Markdown

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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:
  - AsciiDoc https://asciidoc.org/
  - Markdown https://daringfireball.net/projects/markdown/
  - TeX, LaTeX https://www.latex-project.org/
  - troff (man pages) https://www.gnu.org/software/groff/
  - Wikitext https://en.wikipedia.org/wiki/Help:Wikitext
  - 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

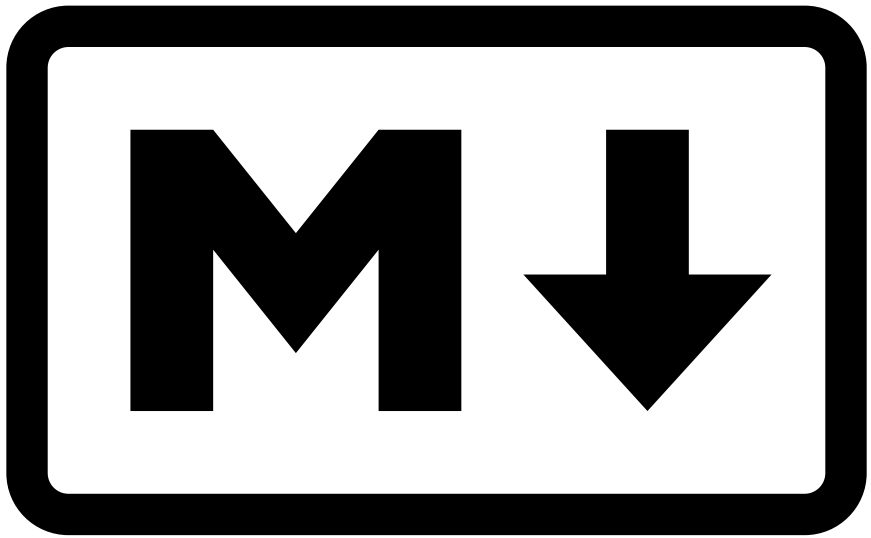


Figure 1: The Markdown Mark

Characteristics

- An easy-to-read and easy-to-write plain text format.
- 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
  - Note-taking applications
  - Technical and scientific publishing
  - Presentation authoring
  - Data science tools
  - AI tools

Usage (2)

Collaboration platforms and tools:

- GitHub:
  - See: Writing on GitHub
- Microsoft Teams:
  - See: Use Markdown formatting in Teams
- Trello:
  - See: How To Format Your Text in Trello

Usage (3)

Blogging platforms and content management systems:

- Moodle:
  - See: https://docs.moodle.org/en/Markdown
- WordPress:
  - See: https://wordpress.com/support/wordpress-editor/blocks/markdown-block/

Usage (4)

Online community platforms:

- Discord:
  - See: Markdown Text 101 (Chat Formatting: Bold, Italic, Underline)
- Reddit:
  - See: https://www.reddit.com/wiki/markdown/
- Stack Overflow:
  - See: How do I format my posts using Markdown or HTML?

Usage (5)

Note-taking applications:

- Joplin (platform: Linux, macOS, Windows, Android, iOS; written in: TypeScript; license: AGPLv3) https://joplinapp.org/ https://github.com/laurent22/joplin
- memos (platform: Docker; written in: Go, TypeScript; license: MIT License) https://www.usememos.com/ https://github.com/usememos/memos

Usage (6)

Technical and scientific publishing:

- bookdown https://bookdown.org/
  https://github.com/rstudio/bookdown
- Daniel Stenberg. *Everything curl*. https://everything.curl.dev/
  https://github.com/curl/everything-curl
- GitBook:
  - See: https://docs.gitbook.com/content-creation/editor/markdown
- Microsoft Learn:
  - See: Markdown reference for Microsoft Learn

Usage (7)

Presentation authoring:

- Marp: Markdown Presentation Ecosystem (platform: browser; written in: TypeScript; license: MIT License) https://marp.app/ https://github.com/marp-team/marp
  - Visual Studio Code extension: Marp for VS Code https://marketplace.visualstudio.com/items?itemName=marp-team.marp-vscode https://github.com/marp-team/marp-vscode
- remark (platform: browser; written in: JavaScript; license: MIT License) https://github.com/gnab/remark https://remarkjs.com/
- reveal.js (platform: browser; written in: JavaScript; license: MIT License) https://revealjs.com/ https://github.com/hakimel/reveal.js
  - Markdown support: https://revealjs.com/markdown/

Usage (8)

Data science tools:

- Project Jupyter:
  - See: Markdown Cells

Usage (9)

Many AI tools provide support for Markdown, see, for example:

- ChatGPT (OpenAI):
  - See: Aneesha Bakharia. ChatGPT and Markdown formats – Generating all Sorts of Editable Diagrams and Formats. January 11, 2023.
- Gemini (Google):
  - See: https://ai.google.dev/gemini-api/docs/file-prompting-strategies

History (1)

- Originally, Markdown was developed in 2004 by John Gruber with contributions from Aaron Swartz.
- It was a 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:
  - John Gruber. *Dive Into Markdown*. 19 March 2004. https://daringfireball.net/2004/03/dive_into_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`
  - See: Sean Leonard. *The `text/markdown` Media Type*. RFC 7763. March 2016. https://www.rfc-editor.org/rfc/rfc7763

Syntactic Ambiguities (1)

- For a comprehensive list of syntactic ambiguities, see:
  - CommonMark Spec – 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 3 https://babelmark.github.io/

- 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.
- Specification: https://spec.commonmark.org/
- 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
  - Pandoc's Markdown
    - See: Pandoc User's Guide – Pandoc's Markdown
  - ...
- See: Markdown Variants (IANA)

Coding Style

See: Markdown style guide (Google)

Tutorials

- *Markdown Guide* https://www.markdownguide.org/
  https://github.com/mattcone/markdown-guide
- Markdown Tutorial (CommonMark)

Editors (1)

Free and open source software:

- Visual Studio Code (platform: Linux, macOS, Windows; license: MIT License) https://code.visualstudio.com/ https://github.com/Microsoft/vscode
  - 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 https://github.com/yzhang-gh/vscode-markdown
    - markdownlint https://marketplace.visualstudio.com/items?itemName=DavidAnson.vscode-markdownlint https://github.com/DavidAnson/vscode-markdownlint
    - Markdown+Math https://marketplace.visualstudio.com/items?itemName=goessner.mdmath https://github.com/goessner/mdmath

Editors (2)

Free and open source software (continued):

- ghostwriter (platform: Linux, Windows; written in: C++; license: GPLv3) https://ghostwriter.kde.org/ https://github.com/KDE/ghostwriter
- Mark Text (platform: Linux, macOS, Windows; written in: JavaScript; license: MIT License) https://www.marktext.cc/ https://github.com/marktext/marktext
- Zettlr (platform: Linux, macOS, Windows; written in: JavaScript; license: GPLv3) https://www.zettlr.com/ https://github.com/Zettlr/Zettlr

Editors (3)

Free and open source software (continued):

- Milkdown (platform: browser; written in: TypeScript; license: MIT License) https://milkdown.dev/ https://github.com/Milkdown/milkdown
  - Demo: https://milkdown.dev/online-demo
- StackEdit (platform: browser; written in: JavaScript; license: Apache License 2.0) https://stackedit.io/ https://github.com/benweet/stackedit

Editors (4)

Non-free software:

- IntelliJ IDEA:
  - Supported in both Ultimate and Community Editions.
  - See: 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
- Use: https://pandoc.org/MANUAL.html
- Generating HTML output:

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

or

```
pandoc -s -t html input.md -o output.html -c style.css
```

Pandoc (2)

Styling HTML output with CSS:

- The `-c`/`--css` command line option associates a custom CSS stylesheet with the output HTML 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 Markdown CSS Theme* (license: Blue Oak Model License)
  https://jez.io/pandoc-markdown-css-theme/
  https://github.com/jez/pandoc-markdown-css-theme

Pandoc (4)

IDE integration:

- Visual Studio Code:
  - vscode-pandoc https://github.com/chrischinchilla/vscode-pandoc https://marketplace.visualstudio.com/items?itemName=ChrisChinchilla.vscode-pandoc

Mermaid (1)

A diagramming tool inspired by Markdown.

- Website: http://mermaid.js.org/
- Repository: https://github.com/mermaid-js/mermaid
- Written in: JavaScript
- License: MIT License

Mermaid (2)

- Supported diagram types: flowchart, sequence diagram, class diagram, state diagram, ER diagram, user journey diagram, Gantt chart, pie chart, requirement diagram (SysML), Git graph, ...
- Supported output formats: PDF, PNG, SVG
- Mermaid diagrams can be embedded in Markdown documents.

Mermaid (3)

Tool support:

- Live editor: https://mermaid.live/edit
- GitHub support: Include diagrams in your Markdown files with Mermaid
- Visual Studio Code: Markdown Preview Mermaid Support
  https://marketplace.visualstudio.com/items?itemName=bierner.markdown-mermaid
  https://github.com/mjbvz/vscode-markdown-mermaid
- Command-line interface: https://github.com/mermaid-js/mermaid-cli
- Pandoc: https://github.com/raghur/mermaid-filter

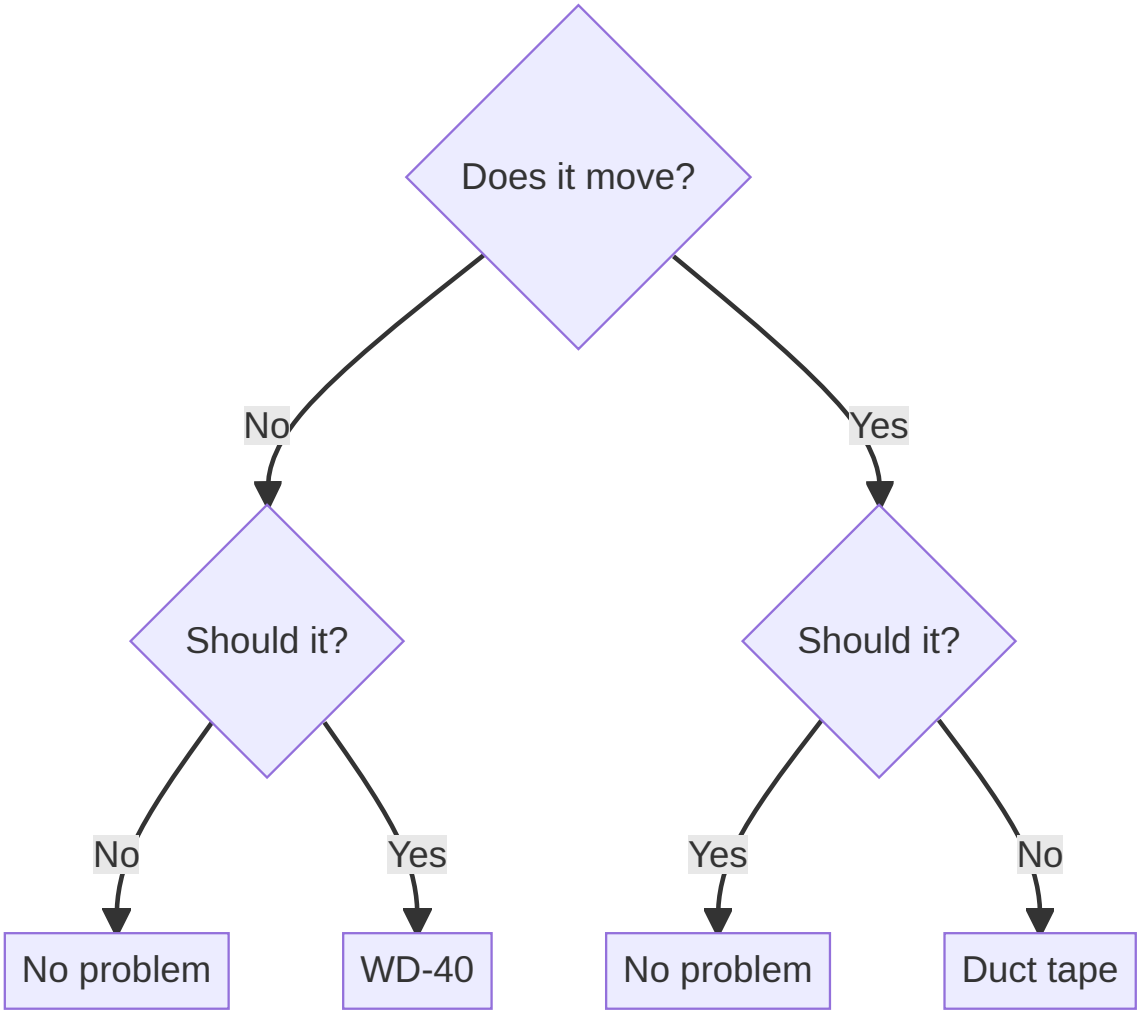
For more tools, see:
https://mermaid.js.org/ecosystem/integrations-community.html

Mermaid (4)

Example: Engineering flowchart

```
flowchart TD
    A{Does it move?}
    A -->|No| B{Should it?}
    A -->|Yes| C{Should it?}
    B -->|No| D[No problem]
    B -->|Yes| E[WD-40]
    C -->|Yes| F[No problem]
    C -->|No| G[Duct tape]
```

Mermaid (5)


Does it move?
No
Yes
Should it?
Should it?
No
Yes
Yes
No
No problem
WD-40
No problem
Duct tape

Mermaid (6)

Embeddig a diagram in a Markdown document (GitHub, Pandoc):

````
```mermaid
# Mermaid diagram
```
````

Pandoc must be run with the `--filter mermaid-filter` command line option that requires the availability of mermaid-filter.

Further Reading

- Sean Leonard. *Guidance on Markdown: Design Philosophies, Stability Strategies, and Select Registrations*. RFC 7764. March 2016. https://www.rfc-editor.org/rfc/rfc7764
- Knut Sveidqvist, Ashish Jain. *The Official Guide to Mermaid.js*. Packt Publishing, 2021. https://mermaid.js.org/landing/