The `coloredtheorem` package

João M. Lourenço

`joao.lourenco@fct.unl.pt`

March 31, 2024

1 Introduction

The `coloredtheorem` package is a simple environment, which takes no options, and that allows to write stuff inside boxes from `tcolorbox`. So, this packages includes `tcolorbox` if necessary. You may include `tcolorbox` with your own favourite options prior to including this package.

Akin to `\newtheorem` from the `amsmath` package, the user should start by defining a new *theorem/box* group and customize its aspect. Each new environment will have its own counter/numnering. Notice that `\label{...}` and `\ref{...}` work as expected. The is also a command to generate the corresponding *list of . . .*

2 Usage

`\usepackage{coloredtheorem}`

> Load the `coloredtheorem` package. This package will load `tcolorbox` if necessary.

`\cthnewtheorem{<envname>}{<Name>}[<tcolorbox options>]`

> `<envname>` is the environment name, e.g., `theorem`.
>
> `<Name>` is the name for new environment being defined, e.g., *Theorem*.
>
> `<tcolorbox options>` options to be passed to the `tcolorbox` environment to customize the boxes for the given environment (this argument is optional).

`\begin{cth<envname>}{<Caption>}[<tcolorbox options>]<Contents>\end{cth<envname>}`

> `<envname>` is the environment name, e.g., `theorem`.
>
> `<Caption>` is the caption/title of the box.
>
> `<tcolorbox options>` options to be passed to the `tcolobox` environment, which will override the defaults given in `\cthnewtheorem`.
>
> `<Contents>` the contents to by typeset inside the coulored environment.

`\cthlistof<envname>s`

> `<envname>` is the environment name, e.g., e.g., `\cthlistoftheorems`. Please notice that there is a 's' (plural) after `<envname>`.

3 Example

Let's start by creating two new environments, one for *algorithms* and another for *examples*, both defaulting to a gray frame, the former with a yellowish background and the latter with a lighter gray background.

```
\cthnewtheorem{algorithm}{Algorithm}[coltitle=black, colback=yellow!10,
                                     colframe=black!15]
\cthnewtheorem{example}{Example}[coltitle=black, colback=black!5,
                                 colframe=black!30]
```

An algorithm box will be created with:

```
\begin{cthalgorithm}{Advance a counter to the next value in a domain
                     $\omega \in \mathbb{N}$.}

Algorithm body here!
\end{cthalgorithm}
```

Algorithm 1 Advance a counter to the next value in a domain $\omega \in \mathbb{N}$.

Input: α: The current value; and ω: the domain.
Output: The next value of α within the domain ω.
1: ▷ *e.g., $\alpha = 3 \land \omega = \{8, 3, 2, 21, 5, 1\} \to 5$*

2: **function** ADVANCE(α: int, ω: set) $\to$ int **is**
3:     $\alpha \leftarrow \alpha + 1$ ▷ *try the next value*
4:     **while** $\alpha \notin \omega \land \omega \neq \{\,\}$ **do**   ▷ *if this value is not in the domain*
5:       $\alpha \leftarrow \alpha + 1$ ▷ *try the next value*
6:     **end while**
7:     **if** $\omega \neq \{\,\}$ **then**
8:       $\omega \leftarrow \omega \setminus \{\alpha\}$ ▷ *remove the value from the domain*
9:     **end if**
10:    **return** α ▷ *the next value (or the last value plus one if no more values)*
11: **end function**

Now, let's rewrite Algorithm 1, but now with a different customized visual, just for this entry! The customization (3rd) argument is passed straight to the `tcolorbox` environment, so anything valid for `tcolorbox` is also valid here.

Algorithm 2 **Advance a counter to the next value in a domain $\omega \in \mathbb{N}$, but now with a customized visual. Also, notice that this algorithm breaks the page boundaries.**

Input: α: The current value; and ω: the domain.
Output: The next value of α within the domain ω.

```
 1: ▷ e.g., α = 3 ∧ ω = {8, 3, 2, 21, 5, 1} → 5

 2: function ADVANCE(α: int, ω: set) → int is
 3:     α ← α + 1                                          ▷ try the next value
 4:     while α ∉ ω ∧ ω ≠ { } do              ▷ if this value is not in the domain
 5:         α ← α + 1                                      ▷ try the next value
 6:     end while
 7:     if ω ≠ { } then
 8:         ω ← ω \{α}                        ▷ remove the value from the domain
 9:     end if
10:     return α            ▷ the next value (or the last value plus one if no more values)
11: end function
```

Now, let's add an example here, this time using the default visual that was given when creating the environment with \cthnewtheorem...

Example 1 This is an example!

As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time. Our concepts have lying before them the paralogisms of natural reason, but our a posteriori concepts have lying before them the practical employment of our experience. Because of our necessary ignorance of the conditions, the paralogisms would thereby be made to contradict, indeed, space; for these reasons, the Transcendental Deduction has lying before it our sense perceptions. (Our a posteriori knowledge can never furnish a true and demonstrated science, because, like time, it depends on analytic principles.) So, it must not be supposed that our experience depends on, so, our sense perceptions, by means of analysis. Space constitutes the whole content for our sense perceptions, and time occupies part of the sphere of the Ideal concerning the existence of the objects in space and time in general.

And now an example with no caption and a different visual... this example will not go into the \listofexamples below!

Example

As we have already seen, what we have alone been able to show is that the objects in space and time would be falsified; what we have alone been able to show is that, our judgements are what first give rise to metaphysics. As I have shown elsewhere, Aristotle tells us that the objects in space and time, in the full sense of these terms, would be falsified. Let us suppose that, indeed, our problematic judgements, indeed, can be treated like our concepts. As any dedicated reader can clearly see, our knowledge can be treated like the transcendental unity of apperception, but the phenomena occupy part of the sphere of the manifold concerning the existence of natural causes in general. Whence comes the architectonic of natural reason,

---

the solution of which involves the relation between necessity and the Categories? Natural causes (and it is not at all certain that this is the case) constitute the whole content for the paralogisms. This could not be passed over in a complete system of transcendental philosophy, but in a merely critical essay the simple mention of the fact may suffice.

Now let's print the lists of algorithms and examples. Remember to add the prefix cthth to the listof, i.e., \cthlistofalgorithms and \cthlistofexamples!

List of Algorithms

List of Examples