XSIM

v0.1pre-1   2017/02/22

eXercise Sheets IMproved

Clemens Niederberger

https://github.com/cgnieder/xsim

contact@mychemistry.eu

Table of Contents

1 Licence, Requirements and README

Permission is granted to copy, distribute and/or modify this software under the terms of the LaTeX Project Public License (LPPL), version 1.3 or later (http://www.latex-project.org/lppl.txt). The software has the status "maintained."

XSIM loads the packages expl3 [L3Pa], xparse [L3Pb], etoolbox [Leh15], booktabs [Fea05] and translations [Nie15].

2 Motivation and Background

It has been quite a while since I first published exsheets [Nie17] in Juni 2012. Since then it has gained a user base and a little bit of popularity as the number of questions on tex.sx shows (98 at the time of writing). User questions, bug reports and feature requests improved it over the time. Still it has a version number starting with a zero which in my versioning system means I still consider it experimental.

This is due to several facts. It lacks a few features which I consider essential for a full version 1. For one thing it is not possible to have several kinds of exercises numbered independently. Using verbatim material such as listings inside exercises and solutions is not possible and the current workaround isn't that ideal either. One request which dates back quite a while now was to have different types of points to exercises...

All of those aren't easy to add due to the way exsheets is implemented right now. As a consequence I wanted to re-implement exsheets for a long time. This is what lead to XSIM. Internally the package works completely different. It will be the official successor of exsheets which is now considered obsolete and will only receive bugfix releases any more.

3 Package Options

XSIM has two package options:

verbose
  Writes extensive information about what XSIM is doing into the log file.

final
  If used the exercise and solution environments will not rewrite the environment body files.

Those options are used the usual way as package option

```
1 \usepackage[verbose]{xsim}
```

or as global option

```
1 \documentclass[verbose]{article}
```

or via the setup command:

`\xsimsetup{⟨options⟩}`
  Set up xsim's two package options and all other options described at other places in the manual.

4 Nomenclature

Throughout this manual certain terms are used. This section explains their meaning in this manual.

collection A *collection* bundles a number of exercises of one type or all types of exercises within certain barriers in the document. Those exercise collections can be printed at any place in the document *after* the collection is complete.

goal *Goals* are a certain type of properties with a numerical value the sum of which is available throughout the document.

parameter *Parameters* are options of exercise types which are the same for each exercise of a type and can be retrieved and used in exercise templates.

property *Properties* are options of exercises which are individual for each exercise and can be retrieved and used in exercise templates.

tag *Tags* are a certain type of properties with a csv list as value which can be used for selective usage of exercises.

template *Templates* are generic code frameworks which are used for typesetting xsim's objects such as exercises, solutions, or grading tables.

5 Exercises and Solutions

5.1 The Environments

`\begin{exercise}[⟨properties⟩]`
  Input and typeset an exercise. See section 8 for details on exercise properties.

`\begin{solution}[⟨options⟩]`
  Input and typeset the solution to the exercise of the previous `exercise` environment. See section 11 for details on options of solutions.

```
1 \begin{exercise}
2   A first example for an exercise.
3 \end{exercise}
4 \begin{solution}
5   A first example for a solution.
6 \end{solution}
```

Exercise 1

A first example for an exercise.

As can be seen in the example a solution is not printed with the default setup. This can be changed using the follwong option.

solution » print = <u>true</u>|false   Default: false
> Set if solutions are printed or or not.

The option (belonging to the module `solution`) can either be set locally as option to the `solution` environment

```
1 \begin{solution}[print=true]
2   A first example for a solution.
3 \end{solution}
```

or with the setup command for all following solutions:

```
1 \xsimsetup{
2   solution/print = true
3 }
```

There is an completely analoguous option for the `exercise` environment:

exercise » print = <u>true</u>|false   Default: true
> Set if exercises are printed or or not.

6 How They Work

Both enviroments write the contents of their bodies verbatim to external files following a certain naming structure:

- ⟨*jobname*⟩-⟨*type*⟩-⟨*id*⟩-⟨*exercise*⟩|⟨*solution*⟩-`body.tex`

For example both enviroments from the first example have been written to files named

- `xsim_manual-exercise-1-exercise-body.tex` and

- `xsim_manual-exercise-1-solution-body.tex`, respectively.

Details on the ⟨*type*⟩ of an exercise will be given in section 7. The ⟨*id*⟩ of an exercise is a positive integer unique to each exercise environment regardless if the exercise is being printed or used at all.

These external files are input when the respective exercise or solution is printed. An advantage of using external files is that *verbatim material is allowed* inside the environments.

Each of those files contains some information about itself and where and why it was generated[1]:

```
 1  % ---------------------------------------------------------------------------
 2  % file `xsim_manual-exercise-1-exercise-body.tex'
 3  %   in folder `exercises/'
 4  %
 5  %     exercise of type `exercise' with id `1'
 6  %
 7  % generated by the `exercise' environment of the
 8  %   `xsim' package v0.1pre-1 (2017/02/22)
 9  % from source `xsim_manual' on 2017/02/23 on line 1
10  % ---------------------------------------------------------------------------
11      A first example for an exercise.
```

Arguably one downside of this approach is that your project folder will be cluttered with files. In order to deal with this somehow XSIM offers the following option:

`path` = {⟨*path name*⟩}   (initially empty)
With this option a subfolder or path within the main project folder can be given. Exercises will be written to and included from this path. *The path must exist on your system before you can use it!* This document uses `path` = {exercises}.

7 New Exercise Types

It is easy to define new exercise enviroments together with a corresponding solution environment using the following command:

`\DeclareExerciseType`{⟨*type*⟩}{⟨*parameters*⟩}
Declare a new exercise type analoguous to the `exercise` and `solution` environments.

The existing environment pair has been defined as follows:

---

1. In this example the sourcecode line number is misleading as the example where the file was generated itself was an external file where the `exercise` environment indeed *was* on line 1.

```
1 \DeclareExerciseType{exercise}{
2   exercise-env      = exercise ,
3   solution-env      = solution ,
4   exercise-name     = \XSIMtranslate{exercise} ,
5   solution-name     = \XSIMtranslate{solution} ,
6   exercise-template = subsection* ,
7   solution-template = subsection*
8 }
```

The above already is an example for almost all parameters that can (and often must) be set. Here is the complete list:

exercise-env = {⟨*exercise environment name*⟩}
> The name for the environment used for the exercises of type ⟨*type*⟩. *This parameter must be set.*

solution-env = {⟨*solution environment name*⟩}
> The name for the environment used for the solutions of type ⟨*type*⟩. *This parameter must be set.*

exercise-name = {⟨*exercise name*⟩}
> The name of the exercises of type ⟨*type*⟩ – used for typesetting. *This parameter must be set.*

solution-name = {⟨*solution name*⟩}
> The name of the solutions of type ⟨*type*⟩ – used for typesetting. *This parameter must be set.*

exercise-template = {⟨*exercise template*⟩}
> The template used for typesetting the exercises of type ⟨*type*⟩. *This parameter must be set.* See section 12 for details on templates.

solution-template = {⟨*solution template*⟩}
> The template used for typesetting the exercises of type ⟨*type*⟩. *This parameter must be set.* See section 12 for details on templates.

counter = {⟨*counter name*⟩}
> The counter used for the exercises of type ⟨*type*⟩. If not explicitly set the counter with the same name as exercise-env is used. Otherwise the specified counter is used. This enables to have different types of exercises sharing a common counter.

8 Exercise Properties

8.1 Predefined Properties

Exercise like the exercise environment and possibly others defined with \DeclareExerciseType have a number of predefined properties:

id
> holds the internal id of an exercise.

`ID`
    holds the user id of an exercise if defined. Otherwise it is equal to `id`.

`counter`
    holds the counter value of an exercise.

`subtitle`
    holds the subtitle of an exercise.

`points` = {⟨*number*⟩}
    holds the reachable points of an exercise.

`bonus-points` = {⟨*number*⟩}
    holds the reachable bonus-points of an exercise.

`print` = `true`|`false`
    holds the print boolean of an exercise.

`use` = `true`|`false`
    holds the usage boolean of an exercise.

`tags` = {⟨*csv list of tags*⟩}

`topics` = {⟨*csv list of topics*⟩}

Some of these properties are fixed and cannot be set by the user. Those include `id` and `counter`. The others can be set using the optional argument of the exercise environment.

9 Difference between Printing and Using an Exercise

10 Collecting Exercises

11 Printing Solutions

12 Styling the Exercises – Templates

13 Exercise Translations

14 Other Commands

References

[Fea05]   Simon FEAR. booktabs. version 1.61803, Apr. 14, 2005 (or newer).
          URL: http://mirror.ctan.org/macros/latex/contrib/booktabs/.

[L3Pa]   THE LATEX3 PROJECT TEAM. l3kernel. version SVN 6377, Jan. 19, 2016 (or newer).
          URL: http://mirror.ctan.org/macros/latex/contrib/l3kernel/.

[L3Pb]   THE LATEX3 PROJECT TEAM.
          l3packages. version SVN 6377, Jan. 19, 2016 (or newer).
          URL: http://mirror.ctan.org/macros/latex/contrib/l3packages/.

[Leh15]   Philipp LEHMAN, current maintainer: Joseph WRIGHT.
          etoolbox. version 2.2a, Aug. 2, 2015 (or newer).
          URL: http://mirror.ctan.org/macros/latex/contrib/etoolbox/.

[Nie15]   Clemens NIEDERBERGER. translations. version 1.2e, Nov. 7, 2015 (or newer).
          URL: http://mirror.ctan.org/macros/latex/contrib/translations/.

[Nie17]   Clemens NIEDERBERGER. exsheets. version 0.21i, Feb. 8, 2017 (or newer).
          URL: http://mirror.ctan.org/macros/latex/contrib/exsheets/.

15 Index