Including Graphics in LATEX

To get the most out of this document, also view the file `graphics.tex`
to see the commands that included the graphics

The graphicx package and the figure environment

LATEX provides a graphics package that allows you to include in your finished document graphics files which you have prepared using a graphics program such as Xfig, CorelDraw, MayuraDraw, Gnuplot, Maple, Matlab, etc. It's also possible to create an eps (Encapsulated PostScript) file from any Windows application by printing to a file, as described in the section below. A general rule of thumb for graphics formats: use pdf or eps for vector graphics (line art, graphs, etc), jpg for photographs, and png for screen shots.

When you use LATEX plus `dvips`,your graphics files must be in eps format. pdfLATEX (which produces a pdf file directly) accepts pdf, jpg, and png, but *not* eps. If you want to use pdfLATEX and your graphics files are in eps format, you can convert them to pdf using the `epstopdf` utility, which is most likely on your system. There is also a `jpeg2ps` utility for converting jpg files to eps.

For illustrating how to use the **graphicx** package to include graphics, we will use a small line drawing of a cat that exists in both eps and pdf formats (called `cat.eps` and `cat.pdf`). These files are in the same folder as this file (`graphics.tex`), which means LATEX and pdfLATEX can find them. (It's easiest to keep your `.eps` and/or `.pdf` files in the same folder as the LATEX file that uses them. LATEX looks for files first in the current directory and then in its normal input path.) Below we use the `\includegraphics` command from the **graphicx** package to insert the picture of the

cat right here: Note that if you use the command `\includegraphics{cat}`, omitting the filename extension, LATEX will find `cat.eps` and pdfLATEX will find `cat.pdf`.

For a more sophisticated treatment, we can put the `\includegraphics` command inside the `figure` environment, which will float the graphic to be sure there is room for it. (See Figure 1.) LaTeX usually places it at the top or bottom of the current page or at the top of the following page. In this example, we'll center, scale and rotate the graphic. Look for it at the bottom of this page. The figure environment also provides a "caption" command.

How to make EPS files from Windows applications

Even if the application you are using to create your figure cannot export as EPS, you can still create an EPS file from a Windows application (such as Word or Excel) as long as you have a (non-Microsoft) PostScript printer driver installed on the PC. The plain, generic Apple LaserWriter 16/600 PS is good for black & white graphics. If you don't have such a PS printer on your PC, use the Add Printer feature to add it; do *not* use a Microsoft, HP, or Tektronix driver. If you need color, use the Generic Adobe PS printer; you will probably need to download this from the Adobe web site (http://www.adobe.com/support/downloads/detail.jsp?ftpID=1500) before using Add Printer. Hint: When adding this printer, select that it's a local printer connected to your computer. Then, select "FILE local port" from the list of ports.

Figure 1: A bigger pussycat, on its side

Step 1: Printing to a file

From your PC application, select Print. When the Print window appears, choose to print to a file, and select the generic PS printer from your list of printers. Then be sure to select the EPS format from among the printer options, as follows:

On WinXP, click Properties, then click the "Advanced..." button. In the next window, click the "+" next to PostScript Options, then change PostScript Output Options to "Encapsulated PostScript (EPS)".

You will be asked to supply a file name. Windows will insist on giving the name a .prn extension, so afterwards you must rename the file with a .ps extension (e.g., mygraphic.ps). (NOTE: if you type quotes ("...") around your file name, Windows will not add the .prn extension and you can avoid the renaming step.)

After making a minor correction (Step 2 below), during which you can give your file a .eps extension, you should be able to import this new eps file into your LaTeX file.

> **PowerPoint Note:** The EPS produced from PowerPoint is especially nasty, containing some illegal code, and therefore requires an extra step to clean it up before doing Step 2. (Also note that, when creating your graphic in PowerPoint, it's best to use a portrait page with no background.) You can clean up the PowerPoint PS file as follows:
>
> - Using GSView, open the .ps file you just created.
> - From the File menu, select "Convert..."
> - In the Device box at the left, select "epswrite", and for Resolution, select 300dpi. Click OK.
>
> (When you are asked for a file name, it's easiest to choose a name with the extension .ps, saving the .eps extension for the final step, below).

Step 2: Correcting the Bounding Box

Windows printer drivers usually create the EPS graphic with a "Bounding Box" (an invisible box that determines the boundaries of the graphic) the size of a full page, even if the graphic itself is small. To change the BB to include only the graphic, open the .ps file in GSView. To display the BB, pull down the Options menu and click on "Show Bounding Box." To correct the BB, from the File menu, select "PS to EPS". In the window that appears, check "Automatically calculate Bounding Box" and click "Yes". You will then be asked to provide a name for a new file with the correct BB; this time give it the .eps extension. You can use the File menu to open the new file and view the corrected BB. Your new file should import correctly into LaTeX using the `\includegraphics` command as described above.

For more information

In Memo RPI.109, Text Formatting with LaTeX, you can find more on the figure environment in section 4.12, and more information on including graphics in section 7.4.

The RPI example file `exrotating.pdf` and its corresponding LaTeX file `exrotating.tex` show how to include landscape figures and tables:

http://www.rpi.edu/dept/arc/training/latex/Examples/exrotating.pdf
http://www.rpi.edu/dept/arc/training/latex/Examples/exrotating.tex

Official documentation for the LaTeX's graphics bundle is in `grfguide.pdf`; look for it on your system. The information on the `graphicx` package is in Section 4.4.

For an exhaustive treatment of including graphics in LaTeX documents see the excellent document, "Using Imported Graphics in LaTeX2e." You can find it at
http://www.ctan.org/tex-archive/info/epslatex.pdf.