

The EXSOL package*

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1 Introduction

1.1 Package goal

The package EXSOL provides macros to allow embedding exercises and solutions in the \LaTeX source of an instructional text (e.g., a book or a course text) while keeping the exercises and the solutions separately in the typeset result.

In *global mode* (the default), this corresponds to generating the following separate documents:

- your original text that only contains the exercises, and
- a solution book that only contains the solutions to the exercises (a package option exists to also copy the exercises themselves to the solution book).

The former is generated when running \LaTeX on your document. This run writes the solutions to a secondary file that can be included into a simple document harness, such that when running \LaTeX on the latter, you can generate a nice solution book.

In *external mode* both the exercises and the solutions are written to secondary files that can be included in a simple document harness, such that when running \LaTeX on these, you can generate an exercise as well as a solution book.

In *local mode* (invoked by specifying the package option 'local'), this corresponds to inserting the saved solutions in the current document at a later stage in the text.

In *inline mode* (invoked by specifying the package option 'inline'), the solutions are inserted 'on the spot'.

This has been conveniently summarized in the table below:

mode	exercises	solutions
global	on the spot	in separate document
external	in separate document	in separate document
local	on the spot	later in the same document
inline	on the spot	on the spot

*This document corresponds to exsol 1.7, dated 2025/02/14.

1.2 Why use ExSol?

- It allows to keep the \LaTeX source of your exercises and their solutions together in a single file, next to each other. Away with the nightmare to keep your solutions in sync with the exercises!
- It separates exercises and solutions, allowing you
 - to only release the solution book to the instructors of the course (using global mode);
 - to encourage students to first try solving the exercises without peeking into the list of solutions (or the solution book).

1.3 Credits

The code of the EXSOL package was taken almost literally from `fancyvrb` [1]. Therefore, all credits go to the authors/maintainers of `fancyvrb`.

Thanks to Paul Levrie, Pieter Pareit, Pekka Pere, Benjamin Grinstein and Philippe Marti for signaling problems and making suggestions for the improvement of the package and the documentation.

1.4 Note

As of version 1.2, the package also contains facilities for generating a formula collection. The only limitation is that exercises and solutions cannot be part of the formula collection. Though this is a restriction, it is not a severe one in my opinion. Formula collections should be as concise as they can be.

Though generating formula collections goes beyond exercises and solutions, I chose not to change the package's name EXSOL. Einstein's name was also not changed into Relativistic Einstein when he got to understand the theory of relativity.

2 Installation

Either you are a package manager and then you'll know how to prepare an installation package for EXSOL.

Either you are a normal user and then you have two options. First, check if there is a package that your favorite \LaTeX distributor has prepared for you. Second, grab the TDS package from CTAN [2] (`exsol.tds.zip`) and unzip it somewhere in your own TDS tree, regenerate your filename database and off you go. In any case, make sure that \LaTeX finds the `exsol.sty` file.

The EXSOL package uses some auxiliary packages: `fancyvrb`, `ifthen`, `kvoptions` and, optionally, `babel`. Fetch them from CTAN [2] if your \TeX distributor does not provide them.

3 Usage

3.1 Preparing your document source

3.1.1 Loading the package

The macro package `exsol` can be loaded with:

```
\usepackage{babel}
\usepackage{exsol}
```

Note before we start that you need to load the `babel` package before you load the `exsol` package! This is to allow you to load the appropriate languages for your text.

OK, now let's get started.

Your first choice to make is where you want your solutions to appear. The primary objective of the `exsol` package was 'global mode', i.e. separating your solutions from the exercises, gathering the solutions in a separate book. To this end, don't specify the package option '`local`', or specify '`local=false`'.

A second mode of operation is 'local mode'. This allows grouping your exercises in series and including them later in your text. Gathering exercises in (numbered) series and 'loading' them locally in your text, allows for simplifying the individual exercise numbers (omitting their prefix containing, chapter number, section number, subsection number a.s.o.).

A third mode of operation is 'inline mode', in which the solution is inserted in the main text 'on the spot'. You can trigger this, by specifying the package option '`inline`'.

3.1.2 Global mode - flat grouping exercises

Adding exercises together with their solutions in your document is easy. Just embed them in a `exercise` and a corresponding `solution` environment. Optionally, you may embed several of them in a `exercises` environment to make them stand out in your text.

```
\begin{exercises}[columns=2]

  \begin{exercise}
    Calculate  $y = 5 + 7$ 
  \end{exercise}
  \begin{solution}
     $y = 12$ 
  \end{solution}

  \begin{exercise}
    Calculate  $y = 7 - 12$ 
  \end{exercise}
\end{exercises}
```

```

\end{exercises}
\begin{solution}
  $y = -5$
\end{solution}

\end{exercises}

```

The optional argument of the `exercises` environment allows specifying the typesetting in multiple columns.

On how to generate a solution book, take a look at the examples in section [3.2.1](#).

3.1.3 Local mode - grouping of exercises in series

One might also consider to keep the solutions in the same text, in local mode. In this case, we advise to gather the exercises in series (e.g. according to their degree of difficulty). This can be done by using the `exerciseries` environment instead of the `exercises` environment. This environment takes and also takes a mandatory label argument. In addition it takes two optional arguments:

- `columns` to specify the amount of columns
- `exsubrule` to specify the creation of a horizontal rule below the exercise series.
- `solsubrule` to specify the creation of a horizontal rule below the solution series.
- `subrule` to specify the creation of a horizontal rule below the exercise and the solution series.

```

\begin{exerciseries}[columns=2,subrule=\hrule]{Easy exercises}

  \begin{exercise}
    Calculate $y = 5 + 7$
  \end{exercise}
  \begin{solution}
    $y = 12$
  \end{solution}

  \begin{exercise}
    Calculate $y = 7 - 12$
  \end{exercise}
  \begin{solution}
    $y = -5$
  \end{solution}

\end{exerciseries}

\begin{exerciseries}{Difficult exercises}

```

```

\begin{exercise}
  Calculate  $y = 5 \cdot 7$ 
\end{exercise}
\begin{solution}
   $y = 35$ 
\end{solution}

\begin{exercise}
  Calculate  $y = 8 / 4$ 
\end{exercise}
\begin{solution}
   $y = 2$ 
\end{solution}

\end{exerciseries}

```

As an alternative, you can specify the 'inine' option to include the solutions on the spot where you specified them.

3.2 Examples

3.2.1 Global mode

Below, you can find an example of a file that contains a number of exercises and solutions, with the goal to generate a separate solution book. Note that referencing exercises works just as you would expect it.

```

%<example>
\documentclass[a4paper,10pt]{article}

\usepackage{a4wide}
\usepackage[english]{babel}
\usepackage[copyexercisessolutions]{exsol}

\title{Global example, from the \textsf{ExSol} package}
\author{Walter Daems}
\setlength{\parindent}{0em}
\begin{document}
\maketitle

\section{Introduction}

In this text we explain how to solve second-order polynomial
equations.

\section{Solving second-order polynomial equations}

\begin{informulacollectiononly}
\section*{Solving second-order polynomial equations}
\end{informulacollectiononly}
\begin{informulacollection}
The roots of the following equation
\begin{equation}
a x^2 + bx + c = 0

```

```

\end{equation}
can be determined as:
\begin{equation}
x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4 a c}}{2 a}
\end{equation}
\end{informatiacollection}

```

To make sure you master calculating the roots of second-order equation, please solve exercise \ref{ex:1}.

```

\begin{exercises}[columns = 2]

\begin{exercise}
\label{ex:1}
Solve the following equation for  $x \in \mathbb{C}$ , with  $\mathbb{C}$  the set of
complex numbers:
\begin{equation}
5 x^2 - 3 x = 5
\end{equation}
\end{exercise}
\begin{solution}
Let's start by rearranging the equation, a bit:
\begin{equation}
5.7 x^2 - 3.1 x = 5.3 \\
5.7 x^2 - 3.1 x - 5.3 = 0
\end{equation}
\end{equation}
The equation is now in the standard form:
\begin{equation}
a x^2 + b x + c = 0
\end{equation}
\end{equation}
For quadratic equations in the standard form, we know that two
solutions exist:
\begin{equation}
x_{1,2} = \frac{-b \pm \sqrt{d}}{2a}
\end{equation}
\end{equation}
with
\begin{equation}
d = b^2 - 4 a c
\end{equation}
\end{equation}
If we apply this to our case, we obtain:
\begin{equation}
d = (-3.1)^2 - 4 \cdot 5.7 \cdot (-5.3) = 130.45
\end{equation}
\end{equation}
and
\begin{equation}
x_1 = \frac{3.1 + \sqrt{130.45}}{11.4} = 1.27 \\
x_2 = \frac{3.1 - \sqrt{130.45}}{11.4} = -0.73
\end{equation}
\end{equation}
The proposed values  $x = x_1, x_2$  are solutions to the given equation.
\end{solution}
\begin{exercise}
\label{ex:2}
Consider a 2-dimensional vector space equipped with a Euclidean
distance function. Given a right-angled triangle, with the sides
 $AB$  and  $BC$  adjacent to the right angle having lengths,  $3$  and
 $4$ , calculate the length of the hypotenuse, labeled  $AC$ .
\end{exercise}
\begin{solution}
This calls for application of Pythagoras' theorem, which
tells us:
\begin{equation}

```

```

\left\|A\right\|^2 + \left\|B\right\|^2 = \left\|C\right\|^2
\end{equation}
and therefore:
\begin{eqnarray}
\left\|C\right\|
&=& \sqrt{\left\|A\right\|^2 + \left\|B\right\|^2} \\
&=& \sqrt{3^2 + 4^2} \\
&=& \sqrt{25} = 5
\end{eqnarray}
Therefore, the length of the hypotenuse equals 5$.
\end{solution}
\end{exercises}

And now, we can come to the conclusion.
\section{Conclusion}
Solving second-order polynomial equations is very easy.
\end{document}
%</example>

```

The result in the original document, can be seen in the file `example.pdf`. As you can see, the `formulacollection` entry and the exercise appear. There's no trace of the solution.

The solution can be recovered by including the `example.sol.tex` file in an appropriate harness. This is explained in section [3.2.3](#).

3.2.2 external mode

Below, you can find an example of a file that contains a number of exercises and solutions, with the goal to generate a separate exercise and solution book.

```

%<example-external>
\documentclass[a4paper,10pt]{article}

\usepackage{a4wide}
\usepackage[english]{babel}
\usepackage[external]{exsol}

\title{External example, from the \textsf{ExSol} package}
\author{Walter Daems}
\setlength{\parindent}{0em}
\begin{document}
\maketitle

\section{Introduction}

In this text we explain how to solve second-order polynomial
equations.

\section{Solving second-order polynomial equations}

\begin{informatiocollectiononly}
\section*{Solving second-order polynomial equations}
\end{informatiocollectiononly}
\begin{informatiocollection}
The roots of the following equation
\begin{equation}
a x^2 + bx + c = 0

```

```

\end{equation}
can be determined as:
\begin{equation}
x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4 a c}}{2 a}
\end{equation}
\end{informatiacollection}

\begin{exercises}[columns = 2]

\begin{exercise}
Solve the following equation for  $x \in \mathbb{C}$ , with  $\mathbb{C}$  the set of
complex numbers:
\begin{equation}
5 x^2 - 3 x = 5
\end{equation}
\end{exercise}
\begin{solution}
Let's start by rearranging the equation, a bit:
\begin{equation}
5.7 x^2 - 3.1 x = 5.3 \\
5.7 x^2 - 3.1 x - 5.3 = 0
\end{equation}
The equation is now in the standard form:
\begin{equation}
a x^2 + b x + c = 0
\end{equation}
For quadratic equations in the standard form, we know that two
solutions exist:
\begin{equation}
x_{1,2} = \frac{-b \pm \sqrt{d}}{2a}
\end{equation}
with
\begin{equation}
d = b^2 - 4 a c
\end{equation}
If we apply this to our case, we obtain:
\begin{equation}
d = (-3.1)^2 - 4 \cdot 5.7 \cdot (-5.3) = 130.45
\end{equation}
and
\begin{equation}
x_1 = \frac{3.1 + \sqrt{130.45}}{11.4} = 1.27 \\
x_2 = \frac{3.1 - \sqrt{130.45}}{11.4} = -0.73
\end{equation}
The proposed values  $x = x_1, x_2$  are solutions to the given equation.
\end{solution}
\begin{exercise}
Consider a 2-dimensional vector space equipped with a Euclidean
distance function. Given a right-angled triangle, with the sides
 $A$  and  $B$  adjacent to the right angle having lengths,  $3$  and
 $4$ , calculate the length of the hypotenuse, labeled  $C$ .
\end{exercise}
\begin{solution}
This calls for application of Pythagoras' theorem, which
tells us:
\begin{equation}
\left\|A\right\|^2 + \left\|B\right\|^2 = \left\|C\right\|^2
\end{equation}
and therefore:
\begin{equation}
\left\|C\right\| = \sqrt{\left\|A\right\|^2 + \left\|B\right\|^2}
\end{equation}

```



```

      &= & \sqrt{3^2 + 4^2} \\
      &= & \sqrt{25} = 5
    \end{eqnarray}
    Therefore, the length of the hypotenuse equals  $5$ .
  \end{solution}
\end{exercises}
And now, we can come to conclusion.

\section{Conclusion}
Solving second-order polynomial equations is very easy.
\end{document}
%</example-external>

```

The result in the original document, can be seen in the file `example-external.pdf`. As you can see, only the `formulacollection` entry appears. There's no trace of the exercises or the solutions.

3.2.3 Harnesses

When running \LaTeX on your document in global or external mode (e.g., the file `example-external.tex` as part of the `exsol` package, as a side effect files with the extension `.sol.tex`, `.exc.tex` and/or `.fc.tex` have been written to disk (in our case, the files `example-external.sol.tex`, `example-external.exc.tex` and `example-external.fc.tex`), containing all exercises, solutions and entries for the formula collection in sequence.

Generating an exercises/solution book is as simple as including the exercise/solution file into a simple \LaTeX harness, that allows you giving it a proper title page and to add other bells and whistles. As an example, you can find a harness for a solution book below.

```

%<*examplesol>
\documentclass[a4paper,10pt]{article}

\usepackage{a4wide}
\usepackage[english]{babel}
\usepackage{exsol}

\setlength{\parindent}{0em}

\title{Solutions to the exercises, specified in the example of the
  \textsf{ExSol} package}
\author{Walter Daems}

\begin{document}

\maketitle

\input{example.sol.tex}

\end{document}
%</examplesol>

```

Similar harnesses can be used for the exercise book and the formula collection.

```

%<examplefor>
\documentclass[a4paper,10pt]{article}

\usepackage{a4wide}
\usepackage[english]{babel}
\usepackage{exsol}

\setlength{\parindent}{0em}

\title{Formula collection, specified in the example of the
\textsf{ExSol} package}
\author{Walter Daems}

\begin{document}

\maketitle

\input{example.fc.tex}

\end{document}
%</examplefor>

%<exampleexc>
\documentclass[a4paper,10pt]{article}

\usepackage{a4wide}
\usepackage[english]{babel}
\usepackage{exsol}

\setlength{\parindent}{0em}

\title{Exercise book, specified in the example-external of the
\textsf{ExSol} package}
\author{Walter Daems}

\begin{document}

\maketitle

\input{example-external.exc.tex}

\end{document}
%</exampleexc>

```

3.2.4 Local mode

Below, you can find an example of a file that contains a number of exercises and solutions, with the goal to include them later in the same document. This is done by issuing the `loadSolutions` macro at the very end of the file. This macro can be called multiple times and will gobble up and include all solutions so far. As a consequence the solutions file is emptied and can be filled again by specifying new exercise/solution pairs.

```

%<example-local>
\documentclass[a4paper,10pt]{article}

\usepackage{a4wide}
\usepackage[german]{babel}

```

```

\usepackage[local,nolabels,exerciseaslist,usesolutionserieslabels]{exsol}
\usepackage{enumitem}

\setlength{\exsolexercisetopbottomsep}{0pt plus 0pt minus 1pt}
\setlength{\exsolexercisefleftmargin}{2em}
\setlength{\exsolexerciserightmargin}{1em}
\setlength{\exsolexerciseparindent}{0em}
\setlength{\exsolexerciseparsep}{\parskip}
\setlength{\exsolexerciseparindent}{0em}
\setlength{\exsolexerciseparsep}{\parskip}
\setlength{\exsolexerciseparsep}{\parskip}

\title{Local example, from the \textsf{ExSol} package}
\author{Philippe Marti}
\setlength{\parindent}{0em}
\begin{document}
\maketitle

\section{\exercisename}

\begin{exerciseries}[columns=2,solsubrule=\hrule]{Gleichungen  $\$$  Gleichungssysteme}

\begin{exercise}
Die Summe zweier Zahlen ist 17 und ihre Differenz 7. Bestimme die
beiden Zahlen!
\end{exercise}
\begin{solution}
5 und 12
\end{solution}

\begin{exercise}
Die Differenz einer Zahl und dem Dreifachen einer zweiten Zahl ist
14. Bestimme die beiden Zahlen, falls die zweite Zahl ein Zehntel
der ersten ist.
\end{exercise}
\begin{solution}
20 und 2
\end{solution}

\end{exerciseries}

\begin{exerciseries}[columns=2]{Geraden}
\begin{exercise}
Berechne den Schnittpunkt von  $y=3x+1$  und  $y=3x-7$ .
\end{exercise}
\begin{solution}
Es gibt keinen Schnittpunkt
\end{solution}

\begin{exercise}
Die Familie Meier fordert Offerten für eine Heizungsreparatur
ein. Firma A berechnet für die Fahrtkosten Fr. 42.- und für
jede Arbeitsstunde 76.-. Bei der Firma B sind die Fahrtkosten
Fr. 35.- und jede Arbeitsstunde wird mit Fr. 80.- berechnet.
\begin{enumerate}[label=\alph*]
\item Welche Kosten entstehen für beide Firmen, wenn ein Monteur
3.5 Stunden
für die Arbeit benötigt? Welche Firma ist in diesem Fall
kostengünstiger?

\item Wie lauten die Gleichungen derjenigen zwei linearen
Funktionen, die jeder Arbeitszeit  $x$  (in Stunden) die

```

```

entstehenden Kosten  $y$  (in Franken) zuordnet?

\item Berechne, bei welcher Arbeitszeit die Kosten bei beiden
Firmen gleich sind.
\end{enumerate}
\end{exercise}
\begin{solution}
\begin{enumerate}[label=\alph*]
\item Firma A: 308.-  $\$$  Firma B: 315.-
\item A:  $y=76x+42$   $\$$  B:  $y=80x+35$ 
\item Bei  $\frac{3}{4}$  Stunden
\end{enumerate}
\end{solution}
\end{exerciseries}

\section{\solutionsname}
\loadSolutions

\end{document}
%</example-local>

```

3.2.5 Inline mode

Below, you can find an example of a file that contains a number of exercises and solutions, with the goal to include the solutions on the spot.

```

%<*example-inline>
\documentclass[11pt,a4paper]{article}

\usepackage[german]{babel}
\usepackage[inline,usesolutionserieslabels]{exsol}
\usepackage{enumitem}

\setlength{\exsolexercisetopbottomsep}{0pt plus 0pt minus 1pt}
\setlength{\exsolexercisefleftmargin}{2em}
\setlength{\exsolexerciserightmargin}{1em}
\setlength{\exsolexerciseparindent}{0em}
\setlength{\exsolexerciselabelsep}{1ex}
\setlength{\exsolexerciselabelwidth}{30pt}
\setlength{\exsolexercisemitindent}{0pt}
\setlength{\exsolexerciseparsep}{\parskip}

\title{Local inline example, from the \textsf{ExSol} package}
\author{Philippe Marti}
\setlength{\parindent}{0em}
\begin{document}
\maketitle

\section{Gleichungssysteme und Geraden}

Ein bisschen Theorie\ldots

\begin{exerciseries}[solsubrule=\hrule]{Gleichungssysteme}
\begin{exercise}
Die Summe zweier Zahlen ist 17 und ihre Differenz 7. Bestimme die
beiden Zahlen!
\end{exercise}
\begin{solution}
5 und 12
\end{solution}

```

```

\begin{exercise}
  Die Differenz einer Zahl und dem Dreifachen einer zweiten Zahl ist
  14. Bestimme die beiden Zahlen, falls die zweite Zahl ein Zehntel
  der ersten ist.
\end{exercise}
\begin{solution}
  20 und 2
\end{solution}
\end{exerciseries}
~\
Etwas mehr Theorie\ldots

\begin{exerciseries}{Geraden}
  \begin{exercise}
    Berechne den Schnittpunkt von  $y=3x+1$  und  $y=3x-7$ .
  \end{exercise}
  \begin{solution}
    Es gibt keinen Schnittpunkt
  \end{solution}

  \begin{exercise}
    Die Familie Meier fordert Offerten für eine Heizungsreparatur
    ein. Firma A berechnet für die Fahrtkosten Fr. 42.- und für
    jede Arbeitsstunde 76.-. Bei der Firma B sind die Fahrtkosten
    Fr. 35.- und jede Arbeitsstunde wird mit Fr. 80.- berechnet.
    \begin{enumerate}[label=\alph*]
      \item Welche Kosten entstehen für beide Firmen, wenn ein Monteur
        3.5 Stunden
        für die Arbeit benötigt? Welche Firma ist in diesem Fall
        kostengünstiger?

      \item Wie lauten die Gleichungen derjenigen zwei linearen
        Funktionen, die jeder Arbeitszeit  $x$  (in Stunden) die
        entstehenden Kosten  $y$  (in Franken) zuordnet?

      \item Berechne, bei welcher Arbeitszeit die Kosten bei beiden
        Firmen gleich sind.
    \end{enumerate}
  \end{exercise}
  \begin{solution}
    \begin{enumerate}[label=\alph*]
      \item Firma A: 308.- | Firma B: 315.-
      \item A:  $y=76x+42$  | B:  $y=80x+35$ 
      \item Bei  $\frac{3}{4}$  Stunden
    \end{enumerate}
  \end{solution}
\end{exerciseries}

\end{document}
%</example-inline>

```

3.3 Fiddling with the spacing

The default spacing provided by the ExSol package should be fine for most users. However, if you like to tweak, below you can find the controls.

As the formula collection generation is intended to interfere as little as possible with the flow of the main document, you will notice that it is impossible to control the extra spacing, as no extra spacing should originate from using the

`informulacollection` environment.

3.3.1 Spacing before and after the `exercises` environment

The lengths below control the spacing of the `exercises` environment:

- `exsolexerciseaboveskip`: rubber length controlling the vertical space after the top marker line of the environment
- `exsolexercisebelowskip`: rubber length controlling the vertical space before the bottom marker line of the environment

You can simply specify them like:

```
\setlength{\exsolexercisesaboveskip}{1ex plus 1pt minus 1pt}  
\setlength{\exsolexercisesbelowskip}{1ex plus 1pt minus 1pt}
```

The spacings specified here are the package defaults.

3.3.2 Spacing of the individual exercises

Caution: the spacing can only be tuned, when one invokes the `exerciseaslist` package option!

Then lengths below control the spacing of the `exercise` environment:

- `exercisetopbottomsep`: rubber length controlling the vertical space before and after individual exercises
- `exercisefleftmargin`: length controlling the horizontal space between the surrounding environment's left margin (most often the page margin) and the left edge of the exercise environment
- `exercisefrightmargin`: length controlling the horizontal space between the surrounding environment's right margin (most often the page margin) and the right edge of the exercise environment
- `exercisefirstlineindent`: length controlling the first-line indentation of the first paragraph in the exercise environment (actually, the label is set w.r.t. this position, that we will conveniently call position 'x')
- `exercisefparindent`: length controlling the first-line indentation of the other paragraphs in the exercise environment.
- `exerciseflabelsep`: length controlling the distance between the label and position 'x'
- `exerciseflabelwidth`: minimal width of the (internally right-aligned) box to use for the exercises label; if the box is not sufficiently big, position 'x' is shifted to the right

- `exerciseparsep`: internal paragraph separation (vertically)

You can simply specify them like:

```
\setlength{\exsolexercisetopbottomsep}{0pt plus 0pt minus 1pt}
\setlength{\exsolexercisefleftmargin}{1em}
\setlength{\exsolexerciserightmargin}{1em}
\setlength{\exsolexerciseparindent}{0em}
\setlength{\exsolexerciselabelsep}{0.5em}
\setlength{\exsolexerciselabelwidth}{0pt}
\setlength{\exsolexercisemitindent}{0pt}
\setlength{\exsolexerciseparsep}{\parskip}
```

The spacings specified here are the package defaults.

3.4 Tips and tricks

If you want to include the solutions all at the end of the current document in global mode, you need to explicitly close the solution stream before including it:

```
\closeout\solutionstream\input{\jobname.sol.tex}
```

If you want to avoid exercises being split by a page boundary, then provide the package option `'minipage'`. This causes the exercises to be wrapped in a `minipage` environment.

4 Implementation

```
1 (*package)
```

4.1 Auxiliary packages

The package uses some auxiliary packages:

```
2 \RequirePackage{ifmtarg}
3 \RequirePackage{fancyvrb}
4 \RequirePackage{ifthen}
5 \RequirePackage{kvoptions}
6 \RequirePackage{multicol}
7 \RequirePackage{varwidth}
8 \@ifpackageloaded{babel}{\typeout{Good: you loaded babel first!}}{\PackageError{exsol}{You fo
9   babel package before exsol}{}}
```

4.2 Package options

The package offers some options:

local This boolean option (true, false) allows setting the mode of the package into local, i.e. that the numbering of the exercises is not related to the position in the document, but uses it's own local counter in combination with a exerciseries counter.

```
10 \DeclareBoolOption[false]{local}
```

external This boolean option (true, false) allows setting the mode of the package into external, i.e. that the both exercises and solutions will be written to separate files.

```
11 \DeclareBoolOption[false]{external}
```

inline This boolean option (true, false) allows setting the mode of the package into inline, i.e. that the solutions will be included 'on the spot'.

```
12 \DeclareBoolOption[false]{inline}
```

nolabels This boolean option (true, false) allows suppressing the 'Exercise' and 'Solution' label that normally appear before the exercise and solution number.

```
13 \DeclareBoolOption[false]{nolabels}
```

exercisefontsize This option allows setting the font of the `exercises` environment. You may choose one of `tiny`, `scriptsize`, `footnotesize`, `small`, `normalsize`, `large`, etc. E.g., `[exercisefontsize=small]`.

```
14 \DeclareStringOption[normalsize]{exercisefontsize}
```


`exerciseaslist` This boolean option (true, false) allows setting the typesetting of the `exercises` in a list environment. This causes the exercises to be typeset in a more compact fashion, with indented left and right margin.

```
15 \DeclareBoolOption[false]{exerciseaslist}
```

`copyexercisesinsolutions` This boolean option (true, false) allows copying the exercises in the solutions file, to allow for making a complete stand-alone exercises bundle.

```
16 \DeclareBoolOption[false]{copyexercisesinsolutions}
```

`minipage` This boolean option (true, false) causes the exercises to be wrapped in minipages. This avoids them getting split by a page boundary.

```
17 \DeclareBoolOption[false]{minipage}
```

`usesolutionserieslabels` This boolean options (true,false) causes the `exerciseries` label to be reused when inserting the corresponding `solutionseries`.

```
18 \DeclareBoolOption[false]{usesolutionserieslabels}
```

The options are processed using:

```
19 \ProcessKeyvalOptions*
```

The options are subsequently handled

```
20 \newcommand{\exercisefontsize}{\csname \exsol@exercisefontsize\endcsname}
```

4.3 Customization of lengths

The commands below allow customizing many lengths that control the typesetting of the exercises.

First some lengths to control the spacing before and after `exercises`.

```
21 \newlength{\exsolexercisesaboveskip}
22 \setlength{\exsolexercisesaboveskip}{0ex plus 1pt minus 1pt}
23 \addtolength{\exsolexercisesaboveskip}{-2\baselineskip}
24 \newlength{\exsolexercisesbelowskip}
25 \setlength{\exsolexercisesbelowskip}{0ex plus 1pt minus 1pt}
26 \addtolength{\exsolexercisesbelowskip}{\baselineskip}
```

Then some lengths to control the spacing for a single exercise. These lengths only work when the `exerciseaslist` package option has been specified. Sensible defaults have been set.

```
27 \newlength{\exsolexercisetopbottomsep}
28 \setlength{\exsolexercisetopbottomsep}{0pt plus 0pt minus 1pt}
29 \newlength{\exsolexerciseleftmargin}
```

```

30 \setlength{\exsolexerciseleftmargin}{1em}
31 \newlength{\exsolexerciserightmargin}
32 \setlength{\exsolexerciserightmargin}{1em}
33 \newlength{\exsolexerciseparindent}
34 \setlength{\exsolexerciseparindent}{0em}
35 \newlength{\exsolexerciselabelsep}
36 \setlength{\exsolexerciselabelsep}{0.5em}
37 \newlength{\exsolexerciselabelwidth}
38 \setlength{\exsolexerciselabelwidth}{0pt}
39 \newlength{\exsolexerciseitemindent}
40 \setlength{\exsolexerciseitemindent}{0pt}
41 \newlength{\exsolexerciseparsep}
42 \setlength{\exsolexerciseparsep}{\parskip}

```

4.4 Con- and destruction of the auxiliary streams

At the beginning of your document, we start by opening a stream to a file that will be used to write the solutions to. At the end of your document, the package closes the stream.

```

43 \AtBeginDocument{
44   \typeout{Writing solutions to solution file \jobname.sol.tex}
45   \newwrite\solutionstream
46   \immediate\openout\solutionstream=\jobname.sol.tex
47   \ifxsol@external
48   \typeout{Writing exercises to exercise file \jobname.exc.tex}
49   \newwrite\exercisestream
50   \immediate\openout\exercisestream=\jobname.exc.tex
51   \else
52   \typeout{Using intermediate exercise file \jobname.exc.tex}
53   \newwrite\exercisestream
54   \fi
55   \typeout{Writing formulae to formula collection file \jobname.fc.tex}
56   \newwrite\formulacollectionstream
57   \immediate\openout\formulacollectionstream=\jobname.fc.tex
58   \typeout{Using intermediate formula file \jobname.for.tex}
59   \newwrite\formulastream
60 }
61 \AtEndDocument{
62   \immediate\closeout\formulacollectionstream
63   \immediate\closeout\solutionstream
64 }

```

In local mode we also want to close the solutionstream, read it and open it again:

```

65 \newcommand\loadSolutions{
66   \immediate\closeout\solutionstream
67   \input{\jobname.sol.tex}
68 %   \immediate\openout\solutionstream=\jobname.sol.tex
69 }

```

4.5 Series counter

By providing an exerciseries counter, proper numbering of the exercise series is provided. Note that separate series, render the numbering of the exercises from document-global, to series-local, therefore hindering the concordance of solutions to exercises.

```
70 \newcounter{exerciseries}[subsubsection]
71 \setcounter{exerciseries}{0}
72 \renewcommand{\theexerciseries}{\arabic{exerciseries}}
```

4.6 Exercise counter

By providing an exercise counter, proper numbering of the exercises is provided to allow for good cross referencing of the solutions to the exercises.

```
73 \newcounter{exercise}[exerciseries]
74 \setcounter{exercise}{0}
75 \renewcommand{\theexercise}{%
76   \ifxsol@local
77   \arabic{exerciseries}.\arabic{exercise}%
78   \else
79   \@ifundefined{c@chapter}{}{\if0\arabic{chapter}\else\arabic{chapter}.\fi}%
80   \if0\arabic{section}\else\arabic{section}\fi%
81   \if0\arabic{subsection}\else.\arabic{subsection}\fi%
82   \if0\arabic{subsubsection}\else.\arabic{subsubsection}\fi%
83   \if0\arabic{exercise}\else%
84   \@ifundefined{c@chapter}%
85   {\if0\arabic{section}\else-\fi}%
86   {-}%
87   \arabic{exercise}%
88   \fi
89   \fi
90 }
```

4.7 Detokenization in order to cope with utf8

Combining old-school L^AT_EX (before X_YL^AT_EX and Lua_T_EX) and UTF-8 is a pain. Detokenization has been suggested by Geoffrey Poore to solve issues with UTF-8 characters messing up the fancyvrb internals.

```
91 \newcommand{\GPES@write@detok}[1]{%
92   \immediate\write\exercisestream{\detokenize{#1}}}%
93 \newcommand{\GPSS@write@detok}[1]{%
94   \immediate\write\solutionstream{\detokenize{#1}}}%
95 \newcommand{\GPSS@write@detok}[1]{%
96   \GPES@write@detok{#1}%
97   \GPSS@write@detok{#1}}%
98 \newcommand{\GPFORCOL@write@detok}[1]{%
99   \immediate\write\formulacollectionstream{\detokenize{#1}}}%
100 \immediate\write\formulastream{\detokenize{#1}}%
```

```

101 \newcommand{\GPFORCOLONLY@write@detok}[1]{%
102 \immediate\write\formulacollectionstream{\detokenize{#1}}}%

```

5 The user environments

exercise The `exercise` environment is used to typeset your exercises, provide them with a nice label and allow for copying the exercise to the solutions file (if the package option `copyexercisesinsolution`) is set. The label can be set by redefining the `\exercisename` macro, or by relying on the Babel provisions. The code is almost literally taken from the `fancyvrb` package.

```

103 \def\exercise{\FV@Environment{}}{exercise}}
104 \def\FVB@exercise{%
105 \refstepcounter{exercise}%
106 \ifexsol@external\else
107 \immediate\openout\exercisestream=\jobname.exc.tex
108 \fi
109 \ifexsol@local
110 % \immediate\write\solutionstream{
111 \else
112 % \immediate\write\solutionstream{\string\vspace*\string{2ex}\string}%
113 % \string\quad\string\newline}
114 \fi
115 \ifexsol@copyexercisesinsolutions
116 \immediate\write\solutionstream{\string\begin{exsol@exercise}{\theexercise}}
117 \fi
118 \immediate\write\exercisestream{\string\begin{exsol@exercise}{\theexercise}}
119 \@bsphack
120 \begingroup
121 \FV@UseKeyValues
122 \FV@DefineWhiteSpace
123 \def\FV@Space{\space}%
124 \FV@DefineTabOut
125 \ifexsol@copyexercisesinsolutions
126 \let\FV@ProcessLine\GPSS@write@detok %
127 \else
128 \let\FV@ProcessLine\GPES@write@detok %
129 \fi
130 \relax
131 \let\FV@FontScanPrep\relax
132 \let\@noligs\relax
133 \FV@Scan
134 }
135 \def\FVE@exercise{
136 \endgroup\@esphack
137 \immediate\write\exercisestream{\string\end{exsol@exercise}}
138 \ifexsol@copyexercisesinsolutions
139 \immediate\write\solutionstream{\string\end{exsol@exercise}}
140 \fi
141 \ifexsol@external\else
142 \immediate\closeout\exercisestream
143 \input{\jobname.exc.tex}

```

```

144 \fi
145 }
146 \DefineVerbatimEnvironment{exercise}{exercise}{}

```

exsol@exercise The `exsol@exercise` environment is an internal macro used to typeset your exercises and provide them with a nice label and number. Do not use it directly. Use the proper environment `exercise` instead.

```

147 \newenvironment{exsol@exercise}[1]
148 {%
149 \ifthenelse{\boolean{exsol@minipage}}{\begin{minipage}[t]{\textwidth}}{%
150 \ifthenelse{\boolean{exsol@exerciseaslist}}
151 {
152 \begin{list}%
153 {}
154 {%
155 \setlength{\topsep}{\exsolexercisetopbottomsep}%
156 \setlength{\leftmargin}{\exsolexercisefleftmargin}%
157 \setlength{\rightmargin}{\exsolexerciserightmargin}%
158 \setlength{\listparindent}{\exsolexerciseparindent}%
159 \setlength{\itemindent}{\exsolexerciseitemindent}%
160 \setlength{\parsep}{\exsolexerciseparsep}
161 \setlength{\labelsep}{\exsolexerciselabelsep}
162 \setlength{\labelwidth}{\exsolexerciselabelwidth}
163 \item[\ifexsol@nolabels~#1:\else\exercisename{}~#1:\fi]%
164 }
165 {\ifexsol@nolabels #1:\else%
166 \subparagraph{\exercisename{}~#1:}\fi}
167 }
168 {%
169 \ifthenelse{\boolean{exsol@exerciseaslist}}%
170 {\end{list}}{%
171 \ifthenelse{\boolean{exsol@minipage}}{\end{minipage}}{\par}%
172 }

```

solution The `solution` environment is used to typeset your solutions and provide them with a nice label and number that corresponds to the exercise that preceded this solution. The no label can be set by redefining the `\solutionname` macro, or by relying on the Babel provisions. The code is almost literally taken from the `fancyvrb` package.

```

173 \def\solution{\FV@Environment}{\solution}}
174 \def\FVB@solution{%
175 % \typeout{Writing solution to \jobname.sol.tex}
176 % WDSC
177 \ifexsol@copyexercisessolutions
178 \immediate\write\solutionstream{\string\begin{exsol@solution}}
179 \else
180 \ifexsol@inline
181 \immediate\write\solutionstream{\string\begin{exsol@solution}}
182 \else
183 \immediate\write\solutionstream{\string\begin{exsol@solution}{\theexercise}}
184 \fi

```

```

185 \fi
186 % \ifexsol@copyexercisessolutions
187 % \immediate\write\solutionstream{\string\begin{exsol@solution}{}}
188 % \else
189 % \immediate\write\solutionstream{\string\begin{exsol@solution}{\theexercise}}
190 % \fi
191 \@bsphack
192 \begingroup
193 \FV@UseKeyValues
194 \FV@DefineWhiteSpace
195 \def\FV@Space{\space}%
196 \FV@DefineTabOut
197 \let\FV@ProcessLine\GPSS@write@detok %
198 \relax
199 \let\FV@FontScanPrep\relax
200 \let\@noligs\relax
201 \FV@Scan
202 }
203 \def\FVE@solution{
204 \endgroup\@esphack
205 \immediate\write\solutionstream{\string\end{exsol@solution}}
206 \ifexsol@inline
207 \immediate\closeout\solutionstream
208 \input{\jobname.sol.tex}
209 \immediate\openout\solutionstream=\jobname.sol.tex
210 \fi
211 }
212 \DefineVerbatimEnvironment{solution}{solution}{}

```

`exsol@solution` The `exsol@solution` environment is an internal macro used to typeset your solutions. Do not use it directly. Use the proper environment `solution` instead.

```

213 \newenvironment{exsol@solution}[1]
214 {%
215 \ifthenelse{\boolean{exsol@minipage}}{\begin{minipage}[t]{\textwidth}}{ }%
216 \ifthenelse{\boolean{exsol@exerciseaslist}}
217 {\begin{list}%
218 { }%
219 }%
220 {%
221 \setlength{\topsep}{\exsol@exercisetopbottomsep}%
222 \setlength{\leftmargin}{\exsol@exercisefleftmargin}%
223 \setlength{\rightmargin}{\exsol@exerciserightmargin}%
224 \setlength{\listparindent}{\exsol@exerciseparindent}%
225 \setlength{\itemindent}{\exsol@exerciseitemindent}%
226 \setlength{\parsep}{\exsol@exerciseparsep}
227 \setlength{\labelsep}{\exsol@exerciselabelsep}
228 \setlength{\labelwidth}{\exsol@exerciselabelwidth}}
229 \item[\ifexsol@nolabels #1:\else%
230 \solutionname{\@ifmtarg{#1}{-}{#1}}\fi
231 ]%
232 {\ifexsol@nolabels #1:\else%
233 \subparagraph{\solutionname{\@ifmtarg{#1}{-}{#1}}\fi}

```

```

234 }
235 {%
236 \ifthenelse{\boolean{exsol@exerciseaslist}}%
237 {\end{list}}{}%
238 \ifthenelse{\boolean{exsol@minipage}}{\end{minipage}}{\par}%
239 }

```

exercises The `exercises` environment helps typesetting your exercises to stand out from the rest of the text. You may use it at the end of a chapter, or just to group some exercises in the text.

```

240 \define@key{exercises}{columns}{\renewcommand\columncount{#1}}
241 \define@key{exercises}{exsubrule}{\renewcommand\exsubrule{#1}}
242 \define@key{exercises}{solsubrule}{\renewcommand\solsubrule{#1}}
243 \define@key{exercises}{subrule}{\renewcommand\exsubrule{#1}\renewcommand\solsubrule{#1}}
244 \newenvironment{exercises}[1][ ]
245 {%
246 \newcommand\columncount{1}% default
247 \newcommand\exsubrule{}% default
248 \newcommand\solsubrule{}% default
249 \setkeys{exercises}{#1}%
250 \exercisefontsize\rule{.25\linewidth}{0.15mm}%
251 \vspace*{-1.5\baselineskip}%
252 \paragraph{\exercisename}~\!
253 \ifthenelse{\columncount > 1}{\begin{multicols}{\columncount}}{}%
254 }%
255 {
256 \ifthenelse{\columncount > 1}{\end{multicols}}{\relax%
257 \vspace*{-\baselineskip}\vspace*{\exsolexercisesbelowskip}}%
258 \exsubrule\par}

```

exerciseries The `exerciseries` environment helps typesetting your exercises in series.

```

259 \define@key{exerciseries}{columns}{\renewcommand\columncount{#1}}
260 \define@key{exerciseries}{exsubrule}{\renewcommand\exsubrule{#1}}
261 \define@key{exerciseries}{solsubrule}{\renewcommand\solsubrule{#1}}
262 \define@key{exerciseries}{subrule}{\renewcommand\exsubrule{#1}\renewcommand\solsubrule{#1}}
263 \newenvironment{exerciseries}[2][ ]
264 {
265 \refstepcounter{exerciseries}%
266 \newcommand\columncount{1} % default
267 \newcommand\exsubrule{} % default
268 \newcommand\solsubrule{} % default
269 \setkeys{exerciseries}{#1}%
270 \paragraph{\seriesname~\theexerciseries:~#2}~\par
271 \ifthenelse{\columncount > 1}{\begin{multicols}{\columncount}}{}
272 \ifexsol@inline\else
273 \immediate\write\solutionstream{\string\begin\string{solutionseries\string}%
274 \string[#1\string]\string{#2\string}\string{\theexerciseries\string}}
275 \fi
276 }
277 {
278 \ifthenelse{\columncount > 1}{\end{multicols}}{\relax

```

```

279 \exsubrule\par
280 \ifexsol@inline\else
281   \immediate\write\solutionstream{\string\end\string{solutionseries\string}}
282 \fi
283 }

```

solutionseries The `solutionseries` environment helps typesetting your solutions in series. You don't need to use this function explicitly. The package does this for you.

```

284 \newenvironment{solutionseries}[3] []
285 {
286   \newcommand\columncount{1} % default
287   \newcommand\exsubrule{} % default
288   \newcommand\solsubrule{} % default
289   \setkeys{exercises}{#1}%
290   \paragraph{\seriesname-#3\ifexsol@usesolutionserieslabels: #2\fi}~\par
291   \ifthenelse{\columncount > 1}{\begin{multicols}{\columncount}}{}
292 }
293 {
294   \ifthenelse{\columncount > 1}{\end{multicols}}{}
295 \solsubrule\par
296 }

```

informulacollection The `informulacollection` environment is used to write its contents to the formula collection stream and load back into the main text for typesetting. The code is almost literally taken from the `fancyvrb` package.

```

297 \def\informulacollection{\FV@Environment{}{informulacollection}}
298 \def\FVB@informulacollection{%
299   \immediate\openout\formulastream=\jobname.for.tex
300   %\typeout{Writing formula to \jobname.for.tex and \jobname.fc.tex}
301   \@bsphack
302   \begingroup
303     \FV@UseKeyValues
304     \FV@DefineWhiteSpace
305     \def\FV@Space{\space}%
306     \FV@DefineTabOut
307     \let\FV@ProcessLine\GPFORCOL@write@detok %
308     \relax
309     \let\FV@FontScanPrep\relax
310     \let\@noligs\relax
311     \FV@Scan
312   }
313 \def\FVE@informulacollection{
314   \endgroup\@esphack
315   \immediate\closeout\formulastream
316   \input{\jobname.for.tex}
317 }
318 \DefineVerbatimEnvironment{informulacollection}{informulacollection}{}

```

informulacollectiononly The `informulacollectiononly` environment is used to write its contents to the formula collection stream *without* loading it back into the main text for typesetting.

The code is almost literally taken from the fancyvrb package.

```

319 \def\informatocollectiononly{\FV@Environment}{informatocollectiononly}}
320 \def\FVB@informatocollectiononly{%
321   %\typeout{Writing special to \jobname.fc.tex}
322   \@bsphack
323   \begingroup
324     \FV@UseKeyValues
325     \FV@DefineWhiteSpace
326     \def\FV@Space{\space}%
327     \FV@DefineTabOut
328     \let\FV@ProcessLine\GPFORCOLONLY@write@detok %
329     \relax
330     \let\FV@FontScanPrep\relax
331     \let\@noligs\relax
332     \FV@Scan
333   }
334 \def\FVE@informatocollectiononly{
335   \endgroup\@esphack
336 }
337 \DefineVerbatimEnvironment{informatocollectiononly}{informatocollectiononly}{}
```

5.1 Some Babel provisions

```

338 \newcommand{\exercisename}{Exercise}
339 \newcommand{\exercisesname}{Exercises}
340 \newcommand{\solutionname}{Solution}
341 \newcommand{\solutionsname}{Solutions}
342 \newcommand{\seriesname}{Series}
```

You may redefine these macros, but to help you out a little bit, we provide with some basic Babel auxiliaries. If you're a true polyglot and are willing to help me out by providing translations for other languages, I'm very willing to incorporate them into the code.

```

343 \addto\captionsdutch{%
344   \renewcommand{\exercisename}{Oefening}%
345   \renewcommand{\exercisesname}{Oefeningen}%
346   \renewcommand{\solutionname}{Oplossing}%
347   \renewcommand{\solutionsname}{Oplossingen}%
348   \renewcommand{\seriesname}{Reeks}%
349 }
350 \addto\captionsgerman{%
351   \renewcommand{\exercisename}{Aufgabe}%
352   \renewcommand{\exercisesname}{Aufgaben}%
353   \renewcommand{\solutionname}{L"osung}%
354   \renewcommand{\solutionsname}{L"osungen}%
355   \renewcommand{\seriesname}{Serie}%
356 }
357 \addto\captionsgerman{%
358   \renewcommand{\exercisename}{Aufgabe}%
359   \renewcommand{\exercisesname}{Aufgaben}%
360   \renewcommand{\solutionname}{L"osung}%
```

```

361 \renewcommand{\solutionsname}{L\ "osungen}%
362 \renewcommand{\seriesname}{Serie}%
363 }
364 \addto\captionfrench{%
365 \renewcommand{\exercisename}{Exercice}%
366 \renewcommand{\exercisesname}{Exercices}%
367 \renewcommand{\solutionname}{Solution}%
368 \renewcommand{\solutionsname}{Solutions}%
369 \renewcommand{\seriesname}{Serie}%
370 }
371 \addto\captionfrench{%
372 \renewcommand{\exercisename}{Teht\ "av\ "a}%
373 \renewcommand{\exercisesname}{Teht\ "avi\ "a}%
374 \renewcommand{\solutionname}{Ratkaisu}%
375 \renewcommand{\solutionsname}{Ratkaisut}%
376 \renewcommand{\seriesname}{Sarja}
377 }
378 \addto\captionsspanish{%
379 \renewcommand{\exercisename}{Ejercicio}%
380 \renewcommand{\exercisesname}{Ejercicios}%
381 \renewcommand{\solutionname}{Soluci\ 'on}%
382 \renewcommand{\solutionsname}{Soluciones}%
383 \renewcommand{\seriesname}{Serie}%
384 }

```

Now the final hack overloads the basic sectioning commands to make sure that they are copied into your solution book.

```

385 \newif\ifnoexinchapter
386 \noexinchapterfalse
387 \ifexsol@local
388 \else
389 \ifx\chapter\@undefined\else
390 \let\exsol@@chapter\@chapter
391 \def\@chapter[#1]#2{%
392 \exsol@@chapter[#1]{#2}
393 \ifnoexinchapter
394 \noexinchapterfalse
395 \else
396 \addtocounter{chapter}{-1}
397 \immediate\write\solutionstream{\string\setcounter{chapter}{\arabic{chapter}}%
398 \string\chapter{#1}}%
399 \ifexsol@external
400 \immediate\write\exercisestream{\string\setcounter{chapter}{\arabic{chapter}}%
401 \string\chapter{#1}}%
402 \fi
403 \addtocounter{chapter}{1}
404 \fi
405 }
406 \fi
407
408 \ifdefined\frontmatter
409 \let\exsol@@frontmatter\frontmatter
410 \def\frontmatter{%

```

```

411 \immediate\write\solutionstream{\string\frontmatter}%
412 \ifexsol@external%
413 \immediate\write\exercisestream{\string\frontmatter}%
414 \fi%
415 \exsol@@frontmatter
416 }
417 \fi
418 \ifdefined\frontmatter
419 \let\exsol@@mainmatter\mainmatter
420 \def\mainmatter{%
421 \immediate\write\solutionstream{\string\mainmatter}%
422 \ifexsol@external%
423 \immediate\write\exercisestream{\string\mainmatter}%
424 \fi%
425 \exsol@@mainmatter
426 }
427 \fi
428 \ifdefined\backmatter
429 \let\exsol@@backmatter\backmatter
430 \def\backmatter{%
431 \immediate\write\solutionstream{\string\backmatter}%
432 \ifexsol@external%
433 \immediate\write\exercisestream{\string\backmatter}%
434 \fi%
435 \exsol@@backmatter
436 }
437 \fi
438 \ifdefined\appendix
439 \let\exsol@@appendix\appendix
440 \def\appendix{%
441 \immediate\write\solutionstream{\string\appendix}%
442 \ifexsol@external%
443 \immediate\write\exercisestream{\string\appendix}%
444 \fi%
445 \exsol@@appendix
446 }
447 \fi
448 \fi

```

`\noexercisennextchapter` If you have chapters without exercises, you may want to leave them out of your solution book. You can do this by putting the `\noexercisennextchapter` macro before your chapter mark.

```

449 \newcommand{\noexercisennextchapter}
450 {
451 \noexinchaptertrue
452 }

```

`\noexercisennextchapter` As an alternative you may just want to put this marker in your text to cause the printing of the sentence “No exercises in this chapter” in your solution book.

```

453 \newcommand{\noexercisennextchapter}
454 {
455 \immediate\write\solutionstream{No exercises in this chapter}

```

```

456 \ifexsol@external%
457 \immediate\write\exercisestream{No exercises in this chapter}%
458 \fi%
459 }

460 </package>

```

References

- [1] Timothy Van Zandt, Herbert Voß, Denis Girou, Sebastian Rahtz, Niall Mansfield The `fancyvrb` package. <http://ctan.org/pkg/fancyvrb>. online, accessed in January 2012.
- [2] The Comprehensive TeX Archive Network. <http://www.ctan.org>. online, accessed in January 2012.

Change History

v0.1		
General: Initial version	1	
v0.2		
General: Minor bug fixes based on		
first use by Paul Levrie	1	
Added option <code>exercisefont</code>	16	
Fixed babel errors	25	
Removed dash in counter when		
in document without		
sectioning commands	19	
<code>exercises</code> : Attempted to fix		
MiKTeX formatting problems	23	
<code>exsol@exercise</code> : Attempted to fix		
MiKTeX formatting problems	21	
v0.3		
General: Minor bug fixes based on		
second use by Paul	1	
<code>exercises</code> : Added some extra		
whitespace below		
<code>exercisename</code>	23	
<code>exsol@exercise</code> : Fixed <code>labelsep</code> to		
avoid cluttered <code>itemize</code>		
environments	21	
v0.4		
General: Allowed for non-list		
formatting of exercises (as		
default)	1	
Added option <code>exerciselinlist</code>	17	
Changed name of option to		
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		<code>exsol@exercise</code> : Added option
		<code>exerciselinlist</code> such that default
		results in non list formatting of
		exercise
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		General: Added option to also
		send exercises to solutions file
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		Added option
		<code>copyexercisinsolutions</code>
	 17
		Changed option <code>exerciselinlist</code>
		to <code>exerciseaslist</code>
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		<code>exsol@exercise</code> : Changed
		implementation to allow for
		copying the exercises to the
		solutions file.
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		v0.6
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