# The codedescribe and codelisting Packages
Version 1.4

Alceu Frigeri[*]

February 2024

**Abstract**

This documentation package is designed to be 'as class independent as possible', depending only on *expl3*, *scontents*, *listing* 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 about page layout is made (besides 'having a marginpar'), or underlying macros, so that it can be used with any document class.

## Contents

## 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 *l3coffins*, *l3seq* and *l3keys*. Besides those *scontents* and *listing* packages 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).

[*]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 1.4 and *codelisting* version 1.4. Those two packages are fairly stable, and given the ⟨obj-type⟩ mechanism (see below, 3.2) it can be easily extended without changing it's interface.

## 2 codelisting Package

It requires two packages: *listings* and *scontents*, defines an environment: *codestore* and 3 main commands: `\tscode`, `\tsdemo` and `\tsresult` and 1 auxiliary command: `\setcodekeys`.

### 2.1 In Memory Code Storage

Thanks to *scontents* (*expl3* based) it's possible to store LaTeX code snippets in a *expl3* key.

*codestore*

```
\begin{codestore} [⟨stcontents-keys⟩]
\end{codestore}
```

This environment is an alias to *scontents* environment (from *scontents* package), all *scontents* keys are valid, with two additional ones: *st* and *store-at* which are aliases to the *store-env* key. If an 'isolated' ⟨*st-name*⟩ is given (unknown *key*), it is assumed 'by Default' that the environment body shall be stored in it (for use with `\tscode` and `\tsdemo`).

### 2.2 Code Display/Demo

`\setcodekeys`

```
\setcodekeys {⟨code-keys⟩}
```

One has the option to set ⟨code-keys⟩ (see 2.2.1) per `\tscode` /`\tsdemo` call, 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.

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

update: 2024/01/06

```
\tscode* [⟨code-keys⟩] {⟨st-name⟩}
\tsdemo* [⟨code-keys⟩] {⟨st-name⟩}
\tsresult* [⟨code-keys⟩] {⟨st-name⟩}
```

`\tscode` just typesets ⟨st-name⟩ (the key-name created with *stcode*), in verbatim mode with syntax highlight. 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 it *executes* said code. The non-start versions place them side-by-side, whilst the star versions places one following the other.
(new 2024/01/06) `\tsresult*` only *executes* said code. The non-start versions centers it and use just half of the base line, whilst the star versions uses the full text width.

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: . . . . |

---

### 2.2.1 Code Keys

Using a *key*=*value* syntax, one can fine tune *listings* syntax highlight.

*settexcs*
*texcs*
*texcsstyle*

*settexcs, settexcs2* and *settexcs3*
*texcs, texcs2* and *texcs3*
*texcsstyle, texcs2style* and *texcs3style*

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 ⟨value⟩ resets the style to it's default).

*setkeywd*
*keywd*
*keywdstyle*

*setkeywd, setkeywd2* and *setkeywd3*
*keywd, keywd2* and *keywd3*
*keywdstyle, keywd2style* and *keywd3style*

Same for other *keywords* sets.

*setemph*
*emph*
*emphstyle*

*setemph, setemph2* and *setemph3*
*emph, emph2* and *emph3*
*emphstyle, emph2style* and *emph3style*

for some extra emphasis sets.

*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*
*codestyle*

*stringstyle* and *commentstyle*

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' LaTeX code (`\tsdemo`). Defaults to whatever value `\parindent` was when the package was first loaded.

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

basicstyle *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, having the object kind (if a macro, or a function, or environment, or variable, or key ...) as 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

It has a single package option:

nolisting it will suppress the *codelisting* package load. In case it's not necessary or one wants to use a differen package for LaTeX code listing.

### 3.2 Object Type keys

The applied text format is defined in terms of ⟨obj-types⟩, which are defined in terms of ⟨format-groups⟩ and each one defines a 'formatting function', 'font shape', bracketing, etc. to be applied.

#### 3.2.1 Format Keys

There is a set of primitive ⟨format-keys⟩ used to define ⟨format-groups⟩ and ⟨obj-types⟩, which are:

| | |
|---|---|
| *meta* | to typeset between angles, |
| *xmeta* | to typeset *verbatim* between angles, |
| *verb* | to typeset *verbatim*, |
| *xverb* | to typeset *verbatim*, suppressing all spaces, |
| *code* | to typeset *verbatim*, suppressing all spaces and replacing a TF by <u>TF</u>, |
| *nofmt* | in case of a redefinition, to remove the 'base' formatting, |
| *slshape* | to use a slanted font shape, |
| *itshape* | to use an italic font shape, |
| *noshape* | in case of a redefinition, to remove the 'base' shape, |
| *lbracket* | defines the left bracket (when using `\tsargs`). **Note:** this key must have an 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` one can (re-)define custom ⟨format-groups⟩. There is, though, a set of pre-defined ones as follow:

| | |
|---|---|
| *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.

### 3.2.3 Object Types

Using `\defobjectfmt` one can (re-)define custom ⟨obj-types⟩. Similarly, there is a set of predefined ones, as follow:

| | |
|---|---|
| *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

One can add user defined groups/objects or change the pre-defined ones with the following commands:

`\defgroupfmt`
new: 2023/05/16

`\defgroupfmt {⟨format-group⟩} {⟨format-keys⟩}`

⟨format-group⟩ is the name of the new group (or one being redefined, which can be one of the standard ones). ⟨format-keys⟩ is any combination of the keys defined in 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`
new: 2023/05/16

`\defobjectfmt {⟨obj-type⟩} {⟨format-group⟩} {⟨format-keys⟩}`

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

For instance, the many optional ⟨*arg⟩ 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*
*update: 2023/05/01*
*update: 2024/02/16*
*NB: this is an example*

```
\begin{codedescribe} [⟨obj-type⟩] {⟨csv-list⟩}
...
\end{codedescribe}
```

This is the main environment to describe *Macros*, *Functions*, *Variable*, *Environments* and *etc.* ⟨csv-list⟩ is typeset in the margin. The optional ⟨obj-type⟩ (see 3.2 and 3.2.3) defines the object-type format.

> ***Note 1:*** One can change the rule color with the key *rulecolor*, for instance `\begin{codedescribe}[rulecolor=white]` will remove the rules.

> ***Note 2:*** Besides that, one can use the keys *new*, *update* and *note* to further customize it. (2024/02/16 these keys can also be used multiple times).

> ***Note 3:*** Finally, one can use *EXP* and *rEXP* to add a star ★ or a hollow star ☆, as per expl3/doc3 conventions (if expandable, restricted expandable or not).

*codesyntax*

```
\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!

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

LaTeX Code:

```
\begin{codedescribe}[env,new=2023/05/01,update=2023/05/01,note={this is an example},update
      =2024/02/16]{codedescribe}
  \begin{codesyntax}
    \tsmacro{\begin{codedescribe}}[obj-type]{csv-list}
    \ldots
    \tsmacro{\end{codedescribe}}{}
  \end{codesyntax}
  This is the main ...
\end{codedescribe}
```

*describelist*
*describelist**

```
\begin{describelist} [⟨item-indent⟩] {⟨obj-type⟩}
..\describe {⟨item-name⟩} {⟨item-description⟩}
..\describe {⟨item-name⟩} {⟨item-description⟩}
...
\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` {⟨item-name⟩} {⟨item-description⟩}

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.

## 3.4 Commands

`\typesetobj`
`\tsobj`

`\typesetobj` [⟨obj-type⟩] {⟨csv-list⟩}
`\tsobj` [⟨obj-type⟩] {⟨csv-list⟩}

This is the main typesetting command (most of the others are based on this). It can be used to typeset a single 'object' or a list thereof. In the case of a list, each term will be separated by commas. The last two by *sep* (defaults to: and).

> ***Note:*** One can change the last 'separator' with the key *sep*, for instance `\tsobj [env,sep=or] {}` (in case one wants to produce an 'or' list of environments). Additionally, one can use the key *comma* to change the last separator to a single comma, like `\tsobj [env,comma] {}`.

`\typesetargs`
`\tsargs`

`\typesetargs` [⟨obj-type⟩] {⟨csv-list⟩}
`\tsargs` [⟨obj-type⟩] {⟨csv-list⟩}

Those will typeset ⟨csv-list⟩ as a list of parameters, like [⟨arg1⟩] [⟨arg2⟩] [⟨arg3⟩], or {⟨arg1⟩} {⟨arg2⟩} {⟨arg3⟩}, etc. ⟨obj-type⟩ 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` {⟨macro-list⟩} [⟨oargs-list⟩] {⟨margs-list⟩}
`\tsmacro` {⟨macro-list⟩} [⟨oargs-list⟩] {⟨margs-list⟩}

This is just a short-cut for
`\tsobj[code]{macro-list} \tsargs[oarg]{oargs-list} \tsargs[marg]{margs-list}`.

`\typesetmeta`
`\tsmeta`

`\typesetmeta` {⟨name⟩}
`\tsmeta` {⟨name⟩}

Those will just typeset ⟨name⟩ between left/right 'angles' (no other formatting).

`\typesetverb`
`\tsverb`

`\typesetverb` [⟨obj-type⟩] {⟨verbatim text⟩}
`\tsverb` [⟨obj-type⟩] {⟨verbatim text⟩}

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.

`\typesetmarginnote`
`\tsmarginnote`

`\typesetmarginnote` {⟨note⟩}
`\tsmarginnote` {⟨note⟩}

Typesets a small note at the margin.

*tsremark* `\begin{tsremark} [⟨NB⟩]`
`\end{tsremark}`

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

| LaTeX Code: | LaTeX Result: |
|---|---|
| `Sample text. Sample test.`<br>` \begin{tsremark}[N.B.]`<br>`   This is an example.`<br>` \end{tsremark}` | Sample text. Sample test.<br>***N.B.*** This is an example. |

## 3.5 Auxiliary Command / Environment

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

**typesettitle**
**tstitle**

`\typesettitle {⟨title-keys⟩}`
`\tstitle {⟨title-keys⟩}`

This is based on the `\maketitle` from the *article* class. The ⟨title-keys⟩ are:

| | |
|---|---|
| *title* | The used title. |
| *author* | Author's name. It's possible to use `\footnote` command in it. |
| *date* | Title's date. |

*tsabstract* `\begin{tsabstract}`
`...`
`\end{tsabstract}`

This is the *abstract* environment from the *article* class.

**typesetdate**
**tsdate**
new: 2023/05/16

`\typesetdate`
`\tsdate`

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