

# The panda package

Estimating the blackness of fonts



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<https://github.com/samcarter/panda>

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## 1 Introduction

Imagine the following problem: there is a hungry panda sitting next to you and just today, you happen to not have any bamboo with you. Now you are a  $\text{\LaTeX}$  user and the only limits are your own imagination, so of course you try to draw a couple of bamboo sticks with  $\text{\LaTeX}$ . Here dear panda, have three bamboo sticks:  $\text{\texttt{III}}$ . The panda likes them and wants to make more.

**However the panda uses a different font and the bamboo sticks suddenly look a lot less tasty, they look just too thin:  $\text{\texttt{III}}$ .**

The panda package provides estimates for the stroke width of fonts and how black the fonts look on the page. Creators of symbols etc. can use these estimates to adjust their drawings to better blend in with the surrounding text.

### **Yummy bamboo sticks: $\text{\texttt{III}}$**

The results won't be a perfect match for all fonts and strokes can also look differently compared to the surrounding text depending on the PDF viewer and zoom level, but the results should be good enough to ensure that the symbols don't stand out immediately.

Note that this package was developed and tested with texts in Latin scripts – results might be less satisfactory if used with other scripts.

This package is work in progress, therefore I would be happy to hear your feedback and ideas how to improve the package. The development version of the source code can be found at <https://github.com/samcarter/panda>, including an issue tracker. If you seek any other assistance (not bug reports/feature requests), I suggest asking at <https://topanswers.xyz/tex>.

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## 2 Clever Panda

The Clever Panda approach is inspired by a brilliant answer by @Skillmon<sup>1</sup>, which uses the difference between the height of a full stop and 1 pt to estimate a proxy for the stroke width of the current font.

The Clever Panda uses a simpler approach of directly employing a fraction the full stop height and combines this with a manually curated list of exceptions.

Compared to the Busy Panda approach, described in the next section, this approach should be faster and isn't limited to what fonts in a loop-up table.

### 2.1 Usage (simple case)

After loading the package, the command `\CleverPanda{}` will expand to a length, which can be used as stroke width for drawing symbols etc.

#### Basic usage

```
\documentclass{article}
\usepackage{CleverPanda}
\begin{document}
  cmr: \rule{ \CleverPanda{ } }{8pt}      cmr: |
                                         ugq: |
  \fontfamily{ugq}\selectfont
  ugq: \rule{ \CleverPanda{ } }{8pt}
\end{document}
```

There are two options for customisation: the `scale=...` package option sets a default scaling value. For example, `scale=10` means that `\CleverPanda{}` returns a length ten times as long as it normally would. The scaling factor can also be set locally in the mandatory argument, e.g. `\CleverPanda{42}`.

#### Options

```
\documentclass{article}
\usepackage[scale=10]{CleverPanda}
\begin{document}
  cmr: \rule{ \CleverPanda{ } }{8pt}      cmr: ■
                                         cmr: ■■■■■
  cmr: \rule{ \CleverPanda{42} }{8pt}
\end{document}
```

### 2.2 Special Case (TikZ)

The `\CleverPanda{}` command works well, as long as the height of the full stop is available when the macro is used. Unfortunately, that's not always the case.

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<sup>1</sup> see <https://topanswers.xyz/tex?q=8139#a7747>

One notable problem case are TikZ options, e.g. while setting line widths. As a workaround, one can use the command `\CleverPandaSet` before the TikZ picture and then `\CleverPandaGet{}` in the TikZ options to access the stroke width:

#### TikZ

```
\documentclass{article}
\usepackage{CleverPanda}
\usepackage{tikz}
\newlength{\IHeight}

\newcommand{\tikzbamboo}{%
  \setlength{\IHeight}{\fontcharht\font`I}%
  \CleverPandaSet
  \begin{tikzpicture}[baseline]
    \draw[line width=\CleverPandaGet{}]          cmr: l
      (0,0) -- (0,\IHeight);                      ugq: l
  \end{tikzpicture}%
}

\begin{document}
  cmr:  \tikzbamboo

  \fontfamily{ugq}\selectfont
  ugq: \tikzbamboo
\end{document}
```

## 3 Busy Panda

The approach of the Busy Panda is different. To get an estimate of how black text in a particular font looks like, the Busy Panda uses a sample PDF with:

Lorem ipsum dolor sit amet, consectetur adip

After converting the PDF into a pixel graphic, the average blackness of the pixels can be calculated. After repeating this for different fonts (including their bold versions), the Busy Panda now contains a look-up table with the average blackness for about 8800 fonts, normalised to the average blackness of Computer Modern Roman. Tests with different sample texts and image resolutions indicate that the error of this method is about 10%. While not perfect, this is usually accurate enough to make symbols blend in with the surrounding text.

Compared to the Clever Panda approach from the previous section, this approach gives more accurate results, in particular for very heavy fonts, and is more versatile to use.

### 3.1 Usage

The basic usage is simple: after loading the package, the command `\BusyPanda{}` provides a normalised estimate of the blackness of the current font:

#### Basic usage

```
\documentclass{article}
\usepackage{BusyPanda}
\begin{document}
  cmr: \BusyPanda{}           cmr: 1
                               ugq: 2.40491

  \fontfamily{ugq}\selectfont
  ugq: \BusyPanda{}
\end{document}
```

There are two options for customisation: the `scale=...` package option sets a default scaling value. For example, `scale=10` means that `\BusyPanda{}` no longer returns 1 for Computer Modern Roman, but 10. The scaling factor can also be set locally in the mandatory argument, e.g. `\BusyPanda{42}`.

#### Options

```
\documentclass{article}
\usepackage[scale=10]{BusyPanda}
\begin{document}
  cmr: \BusyPanda{}           cmr: 10
                               cmr: 42

  cmr: \BusyPanda{42}
\end{document}
```

## 3.2 Creating symbols

There is still a hungry panda sitting next to you, so let's create some extra yummy bamboo sticks:

### Feeding the panda

```
\documentclass{article}
\usepackage{BusyPanda}
\newlength{\IHeight}

\newcommand{\bamboo}{%
  \setlength{\IHeight}{\fontcharht\font`I}%
  \rule{%
    \BusyPanda{0.125}\IHeight
  }{%
    \IHeight
  }%
}
```

Normal bamboo: I

**Extra yummy bamboo: I**

```
\begin{document}
Normal bamboo: \bamboo

\fontfamily{ugq}\selectfont
Extra yummy bamboo: \bamboo
\end{document}
```

In the example above, `\BusyPanda{}` is used in combination with the height of the letter I. This ensures that stroke width will scale with the size of the text.

## 3.3 Unsupported fonts

Given the seemingly infinite number of fonts out there, this package will never be able to support them all – but more can be added with your help!

If the font you are using isn't yet supported (`\BusyPanda{}` will return 1, like for Computer Modern Roman and – if compiled with Lua<sup>A</sup>T<sub>E</sub>X – a warning can be found in the .log file), then please get the test document from:

[https://github.com/samcarter/panda/blob/main/BusyPanda\\_unsupportedFonts.tex](https://github.com/samcarter/panda/blob/main/BusyPanda_unsupportedFonts.tex)

You only need to change the font name in the second line and compile with either `pdfflatex` or `luaalatex`. Then open an issue at <https://github.com/samcarter/panda/issues> and upload the compiled PDF there.

## 4 Examples

Font Family	Clever Panda	Busy Panda
AccanthisADFStdNoThree-LF	Lorem   Ipsum	Lorem   Ipsum
Alegreya-OsF	Lorem   Ipsum	Lorem   Ipsum
Alegreya-TLF	Lorem   Ipsum	Lorem   Ipsum
AnonymousPro	Lorem   Ipsum	Lorem   Ipsum
antp	Lorem   Ipsum	Lorem   Ipsum
antt	Lorem   Ipsum	Lorem   Ipsum
anttc	Lorem   Ipsum	Lorem   Ipsum
anttl	Lorem   Ipsum	Lorem   Ipsum
anttlc	Lorem   Ipsum	Lorem   Ipsum
artemisia	Lorem   Ipsum	Lorem   Ipsum
augie	Lorem   Ipsum	Lorem   Ipsum
<b>AUNCL</b>	<b>LOREM   IPSUM</b>	<b>LOREM   IPSUM</b>
bch	Lorem   Ipsum	Lorem   Ipsum
bodoni	Lorem   Ipsum	Lorem   Ipsum
Cabin-TLF	Lorem   Ipsum	Lorem   Ipsum
Caladea-TLF	Lorem   Ipsum	Lorem   Ipsum
cantarell-OsF	Lorem   Ipsum	Lorem   Ipsum
ccr	Lorem   Ipsum	Lorem   Ipsum
CINZEL-LF	LOREM   IPSUM	LOREM   IPSUM
CINZELDECORATIVE-IF	LOREM   IPSUM	LOREM   IPSUM
ClearSans-TLF	Lorem   Ipsum	Lorem   Ipsum
clm	Lorem   Ipsum	Lorem   Ipsum
clmd	Lorem   Ipsum	Lorem   Ipsum
clmqs	Lorem   Ipsum	Lorem   Ipsum
clms	Lorem   Ipsum	Lorem   Ipsum
clmt	Lorem   Ipsum	Lorem   Ipsum
clmv	Lorem   Ipsum	Lorem   Ipsum
cmbr	Lorem   Ipsum	Lorem   Ipsum
cmdh	Lorem   Ipsum	Lorem   Ipsum
<b>cmn</b>	<b>LOREM   IPSUM</b>	<b>LOREM   IPSUM</b>
cmr	Lorem   Ipsum	Lorem   Ipsum
cmss	Lorem   Ipsum	Lorem   Ipsum
cmtt	Lorem   Ipsum	Lorem   Ipsum
cmvtt	Lorem   Ipsum	Lorem   Ipsum

Font Family	Clever Panda	Busy Panda
comfortaa	Lorem   Ipsum	Lorem   Ipsum
Crlt-TLF	Lorem   Ipsum	Lorem   Ipsum
<b>cyklop</b>	<b>Lorem   Ipsum</b>	<b>Lorem   Ipsum</b>
DejaVuSans-TLF	Lorem   Ipsum	Lorem   Ipsum
DejaVuSansMono-TLF	Lorem   Ipsum	Lorem   Ipsum
DejaVuSerif-TLF	Lorem   Ipsum	Lorem   Ipsum
droidsans	Lorem   Ipsum	Lorem   Ipsum
droidsansmono	Lorem   Ipsum	Lorem   Ipsum
droidserif	Lorem   Ipsum	Lorem   Ipsum
EBGaramond-OsF	Lorem   Ipsum	Lorem   Ipsum
erewhon-OsF	Lorem   Ipsum	Lorem   Ipsum
fav	Lorem   Ipsum	Lorem   Ipsum
fbf-LF	Lorem   Ipsum	Lorem   Ipsum
FiraSans-TLF	Lorem   Ipsum	Lorem   Ipsum
frc	<i>Lorem   Ipsum</i>	<i>Lorem   Ipsum</i>
fve	Lorem   Ipsum	Lorem   Ipsum
fvm	Lorem   Ipsum	Lorem   Ipsum
fvs	Lorem   Ipsum	Lorem   Ipsum
GilliusADF-LF	Lorem   Ipsum	Lorem   Ipsum
GilliusADFNofTwo-LF	Lorem   Ipsum	Lorem   Ipsum
Heuristica-TLF	Lorem   Ipsum	Lorem   Ipsum
iwona	Lorem   Ipsum	Lorem   Ipsum
iwonac	Lorem   Ipsum	Lorem   Ipsum
iwonal	Lorem   Ipsum	Lorem   Ipsum
iwonalc	Lorem   Ipsum	Lorem   Ipsum
jkp	Lorem   Ipsum	Lorem   Ipsum
jkp	Lorem   Ipsum	Lorem   Ipsum
jkpl	Lorem   Ipsum	Lorem   Ipsum
jkpss	Lorem   Ipsum	Lorem   Ipsum
jkpss	Lorem   Ipsum	Lorem   Ipsum
jkptt	Lorem   Ipsum	Lorem   Ipsum
jkpx	Lorem   Ipsum	Lorem   Ipsum
kurier	Lorem   Ipsum	Lorem   Ipsum
kurierc	Lorem   Ipsum	Lorem   Ipsum
kurierl	Lorem   Ipsum	Lorem   Ipsum
kurierlc	Lorem   Ipsum	Lorem   Ipsum
lato-OsF	Lorem   Ipsum	Lorem   Ipsum

Font Family	Clever Panda	Busy Panda
LibreBaskerville-LF	Lorem Ipsum	Lorem Ipsum
LibreBaskerville-LF	Lorem Ipsum	Lorem Ipsum
LibreCaslon-TLF	Lorem Ipsum	Lorem Ipsum
LinuxBiolinumT-OsF	Lorem Ipsum	Lorem Ipsum
LinuxLibertineDisplayT-OsF	Lorem Ipsum	Lorem Ipsum
LinuxLibertineMonoT-TLF	Lorem Ipsum	Lorem Ipsum
LinuxLibertineT-OsF	Lorem Ipsum	Lorem Ipsum
Merriweather-OsF	Lorem Ipsum	Lorem Ipsum
MerriweatherSans-TLF	Lorem Ipsum	Lorem Ipsum
MintSpirit-LF	Lorem Ipsum	Lorem Ipsum
nanumgt	Lorem Ipsum	Lorem Ipsum
nanummj	Lorem Ipsum	Lorem Ipsum
neohellenic	Lorem Ipsum	Lorem Ipsum
opensans-TLF	Lorem Ipsum	Lorem Ipsum
Ovrlock-LF	Lorem Ipsum	Lorem Ipsum
Ovrlock-LF	Lorem Ipsum	Lorem Ipsum
pag	Lorem Ipsum	Lorem Ipsum
pbk	Lorem Ipsum	Lorem Ipsum
pcr	Lorem Ipsum	Lorem Ipsum
phv	Lorem Ipsum	Lorem Ipsum
PlyfrDisplay-OsF	Lorem Ipsum	Lorem Ipsum
pnc	Lorem Ipsum	Lorem Ipsum
ppl	Lorem Ipsum	Lorem Ipsum
ptm	Lorem Ipsum	Lorem Ipsum
PTMono-TLF	Lorem Ipsum	Lorem Ipsum
PTSans-TLF	Lorem Ipsum	Lorem Ipsum
PTSansCaption-TLF	Lorem Ipsum	Lorem Ipsum
PTSansNarrow-TLF	Lorem Ipsum	Lorem Ipsum
PTSerif-TLF	Lorem Ipsum	Lorem Ipsum
PTSerifCaption-TLF	Lorem Ipsum	Lorem Ipsum
put	Lorem Ipsum	Lorem Ipsum
pzc	Lorem Ipsum	Lorem Ipsum
qag	Lorem Ipsum	Lorem Ipsum
qbk	Lorem Ipsum	Lorem Ipsum
qcr	Lorem Ipsum	Lorem Ipsum
qcs	Lorem Ipsum	Lorem Ipsum
qhv	Lorem Ipsum	Lorem Ipsum



Font Family	Clever Panda	Busy Panda
qhvc	Lorem Ipsum	Lorem Ipsum
qpl	Lorem Ipsum	Lorem Ipsum
qtm	Lorem Ipsum	Lorem Ipsum
Quattro-LF	Lorem Ipsum	Lorem Ipsum
QuattroSans-LF	Lorem Ipsum	Lorem Ipsum
Roboto-TLF	Lorem Ipsum	Lorem Ipsum
RobotoSlab-TLF	Lorem Ipsum	Lorem Ipsum
SourceCodePro-TLF	Lorem Ipsum	Lorem Ipsum
SourceSansPro-TLF	Lorem Ipsum	Lorem Ipsum
<b>SQRC</b>	<b>LOREM IPSUM</b>	<b>LOREM IPSUM</b>
stix	Lorem Ipsum	Lorem Ipsum
ua1	Lorem Ipsum	Lorem Ipsum
uaq	Lorem Ipsum	Lorem Ipsum
udidot	Lorem Ipsum	Lorem Ipsum
ugm	Lorem Ipsum	Lorem Ipsum
<b>ugq</b>	<b>Lorem Ipsum</b>	<b>Lorem Ipsum</b>
ul9	Lorem Ipsum	Lorem Ipsum
ulg	Lorem Ipsum	Lorem Ipsum
UniversalisADFSld-LF	Lorem Ipsum	Lorem Ipsum
uop	Lorem Ipsum	Lorem Ipsum
ybd	Lorem Ipsum	Lorem Ipsum
ybv	Lorem Ipsum	Lorem Ipsum
yes	Lorem Ipsum	Lorem Ipsum
yfrat	Lorem Ipsum	Lorem Ipsum
yly	Lorem Ipsum	Lorem Ipsum
yrd	Lorem Ipsum	Lorem Ipsum
yvl	Lorem Ipsum	Lorem Ipsum
wlb	LOREM IPSUM	LOREM IPSUM
yv2	Lorem Ipsum	Lorem Ipsum
yv3	Lorem Ipsum	Lorem Ipsum
yvo	Lorem Ipsum	Lorem Ipsum
vv0D	LOREM IPSUM	LOREM IPSUM
yvt	Lorem Ipsum	Lorem Ipsum
<b>YVTD</b>	<b>LOREM IPSUM</b>	<b>LOREM IPSUM</b>
zgmX	Lorem Ipsum	Lorem Ipsum
zi4	Lorem Ipsum	Lorem Ipsum