Introduction to
open-Source Software (OSS)

Concepts, strategies, and methodologies
related to open-source software development

Week 09 – Lecture 07
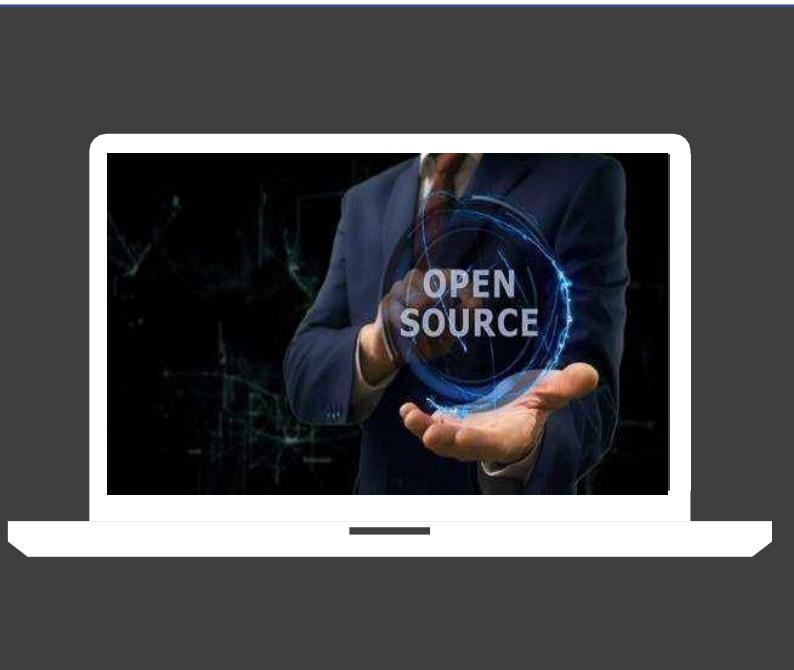
- Markdown for Open Source Software
- Write once, render everywhere: READMEs, Issues, PRs, Docs

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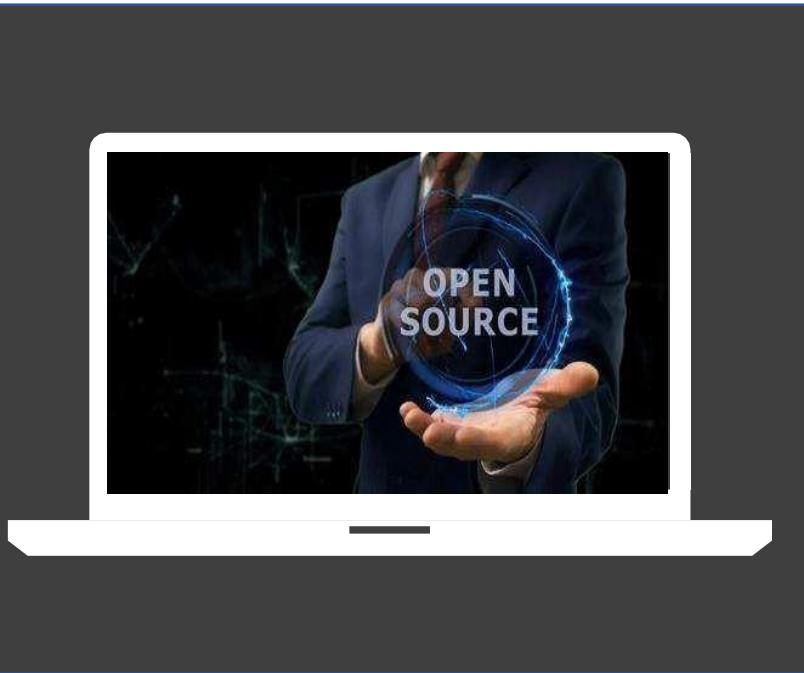
Recap

◯ Git
- Commit History
- GitHub Introduction
- Working with Remotes
- Tags
- Branches

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Today, Agenda

o Markdown Language overview

o Markdown - Application

o Markdown   - Basic Syntax

o Motivation

o Core Syntax (micro-drills)

o GFM essentials (micro-drills)

o Guided Lab: Build a README

o Issue/PR exercise

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Markdown for Open Source Software

- By the end, you can:
  - **Format** technical docs with core Markdown.
  - Use **GFM** features (task lists, tables, fenced code, autolinks).
  - Apply **accessibility** best practices (alt text, headings, links).
  - Produce a **complete README** and basic Issue/PR descriptions.

Motivation - Why Markdown?

- **Plain Text vs Markdown (Before → After → Rendered)**

    Before (plain):

    Project alpha - install: run pip install alpha
    features: fast, simple; docs later

    Markdown:

    ```
    # Project Alpha

    ## Installation
    ```bash
    pip install alpha
    ```

- **Features**
    - Fast
    - Simple

Motivation - Why Markdown?

- **Plain Text vs Markdown (Before → After → Rendered)**
- Before (plain):

- **Key Points:** readability, predictability, portability (GitHub, Docs, Static sites).
- **Example:** Show messy text → cleaned Markdown → preview screenshot.
- **Try it now (1 min):** Bold 2 words, add one list, add a link with descriptive text.

What is Markdown?

- **Markdown** is a **lightweight** markup language that you can use to **add formatting elements** to plaintext text documents.

- Markdown is a **text-to-HTML conversion tool** for web writers.

- Markdown allows you to write using an **easy-to-read**, **easy-to- write** plain text format, then convert it to structurally valid XHTML (or HTML).

- Thus, "Markdown" is two things:
    a)   a plain text formatting syntax; and
    b)   a *software tool*, written in *Perl*, that converts the plain text formatting to HTML

- Created by John Gruber in 2004, Markdown is now one of the world's most popular markup languages.
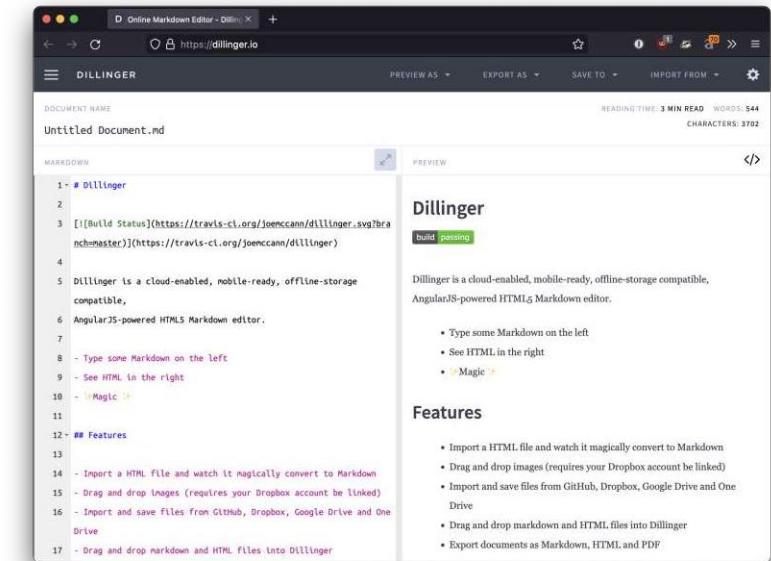
Why Use Markdown?

- Markdown can be used for everything. People use it to
  - create websites,
  - documents,
  - notes, books,
  - presentations,
  - email messages,
  - and technical documentation.
- Markdown is **portable**. Files containing Markdown-formatted text can be opened using **virtually any application**.
- Markdown is **platform-independent.** You can create Markdown-formatted text on any device running **any operating system**.
- **Markdown is everywhere**. Websites like GitHub support Markdown, and lots of desktop and web-based applications support it.
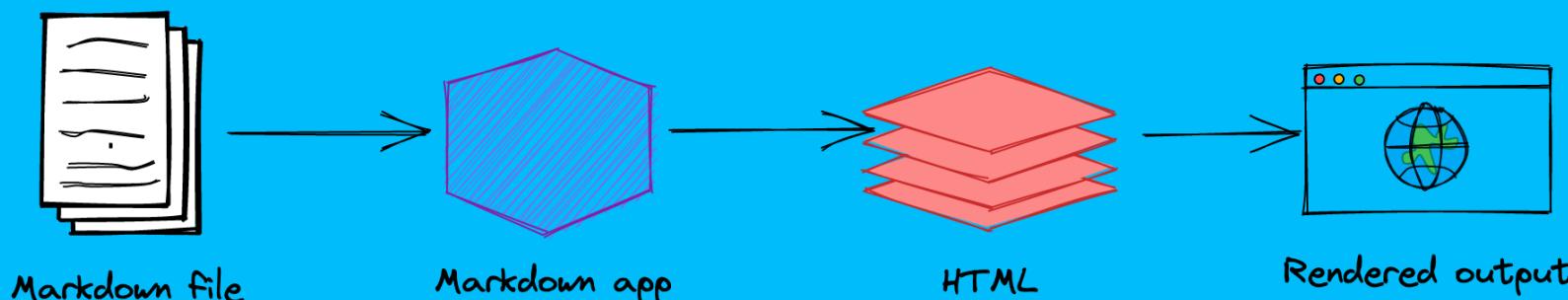
Online tool

- You don't even need to download anything. There are several **online Markdown editors** that you can use to try writing in Markdown.

- Just open the site and start typing in the left pane. A preview of the rendered document appears in the right pane

- https://stackedit.io/

- https://onlinemarkdowneditor.dev/

- https://pandao.github.io/editor.md/en.html

- Dillinger
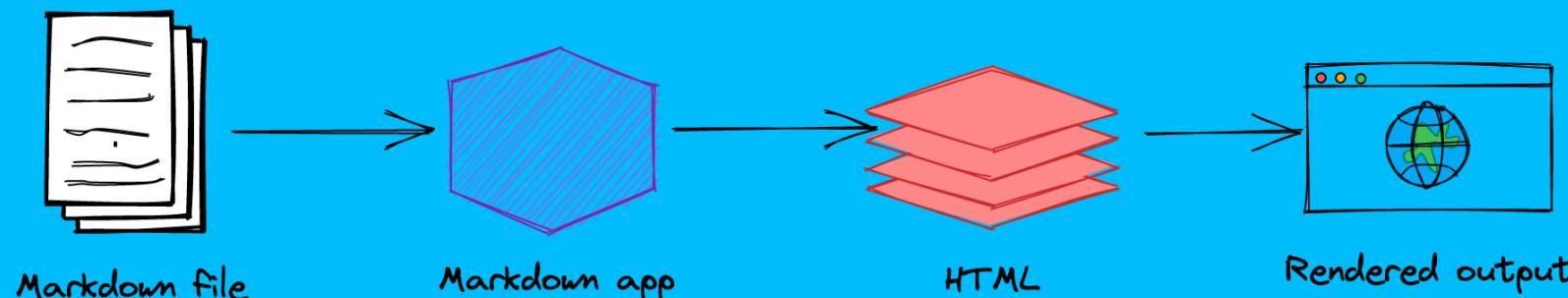
How Does it Work?

- The short answer is that you need a Markdown application capable of processing the Markdown file.

- There are lots of applications available — everything from simple scripts to desktop applications that look like Microsoft Word.

- Despite their visual differences, all of the applications do the same thing. Like **Dillinger**, they all **convert Markdown-formatted text** to **HTML** so it can be displayed in **web browsers**.

Markdown file → Markdown app → HTML → Rendered output

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How Does it Work?

- To summarize, this is a four-part process:
  i. Create a **Markdown file** using a **text editor or a dedicated Markdown** application. The file should have an **.md or .markdown** extension.
  ii. Open the Markdown file in a Markdown application.
  iii. Use the Markdown application to **convert the Markdown file to an HTML** document.
  iv. View the HTML file in a **web browser** or use **the Markdown application** to convert it to another file format, like PDF.

Markdown file   Markdown app   HTML   Rendered output

What's Markdown Good For?

- **Documentation**
  - Markdown is a **natural fit** for **technical documentation**.
  - Companies like **GitHub** are increasingly switching to Markdown for their documentation
  - Read the Docs can generate a documentation website from your open source Markdown files. Just connect your GitHub repository to their service and push — Read the Docs does the rest.
  - MkDocs is a fast and simple static site generator that's geared towards building project documentation. Documentation source files are written in Markdown and configured with a single YAML configuration file.

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What's Markdown Good For?

- **Websites**
  - Markdown was designed for the web, so it should come as no surprise that there are plenty of applications specifically designed for creating website content.
    - Jekyll, a popular static site generator that takes Markdown files and builds an HTML website.
    - GitHub Pages- https://pages.github.com/
    - GitHub Readme File
    - If Jekyll isn't your cup of tea, just pick one of the many other static site generators available.

What's Markdown Good For?

- **Notes**
  - In nearly every way, Markdown is the ideal syntax for taking notes.
  - [Simplenote](#) is a free, barebones note-taking application available for every platform.
  - [Notable](#) is a note-taking application that runs on a variety of platforms.
  - [Bear](#) is an Evernote-like application available for Mac and iOS devices. It doesn't exclusively use Markdown by default, but you can enable Markdown compatibility mode.
  - [Joplin](#) is a note taking application that respects your privacy. It's available for every platform.
  - [Boostnote](#) bills itself as an "open source note-taking app designed for programmers."
- **Books**
  - Looking to self-publish a novel? Try [Leanpub](#), a service that takes your Markdown-formatted files and turns them into an electronic book. Leanpub outputs your book in PDF, EPUB, and MOBI file format.

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What's Markdown Good For?

- **Presentations**
  - Believe it or not, you can generate presentations from Markdown-formatted files.
  - Creating presentations in Markdown takes a little getting used to, but once you get the hang of it, it's a lot faster and easier than using an application like PowerPoint or Keynote.
  - Remark (GitHub project) is a popular browser-based Markdown slideshow tool, as are Cleaver (GitHub project) and Marp (GitHub project).
  - If you use a Mac and would prefer to use an application, check out Deckset or Hyperdeck.

Basic Syntax

- Headings
- Paragraphs
- Horizontal Rules
- Emphasis
- Blockquotes
- Lists
- Code Blocks
- Images
- Links
- Tables

Basic Syntax- Heading

- To create a heading, add number signs (#) in front of a word or phrase.
- The number of number signs you use should correspond to the heading level.
- For example, to create a heading level three (<h3>), use three number signs (e.g., ### My Header).

Markdown	HTML	Rendered Output
# Heading level 1	Heading level 1	Heading level 1
## Heading level 2	Heading level 2	Heading level 2
### Heading level 3	Heading level 3	Heading level 3
#### Heading level 4	Heading level 4	Heading level 4
##### Heading level 5	Heading level 5	Heading level 5
###### Heading level 6	Heading level 6	Heading level 6

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Basic Syntax- Heading - Alternate Syntax

- Alternatively, on the line below the text, add any number of == characters for heading level 1 or -- characters for heading level 2.

Markdown	HTML	Rendered Output
Heading level 1 ==============	Heading level 1	Heading level 1
Heading level 2 --------------	Heading level 2	Heading level 2

Basic Syntax- Heading - Alternate Syntax

Heading Best Practices

For compatibility, always put a space between the number signs and the heading name.

✅ Do this	❌ Don't do this
# Here's a Heading	#Here's a Heading

You should also put blank lines before and after a heading for compatibility.

✅ Do this	❌ Don't do this
Try to put a blank line before… # Heading …and after a heading.	Without blank lines, this might not look right. # Heading Don't do this!

Paragraphs

- To create paragraphs, use a blank line to separate one or more lines of text.

Markdown	HTML	Rendered Output
I really like using Markdown. I think I'll use it to format all of my documents from now on.	I really like using Markdown. I think I'll use it to format all of my documents from now on.	I really like using Markdown. I think I'll use it to format all of my documents from now on.

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Paragraphs

Paragraph Best Practices

Unless the paragraph is in a list, don't indent paragraphs with spaces or tabs.

✅ Do this	❌ Don't do this
Don't put tabs or spaces in front of your paragraphs. Keep lines left-aligned like this.	This can result in unexpected formatting problems. Don't add tabs or spaces in front of paragrap

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Line Breaks

- To create a line break or new line (<br>), end a line with two or more spaces, and then type return.

Markdown	HTML	Rendered Output
This is the first line. And this is the second line.	This is the first line. And this is the second line.	This is the first line. And this is the second line.

Line Breaks

Line Breaks Best Practices

- You can use two or more spaces (commonly referred to as "trailing whitespace") for line breaks in nearly every Markdown application, but it's controversial.

- For compatibility, use trailing white space or the
 HTML tag at the end of the line.

✅ Do this	❌ Don't do this
First line with two spaces after. And the next line. First line with the HTML tag after. And the next line.	First line with a backslash after.\ And the next line. First line with nothing after. And the next line.

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Horizontal Rules

- To create a horizontal rule, use three or more asterisks (***), dashes (---), or underscores (___) on a line by themselves.

- For example

```
***


---



_____
```

Horizontal Rule

Horizontal Rule Best Practices

For compatibility, put blank lines before and after horizontal rules.

✅ Do this	❌ Don't do this
Try to put a blank line before... --- ...and after a horizontal rule.	Without blank lines, this would be a heading. --- Don't do this!

Emphasis

- You can add emphasis by making text bold or italic.

Normal
Bold
Italic
Bold italic

Emphasis - Bold

- To bold text, add two asterisks or underscores before and after a word or phrase.
- To bold the middle of a word for emphasis, add two asterisks without spaces around the letters.

Markdown	HTML	Rendered Output
I just love **bold text**.	I just love \bold text\.	I just love **bold text**.
I just love __bold text__.	I just love \bold text\.	I just love **bold text**.
Love**is**bold	Love\is\bold	Love**is**bold

Emphasis - Bold

Bold Best Practices

Markdown applications don't agree on how to handle underscores in the middle of a word. For compatibility, use asterisks to bold the middle of a word for emphasis.

✅ Do this	❌ Don't do this
Love**is**bold	Love__is__bold

Emphasis - Italic

- To italicize text, add one asterisk or underscore before and after a word or phrase.
- To italicize the middle of a word for emphasis, add one asterisk without spaces around the letters.

Markdown	HTML	Rendered Output
Italicized text is the *cat's meow*.	Italicized text is the cat's meow.	Italicized text is the *cat's meow*.
Italicized text is the _cat's meow_.	Italicized text is the cat's meow.	Italicized text is the *cat's meow*.
A*cat*meow	Acatmeow	A*cat*meow

Emphasis - Italic

Italic Best Practices

- Markdown applications don't agree on how to handle underscores in the middle of a word.
- For compatibility, use asterisks to italicize the middle of a word for emphasis.

✅ Do this	❌ Don't do this
A*cat*meow	A_cat_meow

Emphasis - Bold and Italic

- To emphasize text with bold and italics at the same time, add three asterisks or underscores before and after a word or phrase.
- To bold and italicize the middle of a word for emphasis, add three asterisks without spaces around the letters.

Markdown	HTML	Rendered Output
This text is ***really important***.	This text is really important.	This text is **_really important_**.
This text is ___really important___.	This text is really important.	This text is **_really important_**.
This text is __*really important*__.	This text is really important.	This text is **_really important_**.
This text is **_really important_**.	This text is really important.	This text is **_really important_**.
This is really***very***important text.	This is reallyveryimportant text.	This is really**_very_**important text.

Emphasis - Bold and Italic

Bold and Italic Best Practices

- Markdown applications don't agree on how to handle underscores in the middle of a word.
- For compatibility, use asterisks to bold and italicize the middle of a word for emphasis.

✅ Do this	❌ Don't do this
This is really***very***important text.	This is really___very___important text.

Blockquotes

- To create a blockquote, add a > in front of a paragraph.
- **Blockquotes with Multiple Paragraphs**
    - Blockquotes can contain multiple paragraphs. Add a > on the blank lines between the paragraphs.

```
> Dorothy followed her through many of the beautiful rooms in her castle.
```

Dorothy followed her through many of the beautiful rooms in her castle.

```
> Dorothy followed her through many of the beautiful rooms in her castle.
>
> The Witch bade her clean the pots and kettles and sweep the floor and keep the
 fire fed with wood.
```

Dorothy followed her through many of the beautiful rooms in her castle.

The Witch bade her clean the pots and kettles and sweep the floor and keep the fire fed with wood.

Nested Blockquotes

- Blockquotes can be nested. Add a >> in front of the paragraph you want to nest.
- For example

```
> Dorothy followed her through many of the beautiful rooms in her castle.
>
>> The Witch bade her clean the pots and kettles and sweep the floor and keep
 the fire fed with wood
```

> Dorothy followed her through many of the beautiful rooms in her castle.
>
>> The Witch bade her clean the pots and kettles and sweep the floor and keep the fire fed with wood

Blockquotes with Other Elements

- Blockquotes can contain other Markdown formatted elements.
- Not all elements can be used — you'll need to experiment to see which ones work.

```
> #### The quarterly results look great!
>
> - Revenue was off the chart.
> - Profits were higher than ever.
>
>  *Everything* is going according to **plan**.
```

The quarterly results look great!
- Revenue was off the chart.
- Profits were higher than ever.

Everything is going according to **plan**.

Blockquotes

Blockquotes Best Practices

For compatibility, put blank lines before and after blockquotes.

✅ Do this	❌ Don't do this
Try to put a blank line before... > This is a blockquote ...and after a blockquote.	Without blank lines, this might not look right. > This is a blockquote Don't do this!

Lists

- You can organize items into
  - Ordered and
  - Unordered lists.
  - Nested List
  - Definition List
  - Task List

Ordered Lists

- To create an ordered list, add line items with numbers followed by periods.

- The numbers don't have to be in numerical order, but the list should start with the number one.

Markdown	HTML	Rendered Output
1. First item 2. Second item 3. Third item 4. Fourth item	\ \ - First item\ \ - Second item\ \ - Third item\ \ - Fourth item\ \	1. First item 2. Second item 3. Third item 4. Fourth item
1. First item 2. Second item 3. Third item 4. Fourth item	\ \ - First item\ \ - Second item\ \ - Third item\ \ - Fourth item\ \	1. First item 2. Second item 3. Third item 4. Fourth item
1. First item 8. Second item 3. Third item 5. Fourth item	\ \ - First item\ \ - Second item\ \ - Third item\ \ - Fourth item\ \	1. First item 2. Second item 3. Third item 4. Fourth item

1. First item
2. Second item
3. Third item
   1. Indented item
   2. Indented item
4. Fourth item
	\
	\ - First item\
	\ - Second item\
	\ - Third item
	\
	\ - Indented item\
	\ - Indented item\
	\
	\
	\ - Fourth item\
	\
		1. First item
		2. Second item
		3. Third item
		    1. Indented item
		    2. Indented item
		4. Fourth item

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Unordered Lists

- To create an unordered list, add dashes (-), asterisks (*), or plus signs (+) in front of line items.

- Indent one or more items to create a nested list.

Markdown	HTML	Rendered Output
- First item - Second item - Third item - Fourth item	\<ul\> \<li\>First item\</li\> \<li\>Second item\</li\> \<li\>Third item\</li\> \<li\>Fourth item\</li\> \</ul\>	• First item • Second item • Third item • Fourth item
* First item * Second item * Third item * Fourth item	\<ul\> \<li\>First item\</li\> \<li\>Second item\</li\> \<li\>Third item\</li\> \<li\>Fourth item\</li\> \</ul\>	• First item • Second item • Third item • Fourth item
+ First item + Second item + Third item + Fourth item	\<ul\> \<li\>First item\</li\> \<li\>Second item\</li\> \<li\>Third item\</li\> \<li\>Fourth item\</li\> \</ul\>	• First item • Second item • Third item • Fourth item

- First item
- Second item
- Third item
  - Indented item
  - Indented item
- Fourth item
	\<ul\>
	\<li\>First item\</li\>
	\<li\>Second item\</li\>
	\<li\>Third item
	\<ul\>
	\<li\>Indented item\</li\>
	\<li\>Indented item\</li\>
	\</ul\>
	\</li\>
	\<li\>Fourth item\</li\>
	\</ul\>
		• First item
		• Second item
		• Third item
		    • Indented item
		    • Indented item
		• Fourth item

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Unordered List

Best Practices

Markdown applications don't agree on how to handle different delimiters in the same list. For compatibility, don't mix and match delimiters in the same list
- o   pick one and stick with it.

✅ Do this	❌ Don't do this
- First item - Second item - Third item - Fourth item	+ First item * Second item - Third item + Fourth item

Nested List

- You can nest an unordered list in an ordered list, or vice versa.

```
1. First item
2. Second item
3. Third item
    - Indented item
    - Indented item
4. Fourth item
```

Definition Lists

- Some Markdown processors allow you to create definition lists of terms and their corresponding definitions.

- To create a definition list, type the term on the first line. On the next line, type a colon followed by a space and the definition.

```
First Term
: This is the definition of the first term.

Second Term
: This is one definition of the second term.
: This is another definition of the second term.
```

First Term
This is the definition of the first term.

Second Term
This is one definition of the second term.

This is another definition of the second term.

Task Lists – *todo* list

- Task lists (also referred to as checklists and todo lists) allow you to create a list of items with checkboxes.

- To create a task list, add dashes (-) and brackets with a space ([ ]) in front of task list items. To select a checkbox, add an x in between the brackets ([x]).

```
- [x] Write the press release
- [ ] Update the website
- [ ] Contact the media
```

☑ Write the press release
☐ Update the website
☐ Contact the media

Code Blocks

- Code blocks are normally indented four spaces or one tab.
- When they're in a list, indent them eight spaces or two tabs.

```
1. Open the file.
2. Find the following code block on line 21:

        <html>
          <head>
            <title>Test</title>
          </head>

3. Update the title to match the name of your website.
```

1. Open the file.

2. Find the following code block on line 21:

```
<html>
    <head>
        <title>Test</title>
    </head>
```

3. Update the title to match the name of your website.

Images

- Syntax
  - ![Alt-text](/path/image.extention)

```
![Tux, the Linux mascot](/assets/images/tux.png)
```

Links

- To create a link, enclose the link text in brackets (e.g., [Duck Duck Go]) and then follow it immediately with the URL in parentheses (e.g., (https://duckduckgo.com)).

- To quickly turn a URL or email address into a link, enclose it in angle brackets.

```
My favorite search engine is [Duck Duck Go](https://duckduckgo.com).
```

```
My favorite search engine is [Duck Duck Go](https://duckduckgo.com "The best search engine for privacy").
```

```
<https://www.markdownguide.org>
<fake@example.com>
```

Formatting Links

- To emphasize links, add asterisks before and after the brackets and parentheses.

```
I love supporting the
**[EFF](https://eff.org)**.

This is the *[Markdown
Guide](https://www.markdownguide.org)*.
```

I love supporting the EFF.

This is the *Markdown Guide.*

Link

Best Practices

- Markdown applications don't agree on how to handle spaces in the middle of a URL. For compatibility, try to URL encode any spaces with %20.
- Alternatively, if your Markdown application supports HTML, you could use the a HTML tag.

✅ Do this	❌ Don't do this
[link](https://www.example.com/my%20great%20page) link	[link](https://www.example.com/my great page)

Tables

- To add a table, use three or more hyphens (---) to create each column's header, and use pipes (|) to separate each column.
- For compatibility, you should also add a pipe on either end of the row.

```
| Syntax     | Description |
| ---------- | ----------- |
| Header     | Title       |
| Paragraph  | Text        |
```

Syntax	Description
Header	Title
Paragraph	Text

Tables

Alignment

- You can align text in the columns to the left, right, or center by adding a colon (:) to the left, right, or on both side of the hyphens within the header row.

```
| Syntax    | Description | Test Text   |
| :---      |    :----:   |        ---: |
| Header    | Title       | Here's this |
| Paragraph | Text        | And more    |
```

Syntax	Description	Test Text
Header	Title	Here's this
Paragraph	Text	And more

Footnotes

- Footnotes allow you to add notes and references without cluttering the body of the document.

- When you create a footnote, a superscript number with a link appears where you added the footnote reference.

```
Here's a simple footnote,[^1] and here's a
longer one.[^bignote]

[^1]: This is the first footnote.

[^bignote]: Here's one with multiple paragraphs
and code.
```

Here's a simple footnote,[1] and here's a longer one.[2]

1. This is the first footnote. ↩
2. Here's one with multiple paragraphs and code.

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Strikethrough

- You can strikethrough words by putting a horizontal line through the center of them. The result looks ~~like this~~.

~~The world is flat.~~ We now know that the world is round.

↓

~~The world is flat.~~ We now know that the world is round.

Emoji

- There are two ways to add emoji to Markdown files: copy and paste the emoji into your Markdown-formatted text, or

- type emoji shortcodes.

Copying and Pasting Emoji

In most cases, you can simply copy an emoji from a source like Emojipedia and paste it into your document.

Using Emoji Shortcodes

Some Markdown applications allow you to insert emoji by typing emoji shortcodes. These begin and end with a colon and include the name of an emoji.

:bowtie:	:smile:
:simple_smile:	:laughing:
:blush:	:smiley:
:relaxed:	:smirk:

https://www.webfx.com/tools/emoji-cheat-sheet/

Highlight

- This isn't common, but some Markdown processors allow you to highlight text. The result looks ==like this==.
- To highlight words, use two equal signs (==) before and after the words.
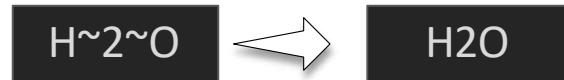
I need to highlight these ==very important words==. ➡️ I need to highlight these very important words .

Subscript and Superscript

- To create a subscript, use one tilde symbol (~) before and after the characters.

$$H\text{\textasciitilde}2\text{\textasciitilde}O \Longrightarrow H2O$$

- To create a superscript, use one caret symbol (^) before and after the characters.

$$X\text{\^{}}2\text{\^{}} \Longrightarrow X^2$$

Subscript and Superscript

- To create a subscript, use one tilde symbol (~) before and after the characters.
- Or use the

H~2~O

H₂O

$\Rightarrow$

H2O

- To create a superscript, use one caret symbol (^) before and after the characters.
- Or use the

X^2^

X²

X^2

Mid-Deck Quiz

- Write an H3 heading.
- Task list: two done, one pending.
- Image with alt text.
- Create a table with right-aligned last column.
- Add a footnote to a claim.

Slide Drawing

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Guided Lab: Build a README

- **Goal:** Create README.md for **md-cleanup**

- **Must include:**
  - Title + one-line pitch
  - Sections: Overview, Installation, Usage, Configuration (code block), Contributing (task list), License
  - One configuration table (Name | Type | Default | Description)
  - An image with descriptive alt text
  - Two descriptive links (Issue tracker, Contributing Guide)

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Reading Materials

- https://www.markdownguide.org/basic-syntax/
- https://daringfireball.net/projects/markdown/
- https://www.markdowntutorial.com/

Thanks

Office Time: Monday-Friday (1000 - 1800)

You can send me an email for meeting, or any sort of discussion related to class matters.

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