

The abracas package

Asymmetric or arbitrary braces

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Version 1.0
August 31, 2012

1 Introduction

The abracas¹ package provides a character key-driven interface to supplement new constructions of the traditional `\overbrace` and `\underbrace` pairs in an asymmetric or arbitrary way.

2 User interface

abracas defines two counterparts to the existing braces:

```
\aoverbrace[⟨spec⟩]{⟨stuff⟩}
```

```
\aunderbrace[⟨spec⟩]{⟨stuff⟩}
```

These create an overbrace and underbrace where `⟨spec⟩` defines a construction pattern based on the elements in Table 1.

The provided interface is based on a ratio-principle, allowing one to put a larger share of “filler” (the horizontal rule) at any location within the brace construction. The traditional `\overbrace` and `\underbrace` pairs have a 1:1 share between the left and right side (either side of the tip/cusp of the brace). Using a 1:2 ratio would place the brace cusp one third (from the left) into the brace. Similarly a 3:2 ratio would place the cusp 40% (or two fifths) from the right edge of the brace.

Other, more complex construction – by means of the optional `⟨spec⟩` argument – can also be made by mixing the elements presented in Table 1.

```
\newbracespec{⟨char⟩}{⟨spec⟩}
```

This allows the user to define a new brace specification `⟨char⟩` the results in the (possibly complex) construction `⟨spec⟩`. The usage is similar to that of a `\newcolumntype` construction provided by the array² package.

¹The abracas package: <http://ctan.org/pkg/abracas>

²The array package: <http://ctan.org/pkg/array>

$\langle spec \rangle$ character	Output
l	⏟
L	⏞
r	⏟
R	⏞
U	⏞
D	⏟
0	(single) Empty fill
1, ..., 9	Copies of regular fill —
@{ $\langle stuff \rangle$ }	Places $\langle stuff \rangle$ into brace
!{ $\langle len \rangle$ }	Regular fill of length $\langle len \rangle$
*{ $\langle num \rangle$ }{ $\langle stuff \rangle$ }	Repeat $\langle stuff \rangle$ a total of $\langle num \rangle$ times

Table 1: Character specifications $\langle spec \rangle$ used to construct braces.

`\bracescript{ $\langle spec \rangle$ }`

Since the brace cusps may not fall directly at the horizontal centre of the construction, `\bracescript` is provided that takes a similar construction-style interface to that of $\langle spec \rangle$ in `\aoverbrace` and `\aunderbrace`. This allows the user to position the scripted text at the location(s) best-suited for presentation.

If the package is loaded with the `overload` option

```
\usepackage[overload]{abraces}
```

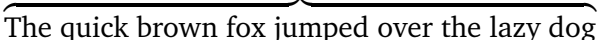
the traditional `\overbrace` and `\underbrace` pairs are redefined to be equivalent to `\aoverbrace` and `\aunderbrace`, respectively, via a straight-forward `\let`:

```
\let\overbrace\aoverbrace
\let\underbrace\aunderbrace
```

3 Examples

Some examples of the types of braces that can be constructed using `abraces`:

```
\newcommand{\foxanddog}{%
\textrm{The quick brown fox jumped over the lazy dog}}
```

- `\aoverbrace{\foxanddog}` (traditional `\overbrace`):


- `\aunderbrace{\foxanddog}` (traditional `\underbrace`):
The quick brown fox jumped over the lazy dog
- `\aoverbrace[L3U1R]{\foxanddog}`:
The quick brown fox jumped over the lazy dog
- `\aoverbrace[l1D1r]{\foxanddog}`:
The quick brown fox jumped over the lazy dog
- `\aunderbrace[l12D7r]{\foxanddog}`:
The quick brown fox jumped over the lazy dog
- `\aunderbrace[l11D2U2D1r]{\foxanddog}`:
The quick brown fox jumped over the lazy dog
- `\aoverbrace[L1R]{\foxanddog}`:
The quick brown fox jumped over the lazy dog
- `\aunderbrace[L1U3R]{\foxanddog}`:
The quick brown fox jumped over the lazy dog
- `\aunderbrace[l16R0l3D3r0L6r]{\foxanddog}`:
The quick brown fox jumped over the lazy dog
- `\aoverbrace[L5*{3}{01}05U50*{3}{10}5R]{\foxanddog}`:
The quick brown fox jumped over the lazy dog
- `\aunderbrace[l1@{\hspace{5em}}2D2@{\hspace{3em}}1r]{\foxanddog}`:
The quick brown fox jumped over the lazy dog
- `\aunderbrace[l11R@{\color{red!80!white}}L1r]{\foxanddog}`:
The quick brown fox jumped over the lazy dog
- `\aoverbrace[L1D!{5em}R]{\foxanddog}`:
The quick brown fox jumped over the lazy dog

The next question might be how to add content to the brace cusps. Here's a possible way to insert text at the appropriate ratio, using the above construction techniques:

$$\overbrace{\text{The quick brown fox jumped over the lazy dog}}^{\text{left} \quad \text{right}}$$

```

\newcommand{\bracetext}[1]{%
  \makebox[0pt][c]{\scriptsize#1}}%
\[
  \overbrace[L2U2D1U1R]{\foxanddog}~{%
    \bracescript{L2r@{\bracetext{left}}l2D1r@{\bracetext{right}}l1R}%
    }%
\]

```

Another usage might include “breaking” a brace across lines to indicate a continuous grouping of objects. The following example³ constructs two open-ended `\aoverbraces` which “spans” multiple lines:

$$f(x) = a_0 + a_1x + a_2x^2 + \overbrace{a_3x^3 + a_4x^4 + \cdots + a_{i-1}x^{i-1}}^{\text{some text}} + \underbrace{a_ix^i + a_{i+1}x^{i+1} + \cdots + a_{n-1}x^{n-1}}$$

```

\usepackage{amsmath}% http://ctan.org/pkg/amsmath
%...
\begin{multline*}
  f(x)=a_0+a_1x+a_2x^2+
  \aoverbrace[L1U1]{a_3x^3+a_4x^4+\cdots+a_{i-1}x^{i-1}+\hspace{1em}}~
  {\bracescript{L1r@{\bracetext{some text}}l1}} \\\jot]
  \aoverbrace[1R]{\hspace{1em}a_ix^i+a_{i+1}x^{i+1}+
  \cdots+a_{n-1}x^{n-1}}
\end{multline*}

```

As a final example, consider a brace that should include a dashed component. Using `\newbracespec` one can define your own dashed component:

```

\newbracespec{d}{%
  5@{\hspace{4pt}}1@{\hspace{4pt}}!{2em}@{\hspace{4pt}}1@{\hspace{4pt}}5%
}

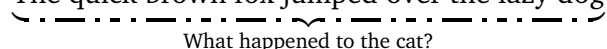
```

and then use

```

\[
  \aunderbrace[1*{3}{d}D*{3}{d}r]{\foxanddog}_
  {\bracetext{What happened to the cat?}}
\]

```

The quick brown fox jumped over the lazy dog


³Taken from the question `\overbrace split across multiple lines` on the TeX StackExchange network.

4 Terms of reference

This package originated from a question on the TeX StackExchange network called [Asymmetric overbrace](#). Some code was taken from the `mathtools`⁴ package.

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⁴The `mathtools` package: <http://ctan.org/pkg/mathtools>