The **symlist** package[*]

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Abstract

The `symlist` package allows easy creation of a list of symbols in a manner similar to LaTeX's built-in support for lists of figures and tables. Like those other lists, the generated list of symbols is sorted in the order that the symbols are introduced in the document text.

1 Introduction

Large mathematical texts, such as dissertations, often introduce a copious body of symbols and notation. Readers of such texts will benefit from a list of symbols that includes a brief description of each symbol and the page number where each symbol is first used or defined. Since symbols usually have no particularly natural ordering, the list of symbols is best sorted by order of introduction, so that the reader can narrow the search for a definition by searching backward from any given usage.

This package allows LaTeX authors to create a list of symbols for their documents using a fairly intuitive interface. When a symbol is first used, instead of just writing the ⟨*symbol*⟩ directly, the author writes `\newsym{`⟨*desc*⟩`}{`⟨*symbol*⟩`}`, where ⟨*desc*⟩ is a short textual description of the symbol's meaning. The list of all introduced symbols, their descriptions, and their page numbers is generated using the `\listofsymbols` macro.

2 Usage

Each LaTeX document that uses the `symlist` package should include a line like the following in its preamble:

```
\usepackage{symlist}
```

There are currently no supported options for the package.

\newsym   To introduce a new symbol to the list of symbols, use the `\newsym` macro with syntax

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[*]This document corresponds to **symlist** v1.1, dated 2008/03/11.

```
\newsym{⟨description⟩}{⟨symbol⟩}
```

This inserts ⟨*symbol*⟩ into your list of symbols with the description ⟨*description*⟩, along with inserting ⟨*symbol*⟩ into the text where the \newsym macro appears. You can use \newsym in equations or regular text; ⟨*description*⟩ will always be processed in horizontal text mode, but the ⟨*symbol*⟩ part will be processed in whatever mode is active when the \newsym macro appears.

For example, suppose you want to include the + symbol in your list of symbols with the description "addition", and the first place the + symbol appears in the document is a display equation like:

```
\[ 7 + 3 + 12 = 22 \]
```

In that case, you should replace the line above with:

```
\[ 7 \newsym{addition}{+} 3 + 12 = 22 \]
```

This only needs to be done for the first use of + (or whichever instance you want to be referenced by the symbol list).

In some cases you might want to put a different symbol in the symbol list than the one that appears in the text. For this, you can use the optional syntax:

```
\newsym[⟨listed symbol⟩]{⟨description⟩}{⟨symbol⟩}
```

For example, you might write the following in a paragraph:

```
denoted by \newsym[$*$]{finite repetition}{Kleene star}.
```

to associate the symbol ∗ with the text "Kleene star". Since the ⟨*listed symbol*⟩ is processed by default in whichever mode is active when the \newsym macro appears, in this case it needs to be surrounded by math-begin/end tokens ($) in order to force it to be displayed in math mode in the index.

\listofsymbols   The \listofsymbols macro generates the list of symbols, their descriptions,
\listsymbolname and the page numbers where the instance defined with \newsym appears. The list is formatted with the title defined by \listsymbolname or "List of Symbols" by default. An example list of symbols is shown below.

List of Symbols

3   Implementation

The following provides the verbatim implementation of the `symlist` LaTeX package, along with some brief commentary on how it works. In general, macro names that contain a @ symbol are not intended to be directly accessible by the outside world; they are for purely internal use. All other macros are intended to be used or redefined by document authors. To find the implementation of any particular macro, the index at the end of this document should prove helpful.

The first line of the `symlist` package "processes" any options that were specified in the `\usepackage` line. (Since there are no options presently supported, it yields an error if any were specified.)

```
1 \ProcessOptions\relax
```

\LOS@symline   Format a line of the list of symbols.

```
2 \newcommand\LOS@symline[4]{%
3   \ifx\hyper@anchor\@undefined%
4     \contentsline{symbol}{\numberline{#2}{#3}}{#4}\relax%
5   \else%
6     \contentsline{symbol}{\numberline{#2}{#3}}{#4}{symbol.#1}%
7   \fi%
8 }
```

\listsymbolname   Define the title for the list of symbols (can be redefined by document authors).

```
9 \newcommand\listsymbolname{List of Symbols}
```

\LOS@cnt   Define a counter to assign a unique integer to each `\newsym` instance.

```
10 \newcount\LOS@cnt
```

\LOS@wd   Define a dimen register to keep track of the largest width symbol introduced so far.

```
11 \newdimen\LOS@wd
```

\LOS@ext   Define the file extension for the symbol list auxiliary file.

```
12 \newcommand\LOS@ext{los}
```

\LOS@init   Initialize the list of symbols by setting the widths of the columns.

```
13 \newcommand\LOS@init[1]{%
14   \long\gdef\l@symbol{\@dottedtocline{1}{1.5em}{#1}}%
15 }
```

\newsym
\LOS@newsym
\LOS@@newsym
Introduce a new symbol. The first step is to update the `\LOS@cnt` and `\LOS@wd` registers. Next, we define a new macro named `\LOS@sym@n`, where n is a unique roman numeral. When executed, this macro will write a new entry to the `.los` auxiliary file to produce a line in the symbol list the next time the document is compiled. However, we can't execute this macro right away because the box we're currently building might not make it into the final document here or at all. For example, material in floats is often processed multiple times as LaTeX tries to find

a suitable place for it. So instead, we embed a call to the new macro in a non-immediate `\write` to the `.aux` auxiliary file. If this `\newsym` instance actually makes it into the final document, then the macro will be written to the `.aux` file, and will then be executed at the end of the current round of processing.

```
16 \newcommand\newsym{\@ifnextchar[\LOS@@newsym\LOS@newsym}
17 \newcommand\LOS@newsym[2]{\LOS@@newsym[#2]{#1}{#2}}
18 \newcommand\LOS@@newsym{}
19 \def\LOS@@newsym[#1]#2#3{%
20   \global\advance\LOS@cnt\@ne%
21   \ifmmode%
22     \settowidth\dimen@{$#1$\kern1em}%
23     \expandafter\gdef%
24       \csname LOS@sym@\romannumeral\LOS@cnt\endcsname##1##2{%
25       \@writefile\LOS@ext{\LOS@symline{##1}{$#1$}{#2}{##2}}}%
26   \else%
27     \settowidth\dimen@{#1\kern1em}%
28     \expandafter\gdef%
29       \csname LOS@sym@\romannumeral\LOS@cnt\endcsname##1##2{%
30       \@writefile\LOS@ext{\LOS@symline{##1}{#1}{#2}{##2}}}%
31   \fi%
32   \ifdim\dimen@>\LOS@wd\global\LOS@wd\dimen@\fi%
33   \if@filesw%
34     \write\expandafter\@auxout\expandafter{%
35       \expandafter\noexpand\expandafter\LOS@sym\expandafter{%
36       \romannumeral\LOS@cnt}{\thepage}}%
37   \fi%
38   \@ifundefined{hyperdef}{}%
39     {\hyperdef{symbol}{\romannumeral\LOS@cnt}}%
40   {#3}%
41 }
```

`\LOS@sym` The `.aux` file is processed twice during a typical LATEX session—once at the beginning of the document body and once at the end. Since our `\LOS@sym@n` macros (described above) are defined within the document body, we only want the material inserted into the `.aux` file to evaluate during the second of these two rounds. Thus, we define `\LOS@sym` to be empty at first and then expanded to `\LOS@sym@n` after the document body begins.

```
42 \newcommand\LOS@sym[2]{}
43 \AtBeginDocument{%
44   \gdef\LOS@sym#1{\csname LOS@sym@#1\endcsname{#1}}%
45   \if@filesw%
46     \@temptokena{\expandafter\@writefile\expandafter\LOS@ext%
47       \expandafter{\expandafter\LOS@init\expandafter{\the\LOS@wd}}}%
48     \immediate\write\@auxout{\the\@temptokena}%
49   \fi%
50 }
```

`\listofsymbols` Produce the list of symbols.

4

```
51 \ifx\chapter\undefined
52   \newcommand\listofsymbols{%
53     \section*{\listsymbolname}%
54     \@mkboth{\MakeUppercase\listsymbolname}%
55            {\MakeUppercase\listsymbolname}%
56     \addvspace{10\p@}%
57     \@starttoc\LOS@ext%
58   }
59 \else
60   \newcommand\listofsymbols{%
61     \if@twocolumn\@restonecoltrue\onecolumn\else\@restonecolfalse\fi%
62     \chapter*{\listsymbolname}%
63     \@mkboth{\MakeUppercase\listsymbolname}%
64            {\MakeUppercase\listsymbolname}%
65     \addvspace{10\p@}%
66     \@starttoc\LOS@ext%
67     \if@restonecol\twocolumn\fi%
68   }
69 \fi
```

Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

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