Psfig/TEX 1.8 Users Guide

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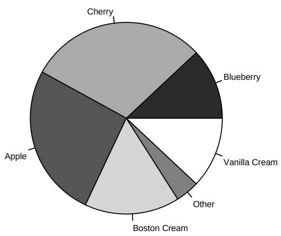
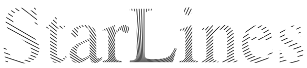
1 Introduction

Psfig/TEX is a macro package for TEX that facilitates the inclusion of PostScript figures into TEX documents. With the help of a compatible postprocessor, [1] PostScript figures are automatically scaled and positioned on the page, and the proper amount of space is reserved. Custom characters such as '' and '' may be created and used freely throughout a document, or figures can be presented as traditional broken-out displays:



January Pie Sales



2 Simple figures

To include a PostScript figure with psfig, include the psfig style at the top of your document:

```
\documentstyle[...,psfig]{article}
```

and then, when you wish to include a figure, invoke the macro

`\psfig{figure=`*input*`}`

[1] The **dvips** program developed by T. Rokicki has full psfig support; it is available via anonymous FTP from `labrea.stanford.edu`. Psfig is available from `whitechapel.media.mit.edu`.

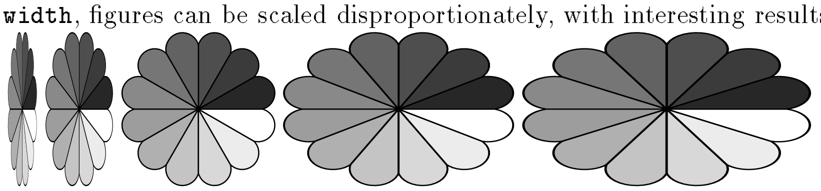
where *input* is the name of a PostScript file. Psfig will automatically position the figure at the current point on the page, and reserve the proper amount of space in TEX so that it doesn't block any other objects on the page. For example, if we have a file called 'piechart.ps' which contains the PostScript code to draw the chart in the introduction, we could use the commands

```
\par
\centerline{\psfig{figure=piechart.ps}}
\par
```

to include it as a centered paragraph. Since no mention of size was made in the above example, psfig draws the figure at its natural size (as if it was printed directly on a PostScript printer.) The pie's natural size is several inches across, which is a little large; the pie in the introduction was produced with:

```
\centerline{\psfig{figure=piechart.ps,height=1.5in}}
```

The `height` option specifies how tall the figure should be on the page. Since no `width` was specified, the figure was scaled equally in both dimensions. (This will also happen with a `width` but no `height` option.) By listing both a `height` and `width`, figures can be scaled disproportionately, with interesting results:



This figure was produced with:

```
\centerline{\hbox{
\psfig{figure=rosette.ps,height=.8in,width=.15in}
\psfig{figure=rosette.ps,height=.8in,width=.35in}
\psfig{figure=rosette.ps,height=.8in}
\psfig{figure=rosette.ps,height=.8in,width=1.2in}
\psfig{figure=rosette.ps,height=.8in,width=1.5in}
}}
```

The `\psfig` macro is (unfortunately) sensitive to whitespace, and will be confused by any extra spaces or newlines in its argument.

3 Sources of figures

Any program that produces PostScript as output can be used for psfig figures as long as it adheres to the bounding box comment convention (see below). For instance, the bitmap image of the author was included as a figure at left.

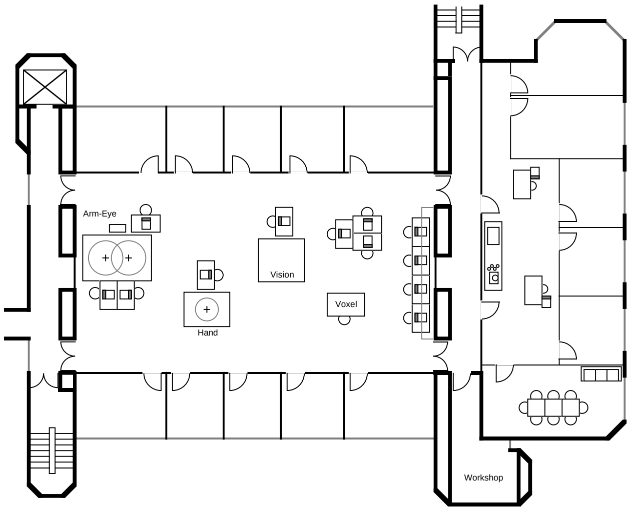


Figure 1: A figure produced by MacDraw

Since the Macintosh drawing applications produce PostScript, they can be used to create figures. Figure 1 shows a figure produced by MacDraw. More Mac figures are shown in the `macdemo.tex` document, and details on dealing with Macintosh postscript are covered in the `README file`.

4 Draft figures and Silent mode

Normally, psfig will print advisory messages to remind you that it is including figures as TeX processes a document. This behavior can be disabled with `\pssilent`, and re-enabled with `\psnoisy`.

Some PostScript figures can take quite a long time to transmit and print; for these figures a draft mode is available to speed printing of draft versions of the document. A figure printed in draft mode will appear as a box with the name of the figure file (Figure 2). The macro `\psdraft` will switch into draft mode, and all subsequent psfig macros will produce draft figures until reaching the macro `\psfull`, which switches out of draft mode.

No `\special` commands are used in draft mode, so a draft document can be previewed using any Dvi viewer. Psfig uses the LaTeX `\fbox` command to produce the draft box; thus draft boxes will not work in plain TeX. The printing of boxes in draft mode can be disabled/enabled with `\psnodraftbox` and `\psdraftbox`.

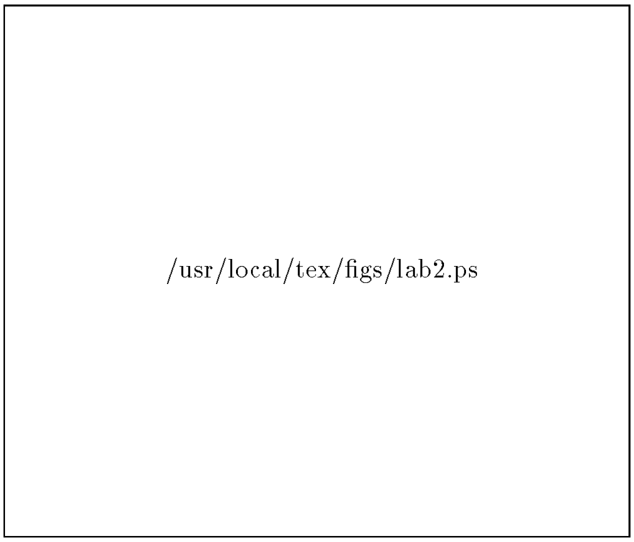


Figure 2: The previous figure, in draft mode

5 Bounding boxes

To properly translate and scale a figure psfig must know its 'natural' position on the page; this information is present in what is called the *bounding box* of a PostScript program. The bounding box is an outer limit to the marks created by a program, and is specified as four coordinates of a rectangle: the lower-left x coordinate (bbllx), the lower-left y coordinate (bblly), the upper-right x coordinate (bburx), and the upper-right y coordinate (bbury). Adobe has defined a convention whereby the bounding box of a program is contained in a 'bounding box comment'. [2] This comment, which must be present in any file to be used as a psfig figure, is a line of the form

`%%BoundingBox:` *bbllx bblly bburx bbury*

All values are in PostScript points, relative to the *default* transformation matrix. The only mandatory PostScript convention is that the first line of the file should begin with the characters '`%!`' (a '`%`' begins a comment in PostScript.) A good place for the bounding box comment is as the second line of the file.

If a bounding box comment is present in the figure file, psfig will extract its values. The bounding box values may instead be specified directly in the `\psfig` argument, using clauses of the form `bbllx=`*bbllx*,`bblly=`*bblly*,..., in which case the figure file is not searched for the bounding box.

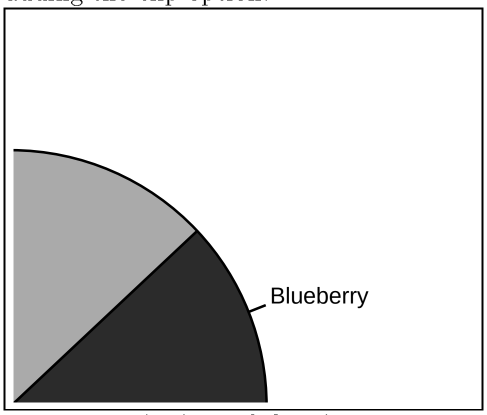
[2] See 'Appendix J: PostScript File Structuring Conventions' in *The PostScript Language Reference Manual*

6 Reserved size

There are two sizes associated with each psfig figure: the size at which it is to be printed on the page and the size it reserves in TEX. This latter size is appropriately termed the *reserved size*, and is expressed as clauses of the form "**`rheight=`***dimen*" and "**`rwidth=`***dimen*". If omitted, the reserved size defaults to the real size. Some special effects need to be transparent to TEX and thus have a zero reserved size, such as the grey box enclosing this paragraph.

7 Clipping

Normally a PostScript program can be expected to not mark the page outside its bounding box. If this is not the case, or if you want to specify a bounding box so as to isolate part of a larger figure, there is an option that sets the PostScript clip path so that no marks will show up outside the declared bounding box. Currently this is invoked by adding a clause of the form "**`clip=t`**". Here a slice has been taken out of the pie chart in the example by specifying a smaller bounding box and adding the clip option.

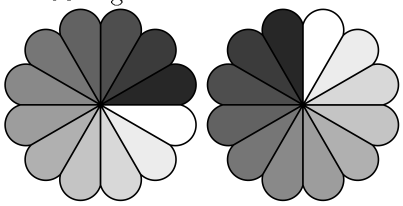


A piece of the pie.

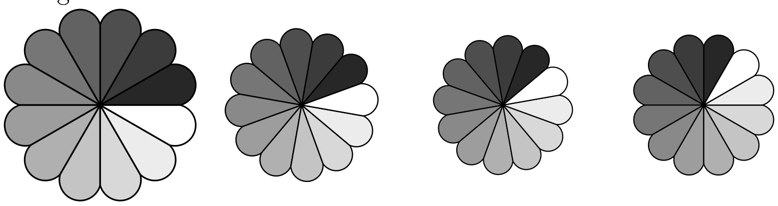
Some PostScript programs use the clipping path to position their output on the page; if a figure is being drawn at its natural size and position despite psfig commands to the contrary, it may need the clip option.

8 Rotating figures

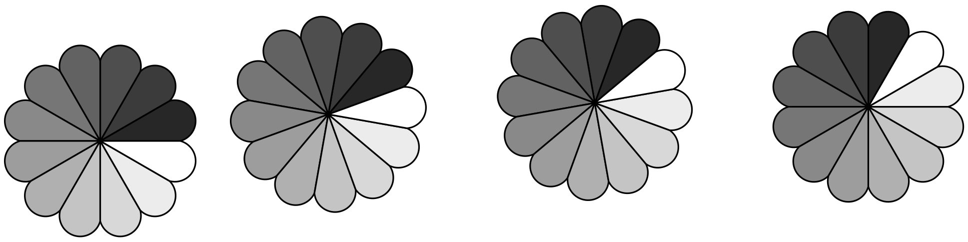
Figures can be rotated by psfig using the `angle=`*degrees* clause. For example, here is the rosette and its 90 degree rotation:



By default psfig scales the figure so that its rotated bounding box fits within the desired size. This can lead to counterintuitive results when rotating to angles which are not multiples of 90 degrees. Here is the rosette rotated to 0,20,40, and 60 degrees.



With autoscaling, some rotated figures come out smaller because the diagonal of their bounding box is of course longer than their height or width alone. This behavior can be disabled with `\psscalefirst`, and re-enabled with `\psrotatefirst`. With `\psscalefirst` a new height and width is computed after the bounding box; the previous figure would now look like:



While the rotated figures will all come out at the same size their reserved sizes will be different, thus they may not be aligned correctly.

9 Acknowledgements

This work was done while the author was with the Department of Computer and Information Science, University of Pennsylvania. Ned Batchelder co-developed the original *troff* version of this program with the author, and was responsible for much of the overall design. For more detailed information on the original version of PostScript see *Psfig – A Ditroff Preprocessor for PostScript Figures* in the USENIX 87 proceedings, or *Bringing troff up to speed* in the July 1987 issue of Unix Review.

Greg Hager provided the initial pure-TEX implementation of psfig. J. Daniel Smith of Schlumberger CAD/CAM implemented the rotation feature and improved the file scanning routines, using certain code fragments from Tom Rokicki's dvips program.