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1. INTRODUCTION

The DocumentClass *alittlebear.cls* aims to provide a simple and easy template for writing math notes on latex. The link to *alittlebear.cls*, *Example.tex*, and *Template.tex* can be found at <https://github.com/a-little-bear/Latex-Template>.

Here is the template of a new tex file:

```
\documentclass[12pt]{alittlebear}

\def\name{}
\def\course{}
\def\headername{}
\def\headernum{}

\begin{document}

\end{document}
```

2. SETTINGS

2.1. Document Preamble.

```
\documentclass[#pt]{alittlebear}
    #: font size in {10, 11, 12}, in pt
\def\name{#}
    #: author name
\def\course{#}
    #: course name
\def\headername{#}
    #: header name
\def\headernum{#}
    #: header number
```

2.2. Document Class.

```
\setlength\parindent{0pt}
    Indentation, Default: 0pt
\def\maincolor{brown}
    Main color, Default: brown
\RequirePackage[margin0.5in]geometry=
    Margin, Default: 0.5in, may change to 1in
\theoremstyle{definition}
    Theorem style from asmthm, Default: definition
```

3. COMMANDS

3.1. Formatting Commands.

```
\ind[1][5]{\hspace*{#1mm}}
```

#1: indentation, Default: 5mm

Example: `\ind{`

 This is an indented paragraph

`}`

```
\ind[10]{
```

 This is an indented paragraph with 10mm indentation

`}`

```
\unind[1][5]{\hspace*{-#1mm}}
```

#1: unindentation, Default: -5mm

```
\explain[2][20]{\\\ind[#1]{#2}}
```

#1: indentation, Default: 20mm, #2: explanation

3.2. TColorBox Commands.

`\qbreak`
End the question and follow by the proof / solution

`\envbreak`
And a separator line within an environment

`\tcbcnt`
Set the counter for tcolorbox theorem environment

`\retcbcnt`
Reset the counter for tcolorbox theorem environment

`\newn, \newm`
New notitle tcolorbox

Example: `\newn{`
 This is a new notitle "note" tcolorbox
 }
 `\newm{`
 This is a new notitle "mathnote" tcolorbox
 }

`\newh, \newr, \newp`
New asmthm theorem tcolorbox environment with prefixes

Example: `\newh{`
 This is a new "hint" asmthm tcolorbox environment
 }
 `\newr{`
 This is a new "remark" asmthm tcolorbox environment
 }
 `\newp{`
 This is a new "proof" asmthm tcolorbox environment
 }

`\newq, \newcl, \newd, \newco, \newt, \newl, \newe, \newu, \newch`
New TColorBox theorem environment with titles

Example: `\newq[optional: #EnvName]{#label}{`
 This is a new "question" tcolorbox theorem environment
 }
 `\newcl[optional: #EnvName]{#label}{`
 This is a new "claim" tcolorbox theorem environment
 }
 `\newd[optional: #EnvName]{#label}{"definition"}`
 `\newco[optional: #EnvName]{#label}{"corollary"}`
 `\newt[optional: #EnvName]{#label}{"theorem"}`
 `\newl[optional: #EnvName]{#label}{"lemma"}`
 `\newe[optional: #EnvName]{#label}{"exercise"}`
 `\newu[optional: #EnvName]{#label}{"unit"}`
 `\newch[optional: #EnvName]{#label}{"chapter"}`

`\ref{\#1:#label}`
Use ref to reference the environment, where `#1:#label` e.g. is "question:q1"

3.3. Math Commands.

`\numberthis`

Add the line number in unnumbered math environment

`\T[1]{\text{#1}}`

Abbreviation of `\text{}`

`\A1[3]{#1 &=#2 &\text{#3}&&\}`

$(\text{left}) = (\text{right}) + (\text{explanation})$

`\cd{\cdot}`

Abbreviation of `\cdot`

`\alt[1]{\intertext{#1}}`

Insert line between align math equations, `\` included

`\bb[1]{\mathbb{#1}}`

`\cal[1]{\mathcal{#1}}`

`\sc[1]{\textsc{#1}}`

More shortcuts for `mathbb`, `mathcal`, `textsc`

`\D{\mathop{}}\!\mathrm{d}`

`d` symbol for differentiation, example: `\D x`

`\DD[2]{\frac{\D #1 }{\D #2}}`

Leibniz's notation of differentiation, example: `\DD{x}{y}`

3.4. Symbol Abbreviations.

```

\C -> \mathbb{C} == complex
\R -> \mathbb{R} == reals
\Q -> \mathbb{Q} == rationals
\Z -> \mathbb{Z} == integers
\N -> \mathbb{N} == naturals
\F -> \mathbb{F} == field

\al -> \alpha
\ep -> \varepsilon
\p -> \partial

\? -> \stackrel{?}{=} == question mark on equal sign
\ra -> \rightarrow == rightarrow (single line)
\Ra -> \Rrightarrow == Rrightarrow (double lines)
\is -> \equiv == equivalent (triple lines)
\injective \surjective \bijective

\arr = angle brackets
\bra = parenthesis (
\sqrbra = square brackets []
\curbra = curly brackets {}
\abs = absolute value | |
\ceil = ceiling + () + ceiling
\floor = floor + () + floor
\near = floor + () + ceiling

\func[3]{#1: #2 \rightarrow #3} == function (name, domain, codomain)
\Pset{#} -> \mathcal{P}(#) == power set
\Relate{#}{##} -> #\mathcal{R}## == relation
\GF[1][2]{\bb{F}_{#1}} == Galois field, default #1 = 2
\modulo[1][n]{\Z/#1\Z} == modulo, default #1 = n

\P -> \mathbb{P} == primes
\nil -> \varnothing == empty set
\0 -> \mathcal{O} == big O
\relate -> \mathcal{R} == relate (relation)

```

4. OTHER NOTABLE COMMANDS

```
\renewcommand{\qedsymbol}
{$_{\scriptstyle \substack{\sc{quod}}\sc{erat}}\sc{dem}}
\scalebox{0.53}{$\blacksquare$}}$}
```

Modified QED symbol

```
\lstnewenvironment{CPP}{\lstset{language=C++}}{}
```

New environment for C++ et al code listing

Example (CPP = C++, C1 = C):

```
\begin{CPP}
  hi
\end{CPP}
```

5. KNOWN BUGS / IMPROVEMENTS

- 1) Nest chapter, exercise, unit together are unlikely to work.
- 2) To improve readability, the environments should try to not be nested.
- 3) Extend listings and tikzpictures.
- 4) The number counters cannot align with section numbers.
- 5) The color box sometimes touch the footer.