

The **secnum** package

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Abstract

The package **secnum** provides a marco `\setsecnum` which allows user to format section numbering intuitively.

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A Usage

Before using the macro, load the package in preamble.

```
\usepackage{secnum}
```

Then, one can format the section numbering by using the marco `\setsecnum` in preamble.

<code>\setsecnum</code>	<code>\setsecnum <num format></code>
-------------------------	--

A typical `<num format>` is like this:

1.1.1

It consists of some syntax abbrs of numbering formats, reffering the follows,

A	a	I	i	1
\Alph	\alph	\Roman	\roman	\arabic

and some separators, which can be any character except the abbrs and special characters such as barces “{}”, comma “,”, space “ ”, etc.

B Process

The process of the macro `\setsecnum` can be explained as follows.

- Step 1. The main function eats the input, saying I.1.a, and stores it in a token list.
- Step 2. Replace abbrs by macros. In our example, it results “`\Roman.\arabic.\alph`”
- Step 3. Split this token list into a sequence by macros. In our example, it results “`\Roman`”, “`.\arabic`” and “`.\alph`”.
- Step 4. Store those codes in indivial containers.
- Step 5. Use them to renew `\thesection`, `\thesubsection`, `\thesubsubsection` etc. provided there is no `\chapter`.

C Implementation

The following is the implementation. Users can ignore.

Preparations

This document class uses L^AT_EX3. Therefore, the packages `expl3`, `xparse` and `l3keys2e` are needed and should use `\ProvidesExplClass` rather than `\ProvidesClass`.

```

1 <*package>
2 <@@=syu>
3 \NeedsTeXFormat{LaTeX2e}
4 \RequirePackage{expl3}
5 \ProvidesExplPackage{secnum}{2020/01/01}{ }
6   { An intuitive way to format section numbering }
7 \RequirePackage{xparse}

```

`\l__syu_secnum_tl` The two variables are used to store the formatting information.

```

\l__syu_secnum_seq
8 \tl_new:N \l__syu_secnum_tl
9 \seq_new:N \l__syu_secnum_seq

```

`\g__syu_chapter_tl` The following variables are used to store the indivial formatting codes.

```

\g__syu_section_tl
\g__syu_subsection_tl
\g__syu_subsubsection_tl
\g__syu_paragraph_tl
\g__syu_subparagraph_tl
10 \tl_new:N \g__syu_chapter_tl
11 \tl_new:N \g__syu_section_tl
12 \tl_new:N \g__syu_subsection_tl
13 \tl_new:N \g__syu_subsubsection_tl
14 \tl_new:N \g__syu_paragraph_tl
15 \tl_new:N \g__syu_subparagraph_tl

```

`\g__syu_if_thechapter_int` This *<integer>* encodes if `\thechapter` is defined.

```

16 \int_new:N \g__syu_if_thechapter_int

```

If `\thechapter` is defined, it is 1.

```

17 \if_cs_exist:N \thechapter
18   \int_gset:Nn \g__syu_if_thechapter_int 1

```

Otherwise, it is 0.

```

19 \else:
20   \int_gset:Nn \g__syu_if_thechapter_int 0
21 \fi:

```

Main function

`\setsecnum` Here is the definition of the main function `\setsecnum`.

```

22 \DeclareDocumentCommand{\setsecnum}{m}
23 {
Store the input in.
24   \tl_set:Nn \l__syu_secnum_tl {#1}
Replace syntax abbrs by corresponding macros.
25   \syu_secnum_unabbr:N \l__syu_secnum_tl
Split into a sequence by macros.
26   \syu_split_by_macros:NN \l__syu_secnum_tl \l__syu_secnum_seq
Read formatting information.
27   \syu_secnum_from_seq:N \l__syu_secnum_seq
Set the secnumdepth.
28   \setcounter{secnumdepth}{\seq_count:N \l__syu_secnum_seq }
Format numberings.
29   \syu_secnum:
30 }
```

Unabbravation

`\syu_secnum_unabbr:N` This function replace the abbrs in a $\langle tl\ var \rangle$ by expansions.

```

31 \cs_new_protected:Npn \syu_secnum_unabbr:N #1
32 {
33   \regex_replace_all:nnN {A} {\c{Alph}} #1
34   \regex_replace_all:nnN {a} {\c{alph}} #1
35   \regex_replace_all:nnN {I} {\c{Roman}} #1
36   \regex_replace_all:nnN {i} {\c{roman}} #1
37   \regex_replace_all:nnN {1} {\c{arabic}} #1
38 }
```

Split to sequence

`\syu_split_by_macros:NN` This function split a $\langle tl\ var \rangle$ into a $\langle sequence \rangle$ by macros.

```

39 \cs_new_protected:Npn \syu_split_by_macros:NN #1 #2
40 {
41   \tl_clear:N \l_tmpa_tl
42   \seq_clear:N #2
43   \tl_map_inline:Nn #1
44   {
45     \tl_put_right:Nn \l_tmpa_tl ##1
46     \__syu_if_macro:nT ##1
47     {
48       \seq_put_right:NV #2 \l_tmpa_tl
49       \tl_clear:N \l_tmpa_tl
50     }
51   }
52 }
```

But how to see if an $\langle item \rangle$ in the token list is a macro?

```

\g__syu_macro_tl This <tl var> stores the first five characters of the meaning of any macro, i.e. macro
                  (watch out its catcode). The idea is to creat a <tl var> and then set its value to be the
                  first five characters of its meaning.

53 \tl_new:N \g__syu_macro_tl
54 \tl_set:Nx \g__syu_macro_tl { \meaning \g__syu_macro_tl }
55 \tl_gset:Nx \g__syu_macro_tl { \tl_range:Nnn \g__syu_macro_tl {1}{5} }

\__syu_if_macro:nT Then, define a conditional testing if the input is a macro. Note that I use \if_meaning
\__syu_if_macro:nF rather than \tl_if_eq:NNTF.
\__syu_if_macro:nTF
56 \prg_new_protected_conditional:Npnn \__syu_if_macro:n #1 { T , F , TF }
57 {
58   \group_begin:
59     \tl_set:Nx \l_tmpa_tl {\meaning #1}
60     \tl_set:Nx \l_tmpa_tl {\tl_range:Nnn \l_tmpa_tl {1} {5}}
This is a trick to keep \l_tmpa_tl in the current local group
61     \exp_after:wN
62     \group_end:
while throwing the comparison result out.

63     \if_meaning:w \l_tmpa_tl \g__syu_macro_tl
64     \prg_return_true:
65     \else:
66     \prg_return_false:
67     \fi:
68 }

```

Read formatting info

```

\syu_secnum_from_seq:N Read the formatting info from given <sequence>.

69 \cs_new_protected:Npn \syu_secnum_from_seq:N #1
70 {

Use \tl_gset:Nx since: 1, these data are global and 2: I need them eating the fully
expanded results.

71   \tl_gset:Nx \g__syu_chapter_tl
72   { \seq_item:Nn #1 { \g__syu_if_thechapter_int } }
73   \tl_gset:Nx \g__syu_section_tl
74   { \seq_item:Nn #1 { 1 + \g__syu_if_thechapter_int } }
75   \tl_gset:Nx \g__syu_subsection_tl
76   { \seq_item:Nn #1 { 2 + \g__syu_if_thechapter_int } }
77   \tl_gset:Nx \g__syu_subsubsection_tl
78   { \seq_item:Nn #1 { 3 + \g__syu_if_thechapter_int } }
79   \tl_gset:Nx \g__syu_paragraph_tl
80   { \seq_item:Nn #1 { 4 + \g__syu_if_thechapter_int } }
81   \tl_gset:Nx \g__syu_subparagraph_tl
82   { \seq_item:Nn #1 { 5 + \g__syu_if_thechapter_int } }
83 }

```

Formatting

`\syu_secnum:` Formatting section numbering.

```
84 \cs_new:Nn \syu_secnum:  
85 {
```

When `\thechapter` is defined, start from it.

```
86 \if_cs_exist:N \thechapter  
87 \renewcommand*{\thechapter}  
88 { \g__syu_chapter_tl {chapter} }  
89 \renewcommand*{\thesection}  
90 { \thechapter  
91 \g__syu_section_tl {section} }
```

Otherwise start from `\thesection`.

```
92 \else:  
93 \renewcommand*{\thesection}  
94 { \g__syu_section_tl {section} }  
95 \fi:
```

The rest levels.

```
96 \renewcommand*{\thesubsection}  
97 { \thesection  
98 \g__syu_subsection_tl {subsection} }  
99 \renewcommand*{\thesubsubsection}  
100 { \thesubsection  
101 \g__syu_subsubsection_tl {subsubsection} }  
102 \renewcommand*{\theparagraph}  
103 { \thesubsubsection  
104 \g__syu_paragraph_tl {paragraph} }  
105 \renewcommand*{\thesubparagraph}  
106 { \theparagraph  
107 \g__syu_subparagraph_tl {subparagraph} }  
108 }
```

```
109 \end{package}
```