The abraces Package

Asymmetric or arbitrary braces

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1 Introduction

The abraces[1] package provides a key-driven interface to suppliment new constructions of the traditional \overbrace and \underbrace pairs.

2 User interface

abraces 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/cust of the brace). Using a 1:2 ratio would place the brace cusp one third (from the left) into the brace. Similary 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.

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
```

[1] The abraces package: http://ctan.org/pkg/abraces

⟨*spec*⟩ character	Output
`l`	⌜
`L`	⌜
`r`	⌝
`R`	⌝
`U`	⌝⌜
`D`	⌟⌞
`0`	(single) Empty fill
`1`,...,`9`	Copies of regular fill ——
`@{`⟨*stuff*⟩`}`	Places ⟨*stuff*⟩ into brace
`!{`⟨*len*⟩`}`	Regular fill of length ⟨*len*⟩

Table 1: Character specifications ⟨*spec*⟩ used to construct braces.

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`):
  $\overbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aunderbrace{\foxanddog}` (traditional `\underbrace`):
  $\underbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aoverbrace[L3U1R]{\foxanddog}`:
  $\overbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aoverbrace[l1D1r]{\foxanddog}`:
  $\overbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aunderbrace[l2D7r]{\foxanddog}`:
  $\underbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aunderbrace[l1D2U2D1r]{\foxanddog}`:
  $\underbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aoverbrace[L1R]{\foxanddog}`:
  $\overbrace{\text{The quick brown fox jumped over the lazy dog}}$

- `\aunderbrace[L1U3R]{\foxanddog}`:
  $\underbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aunderbrace[l6R0l3D3r0L6r]{\foxanddog}`:
  $\underbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aoverbrace[L501010105U501010105R]{\foxanddog}`:
  $\overbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aunderbrace[l1@{\hspace{5em}}2D2@{\hspace{3em}}1r]{\foxanddog}`:
  $\underbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aunderbrace[l1R@{\color{red!80!white}}L1r]{\foxanddog}`:
  $\underbrace{\text{The quick brown fox jumped over the lazy dog}}$
- `\aoverbrace[L1D!{5em}R]{\foxanddog}`:
  $\overbrace{\text{The quick brown fox jumped over the lazy dog}}$

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:

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

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

`\bracescript` is provided as part of the `abraces` package and provides a similar ⟨*spec*⟩ construction interface.

Another usage might include "breaking" a brace across lines to indicate a continuous grouping of objects. The following example[2] constructs two open-ended `\aoverbrace`s which "spans" multiple lines:

[2] Taken from the question `\overbrace` split accross multiple lines on the TeX StackExchange network.

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

```
\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*}
```

4 Terms of reference

This package originated from a question on the TeX StackEchange network called Asymmetric overbrace. Some code was taken from the `mathtools`[3] package.

[3] The `mathtools` package: http://ctan.org/pkg/mathtools