

Emacs Beginner's Tutorial v2

Lyon College, Batesville, AR - Spring 2023

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Image source: <https://xkcd.com/378/>

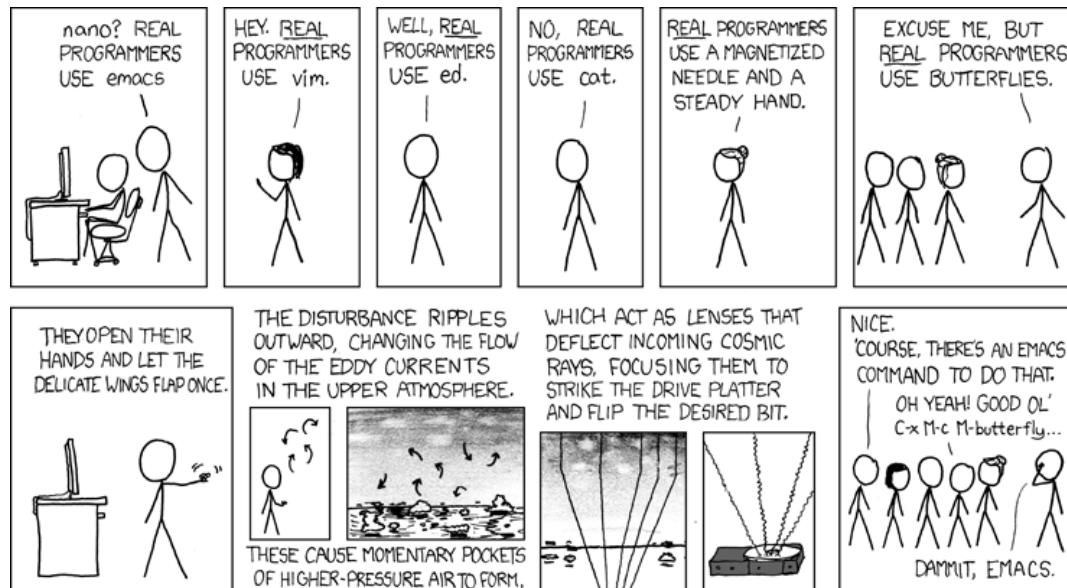


Figure 1: xkcd: Real Programmers (<https://xkcd.com/378/>)

1 README

- This is a makeshift Emacs tutorial for absolute beginners to enable you to do the most basic things with Emacs as your text editor.
- For the best gain from this tutorial, open Emacs on the terminal (command line interface) with `emacs -nw -q` in non-graphics mode, without loading a customization file (like `.emacs` or `init.el`).
- You should be able to complete this tutorial in less than 1 hr - likely less than half the time of the more comprehensive Emacs onboard tutorial (reachable e.g. from the startup screen).
- Unlike the standard tutorial, this is an instruction file: you will do the editing in a separate text file whose content you will download.
- Here are links to the videos (2 x 30 min) in which I go through the tutorial step by step: Part 1 and Part 2.
- Version 2 is for Linux users. You can try this e.g. in Google Cloud Shell (cloud.google.com/shell) where Emacs is pre-installed. Install the shell locally via the browser so that you can use all key bindings.



Figure 2: Emacs logo <https://www.gnu.org/software/emacs/>

- This file is available as PDF or Markdown (.md) or Org-mode file in github.com/birkenkrahe/org/tree/master/emacs.

2 Buffer and key basics

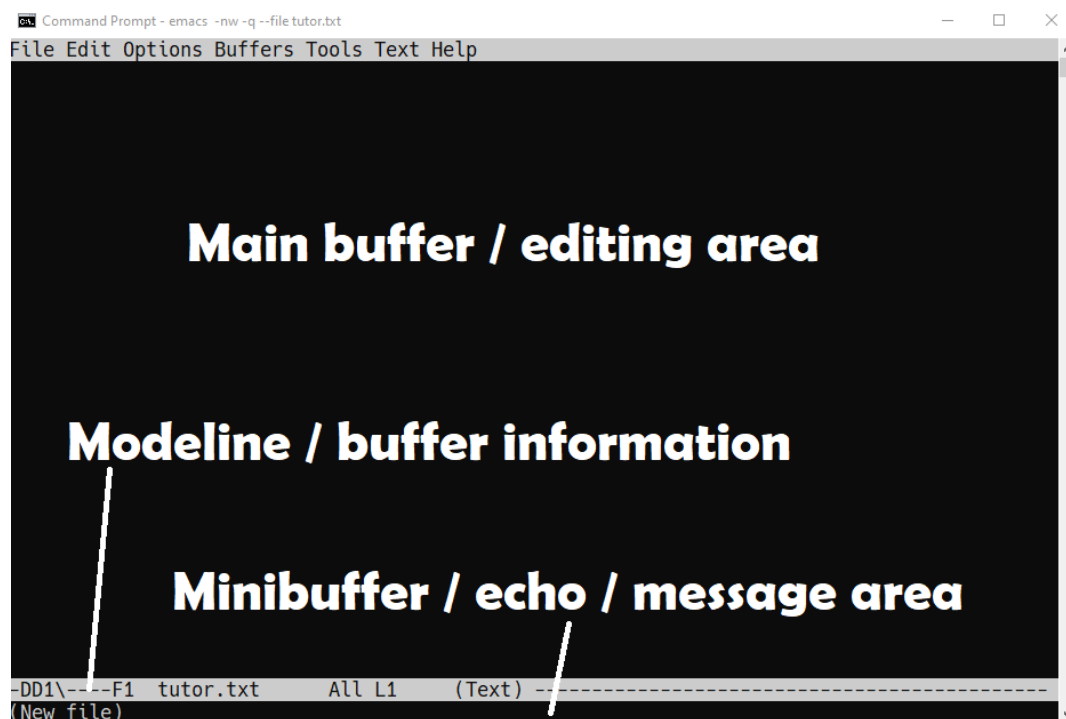


Figure 3: Inserting a text file into buffer with C-x i

- An Emacs **buffer** has three parts:
 - The main **editing** area at the top (to edit text)
 - The **mode line** below it (file and buffer information)
 - The **minibuffer** at the bottom (for messages and input)
- Most commands are bound to keys beginning with **C-** (CTRL), or **M-** (for "Meta", which is the <ALT> key on most keyboards).
- For example, **C-x C-f** means: hold down CTRL and press x and f. **M-<** means: hold down ALT + SHIFT + < all at the same time.

- Most commands are shown in the minibuffer (or *echo* area) so when you have compound commands like **C-x C-f**, you can check your progress.

3 The mode line - basic buffer movement

1. Open a new file with **C-x C-f**. At the prompt, enter the file name: `tutor.txt` and press **<RET>**.
2. Alternatively, you can also open the file directly from the command line: `emacs --file tutor.txt -nw -q`.
3. The modeline shows (among other things):
 - A few dashes to indicate the edit status (----)
 - A file name (`tutor.txt`)
 - How far down in the file you've come (`All` because it's empty)
 - The line number your cursor is on (e.g. `L1`)
 - The file mode (`Text`)
4. Open a browser, open at tinyurl.com/22rt7t2f and save the text to the clipboard with **CTRL + a** and **CTRL + c**.
5. In `tutor.txt`, enter the text with **C-y** ("yank") If you mess up (at any time), type **C-g** to quit any current command sequence.
6. The mode line now indicates that the file has been changed: `**--`
7. Save the file with **C-x C-s**. You should get a confirmation in the minibuffer, alongside the full path to the file - and the mode line changes to ----:


```
Wrote c:/Users/birkenkrahe/tutor.txt
```
8. The text is saved as one long line. Go to the start of the line with **C-a**, then to the end with **C-e**.
9. Go back on the line with **C-b**, and forward with **C-f** (one character), or with **M-b** and **M-f** (one word).
10. Type **M-x column <TAB> <RET>** (that's **ALT + column + Tab-key + Enter**). The command completes to **M-x column-number-mode**. In the mode line, you will now see both row and column number of the cursor position.

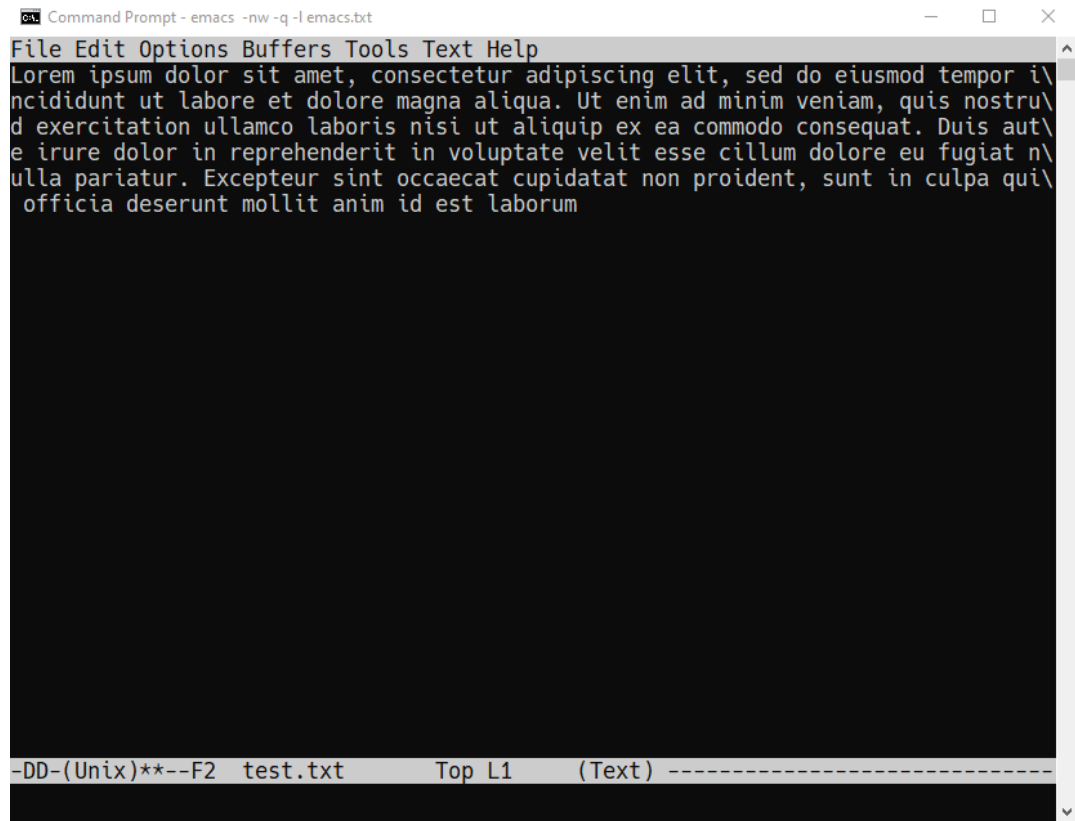


Figure 4: After inserting a text file into buffer with C-y

11. This last command "toggles", which means that you can switch it on/off by repeating the command. Try that a couple of times.

4 Indentation, lines, paragraphs, undo

1. To distribute the text over more than one line, enter **M-q**, or **M-x fill-paragraph**: this command will fill the text in lines of max 70 characters).
2. You can also toggle **M-x auto-fill-mode**, which will fill the paragraph any time you're at the end of a line. You're told when a mode is enabled/disabled for the current buffer.
3. Test that: go to the end of the current paragraph, enter a new (empty) line and insert the text from the clipboard once again (**C-y**).
4. Enable **auto-fill-mode**, go to the end of the new line you just inserted, and press **<RET>**. The paragraph should be filled just so.
5. You probably want to see this again! Type **C-x u** (or **C-/** or **C-_**) to undo the last operation, then press **<RET>** again. The minibuffer will report **Undo**.
6. Commands can be repeated as often as you wish. For example, to go back 4 words, enter **C-u 4 M-b**.
7. If you filled the lines, you should now have multiple lines, and the *modeline* should report that you changed the file (by inserting new lines). Save the file with **C-x C-s**.
8. To go up and down them, use **C-p** (up/previous) and **C-n** (down/next). How would you go up 3 lines? Right: **C-u 3 C-p**.
9. Add the text from the clipboard 5 times: navigate to the end of the text using **C-e** (end of line) and **C-n** (or **<down-arrow>**). Then enter **C-y** five times.
10. To scroll one page down in this large file, use **C-v**. To scroll up, use **M-v** (this will not work in a browser - use **<FN><PgUp>** and **<FN><PgDown>** instead).
11. To go to the top of the file, enter **M-<**. To go to the end of the file, enter **M->**.

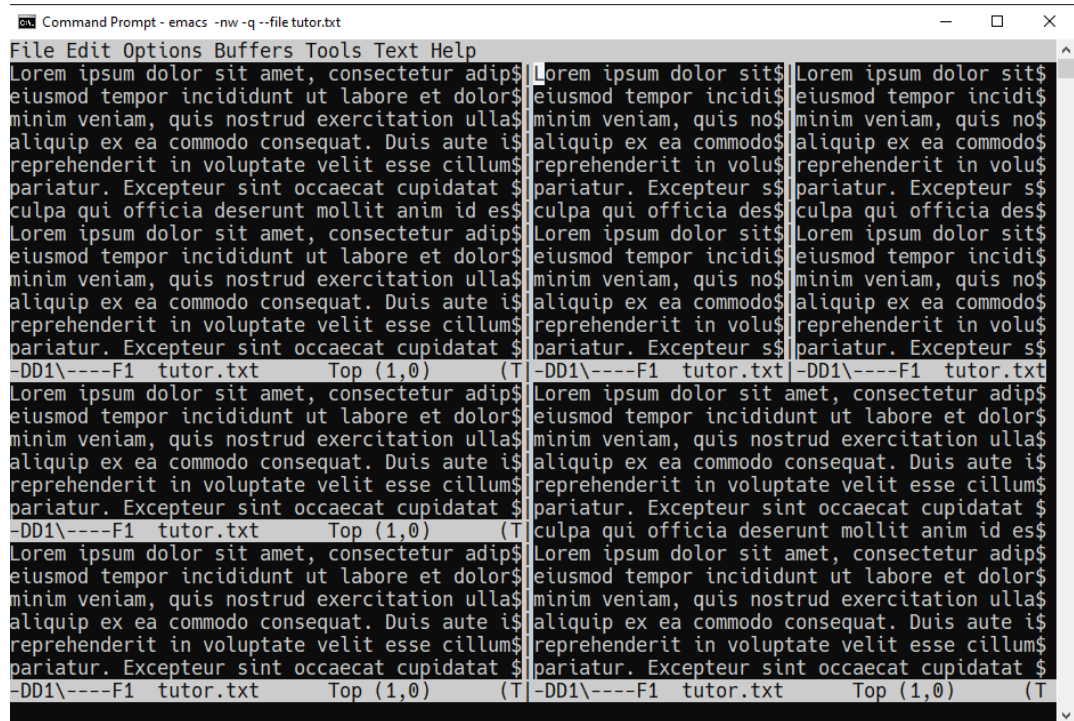
12. To recenter so that the line under the cursor is in the middle of the window, enter **C-1**.
13. Move around the file a little **without touching your mouse**:
 - Jump to the top of the buffer (**M-<**)
 - Go down one page (**C-v** or **<FN><PgDown>**)
 - Go to column 35 jumping by words (**M-f**)
 - Correct with character movements until you're at 35 (**C-f**, **C-b**)
 - Jump to the end of the file (**M->**)
 - Go up two pages (**M-v M-v** or **<FN><PgUp> <FN><PgUp>**)
 - Recenter (**C-1**)
 - Go to the end of the line (**C-e**)
 - Go back to the top of the buffer (**M-<**)

5 Splitting windows

You can split windows any way you like.

1. Split the window horizontally with **C-x 2**.
2. Split the window you're in vertically with **C-x 3**.
3. Move between windows with **C-x o** ¹.
4. Delete a window you're in with **C-x 0**
5. Delete all but the current window with **C-x 1**.
6. Recreate the following window setup:

¹There are packages that make window movement easier - e.g. I use the **ace-window** package. You can install and update Emacs packages with the package manager (**M-x package-list-packages**).



7. Delete all but the current window with `C-x 1`.

6 Delete, copy, kill/cut, yank/paste text

1. You can delete the character under the cursor with `C-d`. Go ahead and delete some characters anywhere in the text.
2. You can delete forward by toggling `M-x overwrite-mode`. Try that: press the space bar (`<SPC>`) a few times with and without overwrite mode. The modeline now shows `ovwr`.
3. Disable overwrite by running the function again: `M-x overwrite-mode`. There should now be `no ovwr` in the mode line.
4. Highlight a region: mark the beginning of the region with `C-SPC` (minibuffer: `Mark set`), and then move the cursor to wherever you want to end it:
5. You can now run commands on the region, for example:

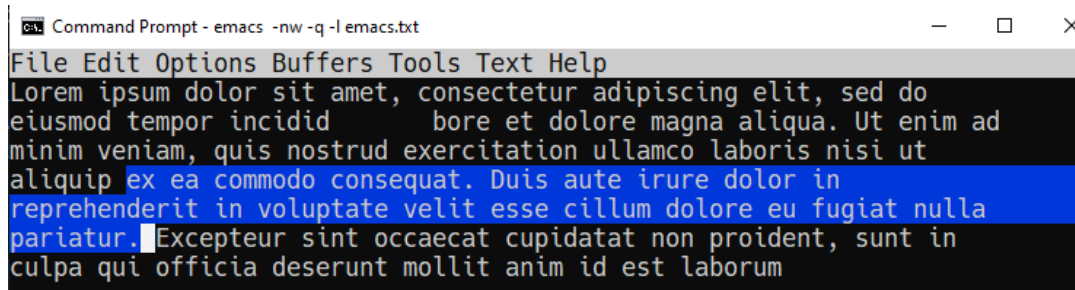
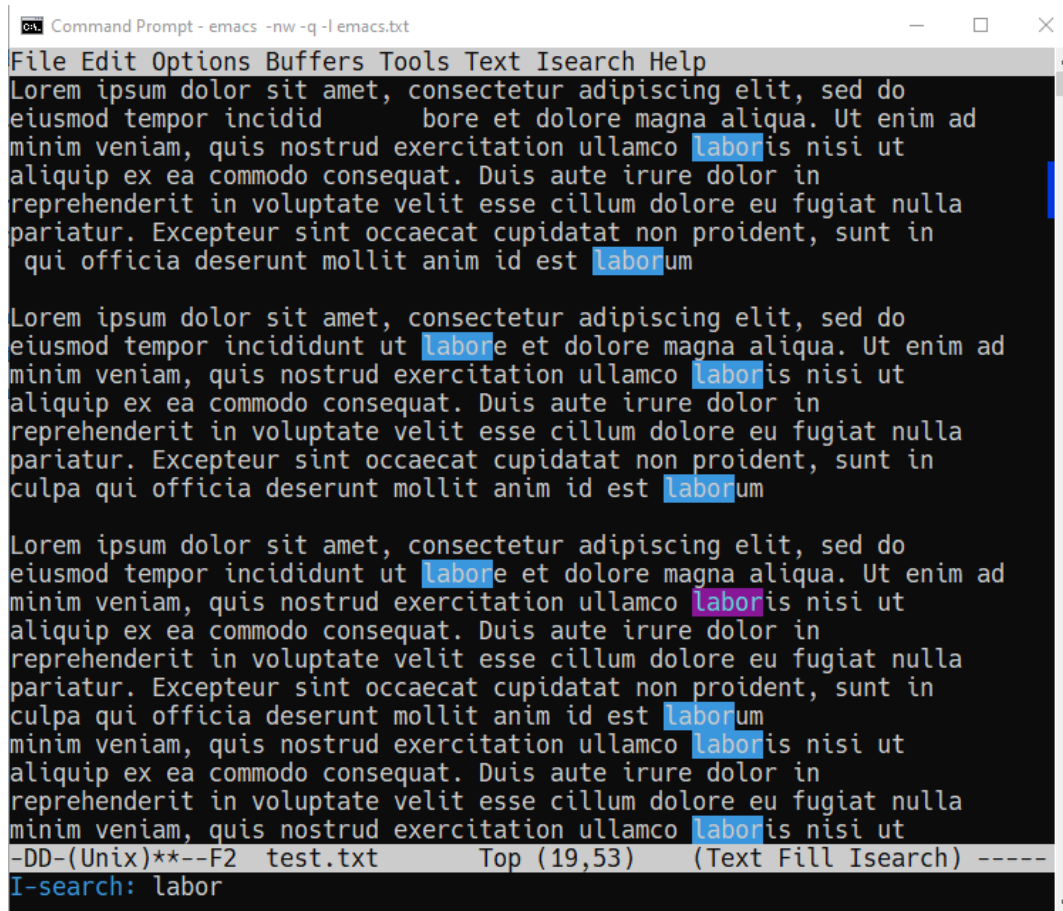


Figure 5: Highlight region after setting mark with C-SPC

- delete it (<Backdelete>)
 - cut ("kill") it (C-w)
 - copy it (M-w)
 - paste ("yank") it (C-y)
6. To try this, mark a whole paragraph (beginning with **Lorem** and ending with **laborum**) and cut it (C-w).
 7. Move to the end of the buffer (M->), enter a new line (<RET>) and yank the region there (C-y).
 8. Mark another paragraph and copy (M-w) it, then go to the top of the buffer (M-<) and yank it (C-y).
 9. If you prefer to use the Windows key bindings (cut = C-x, copy = C-c and paste = C-v) you can toggle them with M-x cua-mode.
 10. However, **cua-mode** bindings will only be active when the mark is active, that is when a mark has been set or a region selected.

7 Searching up and down

1. Emacs supports "incremental" search: start it with C-s followed by the search term:
2. Search for **l**, and then add **o** for **lo**, <backdelete> (←) and change it to **lu**, then <backdelete> again and change it to **labor**. Repeat C-s to move through the found instances.

The image shows a terminal window titled "Command Prompt - emacs -nw -q -l emacs.txt". The Emacs interface is visible with a menu bar (File, Edit, Options, Buffers, Tools, Text, Isearch, Help) and a status bar at the bottom. The main text area contains three paragraphs of Lorem Ipsum. The word "labor" is highlighted in blue in the first paragraph, "labore" in the second, and "laborum" in the third. The status bar shows "-DD-(Unix)*--F2 test.txt Top (19,53) (Text Fill Isearch) -----". The bottom line of the terminal displays "I-search: labor".

```
File Edit Options Buffers Tools Text Isearch Help
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do
eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad
minim veniam, quis nostrud exercitation ullamco laboris nisi ut
aliquip ex ea commodo consequat. Duis aute irure dolor in
reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla
pariatur. Excepteur sint occaecat cupidatat non proident, sunt in
qui officia deserunt mollit anim id est laborum

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do
eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad
minim veniam, quis nostrud exercitation ullamco laboris nisi ut
aliquip ex ea commodo consequat. Duis aute irure dolor in
reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla
pariatur. Excepteur sint occaecat cupidatat non proident, sunt in
culpa qui officia deserunt mollit anim id est laborum

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do
eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad
minim veniam, quis nostrud exercitation ullamco laboris nisi ut
aliquip ex ea commodo consequat. Duis aute irure dolor in
reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla
pariatur. Excepteur sint occaecat cupidatat non proident, sunt in
culpa qui officia deserunt mollit anim id est laborum
minim veniam, quis nostrud exercitation ullamco laboris nisi ut
aliquip ex ea commodo consequat. Duis aute irure dolor in
reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla
minim veniam, quis nostrud exercitation ullamco laboris nisi ut
-DD-(Unix)*--F2 test.txt Top (19,53) (Text Fill Isearch) -----
I-search: labor
```

Figure 6: Incremental search with C-s

3. To end the search and get back where you started: **C-g** (quit). To stay where you found an instance: **C-f**.
4. Search for **labor** again and keep going until the search wraps around the end of the buffer and goes back to the top.
5. Search backwards in the same manner with **C-r**. The minibuffer will tell you what kind of search you've got going, e.g. **Overwrapped I-search backward** when you incrementally searched past the buffer with **C-r**.
6. Stop the search (**C-g**) and start it again: if you do not enter a search term but just type **C-s** or **C-r** again, the last search term will appear.
7. Stop the search with **C-g**.

8 Directory and listing buffer

1. Remove all windows but one with **C-x 1**.
2. List the current directory with **C-x d** - this opens a new **Dired** ("Directory editor") buffer, which is very powerful.
3. **Dired** has a bunch of single letter commands. One is **s** to sort the files by *name* or by *time* (shown in mode line): Go to the top of the buffer (**M-<**), then toggle this by pressing **s** twice.
4. In the directory list, **.** stands for the current directory (the name of which appears at the top), and **..** stands for the next upper level directory.
5. Go to the **..** line and press **<RET>** - this will get you to the directory above your own. Find **Downloads**, go to that line with the cursor and press **<RET>** to get back to where you came from.
6. When the cursor is on the line for that file or directory, you can:
 - rename it with **R**
 - copy it with **C** (upper case)
 - compress it (zip it) with **c** (lower case)
 - mark it for some other command with **m**

```

Command Prompt - emacs -nw -q --file tutor.txt
File Edit Options Buffers Tools Operate Mark Regexp Immediate Subdir Help
c:/Users/birkenkrahe/Downloads:
total used in directory 278063 available 275.6 GiB
-rw-rw-rw- 1 Birkenkrahe None 446 01-20 11:02 text.txt
drwxrwxrwx 1 Administrators SYSTEM 77824 01-20 11:01 ..
dr-xr-xr-x 1 Birkenkrahe None 327680 01-20 11:01 .
-rw-rw-rw- 1 Birkenkrahe None 29914 01-20 08:56 Screenshot 2023-01-20 085326.p\
ng
-rw-rw-rw- 1 Birkenkrahe None 170602 01-20 08:39 Screenshot 2023-01-20 083903.p\
ng
-rw-rw-rw- 1 Birkenkrahe None 107643 01-20 08:38 Screenshot 2023-01-20 083823.p\
ng
-rw-rw-rw- 1 Birkenkrahe None 8362272 01-19 19:01 PythonCrashCourse3E.pdf
-rw-rw-rw- 1 Birkenkrahe None 7238584 01-19 18:51 PythonCrashCourse2ndEd (1).pdf
-DD1\%--F1 Downloads Top (1,0) (Dired by date) -----
c:/Users/birkenkrahe:
total used in directory 20169 available 275.6 GiB
dr-xr-xr-x 1 SYSTEM SYSTEM 4096 10-11 12:48 ..
drwxrwxrwx 1 Administrators SYSTEM 77824 01-20 10:54 .
dr-xr-xr-x 1 Birkenkrahe None 0 2021-08-05 3D Objects
drwxrwxrwx 1 Birkenkrahe None 0 2021-10-27 .android
drwxrwxrwx 1 Birkenkrahe None 0 2021-08-05 AppData
drwxrwxrwx 1 Birkenkrahe None 8192 12-31 20:53 Application Data
-rw-rw-rw- 1 Birkenkrahe None 266 2022-05-08 .authinfo
-rw-rw-rw- 1 Birkenkrahe None 6367 12-09 10:55 .bash_history
-rw-rw-rw- 1 Birkenkrahe None 29 12-07 11:21 .bash-profile
-rw-rw-rw- 1 Birkenkrahe None 1439 11-14 15:22 BasicSummary
drwxrwxrwx 1 Birkenkrahe None 0 12-31 21:14 bin
-DD1\%*-F1 birkenkrahe Top (1,0) (Dired by name) -----

```

Figure 7: C-x 2 splits horizontally to show 2 Dired buffers

7. Split the screen horizontally, and in one of the two screens show the directory one level up:
8. In the **Downloads** directory, find **text.txt** and copy it to the other directory:
 - Go with the cursor to the file **text.txt** and type (upper case) **C**
 - In the minibuffer, delete **Downloads/** , then **<RET>**
 - The copy of the file appears in the other buffer
9. Now, you already have several buffers open, including the file **tutor.txt**, a **Dired** buffer, and others: display all open buffers in a separate window with **C-x C-b**.
10. Change to the ***Buffer List*** window with **C-x o**. Move the cursor on the line with ***scratch*** and press **<RET>** to open the ***scratch*** buffer.
11. Now enter **C-x b** and you see the message **Switch to buffer (default *Buffer List*)**: in the mini-buffer. If you press **<RET>**, you get back to the ***Buffer List***.
12. Enter **C-x b** again, but this time type **M-p** when the cursor is in the mini-buffer: the buffer you were in before that (the **Dired** buffer) is suggested. With **M-p** you can get to previous, with **M-n** to the next default until the list is at an end.
13. Using **C-x b**, return to the **tutor.txt** buffer and delete all other windows with **C-x 1**.

9 Open shell, write, export, time stamp file

To close, there are a few special environments worth noting - you'll be using them plenty later on:

1. **M-x eshell** opens a Linux-style shell. In the shell, at the prompt **\$**, enter **pwd** - the answer should be the location of your **tutor.txt** file. You can also compile files in this shell.
2. Return to **tutor.txt**. Write the file to an Org-mode file **tutor.org** with **C-x C-w**: at the prompt in the minibuffer enter this name. The mode line will now list **tutor.org** and the mode (**Org**) instead of **tutor.txt** and the mode (**Text**).

The screenshot shows the Emacs buffer list window, which is titled "Command Prompt - emacs -nw -q -l emacs.txt". The window displays a directory listing for the path "c:/Users/birkenkrahe:" and a list of buffers.

Directory Listing:

Permissions	Count	Owner	Group	Size	Time	Name
dr-xr-xr-x	1	SYSTEM	SYSTEM	4096	10-11 12:48	..
drwxrwxrwx	1	Administrators	SYSTEM	77824	01-16 17:42	.
dr-xr-xr-x	1	Birkenkrahe	None	0	2021-08-05	3D Objects
drwxrwxrwx	1	Birkenkrahe	None	0	2021-10-27	.android
drwxrwxrwx	1	Birkenkrahe	None	0	2021-08-05	AppData
drwxrwxrwx	1	Birkenkrahe	None	8192	12-31 20:53	Application D\
-rw-rw-rw-	1	Birkenkrahe	None	266	2022-05-08	.authinfo
-rw-rw-rw-	1	Birkenkrahe	None	6367	12-09 10:55	.bash_history
-rw-rw-rw-	1	Birkenkrahe	None	29	12-07 11:21	.bash-profile
-rw-rw-rw-	1	Birkenkrahe	None	1439	11-14 15:22	BasicSummary

Buffer List:

Buffer	Size	Mode	File
CRM Buffer	9872	Dired by name	~/
.* birkenkrahe	1007	Dired by name	c:/Users/
% Users	2727	Text	~/test.txt
% *Help*	445	Text	~/text.txt
% *t.txt	47368	Text	~/t.txt
% *GNU Emacs*	950	Fundamental	
% *scratch*	145	Lisp Interaction	
% *Messages*	9498	Messages	
% *Disabled Command*	759	Help	
% *Completions*	207	Completion List	

Figure 8: C-x C-b opens the **Buffer List** in a separate buffer

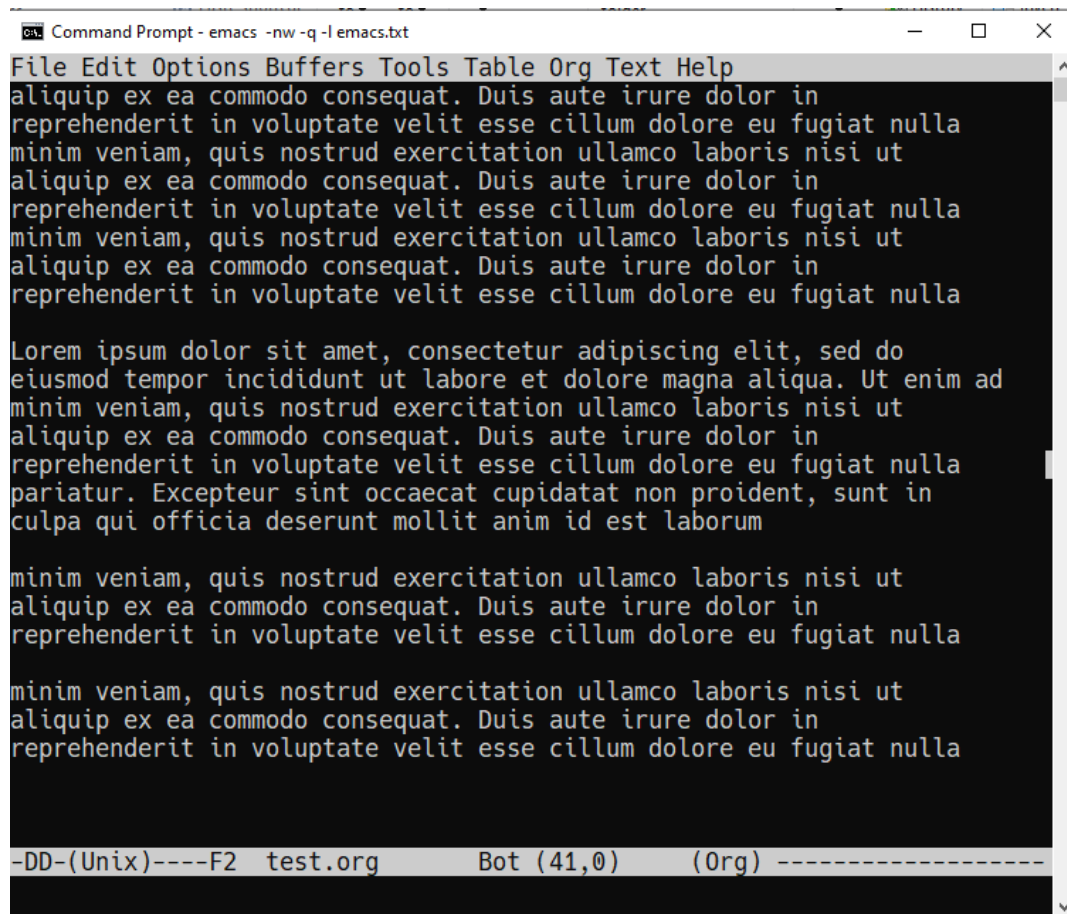


Figure 9: Modeline changes after writing the file as Org-file

3. Go to the top of the file (M-<), create an empty line and write into it:
 * **Headline** - the space between * and the text is important!
4. Org-files can be exported in a variety of file formats: HTML, LaTeX, ODT, text and more. Enter C-c C-e to open the Org-file export dispatcher. When the prompt **Export command:** in the mini-buffer appears, enter h o - the text will be opened as an HTML file in your default browser:

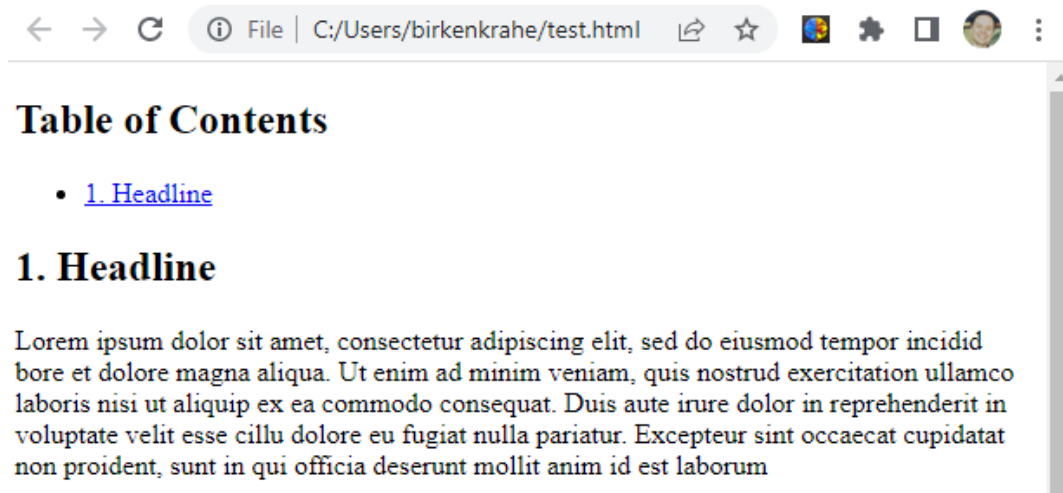


Figure 10: Top of Org-file dispatched as HTML with C-x C-e h o

5. Go back to `tutor.org` in Emacs. Remove all content from the file and save the empty file:
 - Mark whole buffer with C-x h
 - Delete with the <backdelete> key (←)
 - Save file with C-x C-s
6. Insert these lines at the top of the buffer:


```
#+TITLE: Emacs Tutorial
#+AUTHOR: YourName [PLEDGED]
Time-stamp: <>
```
7. Recall that "**Pledged**" means that you have actually completed the tutorial along the lines of the instructions and in good faith as laid out in the Lyon College Honor Pledge.

8. Insert a time stamp with the command `M-x time-stamp`:

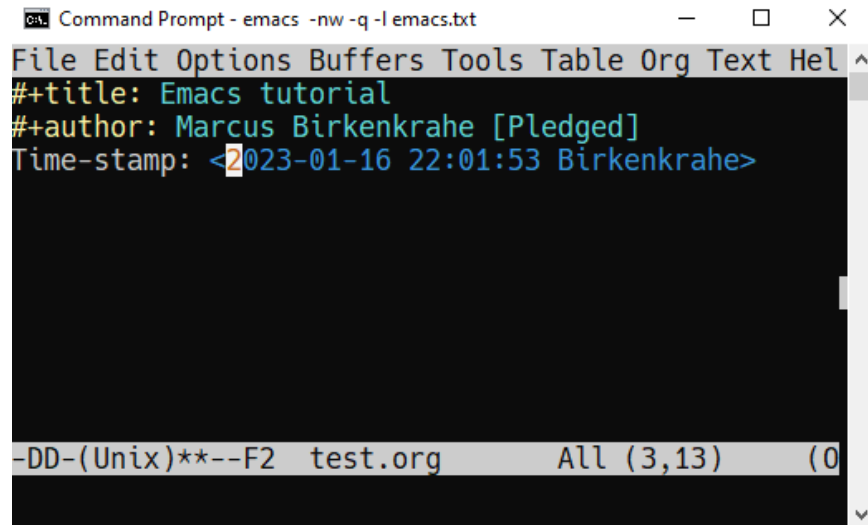


Figure 11: Inserting a time stamp in the Org-file with `M-x time-stamp`

9. Save the file with `C-x C-s` and submit it in Canvas.

10 Getting help

1. For the full tutorial experience, open the Emacs tutorial (link on start page, or `C-h t`). In class, we're going to start your home assignment with a self-made tutorial.
2. There is also complete self-documentation in hypertext stored inside Emacs. To access this system, enter `C-x i`. Info files expand into HTML files and are also available on the Web.
3. Note: you can open any Web page in Emacs with `M-x eww URL`.
4. To get help on a key binding, use `C-h k` and type the key.
5. To get help on a function, use `C-h f` and enter the function.
6. To get fuzzy help on anything, use `C-h a` followed by the term.
7. For psychological help, try `M-x doctor`.

11 Looking up online help

1. open the GNU Emacs home page in Emacs: `M-x eww RET` and give `gnu emacs` as the keyword.
2. open the Google search page in Emacs: `M-x eww RET` followed by `google.com`.
3. Look up the help for the undo command `C-/_`.
4. Look up the help for the `undo` function.
5. Look up the help for `url` then open the browser on the URL (with `C-c C-o`): `https://tinyurl.com/3j5ddtuk`

12 More information: video, refcard, FAQs

- My notes for the video (2021) "Absolute Beginner's Guide to Emacs"
- GNU Emacs reference card (PDF)
- My FAQ: enter `emacs` in the search field

13 Glossary / Emacs cheat sheet

Here is the PDF version of the cheat sheet.

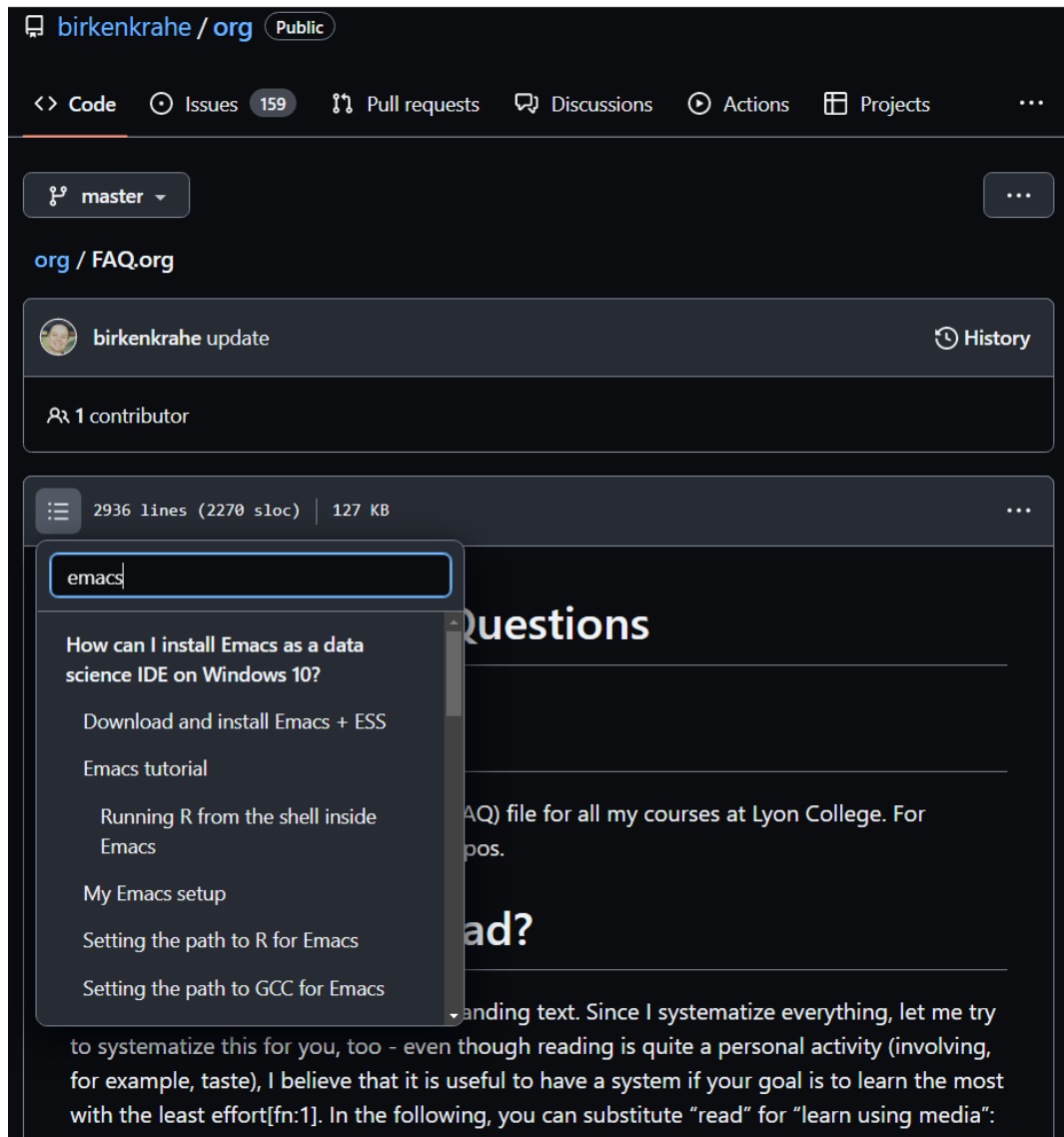


Figure 12: Searching for headlines with "Emacs" in the FAQ file

TERM/KEY	Meaning
buffer	holds text
minibuffer	messages and input
mode line	buffer information
C-x C-f	find-file
C-x i	insert-file
C-g	keyboard-quit
C-x C-s	save-buffer
C-a, C-e	start, end of line
C-f, C-b	forward-char, backward-char
M-f, M-b	forward-word, backward-word
M-<, M->	beginning, end of buffer
M-q	fill-paragraph
C-x u	undo last step
C-v, M-v	scroll up, down
M-<, M->	top, bottom of buffer
C-SPC	set mark (for region)
C-w (C-x)	cut/kill region (CUA)
C-y (C-v)	paste/yank region (CUA)
C-w (C-c)	copy region (CUA)
C-x 1	current window only
C-x 2	split window horizontally
C-x 3	split window vertically
C-x o	go to other window
C-x d	list directories (dired)
C-x C-b	list buffers
C-x b	switch to (last) buffer
M-x eshell	open (Linux-style) shell
C-c C-e	open Org export dispatch
C-c C-v t	org-babel-tangle file ²
<F6>, <F7>	display, hide inline files

14 Acknowledgements

I'm indebted to Jacob Strickland and Jacob Wolfrom for testing the first version, for their careful reading and for many comments that helped improve

²This operation refers to extracting source code from a code block. The header command `:tangle yes` has to be set.

this tutorial. Thanks to Natalie Packham for reminding me of Eliza in Emacs
(`M-x doctor`)!