

# The `visualtoks` Package, version 1.0a

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In The  $\text{\TeX}$ book, Knuth demonstrates the concept of tokens with the following example:

For example, if the normal conventions of plain  $\text{\TeX}$  are in force, the text ‘`{\hskip 36 pt}`’ is converted into a list of eight tokens:

$\{_1 \quad \boxed{\text{\code{hskip}}} \quad 3_{12} \quad 6_{12} \quad \sqcup_{10} \quad p_{11} \quad \mathfrak{t}_{11} \quad \}_2$

The subscripts here are the category codes, as listed earlier: 1 for “beginning of group,” 12 for “other character,” and so on. The  $\boxed{\text{\code{hskip}}}$  doesn’t get a subscript, because it represents a control sequence token instead of a character token. Notice that the space after `\hskip` does not get into the token list, because it follows a control word. (p. 38)

The same style of token display is used several times in the  $\text{\TeX}$ book. It would be useful to be able to generate the display automatically for an arbitrary list of tokens, for pedagogical or debugging purposes. This package provides the `\visualtoks` command which does exactly that.

## Usage

Usage: `\visualtoks{<token list>}`.

This package may be used in plain  $\text{\TeX}$  or  $\text{\LaTeX}$  by `\input{visualtoks}`. The  $\varepsilon\text{\TeX}$  extensions are required for the `\detokenize` primitive.

*<token list>* must be balanced with respect to explicit braces, and must not contain the token `\visualtoks@cycle@nil`. It is assumed that `{` is the only character with category code 1 (beginning of group).

The horizontal separation between displayed tokens may be configured by the dimension register `\visualtokskip`. The default value is 1em.

## Samples

- `\visualetokens{\def \macro {abc #1\egroup}}` gives

`def` `macro` `#6` `112` `{1` `a11` `b11` `c11` `\10` `#6` `112` `egroup` `}2`.

- `\visualetokens{$$\halign{&##\hfil\crr}{}}\par` gives

`$3` `$3` `halign` `{1` `&4` `#6` `#6` `hfil` `crr` `}2` `$3` `$3` `par`.

- Unbalanced `\if...` tokens:

`\visualetokens{\ifnum\iffalse{\fi'} = 0\else}` gives

`ifnum` `iffalse` `{1` `fi` `'12` `}2` `\10` `=12` `\10` `012` `else`.

- To demonstrate how T<sub>E</sub>X tokenizes consecutive spaces:

`\makeatletter \edef\temp{{\11111}\@spaces}}`

`\expandafter\visualetokens\expandafter{\temp}` gives

`{1` `\10` `}2` `{1` `\10` `\10` `\10` `\10` `}2`.

- To demonstrate the `\lowercase` technique:

`\begin{group}`

`\lccode'&=$ \lccode'#=$ \lccode'^=$ \lccode'_'=$`

`\lccode'_{=$ \lccode'A=$ \lccode'?=$ \lccode'~=$`

`\lowercase{\endgroup\def\temp{&##^_{A?~}}`

`\expandafter\demotokens\expandafter{\temp}` gives

`$3` `$4` `$6` `$7` `$8` `$10` `$11` `$12` `$13`.

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## Repository

The upstream repository of this package may be found at

<https://github.com/plante3/visualetokens/tree/main>.