alnumsec.sty: Using alphanumeric section numbering with standard sectioning commands*

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Abstract

This package allows you to use alphanumeric section numbering, e.g. A. Introduction; III. International Law. It's output is similar to alphanum.sty, but you can use the standard LaTeX sectioning commands. Thus it is possible to switch numbering schemes easily. Greek letters, double letters (bb) and different delimiters around them are supported.

Contents

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Part I
User documentation

1 Options

There is only one option: If you specify `usehighlevels`, then the numbers for every heading will start with the numbers of the superior levels, as without the package (e.g. A.II.3.(a) Important Section). Without the option, only the number of the current section level is used, e.g. (a) Important Section. This seems to be common with alphanumeric numbering.

2 Specifying the numbering scheme

You specify the numbering scheme for the headings with the macro

```
\alnumsecstyle{<list of one-letter-specifiers>}
```

with the following specifiers:

a or n stands for **arabic** number: 6

R stands for an uppercase **Roman** number: VI

r stands for a lowercase **roman** number: vi

L stands for an uppercase **Letter**: A

l stands for a lowercase **letter**: a

g is for **greek** letter: α

d is for two lowercase letters (**doubleletter**): aa, bb

b for two greek letters (**doublegreek**)[1]: $\alpha\alpha$

The numbers and letters are all followed by a period per default, if you want to change this, use the macro

```
\surround<name>{<before>}{<after>}
```

Instead of `<name>`, put the word given in boldface in the list above (case matters!), `<before>` and `<after>` will be typeset around the number of type name.

If you use some number types twice, e.g. arabic numbers for the second and fifth level: `\alnumsecstyle{LaRla}`, you might want to distinguish between the two numbers by their separators. To achieve this, you give the separators for lower levels in the optional argument(s) to `\surround<name>`. In the example, you might use `\surroundarabic[(]{}{)}` to achieve A. 2) III. d. (4) or `\surroundarabic[(][)]{}{.}` for A. 2. III. d. (4). Note, however, that alnumsec does *not* recognize that a number type has yet been used and that

[1] The b is from *bis*, latin for "twice", since the greek word would also yield a **d**.

it now should use the alternative separators. Instead, you have to specify the first level for which alternative separators should be used with the command `\otherseparators{<level>}`. In LaTeX, chapter, if defined, has level 0, section has 1 and so on down to subparagraph with level 5. Therefore, in the above example, `\otherseparators{5}` would work, but `\otherseparators{3}` as well.

Please note that `\alnumsecstyle` does not change the numbering scheme of figures or tables (yet). So if a `report` or `book` like document class will be used, one can get double periods there. But this can be corrected easily, for example the `figure` counter representation is usually defined as something like

```
\newcommand\thefigure{%
  \ifnum\value{chapter}>0 \thechapter.\fi \arabic{figure}}
```

So to remove the extra period here one can insert

```
\renewcommand\thefigure{%
  \ifnum\value{chapter}>0 \thechapter\fi \arabic{figure}}
```

right after the use of `\alnumsecstyle`. (same for tables)

3 Sectioning levels to use

Many people that use alphanumeric sectioning numbers also seem to use many, many levels of sectioning commands - alnumsec.sty can handle this. If you only use the levels that are defined in the standard classes (i.e. from `\chapter` or `\section` to `\subparagraph`), you don't have to do anything. `\part` is not treated at all by alnumsec.sty.

If you have more (or simply other[2]) sectioning macros, you have to tell alnumsec about their names and whether the first is on LaTeXs level 0 (like chapter) or 1 (like section). This is done with the macro `\alnumsectionlevels` - here is what the package uses for the article class:

```
\alnumsectionlevels{1}{section,subsection,subsubsection,paragraph,subparagraph}
```

If you use this macro, you have to do it *before* `\alnumsecstyle`!

alnumsec.sty assumes that the number is typeset using `\the<name>` for section level `<name>`. This will always be the case if the macro has been defined using the LaTeX macro designed for this, `\@startsection`.

4 Bugs and Limitations

Currently I am not aware of any real bugs, but one could imagine a lot of more features. However, since I wrote this package for somebody else's needs and don't use it myself, I need input from users to be able to improve it.

[2]With other, I mean other names for the same concept – e.g. my labbook.cls uses `\labday` instead of `\chapter` and `\experiment` instead of `\section`. Different concepts, as e.g. in alphanum.sty, won't work. But anyway, you'll only want to use one of both.

Part II
Implementation

```
⟨*alnumsec⟩
\newif\ifusepreviouslevels\usepreviouslevelsfalse%
\DeclareOption{usehighlevels}{\usepreviouslevelstrue}%
\ProcessOptions%
\RequirePackage{ifthen}%
```

Macros for greek "numbers" and double letters:

```
\providecommand*{\@greek}[1]{\ifcase#1\relax\or$\alpha$\or$\beta$\or
  $\gamma$\or$\delta$\or$\varepsilon$\or$\zeta$\or$\eta$\or$\vartheta$\or
  $\iota$\or$\kappa$\or$\lambda$\or$\mu$\or$\nu$\or$\xi$\or$o$\or$\pi$\or
  $\rho$\or$\sigma$\or$\tau$\or$\upsilon$\or$\varphi$\or$\chi$\or$\psi$\or
  $\omega$\else\@ctrerr\fi}%
\providecommand*{\@doublegreek}[1]{\@greek{#1}{\@greek{#1}}}
\providecommand*{\@doublealph}[1]{\@alph{#1}{\@alph{#1}}}
\newcounter{alnumsec@level}%
\newcounter{fk@secdepth}%
\newcounter{fk@secstart}%
\newcounter{fk@changelevel}\setcounter{fk@changelevel}{20}%
```

`alnumsec@level` is the dynamic counter used while browsing through the levels. `fk@secdepth` is the number of sectioning levels for which names are known and thus numbers can be assigned. `fk@secstart` will be the starting value for every use of `alnumsec@level`, i.e. it will be 0 if `\chapter`[3] is defined and 1 otherwise. `fk@changelevel` is the level from which the alternative separators for lower levels will be used. It is initially set very high so that lower level separators won't be used unless this counter is changed, using the following command:

```
\def\otherseparators#1{%
  \setcounter{fk@changelevel}{#1}
}
```

`\alnumsectionlevels` is the command for users that have more or different than the usual section names. The main work is done by `\fk@countlevels`, after that `fk@secdepth` is set to the number of known levels.

```
\def\alnumsectionlevels#1#2{%
  \setcounter{fk@secstart}{#1}
  \setcounter{alnumsec@level}{#1}%
  \fk@countlevels#2,\relax,%
  \setcounter{fk@secdepth}{\value{alnumsec@level}}%
  \addtocounter{fk@secdepth}{-1}
}
```

`\fk@countlevels` goes through the comma separated list of level names until it encounters the relax that has been put at the end by `\alnumsectionlevels`. For each level, it puts this name into a "numbered" name, e.g. `\fk@levelname1`, and increases the counter.

```
\def\fk@countlevels#1,{%
  \ifx\relax#1%
    \empty%
  \else%
```

[3] or some other macro on the level 0

```
    \expandafter\def\csname fk@levelname\thealnumsec@level\endcsname{#1}%
    \stepcounter{alnumsec@level}%
    \expandafter\fk@countlevels%
  \fi%
}
```

`\alnumsecstyle` is the macro with which the user specifies the numbering scheme and, implicitly, the level of the last numbered section. It feeds its argument to `\fk@scanstyle` and later sets `secnumdepth`. This counter has to be lowered by one because `\fk@scanstyle` increments `alnumsec@level` *after* it has parsed each letter, so after the last letter it is incremented once more. Then `\fk@assignstyle` is called which actually defines `\thesection` and friends.

```
\def\alnumsecstyle#1{%
  \setcounter{alnumsec@level}{\value{fk@secstart}}%
  \fk@scanstyle#1\relax%
  \setcounter{secnumdepth}{\value{alnumsec@level}}%
  \addtocounter{secnumdepth}{-1}%
  \setcounter{alnumsec@level}{\value{fk@secstart}}%
  \fk@assignstyle%
}%
\def\fk@scanstyle#1{%
  \ifx\relax#1%
    \relax%
  \else%
    \ifnum\c@alnumsec@level>\c@fk@secdepth%
      \PackageError{alnumsec}{%
        more numbering levels than sectioning levels}{%
        You have specified \thealnumsec@level\space different
        numbering styles.\MessageBreak However, only
        \thefk@secdepth\space sectioning commands have been defined,
        down to \csname fk@levelname\thefk@secdepth\endcsname.
      }%
    \else%
      \fk@whichstyle{#1}%
      \stepcounter{alnumsec@level}%
    \fi%
    \expandafter\fk@scanstyle%
  \fi%
}
\newif\iffk@letterknown\fk@letterknownfalse
\def\fk@whichstyle#1{%
  \if R#1%
    \fk@defsecstyle{\thealnumsec@level}{\@Roman}{Roman}%
    \fk@letterknowntrue
  \fi%
  \if r#1%
    \fk@defsecstyle{\thealnumsec@level}{\@roman}{roman}%
    \fk@letterknowntrue
  \fi%
  \if n#1%
    \fk@defsecstyle{\thealnumsec@level}{\@arabic}{arabic}%
    \fk@letterknowntrue
  \fi%
  \if a#1%
```

```
    \fk@defsecstyle{\thealnumsec@level}{\@arabic}{arabic}%
    \fk@letterknowntrue
  \fi%
  \if L#1%
    \fk@defsecstyle{\thealnumsec@level}{\@Alph}{Letter}%
    \fk@letterknowntrue
  \fi%
  \if l#1%
    \fk@defsecstyle{\thealnumsec@level}{\@alph}{letter}%
    \fk@letterknowntrue
  \fi%
  \if g#1%
    \fk@defsecstyle{\thealnumsec@level}{\@greek}{greek}%
    \fk@letterknowntrue
  \fi%
  \if d#1%
    \fk@defsecstyle{\thealnumsec@level}{\@doublealph}{doubleletter}%
    \fk@letterknowntrue
  \fi%
  \if b#1%
    \fk@defsecstyle{\thealnumsec@level}{\@doublegreek}{doublegreek}%
    \fk@letterknowntrue
  \fi%
  \iffk@letterknown\else%
    \PackageError{alnumsec}{unknown specifier: #1}{%
      You have given #1 as specifier for the numbering
      scheme.\MessageBreak
      Only the following are known:\MessageBreak
      nrRLldgb
    }
  \fi
}
\def\fk@defsecstyle#1#2#3{%
  \edef\fk@seclevel{\csname fk@levelname#1\endcsname}%
  \expandafter\def\csname fk@\thealnumsec@level num\endcsname{#2}%
  \ifnum\c@alnumsec@level<\c@fk@changelevel%
    \expandafter\def%
      \csname fk@pre@\thealnumsec@level\expandafter\endcsname\expandafter{%
      \csname fk@pre@#3\endcsname}%
    \expandafter\def%
      \csname fk@post@\thealnumsec@level\expandafter\endcsname\expandafter{%
      \csname fk@post@#3\endcsname}%
  \else%
    \expandafter\def%
      \csname fk@lower@pre@\thealnumsec@level\expandafter\endcsname\expandafter{%
      \csname fk@lower@pre@#3\endcsname}%
    \expandafter\def%
      \csname fk@lower@post@\thealnumsec@level\expandafter\endcsname\expandafter{%
      \csname fk@lower@post@#3\endcsname}%
  \fi%
}%
```

In `\fk@assignstyle`, the first level has to be treated differently to allow the use of the previous levels for the lower levels.

```
\def\fk@assignstyle{%
```

```
  \edef\fk@secname{\csname fk@levelname\thefk@secstart\endcsname}%
  \expandafter\@namedef{the\fk@secname\expandafter}\expandafter{%
    \csname fk@pre@\thealnumsec@level\expandafter\endcsname%
    \csname fk@\thefk@secstart num\expandafter\endcsname%
    \csname c@\fk@secname\expandafter\endcsname%
    \csname fk@post@\thealnumsec@level\expandafter\endcsname%
  }%
  \whiledo{%
    \c@alnumsec@level<\c@secnumdepth%
  }{%
    \stepcounter{alnumsec@level}%
    \let\fk@previoussecname\fk@secname%
    \edef\fk@secname{%
      \csname fk@levelname\thealnumsec@level\endcsname}%
    \ifusepreviouslevels%
      \ifnum\c@alnumsec@level<\c@fk@changelevel%
        \expandafter\@namedef{the\fk@secname\expandafter}\expandafter{%
          \csname the\fk@previoussecname\expandafter\endcsname
          \csname fk@pre@\thealnumsec@level\expandafter\endcsname%
          \csname fk@\thealnumsec@level num\expandafter\endcsname%
          \csname c@\fk@secname\expandafter\endcsname%
          \csname fk@post@\thealnumsec@level\endcsname}%
      \else%
        \expandafter\@namedef{the\fk@secname\expandafter}\expandafter{%
          \csname the\fk@previoussecname\expandafter\endcsname
          \csname fk@lower@pre@\thealnumsec@level\expandafter\endcsname%
          \csname fk@\thealnumsec@level num\expandafter\endcsname%
          \csname c@\fk@secname\expandafter\endcsname%
          \csname fk@lower@post@\thealnumsec@level\endcsname}%
      \fi%
    \else%
```

The following three lines are added to have references with parents, thanks to Markus Kohm.

```
      \expandafter\@namedef{p@\fk@secname\expandafter}\expandafter{%
        \csname p@\fk@previoussecname\expandafter\endcsname
        \csname the\fk@previoussecname\endcsname}%
      \ifnum\c@alnumsec@level<\c@fk@changelevel%
        \expandafter\@namedef{the\fk@secname\expandafter}\expandafter{%
          \csname fk@pre@\thealnumsec@level\expandafter\endcsname%
          \csname fk@\thealnumsec@level num\expandafter\endcsname%
          \csname c@\fk@secname\expandafter\endcsname%
          \csname fk@post@\thealnumsec@level\endcsname}%
      \else%
        \expandafter\@namedef{the\fk@secname\expandafter}\expandafter{%
          \csname fk@lower@pre@\thealnumsec@level\expandafter\endcsname%
          \csname fk@\thealnumsec@level num\expandafter\endcsname%
          \csname c@\fk@secname\expandafter\endcsname%
          \csname fk@lower@post@\thealnumsec@level\endcsname}%
      \fi%
    \fi%
  }%
}
\def\define@surroundstyle#1{%
  \@namedef{surround#1}{%
```

```
    \@ifnextchar [{%]
      \csname opt@surround#1\endcsname}{%
      \csname nopt@surround#1\endcsname}%
  }%
  \@namedef{opt@surround#1}[##1]{%
    \@ifnextchar [{%]
      \csname dopt@surround#1\endcsname[##1]}{%
      \csname @opt@surround#1\endcsname[##1]}
  }
  \@namedef{dopt@surround#1}[##1][##2]##3##4{%
    \@namedef{fk@lower@pre@#1}{##1}%
    \@namedef{fk@lower@post@#1}{##2}%
    \@namedef{fk@pre@#1}{##3}%
    \@namedef{fk@post@#1}{##4}%
  }
  \@namedef{@opt@surround#1}[##1]##2##3{%
    \relax
    \@namedef{fk@lower@pre@#1}{##1}%
    \@namedef{fk@pre@#1}{##2}%
    \@namedef{fk@post@#1}{##3}%
    \expandafter\let%
      \csname fk@lower@post@#1\expandafter\endcsname%
      \csname fk@post@#1\endcsname%
  }
  \@namedef{nopt@surround#1}##1##2{%
    \@namedef{fk@pre@#1}{##1}%
    \@namedef{fk@post@#1}{##2}%
    \expandafter\let%
      \csname fk@lower@pre@#1\expandafter\endcsname%
      \csname fk@pre@#1\endcsname%
    \expandafter\let%
      \csname fk@lower@post@#1\expandafter\endcsname%
      \csname fk@post@#1\endcsname%
  }
}
\define@surroundstyle{Roman}
\define@surroundstyle{roman}
\define@surroundstyle{Letter}
\define@surroundstyle{letter}
\define@surroundstyle{arabic}
\define@surroundstyle{doubleletter}
\define@surroundstyle{greek}
\define@surroundstyle{doublegreek}
\newif\iffk@chapterdefined%
\@ifundefined{chapter}{%
  \fk@chapterdefinedfalse%
  \setcounter{fk@secstart}{1}%
  \setcounter{fk@secdepth}{5}%
  \alnumsectionlevels{1}{section,subsection,subsubsection,paragraph,subparagraph}%
}{%
  \fk@chapterdefinedtrue%
  \setcounter{fk@secstart}{0}%
  \setcounter{fk@secdepth}{5}%
  \alnumsectionlevels{0}{chapter,section,subsection,subsubsection,paragraph,subparagraph}%
```

```
}
\iffk@chapterdefined%
  \def\fk@pre@chapter{}%
  \def\fk@post@chapter{.}%
\fi
\surroundRoman{}{.}
\surroundroman{}{.}
\surroundarabic{}{.}
\surroundLetter{}{.}
\surroundletter[(]{}{)}
\surroundgreek[(]{}{)}
\surrounddoubleletter[(]{}{)}
\surrounddoublegreek[(]{}{)}
⟨/alnumsec⟩
```