A Document Class and a Package for Handling Multi-File Projects

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Abstract

The subfiles package allows authors to split a document into one main file and several subsidiary files (subfiles) akin to the \input command, with the added benefit of making the subfiles compilable on their own. This is achieved by reusing the preamble of the main file also for the subfiles.

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1 Introduction

The LATEX commands \include and \input allow the user to split the TEX source of a document into several input files. This is useful when creating documents with many chapters, but also for handling large tables, figures and code samples, which require a considerable amount of trial-and-errors.

In this process the rest of the document is of little use, and can even interfere. For example, error messages may indicate not only the wrong line number, but may point to the wrong file. Frequently, one ends up wanting to work only on the new file:

- Create a new file, and copy-paste the preamble of the main file into it.
- Work on this file, typeset it *alone* as many times as necessary.
- Finally, when the result is satisfactory, delete the preamble from the file (alongside with \end{document}!), and \include or \input it from the main file.

It is desirable to reduce these three steps to the interesting, middle one. Each new, subordinate file (henceforth 'subfile') should behave both as a self-sufficient LATEX document and as part of the whole project, depending on whether it is LATEXed individually or \included/\input from the main document. This is what the class subfiles.cls and the package subfiles.sty are intended for.

2 Basic usage

subfiles.sty The main file, i.e., the file with the preamble to be shared with the subfiles, has to load the package subfiles:

```
\documentclass[...]{...}
\usepackage{subfiles}
\begin{document}
```

\subfile Subordinate files (subfiles) are loaded from the main file or from other subfiles with the command

```
\left\langle subfile_name \right\rangle
```

subfiles.cls The subfiles have to start with the line

```
\documentclass[\langle main\_file\_name \rangle] \{subfiles\}
```

which loads the class subfiles. Its only 'option', which is actually mandatory, gives the name of the main file. This name follows T_EX conventions: .tex is the default extension, the path has to be provided if the main file is in a different directory, and directories in the path have to be separated by / (not \backslash). Thus, we have the following structure.

```
main file subfile

\documentclass[...]{...}
\shared preamble \begin{document}
\usepackage{subfiles}
\usepackage{subfiles}
\...
\subfile{\subfile_name}}
\...
\end{document}
```

Now there are two possibilities.

- If LATEX is run on the subfile, the line \documentclass[..]{subfiles} is replaced by the preamble of the main file (including its \documentclass command). The rest of the subfile is processed normally.
- If LATEX is run on the main file, the subfile is loaded like with an \input command, except that the preamble of the subfile up to \begin{document} as well as \end{document} and the lines following it are ignored.

3 Advanced usage

3.1 Including files instead of inputting them

\subfileinclude

In plain IATEX, you can use either \input or \include to load a file. In most cases the first is appropriate, but sometimes there are reasons to prefer the latter. Internally, the \subfile command uses \input. For those cases where you need \include, the package provides the command

 $\sline \sline \sline$

3.2 Fixing pathes

\cubfiv

Whenever an error message of LATEX or an external program indicates that a file cannot be found, the reason may be that the missing file has to be addressed by varying pathes, depending on which file is typeset. In such a case, it may help to apply the command \subfix to the file or path names. Examples:

package	command when used with subfiles	
biblatex	$\addbibresource{\subfix{\langle file \rangle}}$	
bibunits	s \putbib[\subfix{ $\langle file1 \rangle$ },\subfix{ $\langle file2 \rangle$ },]	
	$\defaultbibliography{\subfix{\langle file1\rangle},}$	

\bibliography \graphicspath

Some commands already apply the fix on the fly. At the moment these are the standard LATEX command \bibliography and \graphicspath from the graphics/graphicx package.

3.3 Conditional execution of commands

\ifSubfilesClassLoaded

The command \ifSubfilesClassLoaded is useful to execute commands conditionally, depending on whether the main file is typeset or a subfile.

```
\ifSubfilesClassLoaded{% then branch
   ... commands executed when the subfile is typeset ...
}{% else branch
   ... commands executed when the main file is typeset ...
}
```

As an example, this can be used to add the bibliography to the main document or to the subdocument, whichever is typeset:

```
main file subfile

\documentclass[...]{...}
\usepackage{subfiles}
\begin{document}
\begin{document}
...
\begin{document}
...
\subfile{\subfile_name}\}
...
\subfile{\subfile_name}\}
...
\bibliography{bibfile}
\end{document}
```

3.4 Referencing between subfiles

When working with multiple subfiles under one main file, one often wants to refer in subfile A.tex to labels in subfile B.tex. To realize that, include in the preamble of the main file:

```
\usepackage{xr}
```

Then, include in the preambles of A.tex and B.tex:

 $\infSubfilesClassLoaded{\externaldocument{\langle main_file_name \rangle}}{\}}$

3.5 Unusual locations for placing definitions and text

Starting with version 2.0, the subfiles package treats sub-preambles and text after \end{document} as one would expect: The preamble of subfiles is skipped when loaded with \subfile, and everything after \end{document} is ignored. In most cases this is what you want.

For reasons of compatibility, the option v1 restores the behaviour of older versons:

```
\usepackage[v1]{subfiles}
```

This will have three effects.

v1

Code after the end of the main document is added to the preamble of the subfiles, but is ignored when typesetting the main file. Here one can add commands

that are to be processed as part of the preamble when the subfiles are typeset on their one. But this also means that any syntax error after \end{document} will ruin the LATEXing of the subfile(s).

Code in the preamble of a subfile is processed as part of the text when typesetting the main file, but as part of the preamble when typesetting the subfile. This means that with the option v1, the preamble of a subfile can only contain stuff that is acceptable for both, the preamble and the text area. One should also keep in mind that each subfile is input within a group, so definitions made here may not work outside.

Code after \end{document} in a subfile is treated like the code preceding it when the subfile is loaded from the main file, but is ignored when typesetting the subfile. The code after \end{document} behaves as if following the \subfile command in the main file, except that it is still part of the group enclosing the subfile. As a consequence, empty lines at the end of the subfile lead to a new paragraph in the main document, even if the \subfile command is immediately followed by text.

4 Use cases

4.1 Hierarchy of directories

Sometimes it is desirable to put a subfile together with its images and supplementary files into its own directory. The difficulty now is that these additional files have to be addressed by different pathes depending on whether the main file or the subfile is typeset. As of version 1.3, the subfiles package handles this problem by using the import package.

As an example, consider the following hierarchy of files:

main.tex
mypreamble.tex
dir1/subfile1.tex
dir1/image1.jpg
dir1/text1.tex
dir1/dir2/subfile2.tex
dir1/dir2/image2.jpg
dir1/dir2/text2.tex

where main, subfile1, and subfile2 have the following contents:

main.tex	subfile1.tex
\documentclass{article}	\documentclass[/main]{subfiles}
\input{mypreamble}	\begin{document}
\usepackage{graphicx}	\input{text1}
\usepackage{subfiles}	\includegraphics{image1.jpg}
\begin{document}	\subfile{dir2/subfile2}
\subfile{dir1/subfile1}	\end{document}
\end{document}	

subfile2.tex \documentclass[../../main]{subfiles} \begin{document} \input{text2} \includegraphics{image2.jpg} \end{document}

Then each of the three files can be typeset individually in its respective directory, where LATEX is able to locate all included text files and images.

4.2 Avoiding extra spaces

Sometimes you may want to load the contents of a subfile without white space separating it from the contents of the main file. In this respect, \subfile behaves similar to \input. Any space or newline before and after the \subfile command will appear in the typeset document, as will any white space between the last character of the subfile and \end{document}. Therefore, to load the contents of a subfile without intervening spaces, you have either to add comment signs:

main.tex	sub.tex
•••	\documentclass[main.tex]{subfiles}
text before%	\begin{document}
\subfile{sub.tex}%	contents of subfile%
text after	\end{document}

or to put everything on the same line:

text before\subfile{sub.tex}text after
contents of subfile\end{document}

5 Troubleshooting

Here are some hints that solve most problems.

- Make sure to use the most recent version of the subfiles package, available from CTAN¹ and Github².
- 2. Make sure that \usepackage{subfiles} appears near the end of the main preamble.
- 3. Make sure that the strings \begin{document} and \end{document} appear on lines of their own and that there are no additional characters preceding or trailing them.
- 4. If some external program that cooperates with TEX, like bibtex or biber, complains about not being able to find a file, locate the name of the file in the LATEX source and replace \(\frac{filename}{} \) by \subfix{\(\lambda filename \)}.

¹https://ctan.org/pkg/subfiles

²https://github.com/gsalzer/subfiles

5. If nothing of the above helps, ask the nice people on tex.stackexchange³.

6 Dependencies

The subfiles package uses the import package by Donald Arsenau to load subfiles from different directories. import.sty is part of the standard TEX distribution.

7 Version history

v1.1: Initial version by Federico Garcia. Subsequent versions by Gernot Salzer.

v1.2:

• Incompatibility with classes and packages removed that modify the \document command, like the class revtex4.

v1.3:

- Use of import package to handle directory hierarchies.
- \ignorespaces added to avoid spurious spaces.
- Incompatibility with commands removed that expect \document to be equal to \@onlypreamble after the preamble. Thanks to Eric Domenjoud for analysing the problem.

v1.4:

- Incompatibility with memoir class and comment package removed.
- Bug '\unskip cannot be used in vertical mode' fixed.

v1.5:

- Command \subfileinclude added.
- Basic support for bibtex related bibliographies in subfiles added. Seems to suffice also for sub-bibliographies with the package chapterbib.
- Support for sub-bibliographies with package bibunits added.

v1.6:

- Support for sub-bibliographies with package bibunits dropped, in favor of \subfix.
- Command \subfix added.
- Incompatibility with standalone class removed.
- The options of the main class are now also processed when typesetting a subfile; before they were ignored. Thanks to Ján Kl'uka for analysing the problem.

 $^{^3}$ https://tex.stackexchange.com/

v2.0:

- Incompatibility with LATEX Oct. 2020 removed. Thanks to Ulrike Fischer from the LATEX 3 team for the warning in time.
- By default, text after \end{document} as well as the preamble of subfiles, when loaded with \subfile, are ignored now. The old behaviour is available via the new package option v1.
- Command \ifSubfilesClassLoaded added and documentation regarding the use of the \bibliography command corrected. Thanks to Github user alan-isaac for reporting the issue.
- Subfiles now can have the same name as the main file. Thanks to Github user June-6th for reporting the issue.
- Problem with the search path for images resolved. Thanks to Github user maxnick for reporting the issue.

8 The Implementation

8.1 The class

```
1 (*class)
2 \NeedsTeXFormat{LaTeX2e}
3 \ProvidesClass{subfiles}[2020/09/07 v2.0 Multi-file projects (class)]
4 \DeclareOption*{%
5 \typeout{Preamble taken from file '\CurrentOption'}%
6 \let\preamble@file\CurrentOption
7 }
8 \ProcessOptions
```

After processing the option of the subfiles class, we reset \@classoptionslist such that the options in the main file will be processed.

9 \let\@classoptionslist\relax

To handle subfiles in separate directories, we use the import package. We load it now, since it resets the macro \import@path.

 $10 \ensuremath{\, \backslash} \ensuremath{\, \mathsf{RequirePackage\{\mathsf{import}\}}}$

We redefine \documentclass to load the class of the main document.

- ${\tt 11 \ let \ subfiles @ document class \ \ document class}$
- 12 \def\documentclass{%
- 13 \let\documentclass\subfiles@documentclass
- 14 \LoadClass

15 }

In earlier versions, we used \subimport to load the preamble of the main file, which has the unwanted effect of undoing changes to the graphics path. Therefore we use \input and initialize \import@path and \input@path to the path of the main file. We use the internal LATEX macro \filename@parse to obtain this path.

16 \filename@parse{\preamble@file}

```
17 \edef\import@path{\filename@area}
```

```
18 \edef\input@path{{\filename@area}}
19 \input{\preamble@file}
```

After loading the preamble of the main file, we reset \import@path{}. Since the preamble may have changed the catcode of the @ sign, we make it (again) a letter. Better safe than sorry.

```
20 {\makeatletter
21 \gdef\import@path{}
22 }
23 \langle /class \rangle
```

8.2 The package

```
24 \(\perp \) \(\text{ProvidesPackage}\)
25 \(\text{NeedsTeXFormat{LaTeX2e}}\)
26 \(\text{ProvidesPackage{subfiles}[2020/09/07 v2.0 Multi-file projects (package)]}\)
```

The package has one option, v1, which affects the way how the text after \end{document} and in the preamble of subfiles is handled. With this option, subfiles behaves like in version 1.x. To implement the retro behaviour, we need a few definitions.

First, we define three macros containing the strings \begin{document}, \end{document} and document. We need them later to detect these strings in the input.

```
27 \def\subfiles@DOCUMENT{document}
28 {\escapechar=-1\relax
29 \xdef\subfiles@BEGINDOCUMENT{\string\\begin\string\{document\string\}}%
30 \xdef\subfiles@ENDDOCUMENT{\string\\end\string\{document\string\}}%
31 }
```

The macro \subfiles@skipDocument skips everything until it encounters the string \end{document}. In earlier versions of the package, this was accomplished by redefining the document environment to the comment environment of the verbatim package. This clashes with the LATEX format published in October 2020, so we copy and adapt the code from the verbatim package (see the definition of \subfiles@skiplines below).

```
32 \def\subfiles@skipDocument{%
33 \let\subfiles@skiplinescont\ignorespaces
34 \let\subfiles@skiplinesend\subfiles@ENDDOCUMENT
35 \subfiles@skiplines
36 }
```

To skip \documentclass the old way, we redefine it to do nothing except restoring its original definition.

```
37 \def\subfiles@skipDocumentclass{%
38 \renewcommand\documentclass[2][]{%
39 \let\documentclass\subfiles@documentclass
40 \ignorespaces
41 }%
42 }
```

To ignore the preamble of a subfile, we redefine \documentclass to skip everything until the string \begin{document} is encountered.

```
43 \def\subfiles@skipPreamble{%
44 \def\documentclass{%
45 \let\documentclass\subfiles@documentclass
46 \def\subfiles@skiplinescont{\begin{document}}%
47 \let\subfiles@skiplinesend\subfiles@BEGINDOCUMENT
48 \subfiles@skiplines
49 }%
50 }
```

Now we set the default behaviour of the subfiles package: When loading the main preamble in a subfile, everything after the preamble is ignored. Moreover, when reading a subfile, its preamble as well as everything after \end{document} is ignored.

- 51 \let\subfiles@handleMain\endinput
- 52 \let\subfiles@handleSubpreamble\subfiles@skipPreamble
- 53 \let\subfiles@handleTextAfterSubdocument\endinput

The option v1 restores the behaviour of the old subfiles package: When loading the main preamble in a subfile, only the contents of the document environent is ignored, but not the stuff following it. Moreover, when reading a subfile, only the \documentclass command and the lines \begin{document} and \end{document} are ignored, but the subfile preamble as well as everything after \end{document} is retained.

```
54 \DeclareOption{v1}{%

55 \let\subfiles@handleMain\subfiles@skipDocument

56 \let\subfiles@handleSubpreamble\subfiles@skipDocumentclass

57 \let\subfiles@handleTextAfterSubdocument\relax

58 }

59 \DeclareOption*{\PackageWarning{subfiles}{Option '\CurrentOption' ignored}}}

60 \ProcessOptions\relax
```

To skip everything until a specific string is read, we adapt code from the verbatim package. The skipping of lines is controlled by two macros that have to be set before calling \subfiles@skiplines. \subfiles@skiplinesend is the string that marks the end of the skipped area; it has to appear on a line of its own, as the only content of this line. \subfiles@skiplinescont contains the code to be executed after skipping has ended.

```
61 \def\subfiles@skiplines{%
    \begingroup
62
      \let\do\@makeother\dospecials
63
      \@makeother\^^L%
64
      \endlinechar'\^^M\relax \catcode'\^^M=12\relax \subfiles@skipline}
66 {\catcode'\^^M=12 \endlinechar=-1 %
   \gdef\subfiles@skipline#1^^M{\def\subfiles@tmp{#1}%
67
        \ifx\subfiles@tmp\subfiles@skiplinesend
68
             \def\subfiles@tmp{\endgroup\subfiles@skiplinescont}%
69
70
        \else\let\subfiles@tmp\subfiles@skipline
        \fi \subfiles@tmp}
```

72 }

To handle subfiles in separate directories, we use the import package. If it has already been loaded, e.g. by the subfiles class, this line does nothing.
73 \RequirePackage{import}

The \subimport command requires path and filename as separate arguments, so we have to split file locations into these two components. The internal IATEX command \filename@parse almost fits the bill, except that it additionally splits the filename into basename and extension. Unfortunately, concatenating basename and extension to recover the filename is not clean: Under Unix/Linux, the filenames base and base. denote different entities, but after \filename@parse both have the same basename and an empty extension. Therefore we redefine the command \filename@simple temporarily; it is responsible for this unwanted split.

```
74 \def\subfiles@split#1{%
75 \let\subfiles@filename@simple\filename@simple
76 \def\filename@simple##1.\\{\edef\filename@base{##1}}%
77 \filename@parse{#1}%
78 \let\filename@simple\subfiles@filename@simple
79 }%
```

E.g., after executing \subfiles@split{../dir1/dir2/file.tex} the macros \filename@area and \filename@base expand to ../dir1/dir2/ and file.tex, respectively.

\subfile

The command \subfile specifies the command \subimport for \inputing the subfile, and then calls \subfiles@subfile.

```
80 \newcommand\subfile{%
```

81 \let\subfiles@loadfile\subimport

82 \subfiles@subfile

83 }

\subfileinclude

The command \subfileinclude specifies the command \subincludefrom for \includeing the subfile, and then calls \subfiles@subfile.

```
84 \newcommand\subfileinclude{%
```

85 \let\subfiles@loadfile\subincludefrom

86 \subfiles@subfile

87 }

The main functionality of the two commands is implemented in \subfiles@subfile. It redefines \documentclass and the document environment to do nothing but reverting these command to their original meaning and avoiding spurious spaces. Reverting \documentclass and \document to their original definition is important for being compatible with classes like standalone or packages like bibentry, which rely on this definition.

88 \newcommand\subfiles@subfile[1]{%

- 89 \begingroup
- 90 \let\subfiles@documentclass\documentclass
- 91 \let\subfiles@document\document
- 92 \let\subfiles@enddocument\enddocument
- 93 \subfiles@handleSubpreamble

```
\let\document\subfiles@document
               95
                      \ignorespaces
               96
                    }{%
               97
                      \let\enddocument\subfiles@enddocument
               98
               99
                      \@ignoretrue
               100
                      \subfiles@handleTextAfterSubdocument
                    }%
              101
                   Now we split the file name into path and base name and load the file.
                    \subfiles@split{#1}%
              102
                    \subfiles@loadfile{\filename@area}{\filename@base}%
                    \endgroup
               104
               105 }
                   If some package provides a command that takes a filename as argument, then
      \subfix
               it has to be prefixed with the current \import@path. This is what the \subfix
               command tries to do. In order to succeed, the filename has to be expanded im-
               mediately, such that the current value of \import@path is used.
               106 \def\subfix#1{\import@path#1}
                   For patching a list of file or path names, we define two auxiliary macros, one
               iterating over a comma-separated list of names and one processing a sequence of
               names enclosed in braces.
               107 \def\subfiles@fixfilelist#1{%
                    \def\subfiles@list{}%
               108
                    \def\subfiles@sep{}%
              109
                    \@for\subfiles@tmp:=#1\do{%
              110
                      \edef\subfiles@list{\subfiles@list\subfiles@sep\subfix{\subfiles@tmp}}%
              111
                      \def\subfiles@sep{,}%
              112
                    }%
              113
              114 }
              115 \def\subfiles@fixpathlist#1{%
                    \def\subfiles@list{}%
              116
                    \@tfor\subfiles@tmp:=#1\do{%
              117
                      \edef\subfiles@list{\subfiles@list{\subfix\subfiles@tmp}}%
              118
              119
                   }%
              120 }
                   We patch \bibliography and \graphicspath (from the graphics/graphicx
\bibliography
               package) such that users don't have to worry about adding \subfix.
\graphicspath
              121 \let\subfiles@bibliography\bibliography
              122 \renewcommand\bibliography[1]{%
                    \subfiles@fixfilelist{#1}%
              123
                    \expandafter\subfiles@bibliography\expandafter{\subfiles@list}%
              124
              125 }
              126 \@ifpackageloaded{graphics}{%
                    \let\subfiles@graphicspath\graphicspath
               127
               128
                    \renewcommand\graphicspath[1]{%
                      \subfiles@fixpathlist{#1}%
              129
                      \edef\subfiles@list{{\subfix{}}\subfiles@list}%
               130
```

\renewenvironment{document}{%

94

```
131 \expandafter\subfiles@graphicspath\expandafter{\subfiles@list}% 132 }% 133 }{}
```

\ifSubfilesClassLoaded

To add code or text conditionally, depending on whether the main document or a subfile is typeset, we provide the command \ifSubfilesClassLoaded.

```
134 \newcommand\ifSubfilesClassLoaded{%
135 \expandafter\ifx\csname ver@subfiles.cls\endcsname\relax
136 \expandafter\@secondoftwo
137 \else
138 \expandafter\@firstoftwo
139 \fi
140 }
```

The subfiles package is loaded near the end of the main preamble. If it is loaded from a subfile, i.e., if subfiles.cls has been loaded, then we have to prepare for skipping the main document. We do this be redefining the \begin command. Normally, the first \begin after the subfiles package starts the main document. To allow for the case that some other environment occurs before (does it really happen?) we test whether we are dealing with \begin{document}. If not, we execute the original definition of \begin; otherwise we skip the main document as specified by \subfiles@handleMain.

```
141 \ifSubfilesClassLoaded{%
     \let\subfiles@begin\begin
142
     \def\begin#1{%
143
        \def\subfiles@tmp{#1}%
144
        \ifx\subfiles@tmp\subfiles@DOCUMENT
145
          \let\begin\subfiles@begin
146
          \let\subfiles@tmp\subfiles@handleMain
147
148
          \def\subfiles@tmp{\subfiles@begin{#1}}%
149
150
151
        \subfiles@tmp
     }%
152
153 }{}
154 \langle /package \rangle
```