

# The `visualtoks` Package, version 1.0a

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In The `TEX`book, Knuth demonstrates the concept of tokens with the following example:

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

`{`<sub>1</sub> `\hskip` `36`<sub>12</sub> `pt`<sub>12</sub> <sub>10</sub> `p`<sub>11</sub> `t`<sub>11</sub> `}`<sub>2</sub>

The subscripts here are the category codes, as listed earlier: 1 for “beginning of group,” 12 for “other character,” and so on. The `\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 `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 `TEX` or `LATEX` by `\input{visualtoks}`. The `ε-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

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

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

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

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

- Unbalanced `\if...` tokens:

`\visualtoks{\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\visualtoks\expandafter{\temp}` gives

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

- To demonstrate the `\lowercase` technique:

`\begingroup \lccode'a=' $ \lccode'?=' $ \lccode'#=' $ \lccode'_'=' $`

`\lowercase{\endgroup\def\temp{$a?## }}\par}`

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

`$3 $11 $12 $6 $10.`