

2.5 Markdown syntax

The text in an R Markdown document is written with the Markdown syntax. Precisely speaking, it is Pandoc's Markdown. There are many flavors of Markdown invented by different people, and Pandoc's flavor is the most comprehensive one to our knowledge. You can find the full documentation of Pandoc's Markdown at <https://pandoc.org/MANUAL.html>. We strongly recommend that you read this page at least once to know all the possibilities with Pandoc's Markdown, even if you will not use all of them. This section is adapted from [Section 2.1 of Xie \(2016\)](#), and only covers a small subset of Pandoc's Markdown syntax.

2.5.1 Inline formatting

Inline text will be *italic* if surrounded by underscores or asterisks, e.g., `_text_` or `*text*`. **Bold** text is produced using a pair of double asterisks (`**text**`). A pair of tildes (`~`) turn text to a subscript (e.g., `H~3~P0~4~` renders H_3PO_4). A pair of carets (`^`) produce a superscript (e.g., `Cu^2+^` renders Cu^{2+}).

To mark text as `inline code`, use a pair of backticks, e.g., ``code``. To include n literal backticks, use at least $n + 1$ backticks outside, e.g., you can use four backticks to preserve three backtick inside: ````` ``code```` `````, which is rendered as ````code````.

Hyperlinks are created using the syntax `[text](link)`, e.g., `[RStudio](https://www.rstudio.com)`. The syntax for images is similar: just add an exclamation mark, e.g., `![alt text or image title](path/to/image)`. Footnotes are put inside the square brackets after a caret `^[]`, e.g., `^[This is a footnote.]`.

There are multiple ways to insert citations, and we recommend that you use BibTeX databases, because they work better when the output format is LaTeX/PDF. [Section 2.8 of Xie \(2016\)](#) has explained the details. The key idea is that when you have a BibTeX database (a plain-text file with the conventional filename extension `.bib`) that contains entries like:

```
@Manual{R-base,
  title = {R: A Language and Environment for Statistical
    Computing},
  author = {{R Core Team}},
  organization = {R Foundation for Statistical Computing},
  address = {Vienna, Austria},
  year = {2017},
  url = {https://www.R-project.org/},
}
```

You may add a field named `bibliography` to the YAML metadata, and set its value to the path of the BibTeX file. Then in Markdown, you may use `@R-base` (which generates “[R Core Team \(2022\)](#)”) or `[@R-base]` (which generates “(R Core Team 2022)”) to reference the BibTeX entry. Pandoc will automatically generate a list of references in the end of the document.

2.5.2 Block-level elements

Section headers can be written after a number of pound signs, e.g.,

```
# First-level header

## Second-level header

### Third-level header
```

If you do not want a certain heading to be numbered, you can add `{-}` or `{.unnumbered}` after the heading, e.g.,

```
# Preface {-}
```

Unordered list items start with `*`, `-`, or `+`, and you can nest one list within another list by indenting the sub-list, e.g.,

- one item
- one item
- one item
 - one more item
 - one more item
 - one more item

The output is:

- one item
- one item
- one item
 - one more item
 - one more item
 - one more item

Ordered list items start with numbers (you can also nest lists within lists), e.g.,

1. the first item
2. the second item
3. the third item
 - one unordered item
 - one unordered item

The output does not look too much different with the Markdown source:

1. the first item
2. the second item
3. the third item
 - one unordered item
 - one unordered item

Blockquotes are written after `>` , e.g.,

```
> "I thoroughly disapprove of duels. If a man should challenge me,  
  I would take him kindly and forgivingly by the hand and lead him  
  to a quiet place and kill him."  
>  
> --- Mark Twain
```

The actual output (we customized the style for blockquotes in this book):

Plain code blocks can be written after three or more backticks, and you can also indent the blocks by four spaces, e.g.,

```
```  
This text is displayed verbatim / preformatted
```
```

Or indent by four spaces:

```
    This text is displayed verbatim / preformatted
```

In general, you'd better leave at least one empty line between adjacent but different elements, e.g., a header and a paragraph. This is to avoid ambiguity to the Markdown renderer. For example, does “ # ” indicate a header below?

```
In R, the character  
# indicates a comment.
```

And does “ - ” mean a bullet point below?

```
The result of 5  
- 3 is 2.
```

Different flavors of Markdown may produce different results if there are no blank lines.

2.5.3 Math expressions

Inline LaTeX equations can be written in a pair of dollar signs using the LaTeX syntax, e.g., $f(k)$
 $= \binom{n}{k} p^k (1-p)^{n-k}$ (actual output: $\binom{n}{k} p^k (1-p)^{n-k}$); math expressions
of the display style can be written in a pair of double dollar signs, e.g.,
$$f(k) = \binom{n}{k} p^k (1-p)^{n-k}$$
, and the output looks like this:

You can also use math environments inside
$$or
$$, e.g.,$$$$

```
$$\begin{array}{ccc}  
x_{11} & x_{12} & x_{13} \\ x_{21} & x_{22} & x_{23} \\ \end{array}$$
```

```
$$X = \begin{bmatrix} 1 & x_1 \\ 1 & x_2 \\ 1 & x_3 \end{bmatrix}$$
```

```
$$\Theta = \begin{pmatrix} \alpha & \beta \\ \gamma & \delta \end{pmatrix}$$
```

```
$$\begin{vmatrix}a & b \\ c & d\end{vmatrix}=ad-bc$$
```

References

R Core Team. 2022. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. <https://www.R-project.org/>.

———. 2016. *Bookdown: Authoring Books and Technical Documents with R Markdown*. Boca Raton, Florida: Chapman; Hall/CRC. <https://github.com/rstudio/bookdown>.