Emacs Markdown Mode

`markdown-mode.el` by Jason R. Blevins, et al.

Manual by Daniel Birket

This is the Emacs Markdown Mode manual (unauthorized), edition 2.1.a, by Daniel Birket, updated 14 November 2016 and composed using Emacs v25.1.1. It was compiled from `.texinfo` source with GNU Texinfo v6.3 and typeset using TEX by Donald Knuth, et al.

This manual describes how to install and use the Emacs Lisp software package `markdown-mode`, version 2.1, released January 9, 2016, which was written by and Copyright © 2007-2016 Jason R. Blevins, et al. The `markdown-mode` software package and its *authorized* manual are online at `http://jblevins.org/projects/markdown-mode/`.

This manual is based upon (and frequently copied verbatim from) the extensive documentation in the `markdown-mode.el` source code, which begins with:

```
;;; markdown-mode.el --- Major mode for Markdown-formatted text ...

;; Copyright (C) 2007-2016 Jason R. Blevins <jrblevin@sdf.org>
...
;; Author: Jason R. Blevins <jrblevin@sdf.org>
;; Maintainer: Jason R. Blevins <jrblevin@sdf.org>
;; Created: May 24, 2007
;; Version: 2.1
;; Package-Requires: ((emacs "24") (cl-lib "0.5"))
;; Keywords: Markdown, GitHub Flavored Markdown, itex
;; URL: http://jblevins.org/projects/markdown-mode/

;; This file is not part of GNU Emacs.

;; This program is free software; you can redistribute it and/or modify
;; it under the terms of the GNU General Public License as published by
;; the Free Software Foundation; either version 2, or (at your option)
;; any later version.

;; This program is distributed in the hope that it will be useful,
;; but WITHOUT ANY WARRANTY; without even the implied warranty of
;; MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
;; GNU General Public License for more details.
```

Table of Contents

1 Introduction

This manual describes how to install and use `markdown-mode`, an Emacs package for working with markdown-formatted text. The features of this package assist the user to insert and manipulate markup syntax compatible with the external `markdown` command and to use it to convert the markdown-formatted text into HTML-formatted text.

The package implements two Emacs *major modes*:

- `markdown-mode`, for editing standard markdown text. See Chapter 3 [Using markdown-mode], page 6.
- `gfm-mode`, for editing GitHub-flavored markdown text. See Chapter 4 [Using gfm-mode], page 17.

The popular Unix filter command `markdown`, created by John Gruber in 2004 in collaboration with Aaron Swartz, provides an easy way to produce styled text by first editing simply-formatted text files and then converting that text to HTML. This approach uses a programmer's familiar edit-compile workflow, is compatible with source-code management tools and separates composition from formatting, allowing the writer to focus on writing without the distractions of WYSIWYG editors. It is described at `http://daringfireball.net/projects/markdown/`.

`markdown` has been re-implemented by various authors and with various additional features and syntax, including `multimarkdown`, `pandoc`, `python markdown` and many others.

GitHub Flavored Markdown is the dialect of markdown used by GitHub. It is described at `http://github.github.com/github-flavored-markdown/`.

The powerful text editor, Emacs, created in 1976 by Richard Stallman, is highly extensible and has a large ecosystem of extensions like this one created over 40 years. GNU Emacs is described at `https://www.gnu.org/software/emacs/`.

2 Installing

This chapter describes how to install `markdown-mode` for everyday use. To install the development version for testing, see Section A.3 [Development Version], page 28.

2.1 Recommended Installation

The recommended way to install the package `markdown-mode` is to use `package.el`, which has been integrated with Emacs since version 24. (It is included in version 23, but must be initialized.)

To install `markdown-mode`, first add the MELPA Stable archive to the list of archives used by `package.el` by adding the following lines to your `.emacs`, `init.el`, or other Emacs startup file and restarting Emacs (or just evaluate the statements):

```
(require 'package)
(add-to-list 'package-archives
             '("melpa-stable" . "https://stable.melpa.org/packages/"))

(package-initialize)
```

Then, after restarting Emacs (or otherwise evaluating the above statements), type the following command:

M-x package-install RET markdown-mode RET.

When installed using the package manager this way, the major modes `markdown-mode` and `gfm-mode` will be auto-loaded, and `markdown-mode` will be used automatically for file names ending in either `.md` or `.markdown`.

You may browse the 1500+ other Emacs packages in the MELPA-Stable archive at `http://stable.melpa.org/` or by typing *M-x list-packages RET* (after adding it to your package-archives list, above).

2.2 Manual Installation

You can manually download and install markdown-mode.

First, download `markdown-mode` from one of:

- `http://jblevins.org/projects/markdown-mode/markdown-mode.el`
- `http://stable.melpa.org/`

and save the file where Emacs can find it in a directory listed in your `load-path` like `/usr/local/share/emacs/site-lisp`.

Then configure `markdown-mode` and `gfm-mode` to load automatically by adding the following to your init file:

```
(autoload 'markdown-mode
          "markdown-mode"
          "Major mode for editing Markdown files" t)
(add-to-list 'auto-mode-alist '("\\.markdown\\'" . markdown-mode))
(add-to-list 'auto-mode-alist '("\\.md\\'" . markdown-mode))

(autoload 'gfm-mode
```

```
            "markdown-mode"
            "Major mode for editing GitHub Flavored Markdown files" t)
   (add-to-list 'auto-mode-alist '("README\\.md\\'" . gfm-mode))
```

This package, `markdown-mode.el`, depends on the package `cl-lib`, which has been bundled with GNU Emacs since version 24.3. If you use GNU Emacs version 24.1 or 24.2 and lack `cl-lib`, you should install `cl-lib` using `package.el`. To install `cl-lib` type:

```
M-x package-install RET cl-lib RET
```

2.3 Managed Loading

If you manage loading packages with `use-package` then you can automatically install and configure `markdown-mode` by adding a declaration such as this one to your init file (This is an example. Please adjust these settings as desired):

```
(use-package markdown-mode
  :ensure t
  :commands (markdown-mode gfm-mode)
  :mode (("README\\.md\\'" . gfm-mode)
         ("\\.md\\'" . markdown-mode)
         ("\\.markdown\\'" . markdown-mode))
  :init (setq markdown-command "multimarkdown"))
```

`use-package` is documented at `https://github.com/jwiegley/use-package`

2.4 OS Package Managers

You may download `markdown-mode` in packages for use with several OS package managers. Most OS packages do not contain the latest stable version. (Please notify the package maintainer if you download one that does not.) Note that OS package managers generally do NOT byte-compile or configure `markdown-mode` to load automatically. Please see the instructions under Section 2.2 [Manual Installation], page 2, if `markdown-mode` does not load automatically.

Debian Linux

`https://packages.debian.org/sid/lisp/elpa-markdown-mode`

Note: As of Sep-2016, this package contains `markdown-mode` version 2.1. It is unknown if the package manager compiles or configures `markdown-mode`.

`http://packages.debian.org/emacs-goodies-el`

Note: *emacs-goodies-el* is a collection of Emacs programs. The version of `markdown-mode` included in it is unknown.

Ubuntu Linux

At the terminal prompt, type:

```
$ sudo apt update

$ apt show elpa-markdown-mode

Package: elpa-markdown-mode
...
Source: markdown-mode
Version: 2.1-1
...
Description-en: mode for editing Markdown-formatted text
files in GNU Emacs.  The mode provides syntax highlighted,
and keyboard shortcuts for editing, compiling and previewing
Markdown.
...
Homepage: http://jblevins.org/projects/markdown-mode/
...

$ sudo apt install elpa-markdown-mode
```

RedHat and Fedora Linux

> https://apps.fedoraproject.org/packages/emacs-goodies
>
> Note: *emacs-goodies* is a collection of Emacs programs. The version of `markdown-mode` that it includes is unknown.
>
> This package is maintained by `sagarun@fedoraproject.org`

NetBSD   http://pkgsrc.se/textproc/markdown-mode

> Note: As of Sep-2016, this package installs and byte-compiles an **obsolete** version 2.0 (Sep-2014) of `markdown-mode`. You must manually edit your startup file as described above under Section 2.2 [Manual Installation], page 2.
>
> The package is maintained by `minskim@NetBSD.org`.

FreeBSD   http://svnweb.freebsd.org/ports/head/textproc/markdown-mode.el

> Note: As of Sep-2016, this package downloads (but does not byte-compile or configure) `markdown-mode` version 2.1 to `/usr/local/share/emacs/site-lisp`. You must manually edit your startup file as described above under Section 2.2 [Manual Installation], page 2.
>
> The package is maintained by `olgeni@FreeBSD.org`

Macintosh MacPorts

> https: / / trac . macports . org / browser / trunk / dports / editors / `markdown-mode.el/Portfile`
>
> Note: As of Sep-2016, this package downloads (but does not byte-compile or configure) an **obsolete** version 2.0 (Sep-2014) of `markdown-mode` from `git://jblevins.org/git/markdown-mode.git` to `/usr/local/share/emacs/site-lisp`. You must manually edit your startup file as described above under Section 2.2 [Manual Installation], page 2.

Macintosh HomeBrew

> At the terminal prompt type

```
$ brew update
...
$ brew info homebrew/emacs/markdown-mode
...
$ brew install homebrew/emacs/markdown-mode
...
```

3 Using `markdown-mode`

This chapter describes how to use `markdown-mode`.

`C-c` is the `mode-specific-command-prefix` and most of `markdown-mode`'s keybindings begin with it. Under it, many keybindings are grouped based on their function:

`C-c C-a`   Prefix keys for insert link commands. (HTML `<a>` tag).
            Use `C-c C-a C-h` to list all commands in this group.
            See Section 3.4 [Links], page 11,

`C-c C-c`   Prefix keys for 'compiling' markdown. ([c]ompile)
            Use `C-c C-c C-h` to list all commands in this group.
            See Section 3.8 [Compile Commands], page 15,

`C-c C-i`   Prefix keys for insert image commands. ([i]mage)
            Use `C-c C-i C-h` to list all commands in this group.
            See Section 3.5 [Images], page 13,

`C-c C-s`   Prefix keys for insert style commands. ([s]tyle)
            Use `C-c C-s C-h` to list all commands in this group.
            See Section 3.3 [Styles], page 10,

`C-c C-t`   Prefix keys for insert title/header commands. ([t]itle)
            Use `C-c C-t C-h` to list all commands in this group.
            See Section 3.1 [Headers], page 6,

`C-c C-x`   Prefix keys for manipulating lists.
            Use `C-c C-x C-h` to list all commands in this group.
            See Section 3.2 [Lists], page 9,

Movement and shifting commands are generally associated with paired delimiters such as `M-{` and `M-}`, or `C-c <` and `C-c >`.

Outline navigation keybindings the same as in `org-mode`.
See ⟨undefined⟩ [(org) Motion], page ⟨undefined⟩,

You can obtain a list of most `markdown-mode` keybindings by pressing `C-c C-h` or `C-h m`.

3.1 Headers

This section describes how to work with headers and horizontal rules.

Note: John Gruber designed `markdown` to handle two pre-existing types of titles and headers: the underlined titles supported by `setext` by Ian Feldman and the headers marked with hash marks supported by `atx` by Aaron Swartz. `markdown-mode` refers to these header styles as `setext` and `atx` headers.

3.1.1 Inserting Headers

This subsection describes how to insert headers.

All header insertion commands use the text in the active region, if any, as the header text. Otherwise, if the current line is not blank, they use the text on the current line. The setext-style (underlined) header insert commands will prompt for header text if there is no active region and the current line is blank.

The prefix for this group of header insert commands is `C-c C-t`.

`C-c C-t h` (`markdown-insert-header-dwim`)

> This will insert or replace 'appropriate' header markup.
>
> The level and type of the header will match the type and level of the previous header, unless a prefix argument is used.
>
> `C-1 C-c C-t h` through `C-6 C-c C-t h`
>
> With a numeric prefix `C-1` to `C-6`, this inserts a header of the given level, with the type being determined automatically (Note that only level 1 or 2 setext headers are possible).
>
> `C-u C-c C-t h` and `C-u C-u C-c C-t h`
>
> With a `C-u` prefix, this promotes the header by one level. With a `C-u C-u` prefix, this demotes the header by one level.
>
> When there is an active region, this will use it for the header text. When the point is at an existing header, it will change the type and level according to the rules above. Otherwise, if the line is not empty, it will create a header using the text on the current line as the header text. Finally, if the point is on a blank line, it will insert empty header markup (atx) or prompt for text (setext).

`C-c C-t H` (`markdown-insert-header-setext-dwim`)

> This will insert setext-style (underlined) headers when possible. (Note that only level 1 or 2 setext headers are possible).
>
> `C-1 C-c C-t H` inserts level-one setext-style headers.
>
> `C-2 C-c C-t H` inserts level-two setext-style headers.
>
> `C-u C-c C-t H` and `C-u C-u C-c C-t H` insert higher or lower level setext-style headers, if possible.

To insert a specific style and level of header use one of the commands below. If the point is at a header, these commands will replace the existing markup in order to update the level and/or type of the header.

atx-style (#) Headers

`C-c C-t 1` (`markdown-insert-header-atx-1`)

> This inserts a first-level atx-style (#) header, using the text in the active region or the text on the current line, if any.

`C-c C-t 2` (`markdown-insert-header-atx-2`)

> This inserts a second-level atx-style (##) header, using the text in the active region or the text on the current line, if any.

`C-c C-t 3` (`markdown-insert-header-atx-3`)

> This inserts a third-level atx-style (###) header, using the text in the active region or the text on the current line, if any.

`C-c C-t 4` (`markdown-insert-header-atx-4`)

> This inserts a fourth-level atx-style (####) header, using the text in the active region or the text on the current line, if any.

`C-c C-t 5` (`markdown-insert-header-atx-5`)
> This inserts a fifth-level atx-style (#####) header, using the text in the active region or the text on the current line, if any.

`C-c C-t 6` (`markdown-insert-header-atx-6`)
> This inserts a sixth-level atx-style (######) header, using the text in the active region or the text on the current line, if any.

setext-style (underlined) Headers

`C-c C-t !` or `C-c C-t t` (`markdown-insert-header-setext-1`)
> This inserts a first-level setext-style (underlined) header, using the text in the active region or the text on the current line, if any. The `C-c C-t t` keybinding is depreciated.

`C-c C-t @` or `C-c C-t s` (`markdown-insert-header-setext-2`)
> This inserts a second-level setext-style (underlined) header, using the text in the active region or the text on the current line, if any. The `C-c C-t s` keybinding is depreciated.

The prefix for this group of header insert commands is `C-c C-c`.

`C-c C-]` (`markdown-complete`)
> This completes the markup at the point, if it is determined to be incomplete.
>
> For example, it ensures that the underline portion of a setext header is the same length as the heading text, or that the number of leading and trailing hash marks of an atx header are equal and that there is no extra white space in the header text.

`C-c C-c ]` (`markdown-complete-buffer`)
> This completes all headers and normalizes all horizontal rules in the buffer.

3.1.2 Moving Headers

To promote or demote both list items and headers: See Section 3.6.1 [Promote/Demote Items], page 13.

3.1.3 Moving Subtrees

Entire subtrees of atx headings can be promoted and demoted with `M-S-LEFT` and `M-S-RIGHT`, which mirror the bindings for promotion and demotion of list items. Similarly, subtrees can be moved up and down with `M-S-UP` and `M-S-DOWN`.

Please note the following "boundary" behavior for promotion and demotion. Any level-six headings will not be demoted further (i.e., they remain at level six, since Markdown and HTML define only six levels) and any level-one headings will promoted away entirely (i.e., heading markup will be removed, since a level-zero heading is not defined).

`M-S-UP` (`markdown-move-subtree-up`)
> This will move the heading at point and the associated sub-tree of sub-headings and text up above the previous heading of the same level.

`M-S-DOWN` (`markdown-move-subtree-down`)
> This will move the heading at point and the associated sub-tree of sub-headings and text down below the next heading of the same level.

`M-S-LEFT` (`markdown-promote-subtree`)
>   This command will promote the heading at point and the associated sub-tree of sub-headings and text to the lower (more inclusive) level to the left.

`M-S-RIGHT` (`markdown-demote-subtree`)
>   This command will promote the heading at point and the associated sub-tree of sub-headings and text to the higher (less inclusive) level to the right.

3.1.4 Navigating Headers

This subsection describes how to navigate among headers and collapse and expand header sections. These commands are similar to the navigation commands in `outline-mode`.

`C-c C-n` (`markdown-next-visible-heading`)
>   This will move point to the next visible heading line (of any level).

`C-c C-p` (`markdown-previous-visible-heading`)
>   This will move point to the previous visible heading line (of any level).

`C-c C-f` (`markdown-forward-same-level`)
>   This will move point to the next visible heading line at the same level as the heading currently at point.

`C-c C-b` (`markdown-backward-same-level`)
>   This will move point to the previous visible heading line at the same level as the heading currently at point.

`C-c C-u` (`markdown-up-heading`)
>   This will move point up to a lower-level (more inclusive) visible heading than the heading currently at point.

3.1.5 Inserting Horizontal Rules

This subsection describes how to insert horizontal rules.

`C-c -` (`markdown-insert-hr`)
>   This will insert (or replace) a horizontal rule.
>
>   Without a prefix argument, it will use the first horizontal rule in the `markdown-hr-strings` list.
>
>   `C-u C-c -` will use the last (sixth) horizontal rule in the list.
>
>   `C-1 C-c -` through `C-6 C-c -` will use the horizontal rule string selected by the number.

3.2 Lists

This section describes how to insert and renumber list items and move them up and down.

3.2.1 Inserting List Items

`M-RET` or `C-c C-x m` or `C-c C-j` (`markdown-insert-list-item`)
>   This inserts an appropriate new list item. It determines the appropriate marker (one of the possible unordered list markers or the next number in sequence for an ordered list) and indentation level by examining nearby list items. If there

is no list before or after the point, it starts a new list. Prefix this command with `C-u` to decrease the indentation by one level. Prefix this command with `C-u C-u` to increase the indentation by one level.

`markdown-mode` version 2.2 repurposes the `C-c C-j` keybinding previously used for `markdown-jump` to match the AUCTex keybinding for inserting list items.

`C-c C-c n` (`markdown-cleanup-list-numbers`)
>   This renumbers any ordered lists in the buffer that are out of sequence.

3.2.2 Promote/Demote List Items

To promote or demote both list items and headers: See Section 3.6.1 [Promote/Demote Items], page 13.

3.2.3 Move List Items

`M-UP` or `C-c C-x u` (`markdown-move-up`)
>   This command will move a list item up. It does not move headers.

`M-DOWN` or `C-c C-x d` (`markdown-move-down`)
>   This command will move a list item down. It does not move headers.

3.3 Styles

This section describes how to insert style markup.

The prefix for this group of commands is `C-c C-s`.

`C-c C-s e` (`markdown-insert-italic`)
>   This inserts markup to *emphasize* a region or word with *italic* face, or removes the existing italic emphasis.
>
>   If there is an active region, it makes the region italic. If the point is at a non-italic word, it makes the word italic. If the point is at an italic word or phrase, it removes the italic markup. Otherwise, it simply inserts italic delimiters and place the cursor between them.

`C-c C-s s` (`markdown-insert-bold`)
>   This inserts markup for **strong** emphasis of a region or word with **bold** face, or removes the existing bold strong emphasis.
>
>   If there is an active region, it makes the region bold. If the point is at a non-italic word, it makes the word bold. If the point is at an bold word or phrase, it removes the bold markup. Otherwise, it simply inserts bold delimiters and place the cursor between them.

`C-c C-s c` (`markdown-insert-code`)
>   Insert markup to make a region or word an inline code fragment.
>
>   If there is an active region, make the region an inline code fragment. If the point is at a word, make the word an inline code fragment. Otherwise, simply insert code delimiters and place the cursor between them.

`C-c C-s k` (`markdown-insert-kbd`)
>   Insert markup to wrap a region or word in <kbd> tags.

> If there is an active region, use the region. If the point is at a word, use the word. Otherwise, simply insert `<kbd>` tags and place the cursor between them. (`markdown-mode` version 2.2).

`C-c C-s b` (`markdown-insert-blockquote`)
> This inserts block quote markup around the active region, if any, or inserts empty block quote markup.

`C-c C-s C-b` (`markdown-blockquote-region`)
> This variation of the insert-blockquote function (above) always operates on the region, regardless of whether it is active or not.
>
> The appropriate amount of indentation, if any, is calculated automatically given the surrounding context, but may be adjusted later using the region indentation commands.

`C-c C-s p` (`markdown-insert-pre`)
> This inserts preformatted code block markup around the active region, if any, or inserts empty preformatted code block markup.

`C-c C-s C-p` (`markdown-pre-region`)
> This variation of the insert-pre function (above) always operates on the region, regardless of whether it is active or not.

3.4 Links

This section describes how to insert and work with links.

3.4.1 Inserting Links

The prefix for this group of commands is `C-c C-a`.

`C-c C-a l` (`markdown-insert-link`)
> This inserts an inline link of the form '`[text](url)`'. The link text is determined as follows: If there is an active region (i.e., when transient mark mode is on and the mark is active), use it as the link text. Otherwise, if the point is at a word, use that word as the link text. In these two cases, the original text will be replaced with the link and point will be left at the position for inserting a URL. Otherwise, insert empty link markup and place the point for inserting the link text.

`C-c C-a L` (`markdown-insert-reference-link-dwim`)
> (`C-c C-a r` depreciated keybinding) This inserts a reference link of the form '`[text][label]`' and an optional corresponding reference label definition. The region (if active) or the word at point (if any) will be used for the link text. If neither is available, then the link text will be read from the mini-buffer.
>
> The reference label will be read from the mini-buffer, with completion from the set of currently defined references. To create an implicit reference link, press `RET` to accept the default empty label. If the entered reference label is not defined, it will prompt for the URL and an optional title.
>
> If a URL is provided, a reference definition will be inserted in accordance with `markdown-reference-location`. If a title is given, it will be added to the end

of the reference definition and will be used to populate the title attribute when converted to XHTML.

`C-c C-a u` (`markdown-insert-uri`)

This inserts a bare URI (URL), delimited by angle brackets. The region (if active) or the URI at point (if any) will be used for the link text. Otherwise, it will insert '`<>`' and position the point in between the brackets for inserting the URI.

`C-c C-a f` (`markdown-insert-footnote`)

This inserts a footnote marker at the point, inserts a footnote definition below, and positions the point for inserting the footnote text. Note that footnotes are an extension to Markdown and are not supported by all processors.

`C-c C-a w` (`markdown-insert-wiki-link`)

This is like the inline link insertion command but inserts a wiki link of the form '`[[WikiLink]]`'. The region (if active) or the word at point (if any) will be used for the link text. If neither is available, it will simply insert '`[[]]`' and position the point between the brackets for inserting the link. Note that wiki links are an extension to Markdown and are not supported by all processors.

3.4.2 Checking References

This section describes how to check references.

`C-c C-c c` (`markdown-check-refs`)

This will check for undefined references. If there are any, a small buffer will open with a list of undefined references and the line numbers on which they appear. In Emacs 22 and greater, selecting a reference from this list and pressing `RET` will insert an empty reference definition at the end of the buffer. Similarly, selecting the line number will jump to the corresponding line.

3.4.3 Navigating Links

This subsection describes commands that navigate links.

`M-p` (`markdown-previous-link`)

This will move to the previous inline, reference or wiki link, if any.

`M-n` (`markdown-next-link`)

This will move to the next inline, reference or wiki link, if any.

`C-c C-o` (`markdown-follow-thing-at-point`)

Press `C-c C-o` when the point is on an inline or reference link to open the URL in a browser. When the point is at a wiki link, open it in another buffer (in the current window, or in the other window with the `C-u` prefix).

`C-c C-l` (`markdown-jump`)

Use `C-c C-l>` to jump from the object at point to its counterpart elsewhere in the text, when possible. Jumps between reference links and definitions; between footnote markers and footnote text. If more than one link uses the same reference name, a new buffer will be created containing clickable buttons for jumping to each link. You may press `TAB` or `S-TAB` to jump between buttons in this window.

Note: the keybinding of the `markdown-jump` function was changed from `C-c C-j` ('j'ump) in version 2.1 to `C-c C-l` ('l'eap) in version 2.2 so that `C-c C-j` could be used to insert list items using the same key binding as the AUCTeX editor.

3.5 Images

This section describes how to insert and work with images. The prefix for this group of commands is `C-c C-i`.

`C-c C-i i` (`markdown-insert-image`)

> This inserts markup for an inline image using the active region or the word at point (if any) as the alt text.

`C-c C-i I` (`markdown-insert-reference-image`)

> This inserts markup for an reference-style image using the active region or the word at point (if any) as the alt text.

`C-c C-i C-t` (`markdown-toggle-inline-images`)

> This will toggle display of local inline images. Use it again to remove local inline image display. (`markdown-mode` version 2.2).

3.6 Misc. Commands

This section describes commands common to both headers and lists, plus miscellaneous commands.

3.6.1 Promote/Demote Items

Headings, horizontal rules, and list items can be promoted and demoted, as well as bold and italic text.

For headings, "promotion" means *decreasing* the level (i.e., moving from '`<h2>`' to '`<h1>`') while "demotion" means *increasing* the level.

For horizontal rules, promotion and demotion means moving backward or forward through the list of rule strings in `markdown-hr-strings`. For bold and italic text, promotion and demotion means changing the markup from underscores to asterisks.

To remember these commands, note that `-` is for decreasing the level (promoting), and `=` (on the same key as `+`) is for increasing the level (demoting). Similarly, the `LEFT` and `RIGHT` arrow keys indicate the direction that the atx heading markup is moving in when promoting or demoting.

`M-LEFT` or `C-c C-x l` or `C-c C--` (`markdown-promote`)

> This will promote headers, rules and list items at point, moving them left. See `markdown-promote` below.

`M-RIGHT` or `C-c C-x r` or `C-c C-=` (`markdown-demote`)

> This will demote headers, rules and list items at point, moving them right.

3.6.2 Indenting the Region

Text in the region can be indented or exdented as a group using `C-c >` to indent to the next indentation point (calculated in the current context), and `C-c <` to exdent to the

previous indentation point. These keybindings are the same as those for similar commands in `python-mode`.

`C-c <` (`markdown-exdent-region`)
> This exdents the region to the previous indentation point.

`C-c >` (`markdown-indent-region`)
> This indents the region to the previous indentation point.

3.6.3 Killing Entities

`C-c C-k` (`markdown-kill-thing-at-point`)
> This kills the header, item or other markdown 'thing' at the point. The interesting text (but not the markup) is added to the kill-ring. You can use `C-y` as usual to yank the text back if desired, without the old markup.

3.7 Notes

This section contains notes on various details of `markdown-mode`.

3.7.1 Navigation Differences

The definition of a "paragraph" is slightly different in markdown-mode than, say, text-mode, because markdown-mode supports filling for list items and respects hard line breaks, both of which break paragraphs. So, markdown-mode overrides the usual paragraph navigation commands `M-{` and `M-}` so that with a `C-u` prefix, these commands jump to the beginning or end of an entire block of text, respectively, where "blocks" are separated by one or more lines.

`M-{` (`markdown-backward-paragraph`)
> This command jumps to the beginning of the block of text at point, or to the previous paragraph. Paragraphs are delimited by one or more blank lines.

`M-}` (`markdown-forward-paragraph`)
> This command jumps to the end of the block of text at point, or to the next paragraph. Paragraphs are delimited by one or more blank lines.

The usual Emacs commands can be used to move by defuns (top-level major definitions). In markdown-mode, a defun is a section. As usual, `C-M-a` will move the point to the beginning of the current or preceding defun, `C-M-e` will move to the end of the current or following defun, and `C-M-h` will put the region around the entire defun.

`C-M-a` (`markdown-beginning-of-defun`)
> This command will move to the beginning of a section.

`C-M-e` (`markdown-end-of-defun`)
> This command will move to the end of a section.

`C-M-h` (`mark-defun`)
> This command will put the region around the current section.

3.7.2 Mark and Region

As noted, many of the commands above behave differently depending on whether Transient
Mark mode is enabled or not. When it makes sense, if Transient Mark mode is on and the
region is active, the command applies to the text in the region (e.g., `C-c C-s s` makes the
region bold). For users who prefer to work outside of Transient Mark mode, since Emacs 22
it can be enabled temporarily by pressing `C-SPC C-SPC`. When this is not the case, many
commands then proceed to work with the word or line at the point.

When applicable, commands that specifically act on the region even outside of Transient Mark mode have the same keybinding as their standard counterpart, but the letter
is uppercase. For example, `markdown-insert-blockquote` is bound to `C-c C-s b` and only
acts on the region in Transient Mark mode while `markdown-blockquote-region` is bound
to `C-c C-s B` and always applies to the region (when nonempty).

Note that these region-specific functions are useful in many cases where it may not be
obvious. For example, yanking text from the kill ring sets the mark at the beginning of the
yanked text and moves the point to the end. Therefore, the (inactive) region contains the
yanked text. So, `C-y` followed by `C-c C-s C-B` will yank text and turn it into a blockquote.

3.7.3 Indenting

`markdown-mode` attempts to be flexible in how it handles indentation. When you press `TAB`
repeatedly, the point will cycle through several possible indentation levels corresponding to
things you might have in mind when you press `RET` at the end of a line or `TAB`. For example,
you may want to start a new list item, continue a list item with hanging indentation, indent
for a nested pre block, and so on. Exdention is handled similarly when backspace is pressed
at the beginning of the non-whitespace portion of a line.

3.7.4 Org and Outline features

`markdown-mode` supports `outline-minor-mode` as well as `org-mode` style visibility cycling
for hash-style (atx) headings.

There are two types of visibility cycling:

- `S-TAB` This cycles globally between the table of contents view (headings only), outline
  view (top-level headings only), and the full document view.
- `TAB` Pressing `TAB` while the point is at a heading will cycle through levels of visibility
  for the subtree: completely folded, visible children, and fully visible.

Note that mixing hash (atx) and underline (setext) style headings will give undesired
results.

3.8 Compile Commands

This section describes compile (output) commands.

The prefix for this group of commands is `C-c C-c`.

`C-c C-c m` (`markdown-other-window`)

        This will run `markdown-command` on the current buffer and display the output
        (XHMTL) in the other window with the buffer name '`*markdown-output*`'.

`C-c C-c p` (`markdown-preview`)

> This will run `markdown-command` on the current buffer and then preview it by writing it to a temporary file and opening that file in a browser.

`C-c C-c e` (`markdown-export`)

> This will run `markdown-command` on the current buffer and then save the result to the file `basename.html`, where 'basename' is the name of the markdown file (visited by the source buffer) without its extension.

`C-c C-c v` (`markdown-export-and-preview`)

> This will run `markdown-command` on the current buffer and then save the result to the file `basename.html`, as with `markdown-export` above, and then preview that file in a browser.

`C-c C-c w` (`markdown-kill-ring-save`)

> This will run `markdown-command` on the current buffer and save the output to the kill ring. You can yank it back where desired with `C-y` as usual.

`C-c C-c l` (`markdown-live-preview-mode`)

> This will toggle markdown live preview mode. When enabled, it will preview the output in the Emacs `eww` browser whenever you save the markdown file. Toggle it off again to stop live preview and close the `eww` browser. You may customize the value of the variable `markdown-live-preview-window-function` with your own function to use a browser other than `eww`. The default value of the variable is the function `markdown-live-preview-window-eww`.

`C-c C-c o` (`markdown-open`)

> This will use `markdown-open-command` to open the source markdown file visited by the buffer directly. See Section 5.1 [Customizing External Commands], page 19.

Summary of compile commands:

- `C-c C-c m` markdown-command > '`*markdown-output*`' buffer.
- `C-c C-c p` markdown-command > '`tempfile`' > browser.
- `C-c C-c e` markdown-command > `basename.html`.
- `C-c C-c v` markdown-command > `basename.html` > browser.
- `C-c C-c w` markdown-command > kill ring.
- `C-c C-c l` markdown-command > '`*eww*`' buffer (live).
- `C-c C-c o` buffer > file > `markdown-open-command`.

4 Using `gfm-mode`

This chapter describes the differences between markdown-mode and the available *GitHub Flavored Markdown Mode*, `gfm-mode`. GitHub Flavored Markdown is described at `http://github.github.com/github-flavored-markdown/`

The GitHub implementation differs slightly from standard Markdown in that it supports things like different behavior for underscores inside of words, automatic linking of URLs, strikethrough text, and fenced code blocks with an optional language keyword.

The GFM-specific features above apply to `README.md` files, wiki pages, and other Markdown-formatted files in repositories on GitHub. GitHub also enables additional features `https://help.github.com/articles/writing-on-github/` for writing on the site (for issues, pull requests, messages, etc.) that are further extensions of GFM. These features include task lists (checkboxes), newlines corresponding to hard line breaks, auto-linked references to issues and commits, wiki links, and so on. To make matters more confusing, although task lists are not part of GFM proper, since 2014 they are rendered (in a read-only fashion) in all Markdown documents in repositories on the site. `https://github.com/blog/1825-task-lists-in-all-markdown-documents` These additional extensions are supported to varying degrees by `markdown-mode` and `gfm-mode` as described below.

URL autolinking

> Both `markdown-mode` and `gfm-mode` support highlighting of URLs without angle brackets.

Multiple underscores in words

> You must enable `gfm-mode` to toggle support for underscores inside of words. In this mode variable names such as *a_test_variable* will not trigger emphasis (italics).

Fenced code blocks

> Code blocks quoted with backticks, with optional programming language keywords, are highlighted in both `markdown-mode` and `gfm-mode`. They can be inserted with `C-c C-s P`. If there is an active region, the text in the region will be placed inside the code block. You will be prompted for the name of the language, but may press enter to continue without naming a language.

Strikethrough

> Strikethrough text is only supported in `gfm-mode` and can be inserted (and toggled) using `C-c C-s d`. Following the mnemonics for the other style keybindings, the letter `d` coincides with the HTML tag `<del>`.

Task lists GFM task lists will be rendered as checkboxes (Emacs buttons) in both `markdown-mode` and `gfm-mode` when `markdown-make-gfm-checkboxes-buttons` is set to a non-nil value (and it is set to t by default). These checkboxes can be toggled by clicking `mouse-1` or pressing `RET` over the button.

Wiki links Generic wiki links are supported in `markdown-mode`, but in `gfm-mode` specifically they will be treated as they are on GitHub: spaces will be replaced by hyphens in filenames and the first letter of the filename will be capitalized. For example,

[[wiki link]] will map to a file named `Wiki-link` with the same extension as the current file.

Newlines Neither `markdown-mode` nor `gfm-mode` do anything specifically with respect to newline behavior. If you use `gfm-mode` mostly to write text for comments or issues on the GitHub site (where newlines are significant and correspond to hard line breaks) then you may want to enable `visual-line-mode` for line wrapping in buffers. You can do this with a `gfm-mode-hook` as follows:

```
;; Use visual-line-mode in gfm-mode
(defun my-gfm-mode-hook ()
        (visual-line-mode 1))
(add-hook 'gfm-mode-hook 'my-gfm-mode-hook)
```

Preview GFM-specific preview can be powered by setting `markdown-command` to use a GFM preview application like Docter (`https: / / github . com / alampros/Docter`). This may also be configured to work with *Marked 2* for `markdown-open-command`.

5 Customizing

This chapter describes how to customize `markdown-mode`.

You may customize the variables in this section by adding lines to your Emacs startup file or by running *M-x customize-group markdown* and then restarting Emacs.

5.1 Customizing External Commands

The variables in this section control how `markdown-mode` calls external commands to convert markdown text to HTML or another format or to preview the markdown text.

`markdown-command`

> string, default: `"markdown"`.
>
> This variable specifies the command and options that `markdown-mode` will use to run `markdown` or another output processor in the following functions:
>
> - *C-c C-c m* (`markdown-other-buffer`)
> - *C-c C-c p* (`markdown-preview`)
> - *C-c C-c e* (`markdown-export`)
> - *C-c C-c v* (`markdown-export-and-preview`)
> - *C-c C-c w* (`markdown-kill-ring-save`)
>
> Examples of `markdown-command` configurations in Emacs startup file:
>
> Default. Assumes `markdown` command in `$PATH`.
>
> > `(setq markdown-command "markdown")`
>
> `markdown` with specified path
>
> > You may need to specify the path to `markdown` if it is not in the `$PATH`, as when Emacs is launched as an app under MacOS.
> >
> > > `(setq markdown-command "/usr/local/bin/markdown")`
>
> `markdown` with `smartypants`
>
> > You may pipe the output of `markdown` to `smartypants` to add smart quotation marks.
> >
> > See `https://daringfireball.net/projects/smartypants/`.
> >
> > > `(setq markdown-command "markdown | smartypants")`
>
> `multimarkdown`
>
> > `multimarkdown` usually outputs to HTML like `markdown`, but can also output to several other formats with the `--to=FORMAT` option. It includes the functionality of `smartypants`.
> >
> > See `http://fletcherpenney.net/multimarkdown/`.
> >
> > > `(setq markdown-command`
> > > `        "/usr/local/bin/multimarkdown")`
>
> `pandoc` `pandoc` will output to HTML, but it can also output to 40 other formats and converts from 5 different markdown dialects, including GitHub-flavored markdown.

See `http://pandoc.org`

```
(setq markdown-command
    (concat
    "/usr/local/bin/pandoc"
    " --from=markdown"
    " --to=html"))
```

`markdown-command-needs-filename`

`nil` or `t`, default: `nil`.

Set `markdown-command-needs-filename` to `t` if the program specified by `markdown-command` needs a filename, that is, if the program does not accept standard input (`stdin`).

When `markdown-command-needs-filename` is set to `nil`, the default, `markdown-mode` will pass the markdown content to the program specified by `markdown-command` using standard input (`stdin`).

When `markdown-command-needs-filename` is set to `t` (or any non-`nil`), `markdown-mode` will pass the name of the file visited by the current buffer as the final command-line argument to the program specified by `markdown-command`. Note that in this case, you will only be able to run `markdown-command` from buffers that are visiting a file.

`markdown-open-command`

string, default: `nil`.

This variable specifies the command and options that the function `markdown-open`, bound to `C-c C-c o`, will use to open the markdown file in an external markdown previewer application. The command will be called with a single argument: the name of the file visited by the buffer. (This only works if the buffer is visiting a file.)

One possible previewer application is *Marked 2* by Brett Terpstra, a live-updating Markdown previewer available from the Apple app store.

You can can open an OSX app like *Marked 2* by running a script like the one below with the `markdown-open-command`.

Script `/usr/local/bin/markview`

```
#!/bin/bash
# Check that file exists and launch app with or without it.
if [[ -f $1 ]]
then open -a "Marked 2" $1
else open -a "Marked 2"
fi
```

5.2 Customizing Markdown Format

The variables in this section control how `markdown-mode` formats Markdown text. These variables may be set in the Emacs startup file or by using *M-x customize-mode*.

markdown-bold-underscore

>   nil or t, default: nil.
>
>   Set to a non-nil value to use two underscores when inserting bold text instead
>   of two asterisks.

markdown-italic-underscore

>   nil or t, default: nil.
>
>   Set to a non-nil value to use single underscores when inserting italic text instead
>   of single asterisks.

markdown-reference-location

>   header, end, or immediately, default header
>
>   This value determines where to insert reference definitions. The possible loca-
>   tions are:
>
>   - header - before the next header.
>   - end - the end of the document.
>   - immediately - after the current block.
>
>   Example:
>
>   (setq markdown-reference-location 'end)

markdown-footnote-location

>   header, end, or immediately, default end
>
>   This value determines where to insert footnote text. The possible locations are
>   the same as for markdown-reference-location, above, but the default is end.

comment-auto-fill-only-comments

>   nil or t, default: nil.
>
>   This variable is made buffer-local and set to nil by default. In programming
>   language modes, when this variable is non-nil, only comments will be filled by
>   auto-fill-mode. However, comments in Markdown documents are rare and
>   the most users probably intend for the actual content of the document to be
>   filled. Making this variable buffer-local allows markdown-mode to override the
>   default behavior induced when the global variable is non-nil.

5.3 Customizing Markdown Headers

The variables in this section allow you to customize how markdown-mode uses headers.

markdown-asymmetric-header

>   nil or t, default: nil.
>
>   Determines if header style will be asymmetric.
>
>   Set to non-nil to only have header characters to the left of the title. The default
>   will ensure header characters are placed to the left and right of the title.

markdown-header-scaling

>   nil or t, default: nil.
>
>   Determines whether to use variable-height faces for headers.

Set to a non-nil value to use a variable-pitch font for headers where the size corresponds to the level of the header.

In detail: When non-nil, `markdown-header-face` will inherit from `variable-pitch` and the six scaling values in `markdown-header-scaling-values` will be applied to headers of levels one through six respectively.

`markdown-header-scaling-values`

A list of 6 float, default: (`list 1.8 1.4 1.2 1.0 1.0 1.0`)

A list of 6 scaling values, relative to baseline, for headers of levels one through six. They are used when 'markdown-header-scaling' is non-nil.

`markdown-nested-imenu-header-index`

`nil` or `t`, default: `nil`.

Set to a non-nil value to use nested imenu header instead of a flat index. A nested index may provide more natural browsing from the menu, but a flat list may allow for faster keyboard navigation via tab completion.

`markdown-hr-strings`

A list of 6 strings. The default is:

```
("-----------------------------------------------------------------------------
 "* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
 "-----------------------------------"
 "* * * * * * * * * * * * * * * *"
 "---------"
 "* * * * *")
```

A list of strings to use when inserting horizontal rules. Different strings will not be distinguished when converted to HTML – they will all be converted to `<hr/>` – but they may add visual distinction and style to plain text documents. To maintain some notion of promotion and demotion, keep these sorted from largest to smallest.

5.4 Customizing Indenting

The variables in this section allow you to customize how `markdown-mode` handles indentation.

`markdown-list-indent-width`

integer, default: 4

Determines the depth of indentation for lists when inserting, promoting, and demoting list items.

`markdown-indent-function`

function, default: `markdown-indent-line`

Determines the function to use for automatic indentation.

`markdown-indent-on-enter`

`nil` or `t`, default: `t`.

Set to a non-nil value to automatically indent new lines when the enter key is pressed.

5.5 Wiki-Links Syntax Highlighting

Besides supporting the basic Markdown syntax, `markdown-mode` also includes syntax highlighting for [[Wiki-Links]]. This support is enabled by setting `markdown-enable-wiki-links` to a non-nil value.

Wiki-links may be followed by pressing `C-c C-o` when the point is at a wiki-link. Use `M-p` and `M-n` to quickly jump to the previous and next links (including links of other types).

Aliased (or "piped") wiki-links of the form '`[[linktext|PageName]]`' are also supported. Since some wikis reverse these components, set `markdown-wiki-link-alias-first` to nil to treat them as '`[[PageName|linktext]]`'.

If `markdown-wiki-link-fontify-missing` is also non-nil, `markdown-mode` will highlight wiki-links with a missing target file in a different color. By default, Markdown Mode only searches for target files in the current directory. Sequential parent directory search (like `Ikiwiki`) can be enabled by setting `markdown-wiki-link-search-parent-directories` to a non-nil value.

The variables below customize how Wiki-Links are handled.

`markdown-enable-wiki-links`

> `nil` or `t`, default: `nil`.
>
> This enables syntax highlighting for [[Wiki-Links]].
>
> Set this to a non-nil value to turn on [[Wiki-Links]] support by default. [[Wiki-Links]] support can be toggled later using the function `markdown-toggle-wiki-links`.

`markdown-link-space-sub-char`

> character, default: `"_"`
>
> Determines the character to replace spaces when mapping wiki links to file names.
>
> For example, use an underscore for compatibility with the Python Markdown Wiki-Links extension. In `gfm-mode`, this is set to `"-"` to conform with GitHub wiki links.

`markdown-wiki-link-alias-first`

> `nil` or `t`, default: `t`.
>
> Set this to a non-nil value to treat aliased wiki links as '`[[linktext|PageName]]`'. When set to nil, they will be treated as '`[[PageName|linktext]]`'.

`markdown-wiki-link-fontify-missing`

> `nil` or `t`, default: `nil`.
>
> When non-nil, change the wiki-link face according to the existence of the target files.
>
> This is expensive because it requires checking for the file each time the buffer changes or the user switches windows. It is disabled by default because it may cause lag when typing on slower machines.

`markdown-wiki-link-search-parent-directories`
>   `nil` or `t`, default: `nil`.
>
>   When non-nil, search for wiki-link targets in parent directories. (This is the default search behavior of Ikiwiki.)
>
>   This only applies when `markdown-wiki-link-fontify-missing`, above, is non-nil.
>
>   See `https://ikiwiki.info`

5.6 Customizing GitHub Flavored Markdown

This section describes variables that customize `gfm-mode`.

`markdown-gfm-additional-languages`
>   list of strings, default `nil`
>
>   Determines any more languages to make available, in addition to the 300+ languages predefined in `markdown-gfm-recognized-languages`, when inserting GFM code blocks. Language strings must be trimmed of white space and not contain any curly braces. They may be of arbitrary capitalization.

`markdown-gfm-use-electric-backquote`
>   `nil` or `t`, default `t`
>
>   Set to non-nil to use the function `markdown-electric-backquote` for interactive insertion of GFM code blocks when backquote is pressed three times.

`markdown-make-gfm-checkboxes-buttons`
>   `nil` or `t`, default `t`
>
>   Determines whether GitHub Flavored Markdown style task lists (checkboxes) should be turned into buttons that can be toggled with mouse-1 or RET. If non-nil, then buttons are enabled. This works in `markdown-mode` as well as `gfm-mode`.

5.7 Customizing HTML Format

This section describes variables that customize HTML formatting.

`markdown-uri-types`
>   list of strings, default: (`"acap"` `"cid"` `"data"` `"dav"` `"fax"` `"file"` `"ftp"` `"gopher"` `"http"` `"https"` `"imap"` `"ldap"` `"mailto"` `"mid"` `"modem"` `"news"` `"nfs"` `"nntp"` `"pop"` `"prospero"` `"rtsp"` `"service"` `"sip"` `"tel"` `"telnet"` `"tip"` `"urn"` `"vemmi"` `"wais"`)
>
>   Determines the list of protocol schemes (e.g., `"http"`) for URIs that `markdown-mode` should highlight.

`markdown-css-paths`
>   list of strings, default `nil`
>
>   Determines a list of URLs of CSS files to link to in the output XHMTL.

`markdown-content-type`
>   string, default: `""`

when set to a nonempty string, an '`http-equiv`' attribute will be included in the XHMTL '`<head>`' block. The suggested values are `"application/xhtml+xml"` or `"text/html"`.

This variable must be set to a non-empty string to use `markdown-coding-system`, below.

`markdown-coding-system`

string or `nil`, default: `nil`

This variable is used for specifying the character set identifier in the '`http-equiv`' attribute when included. The variable `markdown-content-type` must be set before this variable has any effect. When `markdown-coding-system` is set to `nil`, `buffer-file-coding-system` will be used to automatically determine the coding system string (falling back to '`iso-8859-1`' when unavailable). Common settings are '`utf-8`' and '`iso-latin-1`'.

`markdown-xhtml-header-content`

string, default `""`

Determines any additional content to include in the XHMTL '`<head>`' block.

`markdown-xhtml-standalone-regexp`

string, default `^\\(<\\?xml\\|<!DOCTYPE\\|<html\\)`

a regular expression which `markdown-mode` uses to determine whether the output of `markdown-command` is a standalone XHMTL document or an XHMTL fragment. If this regular expression is not matched in the first five lines of output, `markdown-mode` assumes the output is a fragment and adds a header and footer.

5.8 LaTeX Math Syntax Highlighting

This section describes the variable that enables LaTeX Math Syntax highlighting.

`markdown-enable-math`

`nil` or `t`, default: `nil`.

Syntax highlighting for mathematical expressions written in LaTeX can be enabled by default by setting `markdown-enable-math` to a non-nil value. You can set it either via customize or by placing (`setq markdown-enable-math t`) in `.emacs`, and then restarting Emacs or calling `markdown-reload-extensions`.

Only expressions denoted by '`$..$`', '`$$..$$`', or '`\[..\]`' are highlighted.

Math support can be toggled later using *M-x markdown-enable-math*.

Appendix A Development

This appendix is for contributors to `markdown-mode`, past or future. . . **Thank you.**

A.1 Acknowledgments

`markdown-mode` has benefited greatly from the efforts of:

- © 2007-2016 Jason R. Blevins `jrblevin@sdf.org`, principle author and maintainer of `markdown-mode`.
- © 2007, 2009 Edward O'Connor `ted@oconnor.cx` for a font-lock regexp fix and GitHub Flavored Markdown mode (`gfm-mode`).
- © 2007 Conal Elliott `conal@conal.net` for a font-lock regexp patch.
- © 2008 Greg Bognar `greg_bognar@hms.harvard.edu` for menus and running `markdown` with an active region.
- © 2008 Dmitry Dzhus `mail@sphinx.net.ru` for undefined reference checking.
- © 2008 Bryan Kyle `bryan.kyle@gmail.com` for indentation code.
- © 2008 Ben Voui `intrigeri@boum.org` for font-lock face customizations.
- © 2009 Ankit Solanki `ankit.solanki@gmail.com` for `longlines.el` compatibility and custom CSS.
- © 2009 Hilko Bengen `bengen@debian.org` for proper XHTML output.
- © 2009 Peter Williams `pezra@barelyenough.org` for `fill-paragraph` enhancements.
- © 2010 George Ogata `george.ogata@gmail.com` for fixing several byte-compilation warnings.
- © 2011 Eric Merritt `ericbmerritt@gmail.com` for wiki link features.
- © 2011 Philippe Ivaldi `pivaldi@sfr.fr` for XHTML preview customizations and XHTML export.
- © 2011 Jeremiah Dodds `jeremiah.dodds@gmail.com` for supporting Markdown processors which do not accept input from stdin.
- © 2011 Christopher J. Madsen `cjm@cjmweb.net` for patches to fix a match data bug and to prefer `visual-line-mode` in `gfm-mode`.
- © 2011 Shigeru Fukaya `shigeru.fukaya@gmail.com` for better adherence to Emacs Lisp coding conventions.
- © 2011 Joost Kremers `joostkremers@fastmail.fm` for footnote-handling functions, bug reports regarding indentation, and fixes for byte-compilation warnings.
- © 2011-2012 Donald Ephraim Curtis `dcurtis@milkbox.net` for fixing the `fill-paragraph` regexp, refactoring the compilation and preview functions, heading font-lock generalizations, list renumbering, and kill ring save.
- © 2012 Akinori Musha `knu@idaemons.org` for an imenu index function.
- © 2012 Zhenlei Jia `zhenlei.jia@gmail.com` for smart exdention function.
- © 2012 Peter Jones `pjones@pmade.com` for link following functions.
- © 2013 Matus Goljer `dota.keys@gmail.com` for improved wiki link following and GFM code block insertion.

- © 2015 Google, Inc. (Contributor: Samuel Freilich `sfreilich@google.com`) for improved filling behavior regarding list items, footnotes, and reference definitions, improved killing of footnotes, and numerous other tests and bug fixes.
- © 2015 Antonis Kanouras `antonis@metadosis.gr` for strikethrough support.
- © 2015 Howard Melman `hmelman@gmail.com` for supporting GFM checkboxes as buttons.
- © 2015-2016 Danny McClanahan `danieldmcclanahan@gmail.com` for live preview mode, completion of GFM programming language names, improved font lock for fenced code blocks and meta-data blocks, `cl-lib` updates, and numerous other improvements.
- © 2015-2016 Syohei Yoshida `syohex@gmail.com` for better heading detection and movement functions, improved italic font lock, fixing adaptive filling for hanging list items, more efficient fontification, and numerous other improvements.
- © 2016 Vitalie Spinu `spinuvit@gmail.com` for improvements to font lock and source code aesthetics.
- Kvin Le Gouguec for improvements related to ATX headings and Pandoc fancy lists.
- Cyril Brulebois for Debian packaging.
- Daniel Burrows for filing Debian bug #456592.
- Peter S. Galbraith for maintaining `emacs-goodies-el`.
- Carsten Dominik for `org-mode`, from which the visibility cycling functionality was derived, and for a bug fix related to `orgtbl-mode`.
- Jose A. Ortega Ruiz for Emacs 23 fixes.
- Nelson Minar for `html-helper-mode`, from which comment matching functions were derived.
- Werner Dittmann for bug reports regarding the `cl` dependency and `auto-fill-mode` and indentation.
- Alec Resnick for bug reports.
- Scott Pfister for generalizing the space substitution character for mapping wiki links to file names.
- Marcin Kasperski for a patch to escape shell commands.
- Kevin Porter for wiki link handling in `gfm-mode`.
- Max Penet and Peter Eisentraut `peter_e@gmx.net` for an auto-load token for `gfm-mode`.
- Ian Yang for improving the reference definition regex.
- Michael Sperber for `XEmacs` fixes.
- Francois Gannaz for suggesting charset declaration in XHTML output.
- Bryan Fink for a bug report regarding externally modified files.
- Vegard Vesterheim for a bug fix related to `orgtbl-mode`.
- Makoto Motohashi for before- and after- export hooks, unit test improvements, and updates to support wide characters.
- Michael Dwyer for `gfm-mode` underscore regexp.
- Chris Lott for suggesting reference label completion.

- Gunnar Franke for a completion bug report.
- David Glasser for a `paragraph-separate` fix.
- Daniel Brotsky for better auto-fill defaults.
- Matt McClure for a patch to prevent overwriting source files with .html extensions upon export.
- Roger Bolsius for ordered list improvements.
- Google's Open Source Programs Office for recognizing the project with a monetary contribution in June 2015.

A.2 History of Releases

`markdown-mode` was primarily written and is maintained by Jason Blevins. The first release, 1.1, was on May 24, 2007. This manual documents `markdown-mode`, version 2.1, released January 9, 2016.

Most of the prior versions may be downloaded:

- 2007-05-24 v1.1
- 2007-05-25 v1.2
- 2007-06-05 v1.3 `http://jblevins.org/projects/markdown-mode/rev-1-3`
- 2007-06-29 v1.4
- 2007-10-11 v1.5 `http://jblevins.org/projects/markdown-mode/rev-1-5`
- 2008-06-04 v1.6 `http://jblevins.org/projects/markdown-mode/rev-1-6`
- 2009-10-01 v1.7 `http://jblevins.org/projects/markdown-mode/rev-1-7`
- 2011-08-12 v1.8 `http://jblevins.org/projects/markdown-mode/rev-1-8`
- 2011-08-15 v1.8.1 `http://jblevins.org/projects/markdown-mode/rev-1-8-1`
- 2013-01-25 v1.9 `http://jblevins.org/projects/markdown-mode/rev-1-9`
- 2013-03-24 v2.0 `http://jblevins.org/projects/markdown-mode/rev-2-0`
- 2016-01-09 v2.1 `http://jblevins.org/projects/markdown-mode/rev-2-1`

A.3 Development Version

You may browse the project files of `markdown-mode`, contribute to its development or help to test the current development version.

- To browse the `markdown-mode` project files, visit the project's page on GitHub at `https://github.com/jrblevin/markdown-mode`.
- To contribute to the development of `markdown-mode`, you may fork the project to your own GitHub account or clone the repository directly with:

  Using HTTPS
  > `'$ git clone https://github.com/jrblevin/markdown-mode.git'`

  Using SSH `'$ git clone ssh://git@github.com:jrblevin/markdown-mode.git'`

- To test the current development version of `markdown-mode`, you may either download `markdown-mode.el` from the repository at `https://github.com/jrblevin/markdown-mode` or from MELPA at `https://melpa.org/#/markdown-mode`.

  After downloading `markdown-mode.el` to the directory `~/my/directory`, then ensure that Emacs can find it by adding the following line to your Emacs startup file:

  ```
  (add-to-list 'load-path "~/my/directory")
  ```

  Please realize that the development version may be unstable at times. See the next section for how to submit a bug report.

A.4 Bugs and Errors

Software Bugs

`markdown-mode` was developed and primarily tested for compatibility with GNU Emacs 24.3 and later. If you encounter a problem and have an older version of Emacs, please consider updating your version of Emacs to resolve the problem.

If you have identified a bug with `markdown-mode.el`, please construct a test case or a patch and create an issue on the issue tracker at `https://github.com/jrblevin/markdown-mode/issues`.

Manual Errors

If you find an error in this *unauthorized* manual, please create an issue on the issue tracker at `https://github.com/daniel-birket/markdown-mode-texinfo/issues`. Please do not complain to Dr. Blevin about errors in *this* manual. You will find his original manual at `https://github.com/jrblevin/markdown-mode`.

GNU General Public License 2.0

<div style="text-align:center">Version 2, June 1991</div>

Copyright © 1989, 1991 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA

Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change
it. By contrast, the GNU General Public License is intended to guarantee your freedom
to share and change free software—to make sure the software is free for all its users. This
General Public License applies to most of the Free Software Foundation's software and to
any other program whose authors commit to using it. (Some other Free Software Foundation
software is covered by the GNU Lesser General Public License instead.) You can apply it
to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General
Public Licenses are designed to make sure that you have the freedom to distribute copies
of free software (and charge for this service if you wish), that you receive source code or
can get it if you want it, that you can change the software or use pieces of it in new free
programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you
these rights or to ask you to surrender the rights. These restrictions translate to certain
responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you
must give the recipients all the rights that you have. You must make sure that they, too,
receive or can get the source code. And you must show them these terms so they know
their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this
license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone
understands that there is no warranty for this free software. If the software is modified by
someone else and passed on, we want its recipients to know that what they have is not the
original, so that any problems introduced by others will not reflect on the original authors'
reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid
the danger that redistributors of a free program will individually obtain patent licenses, in
effect making the program proprietary. To prevent this, we have made it clear that any
patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

   Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

   You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

   a. You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

   b. You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

   c. If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

   These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

   a. Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

   b. Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

   c. Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

   If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

   It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

   This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

   Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software

which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

Appendix: How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
one line to give the program's name and a brief idea of what it does.
Copyright (C) yyyy  name of author

This program is free software; you can redistribute it and/or modify
it under the terms of the GNU General Public License as published by
the Free Software Foundation; either version 2 of the License, or
(at your option) any later version.

This program is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
GNU General Public License for more details.

You should have received a copy of the GNU General Public License
along with this program; if not, write to the Free Software
Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA  02110-1301, USA.
```

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type 'show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type 'show c' for details.
```

The hypothetical commands 'show w' and 'show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than 'show w' and 'show c'; they could even be mouse-clicks or menu items—whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
'Gnomovision' (which makes passes at compilers) written by James Hacker.

signature of Ty Coon, 1 April 1989
Ty Coon, President of Vice
```

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License.

GNU Free Documentation License

0. PREAMBLE

The purpose of this License is to make a manual, textbook, or other functional and useful document *free* in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or non-commercially. Secondarily, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

This License is a kind of "copyleft", which means that derivative works of the document must themselves be free in the same sense. It complements the GNU General Public License, which is a copyleft license designed for free software.

We have designed this License in order to use it for manuals for free software, because free software needs free documentation: a free program should come with manuals providing the same freedoms that the software does. But this License is not limited to software manuals; it can be used for any textual work, regardless of subject matter or whether it is published as a printed book. We recommend this License principally for works whose purpose is instruction or reference.

1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work, in any medium, that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. Such a notice grants a world-wide, royalty-free license, unlimited in duration, to use that work under the conditions stated herein. The "Document", below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as "you". You accept the license if you copy, modify or distribute the work in a way requiring permission under copyright law.

A "Modified Version" of the Document means any work containing the Document or a portion of it, either copied verbatim, or with modifications and/or translated into another language.

A "Secondary Section" is a named appendix or a front-matter section of the Document that deals exclusively with the relationship of the publishers or authors of the Document to the Document's overall subject (or to related matters) and contains nothing that could fall directly within that overall subject. (Thus, if the Document is in part a textbook of mathematics, a Secondary Section may not explain any mathematics.) The relationship could be a matter of historical connection with the subject or with related matters, or of legal, commercial, philosophical, ethical or political position regarding them.

The "Invariant Sections" are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released

under this License. If a section does not fit the above definition of Secondary then it is not allowed to be designated as Invariant. The Document may contain zero Invariant Sections. If the Document does not identify any Invariant Sections then there are none.

The "Cover Texts" are certain short passages of text that are listed, as Front-Cover Texts or Back-Cover Texts, in the notice that says that the Document is released under this License. A Front-Cover Text may be at most 5 words, and a Back-Cover Text may be at most 25 words.

A "Transparent" copy of the Document means a machine-readable copy, represented in a format whose specification is available to the general public, that is suitable for revising the document straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file format whose markup, or absence of markup, has been arranged to thwart or discourage subsequent modification by readers is not Transparent. An image format is not Transparent if used for any substantial amount of text. A copy that is not "Transparent" is called "Opaque".

Examples of suitable formats for Transparent copies include plain ASCII without markup, Texinfo input format, LaTeX input format, SGML or XML using a publicly available DTD, and standard-conforming simple HTML, PostScript or PDF designed for human modification. Examples of transparent image formats include PNG, XCF and JPG. Opaque formats include proprietary formats that can be read and edited only by proprietary word processors, SGML or XML for which the DTD and/or processing tools are not generally available, and the machine-generated HTML, PostScript or PDF produced by some word processors for output purposes only.

The "Title Page" means, for a printed book, the title page itself, plus such following pages as are needed to hold, legibly, the material this License requires to appear in the title page. For works in formats which do not have any title page as such, "Title Page" means the text near the most prominent appearance of the work's title, preceding the beginning of the body of the text.

The "publisher" means any person or entity that distributes copies of the Document to the public.

A section "Entitled XYZ" means a named subunit of the Document whose title either is precisely XYZ or contains XYZ in parentheses following text that translates XYZ in another language. (Here XYZ stands for a specific section name mentioned below, such as "Acknowledgements", "Dedications", "Endorsements", or "History".) To "Preserve the Title" of such a section when you modify the Document means that it remains a section "Entitled XYZ" according to this definition.

The Document may include Warranty Disclaimers next to the notice which states that this License applies to the Document. These Warranty Disclaimers are considered to be included by reference in this License, but only as regards disclaiming warranties: any other implication that these Warranty Disclaimers may have is void and has no effect on the meaning of this License.

2. VERBATIM COPYING

You may copy and distribute the Document in any medium, either commercially or noncommercially, provided that this License, the copyright notices, and the license notice saying this License applies to the Document are reproduced in all copies, and that you add no other conditions whatsoever to those of this License. You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute. However, you may accept compensation in exchange for copies. If you distribute a large enough number of copies you must also follow the conditions in section 3.

You may also lend copies, under the same conditions stated above, and you may publicly display copies.

3. COPYING IN QUANTITY

If you publish printed copies (or copies in media that commonly have printed covers) of the Document, numbering more than 100, and the Document's license notice requires Cover Texts, you must enclose the copies in covers that carry, clearly and legibly, all these Cover Texts: Front-Cover Texts on the front cover, and Back-Cover Texts on the back cover. Both covers must also clearly and legibly identify you as the publisher of these copies. The front cover must present the full title with all words of the title equally prominent and visible. You may add other material on the covers in addition. Copying with changes limited to the covers, as long as they preserve the title of the Document and satisfy these conditions, can be treated as verbatim copying in other respects.

If the required texts for either cover are too voluminous to fit legibly, you should put the first ones listed (as many as fit reasonably) on the actual cover, and continue the rest onto adjacent pages.

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine-readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a computer-network location from which the general network-using public has access to download using public-standard network protocols a complete Transparent copy of the Document, free of added material. If you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

It is requested, but not required, that you contact the authors of the Document well before redistributing any large number of copies, to give them a chance to provide you with an updated version of the Document.

4. MODIFICATIONS

You may copy and distribute a Modified Version of the Document under the conditions of sections 2 and 3 above, provided that you release the Modified Version under precisely this License, with the Modified Version filling the role of the Document, thus licensing distribution and modification of the Modified Version to whoever possesses a copy of it. In addition, you must do these things in the Modified Version:

A. Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any,

be listed in the History section of the Document). You may use the same title as
a previous version if the original publisher of that version gives permission.

B. List on the Title Page, as authors, one or more persons or entities responsible for
authorship of the modifications in the Modified Version, together with at least five
of the principal authors of the Document (all of its principal authors, if it has fewer
than five), unless they release you from this requirement.

C. State on the Title page the name of the publisher of the Modified Version, as the
publisher.

D. Preserve all the copyright notices of the Document.

E. Add an appropriate copyright notice for your modifications adjacent to the other
copyright notices.

F. Include, immediately after the copyright notices, a license notice giving the public
permission to use the Modified Version under the terms of this License, in the form
shown in the Addendum below.

G. Preserve in that license notice the full lists of Invariant Sections and required Cover
Texts given in the Document's license notice.

H. Include an unaltered copy of this License.

I. Preserve the section Entitled "History", Preserve its Title, and add to it an item
stating at least the title, year, new authors, and publisher of the Modified Version
as given on the Title Page. If there is no section Entitled "History" in the Docu-
ment, create one stating the title, year, authors, and publisher of the Document
as given on its Title Page, then add an item describing the Modified Version as
stated in the previous sentence.

J. Preserve the network location, if any, given in the Document for public access to
a Transparent copy of the Document, and likewise the network locations given in
the Document for previous versions it was based on. These may be placed in the
"History" section. You may omit a network location for a work that was published
at least four years before the Document itself, or if the original publisher of the
version it refers to gives permission.

K. For any section Entitled "Acknowledgements" or "Dedications", Preserve the Title
of the section, and preserve in the section all the substance and tone of each of the
contributor acknowledgements and/or dedications given therein.

L. Preserve all the Invariant Sections of the Document, unaltered in their text and
in their titles. Section numbers or the equivalent are not considered part of the
section titles.

M. Delete any section Entitled "Endorsements". Such a section may not be included
in the Modified Version.

N. Do not retitle any existing section to be Entitled "Endorsements" or to conflict in
title with any Invariant Section.

O. Preserve any Warranty Disclaimers.

If the Modified Version includes new front-matter sections or appendices that qualify
as Secondary Sections and contain no material copied from the Document, you may at
your option designate some or all of these sections as invariant. To do this, add their

titles to the list of Invariant Sections in the Modified Version's license notice. These titles must be distinct from any other section titles.

You may add a section Entitled "Endorsements", provided it contains nothing but endorsements of your Modified Version by various parties—for example, statements of peer review or that the text has been approved by an organization as the authoritative definition of a standard.

You may add a passage of up to five words as a Front-Cover Text, and a passage of up to 25 words as a Back-Cover Text, to the end of the list of Cover Texts in the Modified Version. Only one passage of Front-Cover Text and one of Back-Cover Text may be added by (or through arrangements made by) any one entity. If the Document already includes a cover text for the same cover, previously added by you or by arrangement made by the same entity you are acting on behalf of, you may not add another; but you may replace the old one, on explicit permission from the previous publisher that added the old one.

The author(s) and publisher(s) of the Document do not by this License give permission to use their names for publicity for or to assert or imply endorsement of any Modified Version.

5. COMBINING DOCUMENTS

   You may combine the Document with other documents released under this License, under the terms defined in section 4 above for modified versions, provided that you include in the combination all of the Invariant Sections of all of the original documents, unmodified, and list them all as Invariant Sections of your combined work in its license notice, and that you preserve all their Warranty Disclaimers.

   The combined work need only contain one copy of this License, and multiple identical Invariant Sections may be replaced with a single copy. If there are multiple Invariant Sections with the same name but different contents, make the title of each such section unique by adding at the end of it, in parentheses, the name of the original author or publisher of that section if known, or else a unique number. Make the same adjustment to the section titles in the list of Invariant Sections in the license notice of the combined work.

   In the combination, you must combine any sections Entitled "History" in the various original documents, forming one section Entitled "History"; likewise combine any sections Entitled "Acknowledgements", and any sections Entitled "Dedications". You must delete all sections Entitled "Endorsements."

6. COLLECTIONS OF DOCUMENTS

   You may make a collection consisting of the Document and other documents released under this License, and replace the individual copies of this License in the various documents with a single copy that is included in the collection, provided that you follow the rules of this License for verbatim copying of each of the documents in all other respects.

   You may extract a single document from such a collection, and distribute it individually under this License, provided you insert a copy of this License into the extracted document, and follow this License in all other respects regarding verbatim copying of that document.

7. AGGREGATION WITH INDEPENDENT WORKS

A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, is called an "aggregate" if the copyright resulting from the compilation is not used to limit the legal rights of the compilation's users beyond what the individual works permit. When the Document is included in an aggregate, this License does not apply to the other works in the aggregate which are not themselves derivative works of the Document.

If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one half of the entire aggregate, the Document's Cover Texts may be placed on covers that bracket the Document within the aggregate, or the electronic equivalent of covers if the Document is in electronic form. Otherwise they must appear on printed covers that bracket the whole aggregate.

8. TRANSLATION

Translation is considered a kind of modification, so you may distribute translations of the Document under the terms of section 4. Replacing Invariant Sections with translations requires special permission from their copyright holders, but you may include translations of some or all Invariant Sections in addition to the original versions of these Invariant Sections. You may include a translation of this License, and all the license notices in the Document, and any Warranty Disclaimers, provided that you also include the original English version of this License and the original versions of those notices and disclaimers. In case of a disagreement between the translation and the original version of this License or a notice or disclaimer, the original version will prevail.

If a section in the Document is Entitled "Acknowledgements", "Dedications", or "History", the requirement (section 4) to Preserve its Title (section 1) will typically require changing the actual title.

9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, or distribute it is void, and will automatically terminate your rights under this License.

However, if you cease all violation of this License, then your license from a particular copyright holder is reinstated (a) provisionally, unless and until the copyright holder explicitly and finally terminates your license, and (b) permanently, if the copyright holder fails to notify you of the violation by some reasonable means prior to 60 days after the cessation.

Moreover, your license from a particular copyright holder is reinstated permanently if the copyright holder notifies you of the violation by some reasonable means, this is the first time you have received notice of violation of this License (for any work) from that copyright holder, and you cure the violation prior to 30 days after your receipt of the notice.

Termination of your rights under this section does not terminate the licenses of parties who have received copies or rights from you under this License. If your rights have been terminated and not permanently reinstated, receipt of a copy of some or all of the same material does not give you any rights to use it.

10. FUTURE REVISIONS OF THIS LICENSE

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. See `http://www.gnu.org/copyleft/`.

Each version of the License is given a distinguishing version number. If the Document specifies that a particular numbered version of this License "or any later version" applies to it, you have the option of following the terms and conditions either of that specified version or of any later version that has been published (not as a draft) by the Free Software Foundation. If the Document does not specify a version number of this License, you may choose any version ever published (not as a draft) by the Free Software Foundation. If the Document specifies that a proxy can decide which future versions of this License can be used, that proxy's public statement of acceptance of a version permanently authorizes you to choose that version for the Document.

11. RELICENSING

"Massive Multiauthor Collaboration Site" (or "MMC Site") means any World Wide Web server that publishes copyrightable works and also provides prominent facilities for anybody to edit those works. A public wiki that anybody can edit is an example of such a server. A "Massive Multiauthor Collaboration" (or "MMC") contained in the site means any set of copyrightable works thus published on the MMC site.

"CC-BY-SA" means the Creative Commons Attribution-Share Alike 3.0 license published by Creative Commons Corporation, a not-for-profit corporation with a principal place of business in San Francisco, California, as well as future copyleft versions of that license published by that same organization.

"Incorporate" means to publish or republish a Document, in whole or in part, as part of another Document.

An MMC is "eligible for relicensing" if it is licensed under this License, and if all works that were first published under this License somewhere other than this MMC, and subsequently incorporated in whole or in part into the MMC, (1) had no cover texts or invariant sections, and (2) were thus incorporated prior to November 1, 2008.

The operator of an MMC Site may republish an MMC contained in the site under CC-BY-SA on the same site at any time before August 1, 2009, provided the MMC is eligible for relicensing.

ADDENDUM: How to use this License for your documents

To use this License in a document you have written, include a copy of the License in the document and put the following copyright and license notices just after the title page:

```
Copyright (C)  year  your name.
Permission is granted to copy, distribute and/or modify this document
under the terms of the GNU Free Documentation License, Version 1.3
or any later version published by the Free Software Foundation;
with no Invariant Sections, no Front-Cover Texts, and no Back-Cover
Texts.  A copy of the license is included in the section entitled ``GNU
Free Documentation License''.
```

If you have Invariant Sections, Front-Cover Texts and Back-Cover Texts, replace the "with. . . Texts." line with this:

```
with the Invariant Sections being list their titles, with
the Front-Cover Texts being list, and with the Back-Cover Texts
being list.
```

If you have Invariant Sections without Cover Texts, or some other combination of the three, merge those two alternatives to suit the situation.

If your document contains nontrivial examples of program code, we recommend releasing these examples in parallel under your choice of free software license, such as the GNU General Public License, to permit their use in free software.

Concept Index

U

V

W

Key Index

Variable Index

Function Index

Program Index