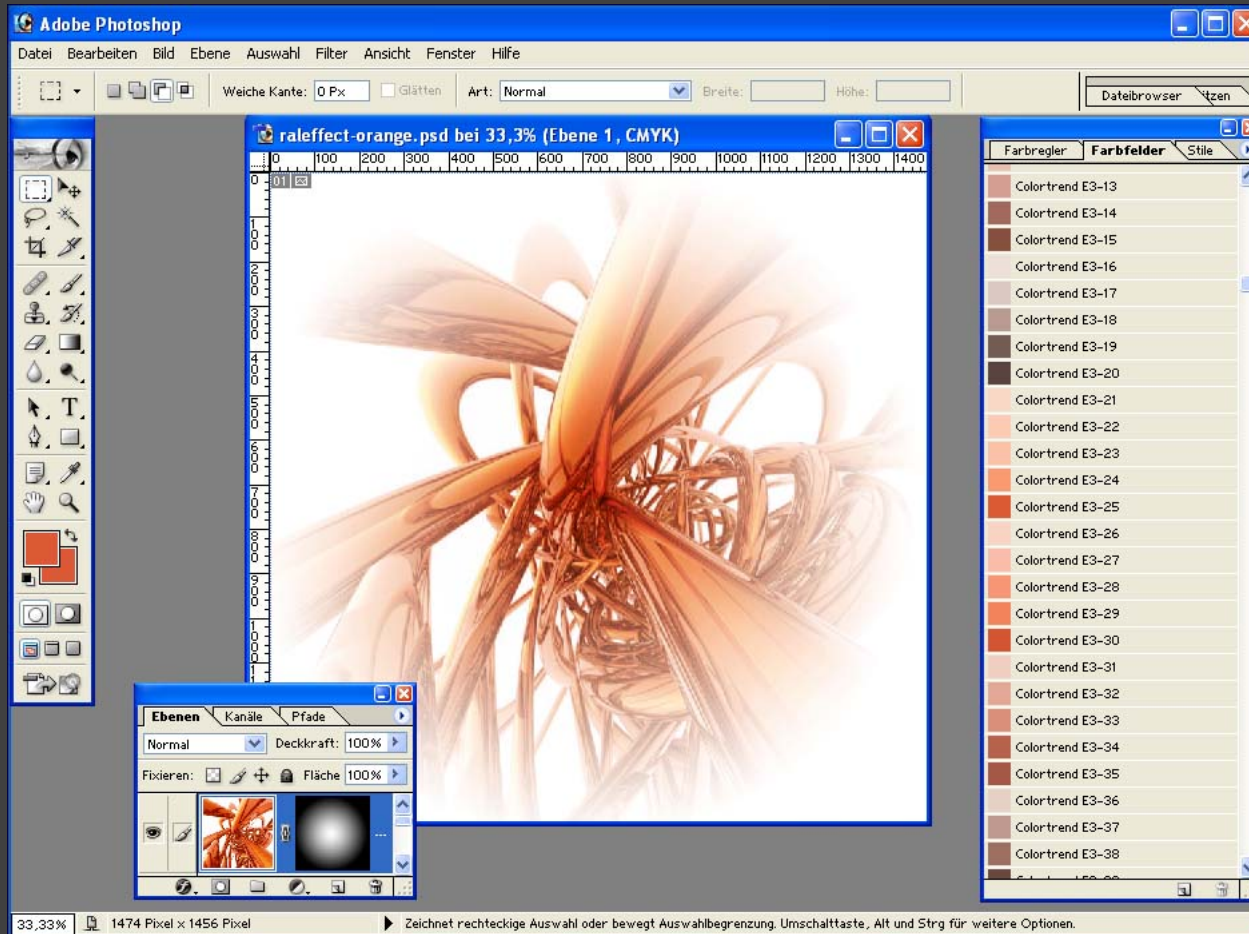
Then:

```
#> xelatex doc.tex
```

Figure file formats in TWO groups:

- Raster: bmp, png, jpg, tif, eps, pdf, . . .
- Vector: eps, pdf, wmf, emf, . . .

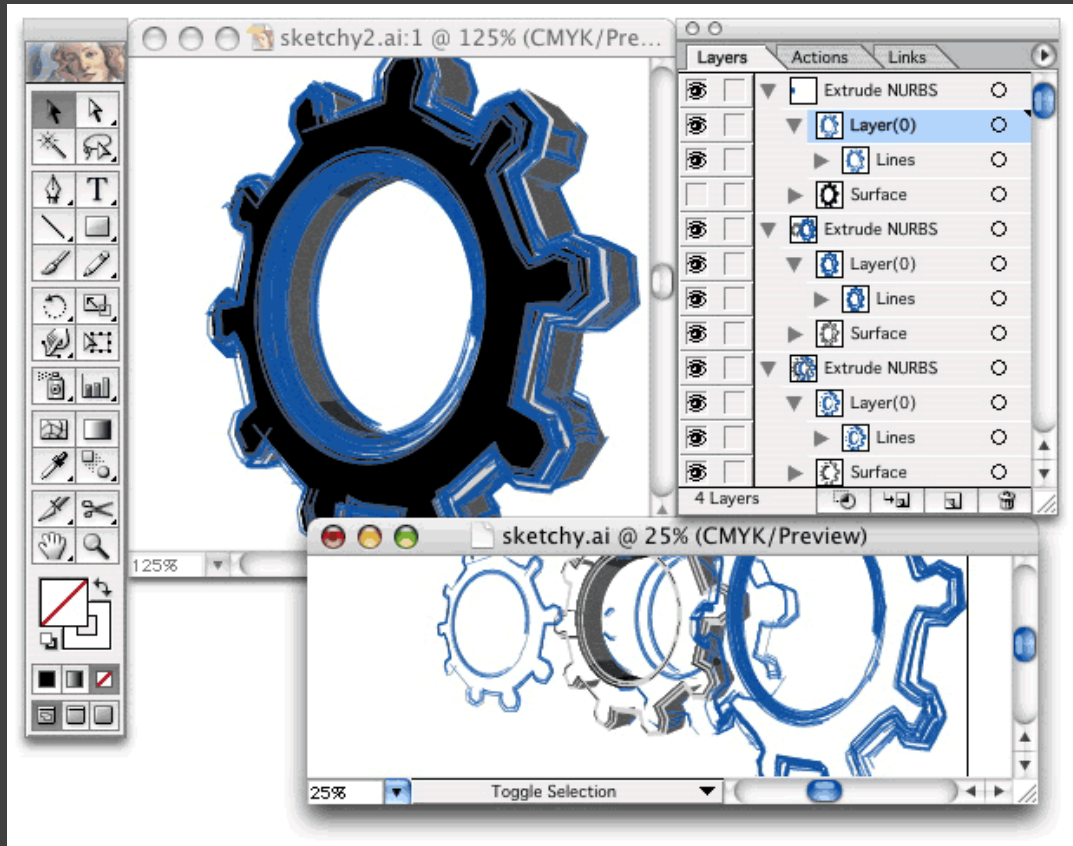
By what do you get RASTER figures?



- Camera
- Screen capture
- Adobe Photo-shop

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 5: 150 DPI JPG

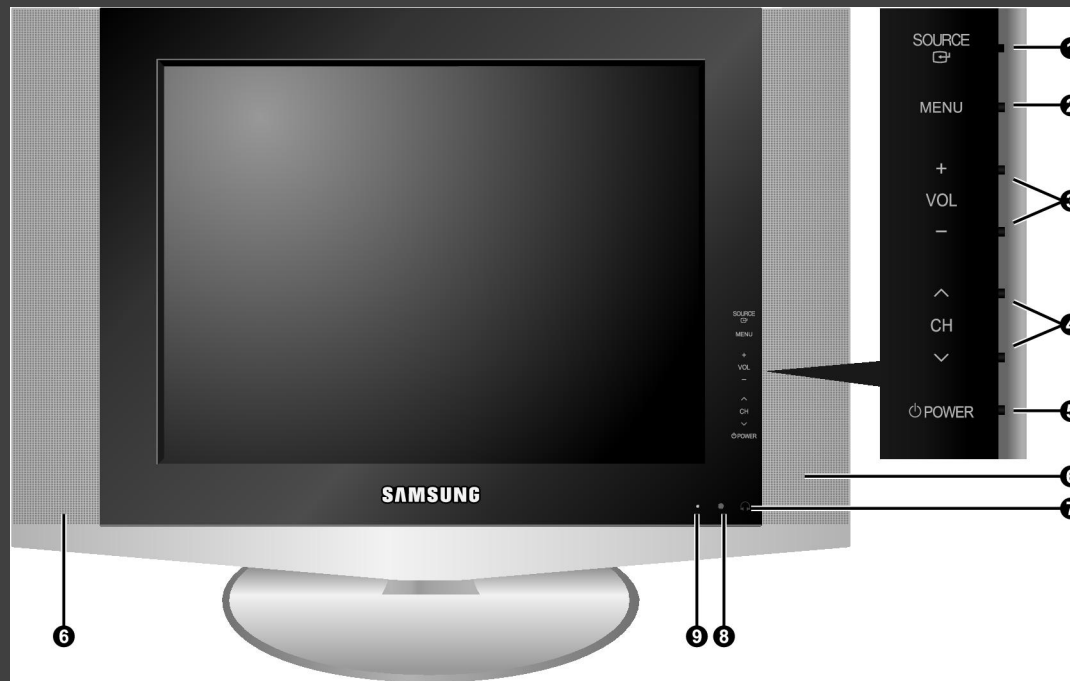


Figure 6: 300 DPI JPG



Figure 7: 600 DPI JPG



Figure 8: 100 DPI JPG $\frac{1}{2}$ scaled down

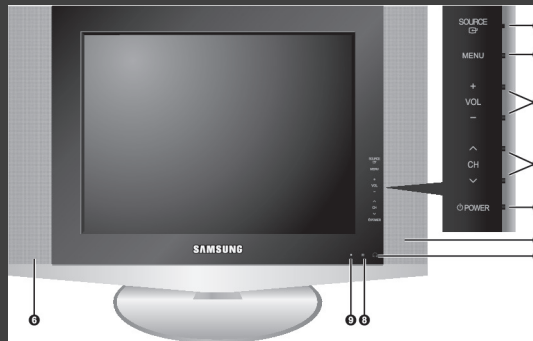


Figure 9: 150 DPI JPG $\frac{1}{2}$ scaled down

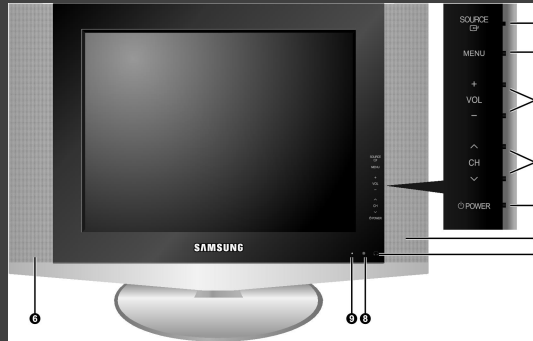


Figure 10: 300 DPI JPG $\frac{1}{2}$ scaled down



Figure 11: 600 DPI JPG $\frac{1}{2}$ scaled down

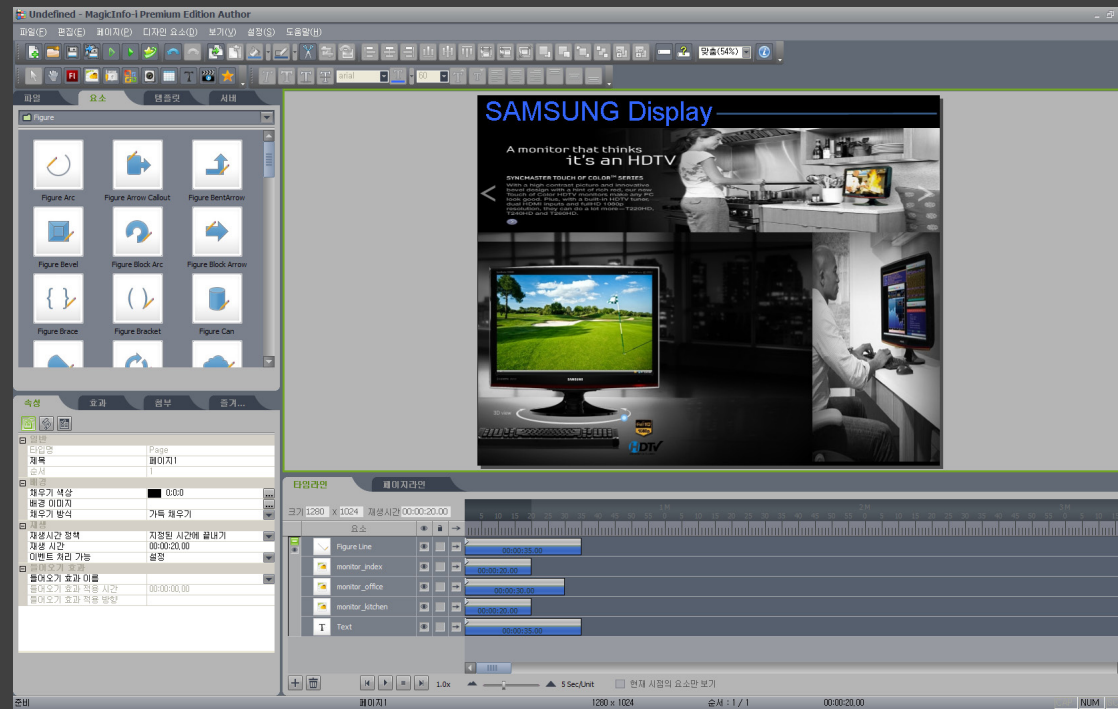


Figure 12: 1680 pixels 72 DPI JPG $\frac{1}{4}$ scaled down

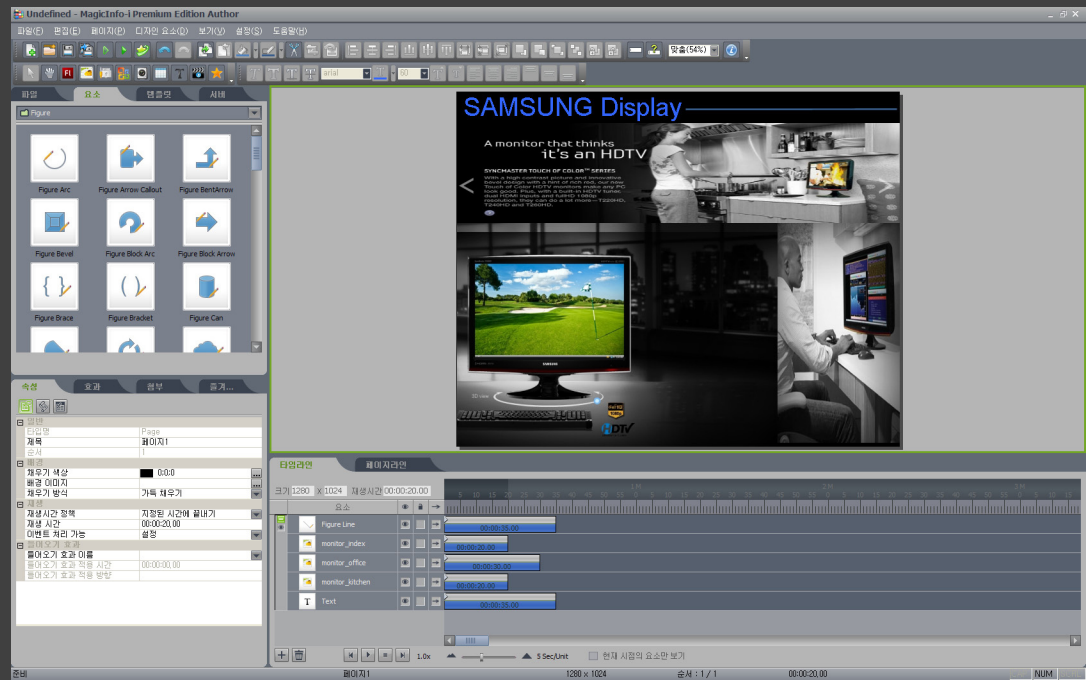


Figure 13: 1680 pixels 100 DPI JPG $\frac{1}{3}$ scaled down

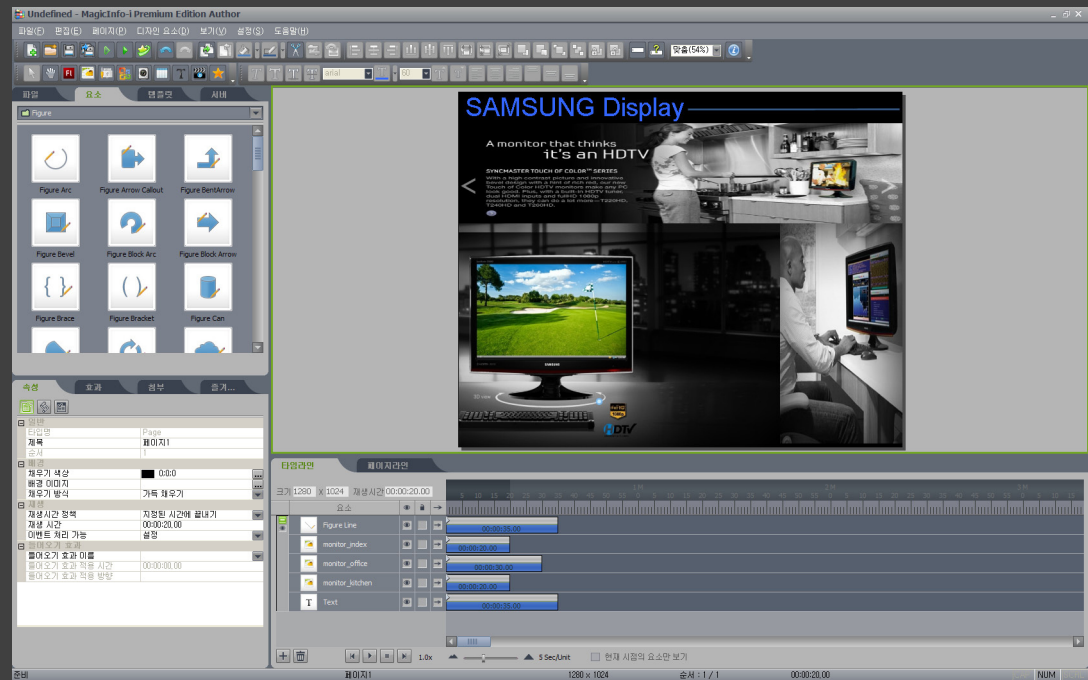


Figure 14: 1680 pixels 150 DPI JPG $\frac{1}{2}$ scaled down

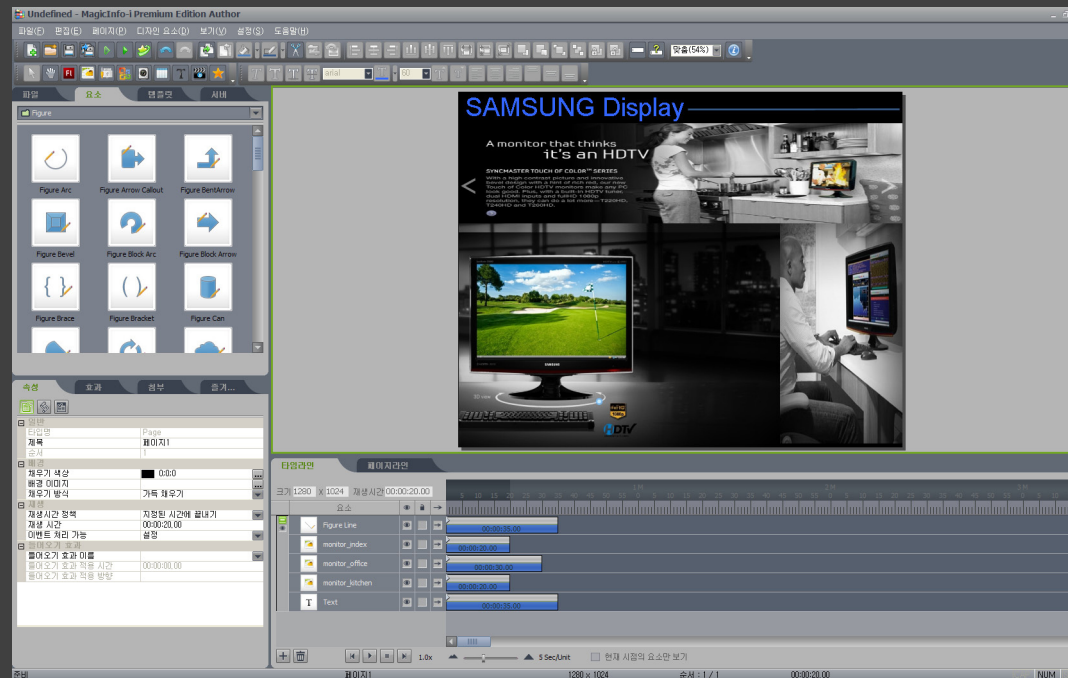


Figure 15: 1680 pixels 300 DPI JPG

Some tips for figure file processing:

```
#> 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?



J.N. SHERMAN, principal of Hazelton Public School, 7th year from a photo. COURTESY OF JOHN AND MARGARET

determined by the whim of the board. Principal J.N. Sherman, for example, made more in 1892, but saw his pay reduced in 1893, and 1894, and 1895. In addition, the board threatened to hold Mr. Sherman 'guilty of negligence of his duty' for not properly tending the classrooms. In June, 1897, Mr. Sherman suffered a nervous breakdown and, on doctor's orders, resigned his position. Mr. Aitch, his successor, did not have an easy time of it either. He resigned in November that year (1897) and was replaced by Mr. C.N. Evans (December 1897) through to December 1898. Mr. David Wright succeeded him as headmaster in 1899.

In his unpublished history of the school board, Jack Laycock noted "Sherman was indeed a victim of a very inconsiderate board who reduced his salary, chastised and threatened him for failing to keep the grounds clean and even failed to appreciate the man's thoroughness in offering to oversee the planting of trees on Arbor Day. All through the seasons of those days one is struck at the lack of concern for the staff by the board. They were hard-headed businessmen and none of them much better off financially than any of the teachers would ever be."

In August 1899 the overwhelming problem could no longer be ignored. The school board purchased three lots in the west end for a school site. Mr. H. Proulx set up plans for a brick school, which was built by William Wright for \$100. The West Ward School opened on November 30, 1899.

Call it restrictive justice if you wish, but Mr. J.N. Sherman returned to the education field again in 1901, but this time as a board of education member. In June that year he proposed a motion, seconded by J.R. Boyd, that all new teachers, except the principal, be started at a salary of \$250 with an increase of \$10 per annum, up to a limit of \$350, and that no-one teachers be employed with qualifications less than second class professional training. The motion was rejected. "Mr. Sherman had made the first move towards a salary schedule but he was 40 years ahead of his time," noted Jack Laycock in his school history.

Care and celebration

Hazelton had developed a social conscience and a remarkable sense of spirit in the village. When cannibal Henry Newkirk injured his spine in an accident at Thomson-Sons lumber mill, the village council ordered his taxes to help the family through the crisis. And when the community learned of the 'soldier' of Ladysmith, a South African village held by the anti-British forces during the First War, their spontaneous outpouring of joy evoked that of much larger towns in the province. The March 1, 1901, edition of the *Forster* reports people running to and fro, throwing flour into the air and waving flags. "The mayor had the official stars of Ladysmith's relief hero announced when a board meeting was in fact for a general demonstration - not a fake, not a weak attempt, but an actual demonstration on true Canadian lines" it was the grandest spectacle Hazelton had ever seen. A large procession formed at the



school and marched down Main Street, all carrying Union Jacks and singing patriotic songs to the accompaniment of the Hazelton Town Band.

"In connection with this whole magnificent affair one man stands out prominently, because of his loyalty and enthusiasm. That man is Mr. J.R. Rowe who formerly held a commission in the British army. As he received news that was the news of Ladysmith's relief, Mr. Rowe went [to] his office desk and cheered himself hoarse."

In the evening they gathered for patriotic addresses at the church hall and in a big bonfire at the Millar site (John Millar had purchased a portion of the swamp adjacent the river from the Hunt family and had a mill and three plant near the end of Measurers Street).

Then came

Floyd Clewmon, editor of the *Forster*, introduced Hazelton to the idea of becoming a town as early as August 1892. He said, "It must be apparent to all who have taken an interest in our municipal affairs that the machinery of government adapted to a small village is no longer suitable for a town of the size and growing importance of Hazelton." He mentioned a council of 11 members, structured on a committee system. "This against the expensiveness instead of being buried through in further at the close of a session would all be referred to a finance committee for careful examination and report. It would also be the duty of

BOOK WAR CELEBRATION, March 1901. When the villagers heard that British forces had rescued the South African village of Ladysmith, they staged a spontaneous celebration, captured in photographs. This is a view of Main Street looking west. The pocket square in the right foreground marks the point of the Methodist manse. Next to it is James Cook's grocery store. In the left foreground is the W.H. Matthews Road, north William Crockett's Hazelton Machine Works (later Oscar Wilde's assembly) beside it. The Dominion Hotel had not yet been built in the empty space next to Crockett's. White Brothers Hotel was then at the next building in the next row across an intersection. SOURCE: VILLAGE

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



Figure 16: Hoze Jr.

```
\begin{minipage}{\textwidth}  
\centering  
\includegraphics[scale=.2]{silver}  
\captionof{figure}{Hoze Jr.}  
\end{minipage}
```

Figures in a table:



Silver



at



Jeju-do



hiking along Olle-gil



```
\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\baselineskip]
```

Figure environment in two columns:

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{figure*}  
\includegraphics{foo}  
\end{figure*}
```

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

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cuted.sty or *midfloat.sty* in two columns:

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

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```
\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`
- `hvfloat.sty`
- `wrapfig.sty`
- `eso-pic.sty`
- `wallpaper.sty`
- `everypage.sty`
- `flowfram.sty`

#> `texdoc hvfloat`

To make text flow around a figure, using *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.



Figure 17: Martin Luther King Jr.

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.

```
\stri  
\begin{wrapfigure}{l}{0.35\textwidth}  
  %\vspace{-20pt}  
  \begin{center}  
    \includegraphics[scale=.5]{MartinLutherKingSpeaking}  
  \end{center}  
  %\vspace{-20pt}  
  \caption{Martin Luther King Jr.}  
  %\vspace{-10pt}  
\end{wrapfigure}  
\strii\ \strii  
\newpage
```

To put a text next to a figure, using the *minipage* environment:

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.

```
\stri\par
\begin{minipage}[m]{\textwidth}
\begin{minipage}{.475\textwidth}
\includegraphics[scale=.25]{silver}
\end{minipage}\hfill
\begin{minipage}{.475\textwidth}
\strii
\end{minipage}
\end{minipage}
\par\stri
\newpage
```

How to put a list next to a figure?

Get it out of your mind.

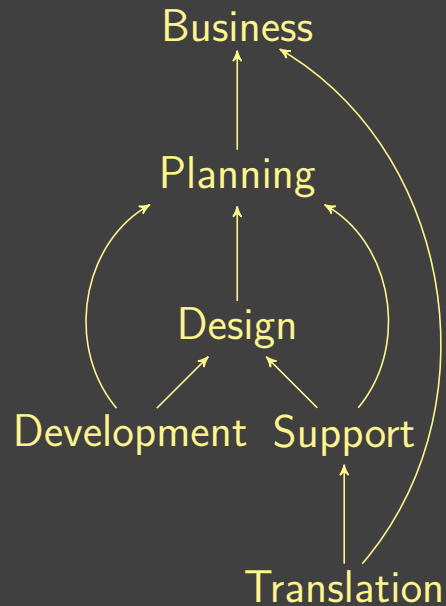
What you need only is:

- The *figure* environment
- The *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 *hzillust.sty* based on *memoir*:

- `\placefigure[...]{figure}`
- `\illustfigure[...]{figure}{text}`
- `\placetable[...]{tabular}`
- `\illusttable[...]{tabular}{text}`
- `\listfig[...]{figure}`
- `\linefig[...]{figure}`
- `IFenumerate`

`\placefigure:`



Figure 18: Li Bingbing

```
\placefigure[float=false, caption={Li Bingbing}, captionstyle=\raggedright, figurehalign=\centering, scale=0.35, rotate=90]{LiBingbing}
```

\illustrfigure:

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.



Li Bingbing

```
\illustrfigure[figureposition=right, frame, framerule=0.5pt, framesep=5pt, scale=0.25, valign=middle,  
textstyle=\sloppy\raggedright, legend={Li Bingbing}]{LiBingbing}{  
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.  
}
```

`\placetable:`

Table 1: Paper size

	A	B	C	JIS B
0	841x1189	1000x1414	917x1297	1030x1456
1	594x841	707x1000	648x917	728x1030
2	420x594	500x707	458x648	515x728
3	297x420	353x500	324x458	364x515
4	210x297	250x353	229x324	257x364
5	148x210	176x250	162x229	182x257
6	105x148	125x176	114x162	128x182
7	74x105	88x125	81x114	91x128

```
\placetable[float=false, caption={Paper size}, captionstyle=\centering, label=PaperSize,  
tabularstyle=\centering, tabularfont=\sffamily\small]{  
\begin{tabular}{ccccc}  
\toprule
```

```

& \textbf{A} & \textbf{B} & \textbf{C} & \textbf{JIS B} \\
\midrule
0 & 841x1189 & 1000x1414 & 917x1297 & 1030x1456 \\
1 & 594x841 & 707x1000 & 648x917 & 728x1030 \\
2 & 420x594 & 500x707 & 458x648 & 515x728 \\
3 & 297x420 & 353x500 & 324x458 & 364x515 \\
4 & 210x297 & 250x353 & 229x324 & 257x364 \\
5 & 148x210 & 176x250 & 162x229 & 182x257 \\
6 & 105x148 & 125x176 & 114x162 & 128x182 \\
7 & 74x105 & 88x125 & 81x114 & 91x128 \\
\bottomrule
\end{tabular}
}

```

`\illusttable:`

	raster	vector
eps	O	O
pdf	O	O
bmp	O	X
jpg	O	X
png	O	X

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.

```
\illusttable[valign=bottom]{  
\begin{tabular}{c|cc}  
\toprule  
& raster & vector \\  
\midrule  
eps & O & O \\  
pdf & O & O \\  
bmp & O & X \\  
jpg & O & X \\  
png & O & X \\  
\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.

```
}
```

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 ✗.

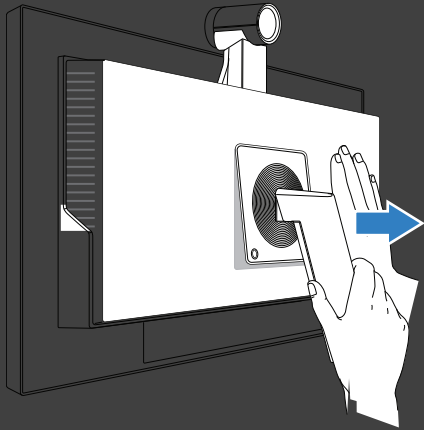
While the test is performed, the valid items will be indicated by a ✓ whereas the invalid items will be indicated by a ✗.

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

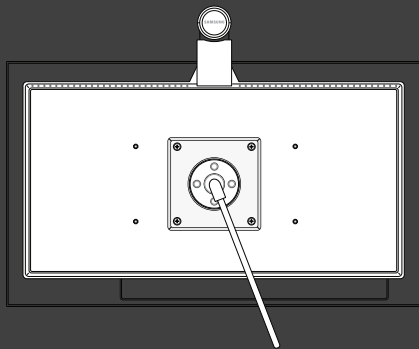
While the test is performed, the valid items will be indicated by a `\linefig[scale=2]{MarkChecked}` whereas the invalid items will be indicated by a `\linefig[raise=0pt]{MarkFailed}`.

To add a figure to a list item:

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

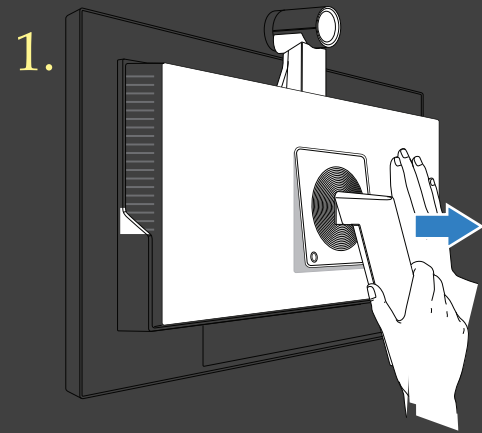


- Attach the wall-mount bracket, and fasten the screws.

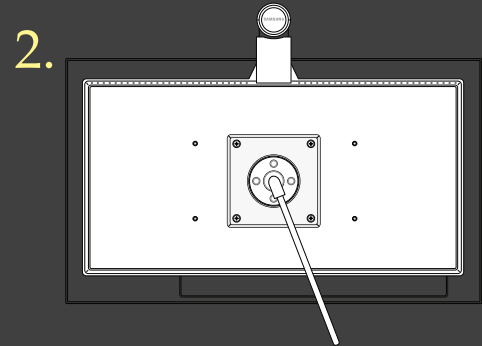


```
\begin{itemize}
\item Unfasten the screw, and lift and remove the stand.
\listfig{WallMount1}
\item Attach the wall-mount bracket, and fasten the screws.
\listfig{WallMount2}
\end{itemize}
```

To enumerate items with figures:



Unfasten the screw, and lift and remove the stand.



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

```
\begin{IFenumerate}  
\illustrate{WallMount1}{  
Unfasten the screw, and lift and remove the stand.
```

```
}  
\illustration{WallMount2}{  
Attach the wall-mount bracket, and fasten the screws.  
}  
\end{IFenumerate}
```

To put a watermark:

```
\usepackage{wallpaper}
```

```
\ThisCenterWallPaper{1}{MartinLutherKing}
```



With *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@showfilenametrue
```

```
\fi
```

```
}
```

```
\newcommand\setlinefig[1]{%  
\presetkeys{linefig}{#1}{}%  
}
```

```
\setlinefig{raise={-0.5ex}, scale=1}
```

```
\newcommand\linefig[2][]{%  
\setkeys{linefig}{#1}%  
\raisebox{\linefigraise}{\includegraphics[scale=\linefigscale]{#2}}%  
\iflinefig@showfilename{\tiny#2}\fi%  
}
```

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.