

# 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

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

```
def macro #6 112 {1 a11 b11 c11 110 #6 112 egroup }2.
```

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

$$\begin{array}{c} \$3 \quad \$3 \quad \boxed{\text{halign}} \quad \{_1 \quad \&_4 \quad \#_6 \quad \#_6 \quad \boxed{\text{hfil}} \quad \boxed{\text{crrr}} \quad \}_2 \quad \$3 \quad \$3 \quad \boxed{\text{par}}. \end{array}$$

- Unbalanced \if... tokens:

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

```
ifnum iffalse {1 fi '12 }2 110 =12 110 012 else.
```

- To demonstrate how `TFX` tokenizes consecutive spaces:

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

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

$$\{1 \quad \sqcup_{10} \quad \}^2 \quad \{1 \quad \sqcup_{10} \quad \sqcup_{10} \quad \sqcup_{10} \quad \sqcup_{10} \quad \}^2.$$

- To demonstrate the \lowercase technique:

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

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

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

$\$3 \quad \$_{11} \quad \$_{12} \quad \$6 \quad \$_{10}.$

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## Repository

The upstream repository of this package may be found at

[https://github.com/plante3/visualtoks/tree/main.](https://github.com/plante3/visualtoks/tree/main)