# The codedescribe and codelisting Packages Version 1.16

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#### Abstract

This package is designed to be as class independent as possible, depending only on exp13, scontents, listing, xpeekahead and pifont. Unlike other packages of the kind, a minimal set of macros/commands/environments is defined: most/all defined commands have an "object type" as a keyval parameter, allowing for an easy expansion mechanism (instead of the usual "one set of macros/environments" for each object type).

No assumption is made about page layout (besides "having a marginpar"), or underlying macros, so that it can be used with any document class.

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### 1 Introduction

This package aims to document both Document level (i.e. final user) commands, as well Package/Class level commands. It's fully implemented using expl3 syntax and structures, in special 13coffins, 13seq and 13keys. Besides those scontents and listing packages (see [1] and [2]) are used to typeset code snippets. The package pifont is needed just to typeset those (open)stars, in case one wants to mark a command as (restricted) expandable.

No other package/class is needed, any class can be used as the base one, which allows to demonstrate the documented commands with any desired layout.

codelisting defines a few macros to display and demonstrate LATEX code (using listings and scontents), whilst codedescribe defines a series of macros to display/enumerate macros and environments (somewhat resembling the doc3 style).

<sup>\*</sup>https://github.com/alceu-frigeri/codedescribe

## 1.1 Single versus Multi-column Classes

This package "can" be used with multi-column classes, given that the \linewidth and \columnsep are defined appropriately. \linewidth shall defaults to text/column real width, whilst \columnsep, if needed (2 or more columns) shall be greater than \marginparwidth plus \marginparsep.

### 1.2 Current Version

This doc regards to *codedescribe* version 1.16 and *codelisting* version 1.16. Those two packages are fairly stable, and given the *(obj-type)* mechanism (see 3.2) they can be easily extended without changing their interface.

## 2 codelisting Package

It requires two packages: listings and scontents, defines an environment: codestore, a few commands for listing/demo code: \tscode, \tsmergedcode, \tsdemo, \tsresult and \tsexec and 2 auxiliary commands: \setcodekeys and \setnewcodekey.

## 2.1 In Memory Code Storage

Thanks to scontents (expl3 based) it's possible to store LATEX code snippets in a expl3 sequence variable.

codestore

```
\label{local_local_local} $$ \left[ \left\langle \text{stcontents-keys} \right\rangle \right] \\ \left( \text{codestore} \right) $$
```

This environment is an alias to scontents environment (from scontents package, see [1]), all scontents keys are valid, with two additional ones: st and store-at which are aliases to the store-env key. If an "isolated"  $\langle st-name \rangle$  is given (unknown key), it is assumed that the environment body shall be stored in it (for use with \tscode, \tsmergedcode, \tsdemo, \tsresult and \tsexec).

**Note:** From scontents,  $\langle \text{st-name} \rangle$  is  $\langle \text{index} \rangle \text{ed}$  (The code is stored in a sequence variable). It is possible to store as many code snippets as needed under the same name. The first one will be  $\langle \text{index} \rangle \rightarrow 1$ , the second 2, and so on.

Warning: If explicitly using one of the store-env, st or store-at keys, the storage name can be anything. BUT, due to changes (August 2025) in the latex kernel keys processing, if an implicitly key is used, then colons (:), besides a comma and equal signs, aren't allowed.

L⁴T<sub>E</sub>X Code:

```
%The code will be stored as 'store:A'
\begin{codestore}[store-env = store:A]
...
\end{codestore}

%Same
\begin{codestore}[st = store:A]
...
\end{codestore}

%The code will be stored as 'storeA'
\begin{codestore}[storeA]
...
\end{codestore}

%This might raises an error.
%It will be stored as 'store' (not as 'store:A')
\begin{codestore}[store:A]
...
\end{codestore}
```

## 2.2 Code Display/Demo

\tscode\*
\tsdemo\*
\tsresult\*

```
\label{tscode*} $$ \code-keys \] {\langle st-name \rangle} [\langle index \rangle] $$ \tsdemo* [\langle code-keys \rangle] {\langle st-name \rangle} [\langle index \rangle] $$ \tsresult* [\langle code-keys \rangle] {\langle st-name \rangle} [\langle index \rangle] $$
```

updated: 2024/01/06 updated: 2025/04/29 \tscode\* just typesets \(\st-name\) (created with codestore) verbatim with syntax highlight (from listings package [2]). The non-star version centers it and use just half of the base line. The star version uses the full text width.

\tsdemo\* first typesets \( \st-name \), as above, then executes it. The non-start version place them side-by-side, whilst the star version places one following the other.

(new 2024/01/06) \tsresult\* only executes it. The non-start version centers it and use just half of the base line, whilst the star version uses the full text width.

**Note:** (from stcontents package)  $\langle index \rangle$  can be from 1 up to the number of stored codes under the same  $\langle st-name \rangle$ . Defaults to 1.

**Note:** All are executed in a local group which is discarded at the end. This is to avoid unwanted side effects, but might disrupt code execution that, for instance, depends on local variables being set. That for, see \tsexec below.

For Example:

LATEX Code:

```
\begin{codestore}[stmeta]
    Some \LaTeX{} coding, for example: \ldots.
\end{codestore}
This will just typesets \tsobj[key]{stmeta}:
\tscode*[codeprefix={Sample Code:}] {stmeta}
and this will demonstrate it, side by side with source code:
\tsdemo[numbers=left,ruleht=0.5,
    codeprefix={inner sample code},
    resultprefix={inner sample result}] {stmeta}
```

LATEX Result:

This will just typesets stmeta:

Sample Code:

```
Some \LaTeX{} coding, for example: \ldots.
```

and this will demonstrate it, side by side with source code:

inner sample code

inner sample result

```
Some \LaTeX{} coding, for example: \ldots.
```

Some LATEX coding, for example: ....

\tsmergedcode\*

```
\verb|\tsmergedcode*| [$\langle \texttt{code-keys} \rangle] $ \{ \langle \texttt{st-name-index list} \rangle \} $
```

new: 2025/04/29

This will typeset (as \tscode) the merged contents from  $\langle st-name-index list \rangle$ . The list syntax comes from scontents (command \mergesc), where it is possible to refer to a single index  $\{\langle st-name A \rangle\}$  [ $\langle index \rangle$ ], a index range  $\{\langle st-name B \rangle\}$  [ $\langle index A-index B \rangle$ ], or all indexes from a  $\langle st-name C \rangle$ } [ $\langle 1-end \rangle$ ]. The special index  $\langle 1-end \rangle$  refers to all indexes stored under a given  $\langle st-name \rangle$ .

```
Note: The brackets aren't optional. For instance \tsmergedcode* [\langle code-keys \rangle] { \{\langle st-name\ A \rangle\}\ [\langle index \rangle]\ ,\ \{\langle st-name\ B \rangle\}\ [\langle index A-index B \rangle]\ ,\ \{\langle st-name\ C \rangle\}\ [\langle 1-end \rangle]\ }
```

\tsexec

```
\tsexec {\langle st-name \rangle} [\langle index \rangle]
```

new: 2025/04/29

Unlike the previous commands which are all executed in a local group (discarded at the end) this will execute the code stored at  $\langle st-name \rangle$  [ $\langle index \rangle$ ] in the current LATEX group.

#### Code Keys 2.2.1

\setcodekeys

\setcodekeys  $\{\langle code-keys \rangle\}$ 

One has the option to set (code-keys) per \tscode, \tsmergedcode, \tsdemo and \tsresult call (see 2.2), or globally, better said, in the called context group.

> N.B.: All \tscode and \tsdemo commands create a local group in which the (code-keys) are defined, and discarded once said local group is closed. \setcodekeys defines those keys in the *current* context/group.

\setnewcodekey

\setnewcodekey  $\{\langle new-key \rangle\} \{\langle code-keys \rangle\}$ 

2025-05-01

This will define a new key (new-key), which can be used with \tscode, \tsmergedcode, \tsdemo and \tsresult. \(\lambda\) can be any of the following ones, including other \(\lambda\) new-key\(\rangle\)s. Be careful not to create a definition loop.

settexcs texcs

settexcs, settexcs2, settexcs3 and settexcs4

texcs, texcs2, texcs3 and texcs4

texcsstvle

texcsstyle, texcs2style, texcs3style and texcs4style

2025-05-01

Those define sets of LATEX commands (csnames), the set variants initialize/redefine those sets (an empty list, clears the set), while the others extend those sets. The style ones redefines the command display style (an empty \( \nabla \) alue \( \nabla \) resets the style to it's default).

setkeywd keywd

setkeywd, setkeywd2, setkeywd3 and setkeywd4

keywd, keywd2, keywd3 and keywd4

keywdstyle, keywd2style, keywd3style and keywd4style keywdstyle

2025-05-01 updated:

Same for other *keywords* sets.

setemph emph

setemph, setemph2, setemph3 and setemph4

emph, emph2, emph3 and emph4

emphstyle

emphstyle, emph2style, emph3style and emph4style

updated: 2025-05-01

for some extra emphasis sets.

letter other

letter and other

These allow to redefine what a letter or other are (they correspond to the alsoletter and alsoother keys from listings). The default value for the letter includes (sans the comma) **©**: \_, whilst other default value is an empty list.

> **Note:** You might want to consider setting letter to just letter={0,\_} so you don't have to list all variants, but just the base name of an expl3 function.

numbers numberstyle numbers and numberstyle

numbers possible values are none (default) and left (to add tinny numbers to the left of the listing). With numberstyle one can redefine the numbering style.

stringstyle stringstyle and commentstyle

codestyle

to redefine strings and comments formatting style.

bckgndcolor

bckgndcolor

to change the listing background's color.

codeprefix resultprefix codeprefix and resultprefix

those set the codeprefix (default: LATEX Code:) and resultprefix (default: LATEX Result:)

parindent parindent

> Sets the indentation to be used when 'demonstrating' LATEXcode (\tsdemo). Defaults to whatever value \parindent was when the package was first loaded.

ruleht

When typesetting the 'code demo' (\tsdemo) a set of rules are drawn. The Default, 1, equals to \arrayrulewidth (usually 0.4pt).

basicstyle

new: 2023/11/18 Sets the base font style used when typesetting the 'code demo', default being \footnotesize \ttfamily

#### 3 codedescribe Package

This package aims at minimizing the number of commands, being the object kind (if a macro, or environment, or variable, or key ...) a parameter, allowing for a simple extension mechanism: other object types can be easily introduced without having to change, or add commands.

#### 3.1 Package Options

nolisting it will suppress the codelisting package load. In case it isn't needed or another listing package will be used.

Changes the base skip, all skips (used by the environments at 3.3) are scaled up from this. base skip It defaults to the font size at load time.

strict Package Warnings will be reported as Package Errors.

color scheme Possible values: black, default, brighter and darker. This will adjust the initial color configuration for the many format groups/objects (see 3.2.1). black will defaults all \tsobj colors to black. default, brighter and darker are roughly the same color scheme. The default scheme is the one used in this document. With brighter the colors are brighter than the default, and with darker the colors will be darker, but not black.

Note: color scheme doesn't affect codelisting / listings colors.

#### 3.2 Object Type keys

(obj-types) defines the applied format, which is defined in terms of (format-groups) wich defines a formatting function, font shape, bracketing, etc. to be applied.

#### Format Keys 3.2.1

Those are the primitive (format-keys) used when (re)defining (format-groups) and (obj-types) (see 3.2.4):

to typeset between angles, meta

to typeset \*verbatim\* between angles, xmeta

to typeset \*verbatim\*, verb

xverb to typeset \*verbatim\*, suppressing all spaces,

to typeset \*verbatim\*, suppressing all spaces and replacing a TF by TF, code

in case of a redefinition, to remove the 'base' formatting. nofmt

to use a slanted font shape, slshape to use an italic font shape, itshape

in case of a redefinition, to remove the 'base' shape, noshape

defines the left bracket (when using \tsargs). Note: this key must have an 1bracket

associated value,

rbracket defines the right bracket (when using \tsargs). Note: this key must have an

associated value,

color defines the text color. **Note:** this key must have an associated value (a color,

as understood by xcolor package).

#### 3.2.2 Format Groups

Using \defgroupfmt (see 3.2.4) one can (re-)define custom \( format-groups \). The following ones are predefined:

meta which sets meta and color

verb which sets color

oarg which sets meta and color code which sets code and color

syntax which sets color

keyval which sets slshape and color

option which sets color defaultval which sets color

env which sets slshape and color pkg which sets slshape and color

**Note:** color was used in the list above just as a 'reminder' that a color is defined/associated with the given group, it can be changed with \defgroupfmt.

### 3.2.3 Object Types

Object types are the <code>keys</code> used with <code>tsobj</code> (and friends, see 3.4) defining the specific formatting to be used. With <code>defobjectfmt</code> (see 3.2.4) one can (re-)define custom <code>obj-types</code>. The predefined ones are:

```
arg, meta based on (group) meta
```

verb, xverb based on (group) verb plus verb or xverb

marg based on (group) meta plus brackets

oarg, parg, xarg based on (group) oarg plus brackets

code, macro, function based on (group) code

syntax based on (group) syntax

keyval, key, keys, values based on (group) keyval

option based on (group) option

defaultval based on (group) defaultval

env based on (group) env
pkg, pack based on (group) pkg

### 3.2.4 Customization

To create user defined groups/objects or change the pre-defined ones:

\defgroupfmt

 $\label{lem:defgroupfmt} $$ \defgroupfmt {\langle format-group \rangle} {\langle format-keys \rangle}$$ 

new: 2023/05/16

 $\langle format-group \rangle$  is the name of the new group (or one being redefined, which can be one of the standard ones).  $\langle format-keys \rangle$  is any combination of the keys from 3.2.1

For example, one can redefine the *code group* standard color with \defgroupfmt{code}{color=red} and all *obj-types* based on it will be typeset in red (in the standard case: *code*, *macro* and *function* objects).

```
\defobjectfmt
```

```
\label{lem:defobjectfmt} $$ \ensuremath{ \langle obj-type \rangle } {\langle format-group \rangle } {\langle format-keys \rangle } $$
```

new: 2023/05/16

⟨obj-type⟩ is the name of the new ⟨object⟩ being defined (or redefined), ⟨format-group⟩ is the base group to be used (see 3.2.2). ⟨format-keys⟩ (see 3.2.1) allow for further differentiation.

For instance, the many optional  $\langle *arg \rangle$  are defined as follow:

```
\colorlet {c__codedesc_oarg_color} { gray!90!black }
\defgroupfmt {oarg} { meta , color=c__codedesc_oarg_color }
\defobjectfmt {oarg} {oarg} { lbracket={[]} , rbracket={]]} }
\defobjectfmt {parg} {oarg} { lbracket={(]} , rbracket={(]} }
\defobjectfmt {xarg} {oarg} { lbracket={<} , rbracket={>} }
```

#### 3.3 Environments

#### codedescribe

new: 2023/05/01 updated: 2023/05/01 updated: 2024/02/16 updated: 2025/09/25 NB: a note example

\end{codedescribe}

This is the main environment to describe *Commands*, *Variables*, *Environments*, etc. <csv-list</pre>
items will be listed in the left margin. The optional <obj-keys</pre>
 defaults to just code, it can be any object type as defined at 3.2.3 (and 3.2.4), besides the following keys:

new To add a new line. update To add an updated line. note To add a NB line.

rulecolor For instance \begin{codedescribe} [rulecolor=white] will suppress the rules.

EXP A star ★ will be added to all items, signaling the commands are fully expand-

A star ★ will be added to all items, signaling the commands are fully expandable.

able.

rexp A hollow star ☆ will be added to all items, signaling the commands are

restricted expandable.

**Note:** The keys new, update and note can be used multiple times. (2024/02/16)

**Note:** With the strict package option an error will be raised if used inside another *codedescribe* environment. Otherwise a warning will be raised. (it's safe to do so, but it doesn't make much sense).

codesyntax

updated: 2025/09/25

\begin{codesyntax}

\end{codesyntax}

The codesyntax environment sets the fontsize and activates \obeylines, \obeyspaces, so one can list macros/cmds/keys use, one per line.

**Note:** codesyntax environment shall appear only once, inside of a codedescribe environment. Take note, as well, this is not a verbatim environment!

**Note:** With the strict package option an error will be raised if used outside a *codedescribe* environment, or more than once inside. Otherwise warnings will be raised.

For example, the code for codedescribe (previous entry) is:

## L⁴T<sub>E</sub>X Code:

```
describelist
describelist*
```

```
\begin{describelist} [\langle item-indent \rangle] {\langle obj-type \rangle}
   \describe {\langle item-name \rangle} {\langle item-description \rangle}
   \describe {\langle item-name \rangle} {\langle item-description \rangle}
```

\end{describelist}

This sets a description like 'list'. In the non-star version the (items-name) will be typeset on the marginpar. In the star version, (item-description) will be indented by (item-indent) (defaults to: 20mm). ⟨obj-type⟩ defines the object-type format used to typeset <item-name⟩.

\describe

```
\describe {\langle item-name \rangle} {\langle item-description \rangle}
```

This is the describelist companion macro. In case of the describe\*, (item-name) will be typeset in a box (item-ident) wide, so that (item-description) will be fully indented, otherwise (item-name) will be typed in the marginpar.

> Note: An error will be raised (undefined control sequence) if called outside of a describelist or describelist\* environment.

#### Typeset Commands 3.4

Note that, in the following commands, (obj-type) refers to any object type defined in 3.2.3 and 3.2.4.

### \typesetobj \tsobj

```
\typesetobj [\langle obj-type \rangle] \{\langle csv-list \rangle\}
\tsobj [\langle obj-type \rangle] \{\langle csv-list \rangle \}
```

updated: 2025/05/29 This is the main typesetting command, each term of (csv-list) will be separated by a comma and formatted as defined by obj-type (defaults to code). obj-type can be any object from 3.2.3 (or 3.2.4) and the following keys:

To change the item separator. Defaults to a comma, can be anything. mid sep To change the separator between the last two items. Defaults to "and".

comma To set the separator between the last two items to a comma.

bnf or To produce a bnf style or list, like [abc|xdh|htf|hrf].

To produce a bnf style or list between angles, like (abc|xdh|htf|hrf). meta or

To produce a bnf style or list between parentheses, like (abc|xdh|htf|hrf). par or

## \typesetargs \tsargs

sep

```
\verb|\typesetargs| [\langle \texttt{obj-type} \rangle] {\langle \texttt{csv-list} \rangle}|
\t sargs [\langle obj-type \rangle] {\langle csv-list \rangle}
```

These will typeset  $\langle csv-list \rangle$  as a list of parameters, like  $[\langle arg1 \rangle] [\langle arg2 \rangle] [\langle arg3 \rangle]$ , or  ${\langle \arg 1 \rangle} {\langle \arg 2 \rangle} {\langle \arg 3 \rangle}$ , etc.  ${\langle obj-type \rangle}$  defines the formating AND kind of brackets used (see 3.2): [] for optional arguments (oarg), {} for mandatory arguments (marg), and so on.

### \typesetmacro \tsmacro

```
\typesetmacro {\langle macro-list \rangle} [\langle oargs-list \rangle] {\langle margs-list \rangle}
\tsmacro {\langle macro-list \rangle \big[ \langle args-list \rangle \big] {\langle margs-list \rangle \big]
```

These are just short-cuts for

\tsobj[code]{macro-list} \tsargs[oarg]{oargs-list} \tsargs[marg]{margs-list}.

#### \typesetmeta \tsmeta

```
\typesetmeta \{\langle name \rangle\}
\t {\langle name \rangle}
```

These will just typeset (name) between left/right 'angles' (no further formatting).

### \typesetverb \tsverb

```
\typesetverb [\langle obj-type \rangle] {\langle verbatim text \rangle }
\tsverb [\langle obj-type \rangle] {\langle verbatim text \rangle }
```

Typesets (verbatim text) as is (verbatim...). (obj-type) defines the used format. The difference with \tsobj [verb] {something} is that (verbatim text) can contain commas (which, otherwise, would be interpreted as a list separator in \tsobj.

**Note:** This is meant for short expressions, and not multi-line, complex code (one is better of, then, using 2.2). (verbatim text) must be balanced! otherwise, some low level TeX errors may pop out.

## 3.5 Note/Remark Commands

\typesetmarginnote \tsmarginnote

\typesetmarginnote  $\{\langle note \rangle\}$  \tsmarginnote  $\{\langle note \rangle\}$ 

Typesets a small note at the margin.

tsremark

 $\begin{tsremark} \ [\langle \mathtt{NB} \rangle] \\ \end{tsremark}$ 

The environment body will be typeset as a text note.  $\langle NB \rangle$  (defaults to Note:) is the note begin (in boldface). For instance:

LATEX Code:

LATEX Result:

Sample text. Sample test.
\begin{tsremark}[N.B.]
This is an example.
\end{tsremark}

Sample text. Sample test.

**N.B.** This is an example.

## 3.6 Auxiliary Commands and Environment

In case the Document Class being used redefines the \maketitle command and/or abstract environment, alternatives are provided (based on the article class).

\typesettitle \tstitle

 $\label{title} $$ \title-keys$ \$   $\title {\langle title-keys \rangle }$ 

This is based on the \maketitle from the article class. The \tag{title-keys} are:

title The title.

author Author's name. It's possible to use the \footnote command in it.

date Title's date.

**Note:** The \footnote (inside this) will use an uniquely assigned counter, starting at one each time this is used (to avoid hyperref warnings).

tsabstract

\begin{tsabstract}

. .

\end{tsabstract}

This is the abstract environment from the article class.

\typesetdate \tsdate

\typesetdate

\tsdate

new: 2023/05/16

This provides the current date (in Month Year, format).

## References

- [1] Pablo González. SCONTENTS Stores LaTeX Contents. 2024. URL: http://mirrors.ctan.org/macros/latex/contrib/scontents/scontents.pdf (visited on 03/10/2025).
- [2] Jobst Hoffmann. The Listings Package. 2024. URL: http://mirrors.ctan.org/macros/latex/contrib/listings/listings.pdf (visited on 03/10/2025).