LaTeXTutorial Project: Customizing

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Required packages: `enumitem`, `amsmath`, `amssymb`, `amsthm`, `enumitem`

1 Customizing Enumerated Lists

For hints and examples, see `https://www.latex-tutorial.com/tutorials/lists/`.

Exercise 1. Use the `label` option (provided by `enumitem` package) with the `itemize` environment to change the bullets to asterisks. Create an unordered list of three words you associate with Colorado.

Exercise 2. Use the `label` option with the `enumerate` environment to change the numbers to capital roman numerals (still followed by a period). Create a list of three animals, ranked by cuteness.

Exercise 3. Use the `label` option with the `enumerate` environment to change the (arabic) numbers to lower-case letters surrounded by parentheses, e.g. (a), (b), (c). Create a list of three non-maths classes you've liked.

Exercise 4. Use the `label` option with the `enumerate` environment to include the word "Problem" before the numbers, and all in bold, e.g. **Problem 1.**, **Problem 2.**. Create a list of three maths problems. [Bonus: Create an environment called "solution" that mimics the `proof` environment (see exercises from Section 3, below), and typeset solutions to your problems.]

2 Custom Commands

For hints and examples, see `https://www.overleaf.com/learn/latex/commands`.

Exercise 1. The simplest command: Use `\newcommand` to create a command called `comment` that takes one parameter but no code specified. This should allow you to type `comment<text>` to tell the processor to do nothing with `<text>`, effectively commenting it out (see `https://tex.stackexchange.com/questions/87303/multi-line-block-comments-in-latex`, answer by `ntjess`).

Exercise 2. Create a command called `\bb` (or your own semantically intuitive command name) that applies font **`\mathbb`** (demonstrated in link, above). Test it by using `\bb` to produce $\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}, \mathbb{C}$. [Bonus: List these in a `description` environment, with each item labeled by the set of numbers it represents, e.g. $\mathbb{R}$.]

Exercise 3. Create a command called `\cal` (or your own semantically intuitive command name) that applies font **`\mathcal`**. Test it by producing $\mathcal{B}, \mathcal{P}, \mathcal{R}$.

Exercise 4. Create a command called `\plusbinomial` that creates a binomial raised to an exponent (demonstrated in link, above).

Exercise 5. Create a command (with your own command name) that produces a sum whose lower limit is a mandatory parameter but whose upper limit is optional (for instance, so that you can express $\sum_{n\in\mathbb{N}}$ without the optional parameter, or $\sum_{n=1}^{\infty}$ with it.)

Exercise 6. Check the output of command \S. Overwrite this command to produce $\mathbb{S}$ instead, using the command \renewcommand (demonstrated in link, above).

3 Custom Environments (Maths-Focused)

For hints and examples, see https://www.overleaf.com/learn/latex/environments and https://www.overleaf.com/learn/latex/theorems_and_proofs.

Exercise 1. Use the \newenvironment command to create a solution environment that begins with "*Solution.*" and ends with a right-justified black QED symbol.

Exercise 2. Use the \newtheorem command to define an unnumbered fact environment in the style of remark.

Exercise 3. Use the \newtheorem command to define the environments definition and example, numbered with section references, in the style of definition.

Exercise 4. Use the \newtheorem command to define the environments theorem, lemma, and corollary, numbered with section references, in the style of definition.

Exercise 5. Use the \newtheorem command to define an unnumbered fact environment in the style of remark.

4 Flexible Tables

For hints and examples, see https://en.wikibooks.org/wiki/LaTeX/Tables.

Exercise. Create a table with five columns:

1. Mathematician
2. Years alive
3. Country of birth
4. Field(s) of expertise
5. Notable contributions

Format the table so that each column has a sensible width, and entries with substantial text may flow into multiple lines.

5 Fancy Headers and Footers

For hints and examples, see https://www.overleaf.com/learn/latex/headers_and_footers.

Exercise 1. Add a fancy page style to your document.

Exercise 2. Add your name to the left side of the of header and the section number and title to the right side. Place the page number in the center of the footer.

Exercise 3. Convert the document to two-sided format by adding the twoside option to your documentclass command. Place page numbers on the "outside" of the footer, the section number and title to the "inside" of the header, and a title (e.g. "LaTeX Customization Practice") to the "outside" of the header.