

# L<sup>A</sup>T<sub>E</sub>X

## Scaled Pictures in L<sup>A</sup>T<sub>E</sub>X

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Three years ago, I wrote macros to extend the picture environment, to allow for the automatic re-sizing of the picture. It behaved almost exactly like the picture environment, and was used thus:

```
\begin{scalegpicture}{n}(xlen,ylen)
[(xllcorner,yllcorner)]
% picture commands
\end{scalegpicture}
```

Here

1. “ $n$ ” is the percentage of a “full picture”. A “full picture” is one that fills up the line, leaving a small margin on each side, and has  $n = 100$ ;

Exactly as in the picture environment:

2. “ $xlen$ ” is the coordinate length needed across the breadth of the picture (must be a positive integer);
3. “ $ylen$ ” is the coordinate length needed across the height of the picture (need not be an integer);
4. “(xllcorner,yllcorner)” are the coordinates of the bottom left hand corner of the picture. If these are (0,0), then this can be omitted.

The reason for this macro is to eliminate the need to calculate the `\unitlength`, and to enable pictures to be re-sized easily.

Thanks to comments from A.S. Berdnikov, O.A. Grineva and S.B. Turta, in *TUGboat*, Vol. 17, #2, pp. 229-232, 1996, I changed the macro to use `\hsize` and not `\textwidth` for the calculation, and so it works properly inside minipages and in tabular paragraph mode, etc.

However, there were two problems with changing the percentage number that required further attention:

1. The size of the font remained the same, no matter the percentage of a “full picture”;
2. The positions of the labels usually needed adjustments.

I have tried to address both these problems and now have a working version, available from CTAN under the name **fullpict.sty**.

1. I have created a new environment:

```
\begin{scaledpicture}{n}(xlen,ylen)
[(xllcorner,yllcorner)]
% picture commands
\end{scaledpicture}
```

This addresses the font size problem in the following way: for a normal line of text, such as North American 8.5×11 paper, or European A4 paper, with full page or standard article style,

Percentage number	Font size
< 39	<code>\tiny</code>
≥ 39 and < 49	<code>\scriptsize</code>
≥ 49 and < 59	<code>\footnotesize</code>
≥ 59 and < 74	<code>\small</code>
≥ 74	<code>\normalsize</code>

2. Within minipages and in tabular paragraph mode, the choice of the font size is further adjusted to reflect the smaller size of the picture.
3. Also, the placing of labels can be helped with the commands:

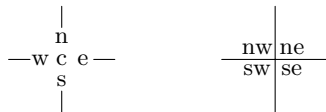
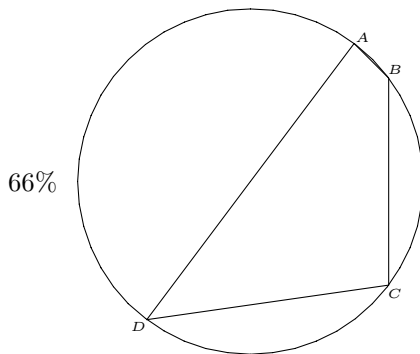
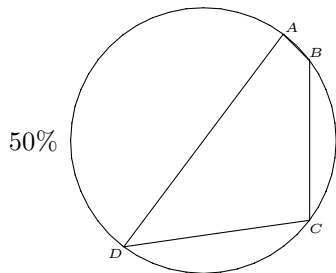
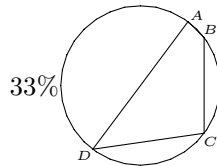
- (a) `\cput(a,b){label}` — put centered at the point  $(a, b)$ .
- (b) `\eput(a,b){label}` — put to the east (right and centered) of the point  $(a, b)$ .
- (c) `\nput(a,b){label}` — put to the north (above and centered) of the point  $(a, b)$ .
- (d) `\wput(a,b){label}` — put to the west (left and centered) of the point  $(a, b)$ .
- (e) `\sput(a,b){label}` — put to the south (below and centered) of the point  $(a, b)$ .
- (f) `\neput(a,b){label}` — put to the north-east of the point  $(a, b)$ .
- (g) `\nwput(a,b){label}` — put to the north-west of the point  $(a, b)$ .
- (h) `\swput(a,b){label}` — put to the south-west of the point  $(a, b)$ .
- (i) `\seput(a,b){label}` — put to the south-east of the point  $(a, b)$ .

4. If you want a more accurate placement of the label, or to use a different radius from the default, make use of the command `\angleput{degrees}[radius](a,b){label}`.

Here, **degrees** represents the angle from the positive direction of the  $x$ -axis (may be positive or negative), and the optional **[radius]** allows multiplication of the default radius (1) by **radius** (may be positive or negative).

It may be of interest to note that, instead of using a circle for the placement of points, a polygon with 24 sides was used. This made the calculations considerably easier, using linear functions instead of trigonometric functions. This becomes noticeable, only for larger values of **radius**. It seems unlikely that such values would be used in practice.

These are used in the diagrams illustrated below:



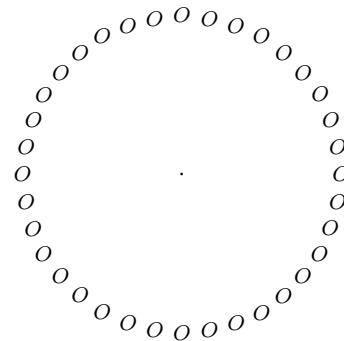
Geographic positions



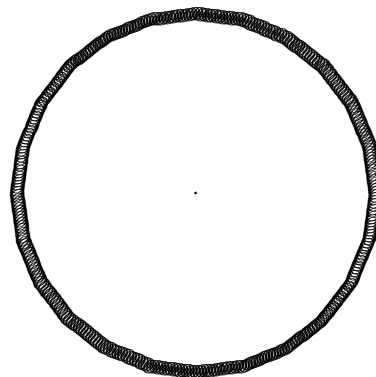
24 points at distance zero — 15 degree intervals



24 points at distance 2.2 — 15 degree intervals



36 points at distance 10 — 10 degree intervals



360 points at distance 13.5 — 1 degree intervals

The environment `scaledpicture` automatically centers the picture. If you do not want it centered, use the environment `Scaledpicture`. These macros are incorporated in `fullpict.sty`, which is available from CTAN `tex-archive/macros/latex/contrib/supported/fullpict/`, or by anonymous ftp from

**isthmus.math.mun.ca**

directory `/pub/cruX`.

Please report any bugs or criticisms to me.

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