

# The `visualtoks` Package, version 1.1

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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:

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

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 loaded by `\input{visualtoks}` (plain  $\text{\TeX}$  and other formats) or `\usepackage{visualtoks}` ( $\text{\LaTeX}$ ).

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

*<token list>* must be balanced with respect to explicit braces, and must not contain the token `\visualtoks@cycle@nil`. It is assumed that `{` and `}` are the only characters with category codes 1 (beginning of group) and 2 (end of group) respectively.

An *anomalous* control sequence is one that differs in shape from the control sequence with the same name constructed by `\csname`. Anomalous control sequences are marked with a star next to their box.

## Samples

- `\visualtoks{\def \macro#1{abc #1\egroup}}` gives  
`def macro #6 112 {1 a11 b11 c11 110 #6 112 egroup }2.`
- `\visualtoks{$$\halign{&##\hfil\crrc}$$\par}` gives  
`$3 $3 halign {1 &4 #6 #6 hfil crrc }2 $3 $3 par.`
- Unbalanced `\if...` tokens:  
`\visualtoks{\ifnum\iffalse{\fi'} = 0\else}` gives  
`ifnum iffalse {1 fi '12 }2 110 =12 110 012 else.`
- To demonstrate how  $\TeX$  tokenizes consecutive spaces:  
`\makeatletter \edef\temp{{\ }{\@spaces}}\expandafter\visualtoks\expandafter{\temp}` gives  
`{1 110 }2 {1 110 110 110 110 }2.`
- To demonstrate the `\lowercase` technique:  
`\begingroup  
  \lccode'&=$ \lccode'#=$ \lccode'^=$ \lccode'_'=$  
  \lccode'_'=$ \lccode'A=$ \lccode'?=$ \lccode'~=$  
\lowercase{\endgroup\def\temp{&##^_A?~}}  
\expandafter\visualtoks\expandafter{\temp}` gives  
`$3 $4 $6 $7 $8 $10 $11 $12 $13.`
- To show anomalous tokens:  
`\font\tenrm=cmr10 \tenrm  
\expandafter\visualtoks\expandafter{\the\font \tenrm}` gives  
`tenrm* tenrm.`

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## Repository

The upstream repository of this package may be found at

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