Markdown

Péter Jeszenszky
Faculty of Informatics, University of Debrecen
jeszenszky.peter@inf.unideb.hu

Last modified: September 28, 2020
Markup Languages

• Markup languages are computer languages for annotating text.
  – They allow the association of metadata with parts of text in a clearly distinguishable way.

• Examples:
  – TeX, LaTeX https://www.latex-project.org/
  – Markdown https://daringfireball.net/projects/markdown/
  – troff (man pages) https://www.gnu.org/software/groff/
  – XML https://www.w3.org/XML/
What is Markdown?

- Markdown is a lightweight markup language with plain text formatting syntax.
  - See: https://en.wikipedia.org/wiki/Markdown
Symbol

• Dustin Curtis. *The Markdown Mark*.  
  https://dcurt.is/the-markdown-mark  
  https://github.com/dcurtis/markdown-mark
Characteristics

- An easy-to-read and easy-to-write plain text format that.
- Can be converted to various output formats (e.g., HTML).
- Specifically targeted at non-technical users.
- The syntax is mostly inspired by the format of plain text email.
Usage (1)

• Markdown is widely used on the web for entering text.

• The main application areas include:
  – Collaboration platforms and tools
  – Blogging platforms and content management systems
  – Online community platforms
  – Technical and scientific publishing
Usage (2)

• Collaboration platforms and tools:
  – GitHub https://github.com/
    • See: Writing on GitHub
  – Trello https://trello.com/
    • See: How To Format Your Text in Trello
Usage (3)

• Blogging platforms and content management systems:
  - Moodle https://moodle.org/
    • See: https://docs.moodle.org/en/Markdown
  - WordPress https://wordpress.com/
    • See: *Using Markdown on WordPress.com*
      https://en.support.wordpress.com/can-i-use-markdown-on-wordpress-com/
Usage (4)

• Online community platforms:
  - reddit https://www.reddit.com/
    • See: https://www.reddit.com/wiki/markdown
  - Stack Overflow https://stackoverflow.com/
    • See: *How do I format my posts using Markdown or HTML?* https://stackoverflow.com/help/formatting
Usage (5)

• Technical and scientific publishing:
  - bookdown https://bookdown.org/
  - GitBook https://www.gitbook.com/
    • See: https://docs.gitbook.com/content-editing/markdown
  - Microsoft Docs https://docs.microsoft.com/
    • See: Docs Markdown reference https://docs.microsoft.com/en-us/contribute/markdown-reference
History (1)

- Originally, Markdown was developed in 2004 by John Gruber with contributions from Aaron Swartz.
  - It was created in the form of:
    - a plain text format for writing structured documents, and
    - a Perl script to convert Markdown to HTML (Markdown.pl).

- Website:
  https://daringfireball.net/projects/markdown/
History (2)

• About the motivation behind the creation of Markdown:

• The original Markdown syntax: https://daringfireball.net/projects/markdown/syntax
  – The syntax is not specified unambiguously.
File Properties

- File extension: .md
- Media type: text/markdown
  - Optional parameter: variant
Syntactic Ambiguities (1)

• For a comprehensive list of syntactic ambiguities, see:
  - *CommonMark Spec – Why is a spec needed?*
    https://spec.commonmark.org/0.29/#why-is-a-spec-needed-

• A possible option to resolve these ambiguities is to consult the source code of Gruber's implementation (i.e., Markdown.pl).
  - Unfortunately, it was quite buggy.
Syntactic Ambiguities (2)

- Babelmark 2
  https://johnmacfarlane.net/babelmark2/
  - A tool for comparing the output of various implementations of the original Markdown syntax.
Standardization

• CommonMark https://commonmark.org/
  – A standard, unambiguous syntax specification for Markdown.
    • Provides a test suite to validate implementations against the specification.
Variants

- Several variants and extensions of Markdown exist, for example:
  - GitHub Flavored Markdown (GFM)
    - See: GitHub Flavored Markdown Spec https://github.github.com/gfm/
  - Pandoc's Markdown
      https://pandoc.org/MANUAL.html#pandocs-markdown
  - ...

- See: Markdown Variants
  https://www.iana.org/assignments/markdown-variants/markdown-variants.xhtml
Tutorials

• *Markdown Guide*
  https://www.markdownguide.org/

• *Markdown Tutorial*
  https://commonmark.org/help/tutorial/
Editors (1)

• Free and open source software:
  • See: https://code.visualstudio.com/docs/languages/markdown
  • Recommended extensions:
    – Markdown All in One https://marketplace.visualstudio.com/items?itemName=yzhang.markdown-all-in-one
Editors (2)

- Free and open source software (continued):
  - Mark Text (platform: Linux, macOS, Windows; written in: JavaScript; license: MIT License) [https://marktext.app/](http://marktext.app/) [https://github.com/marktext/marktext](https://github.com/marktext/marktext)
  - StackEdit (written in: JavaScript; license: Apache License 2.0) [https://stackedit.io/](https://stackedit.io/) [https://github.com/benweet/stackedit](https://github.com/benweet/stackedit)
Editors (3)

- Non-free software:
  - `<oXygen/>` XML Editor [https://www.oxygenxml.com/](https://www.oxygenxml.com/)
    - See: [https://www.oxygenxml.com/xml_editor/markdown_editor.html](https://www.oxygenxml.com/xml_editor/markdown_editor.html)
  - IntelliJ IDEA [https://www.jetbrains.com/idea/](https://www.jetbrains.com/idea/)
    - Supported in Ultimate and Community Editions.
    - See: [https://www.jetbrains.com/help/idea/markdown.html](https://www.jetbrains.com/help/idea/markdown.html)
Conversion Tools

• Free and open source software:
  - Pandoc (platform: Linux, macOS, Windows; license: GPLv2) https://pandoc.org/
    https://github.com/jgm/pandoc
    • A command-line tool written in Haskell to convert files from one markup format into another.
    • Markdown is supported both as source and target formats.
Pandoc (1)

- Installation: [https://pandoc.org/installing.html](https://pandoc.org/installing.html)
- Use: [https://pandoc.org/MANUAL.html](https://pandoc.org/MANUAL.html)

```bash
pandoc --standalone --to html input.md \ 
--output output.html --css style.css

or

pandoc -s -t html input.md -o output.html.html \ 
-c style.css
```
Styling the output with CSS:

- The `-c/- --css` command line option associates a custom CSS stylesheet with the output document.
  - This option can be used repeatedly.
Pandoc (3)

• Examples of custom CSS stylesheets:
  - *Pan Am: Simple CSS for Pandoc* (license: WTFPL)
    https://benjam.info/pan-am/
    https://github.com/bgw/pan-am
    • CSS stylesheet: http://benjam.info/panam/styling.css
  - *Tufte Pandoc CSS* (license: *MIT License*)
    https://jez.io/tufte-pandoc-css/
    https://github.com/jez/tufte-pandoc-css
Pandoc (4)

- IDE integration:
  - Visual Studio Code:
    - vscode-pandoc https://github.com/dfinke/vscode-pandoc
R Markdown (1)

- R Markdown is an extension of Markdown that enables the embedding of executable code chunks.
  - For example, the following languages are supported: Apache Groovy, Bash, Haskell, Python, R, Scala, SQL, ...

- File extension: .Rmd

- Website: [https://rmarkdown.rstudio.com/](https://rmarkdown.rstudio.com/)
R Markdown (2)

• R Markdown is implemented as an R package (rmarkdown).
  https://cran.r-project.org/web/packages/rmarkdown/
R Markdown (3)

- Supported output formats: HTML, PDF, PowerPoint, MS Word, ...

- Creating PDF output requires a TeX installation.
  - For the list of available options, see: https://www.latex-project.org/get/#tex-distributions
  - The easiest way of installing TeX for R users:
    - TinyTeX https://yihui.org/tinylatex/
      - A lightweight, cross-platform, portable TeX distribution based on TeX Live.
      - The `tinytex` R package is provided for installing TinyTeX. The installation does not require administrator privileges.
R Markdown (4)

• Documentation:

• Tool support:
  - RStudio https://www.rstudio.com/
The rmarkdown packages depends on the knitr package.

- knitr is an R package for dynamic report generation.
- It is used to evaluate computer code embedded in Markdown and to include the result.
- Website: https://yihui.org/knitr/
  https://github.com/yihui/knitr
R Markdown (6)

• Conversion:
# Using LaTeX and R

Plot of the function $f(x) = \sin(x) + \cos(\sqrt{3}x)$:

```{r}
library(ggplot2)
f <- function(x) sin(x) + cos(sqrt(3) * x)
ggplot(data.frame(x = 0), aes(x)) +
  stat_function(fun = f, colour = "blue") + xlim(-2 * pi, 2 * pi)
```
Using LaTeX and R

Plot of the function $f(x) = \sin(x) + \cos(\sqrt{3}x)$:

```r
library(ggplot2)
f <- function(x) sin(x) + cos(sqrt(3) * x)
ggplot(data.frame(x = 0), aes(x)) + stat_function(fun = f, colour = "blue") + xlim(-2 * pi, 2 * pi)
```
R Markdown (9)

- **bookdown:**
  - An R package for writing books and long-form articles/reports with R Markdown.
  - It supports multiple output formats: PDF, LaTeX, HTML, EPUB, MS Word.
  - It also supports the inclusion of dynamic graphics and interactive applications.
  - It supports the use of LaTeX math formulas with each output format.
  - The list of books written with bookdown can be found at the website of the package.
  - Website: [https://bookdown.org/](https://bookdown.org/)
  - Documentation: [https://bookdown.org/yihui/bookdown/](https://bookdown.org/yihui/bookdown/)
Examples

- [https://github.com/jeszy75/markdown-examples](https://github.com/jeszy75/markdown-examples)
Further Reading