

Introduction to Cognitive Robotics

Module 8: An Introduction to Functional Programming with Lisp

Lecture 4: Emacs

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Beginners Guide to Emacs

Based on Jessica Hamrick's Absolute Beginners Guide to Emacs
<http://www.jesshamrick.com/2012/09/10/absolute-beginners-guide-to-emacs/>

Before we begin ...

Emacs is old-school software, but it is extremely powerful

- Older than the mouse
- Older than current keyboard shortcuts for cut and paste such as ctrl-c and ctrl-v
- Older than you, probably

But watching the speed with which an Emacs master edits text will take your breath away

Before we begin ...

Learning to use Emacs can be bewildering at first, even infuriating, but ...

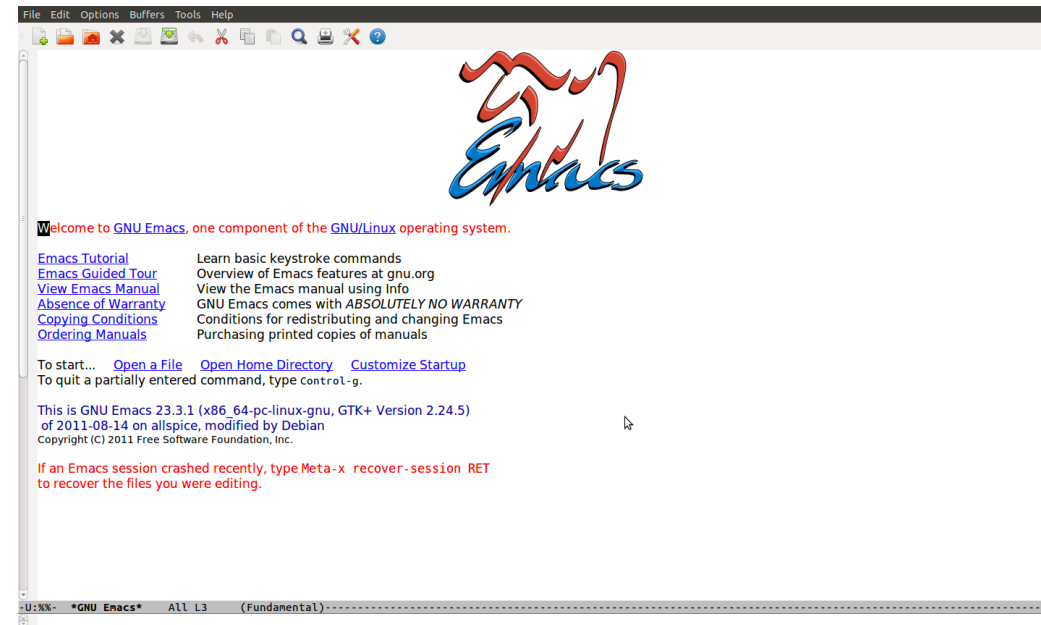
- Practice the key-strokes
- Embed them in muscle memory
- Avoid the mouse

and, eventually, it will become second-nature and your speed at editing will increase dramatically

Opening Emacs

When you first open Emacs, you will see a window like this

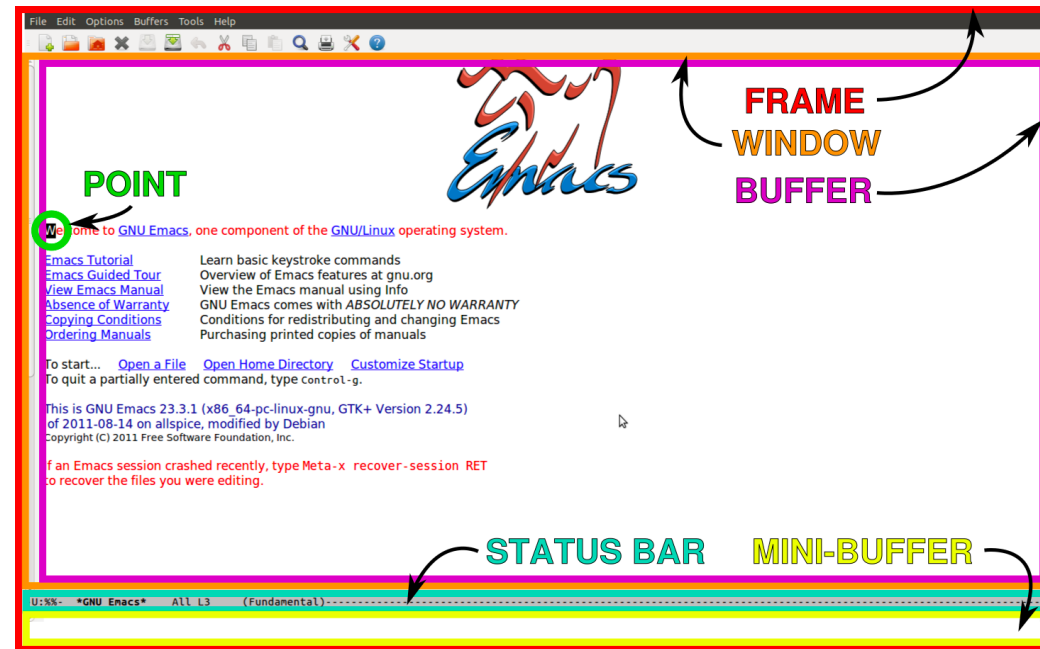
- Try not to rely on the menu bar at the top
- Learn to use the keyboard shortcuts



Credit: Jessica Hamrick <http://www.jesshamrick.com/2012/09/10/absolute-beginners-guide-to-emacs/>

Opening Emacs

Emacs refers to a **frame**, **window**, **buffer**, **point**, **status bar**, and **mini-buffer**



Credit: Jessica Hamrick <http://www.jesshamrick.com/2012/09/10/absolute-beginners-guide-to-emacs/>

Opening Emacs

Frame	this is what you would normally refer to as a window
Window	this is effectively a view; there can be many windows
Buffer	this the text that is being edited; there can be many buffers
Point	this is where the cursor is; it can also refer to a region of text
Status bar	displays information about the point and the active buffer
Mini-buffer	will occasionally display status messages you also enter Emacs commands here

Keyboard Shortcuts

There are two very important keys in Emacs;
both are used in combination with other keys

1. The “**Ctrl**” key
 - Usually written as just “**C**”
 - Combinations are written “**C-<key>**”
 - e.g. **C-f** means the “**ctrl key f key**” combination
2. The “**Meta**” key (“**Alt**” or possibly the Windows key)
 - Usually written as just “**M**”
 - Combinations are written “**M-<key>**”
 - e.g. **M-x** means the “**meta key x key**” combination

Keyboard Shortcuts

The four most important keyboard shortcuts to know are

C-h C-h help

M-x run command
e.g. **M-x ielm** runs the Emacs equivalent of the Lisp REPL loop

C-g quit, i.e. cancel an operation
e.g. if you have entered a command in the mini-buffer

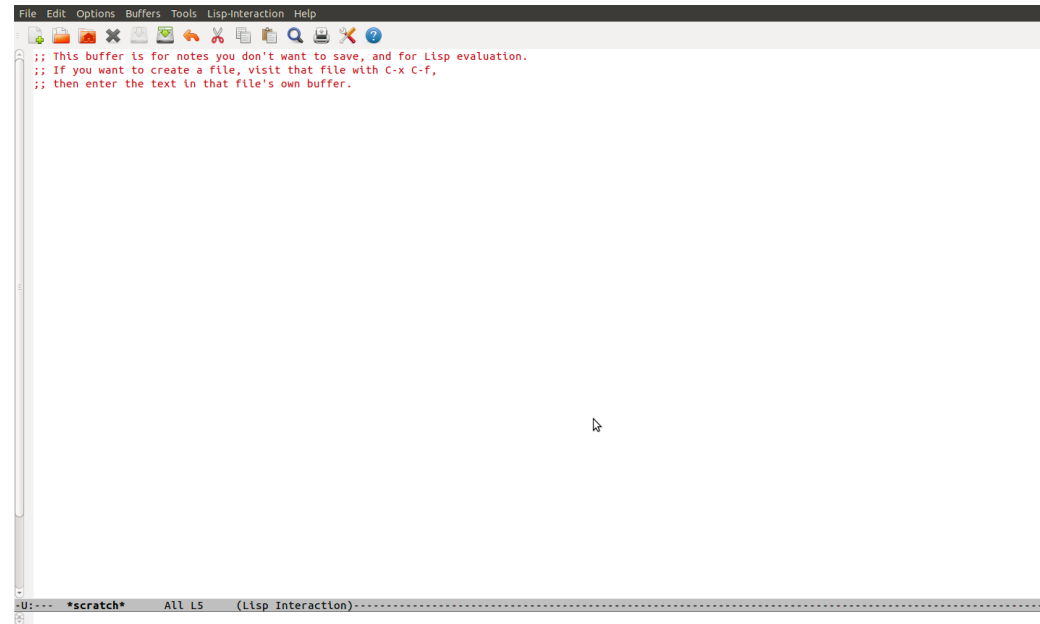
C-x C-c exit Emacs

Buffers and Windows

- You can have many buffers open at once
 - Usually they display the contents of a file
 - They can also display output from programs or other information
- By default, Emacs creates a single window and displays the ***GNU Emacs*** buffer in it
- It also always opens up a ***Messages*** buffer to display information and error messages about Emacs itself
- There is also always a ***scratch*** buffer for notes or other text you don't want to save.

Buffers and Windows

There is also always a ***scratch*** buffer for notes or other text you don't want to save.



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Buffers and Windows

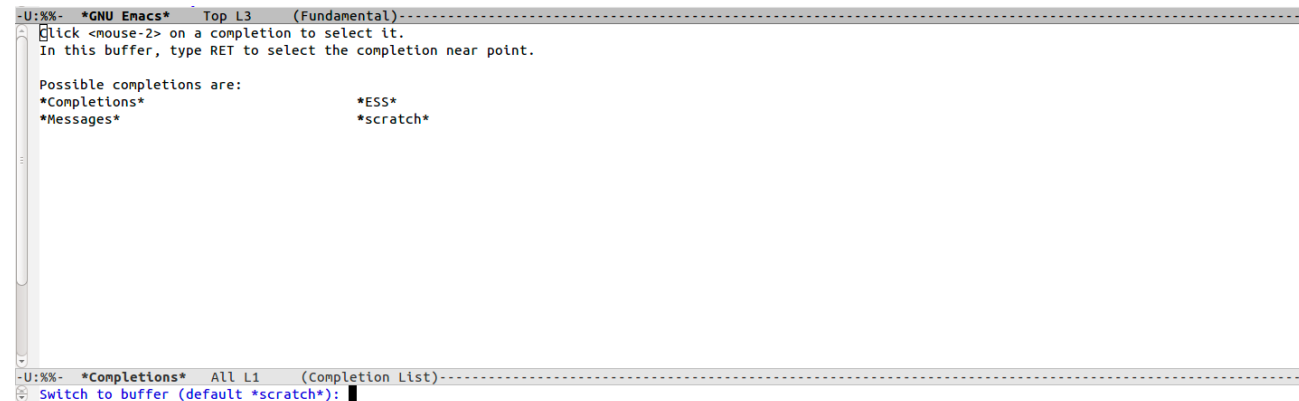
- You can't see the other buffers until you tell Emacs to view them through a window
- To do this, use the **C-x b** key combination
 - This will move the **point** to the mini-buffer and display a message that looks like “Switch to buffer (default *scratch*)”

A screenshot of an Emacs mini-buffer. The top line shows the Emacs status bar with text: "-U:%%- *GNU Emacs* All L3 (Fundamental)". The bottom line shows the mini-buffer message: "Switch to buffer (default *scratch*):".

```
-U:%%- *GNU Emacs* All L3 (Fundamental)-----  
Switch to buffer (default *scratch*):
```

Buffers and Windows

- Press the tab key from the mini-buffer prompt to see which buffers are open



The screenshot shows the GNU Emacs completion list window. The window title is `-U:%%- *GNU Emacs* Top L3 (Fundamental)-`. The main text area contains the following instructions and list:

```
Click <mouse-2> on a completion to select it.  
In this buffer, type RET to select the completion near point.  
  
Possible completions are:  
*Completions*          *ESS*  
*Messages*             *scratch*
```

The bottom of the window shows the prompt `-U:%%- *Completions* All L1 (Completion List)-` and the text `Switch to buffer (default *scratch*):` with a cursor.

- When typing the name of the buffer, tab will complete it for you
- Use C-g if you want to cancel this command

Buffers and Windows

You can also cycle through buffers sequentially with the key combinations

C-x <left arrow>

C-x <right arrow>

Buffers and Windows

Windows are just views into a buffer

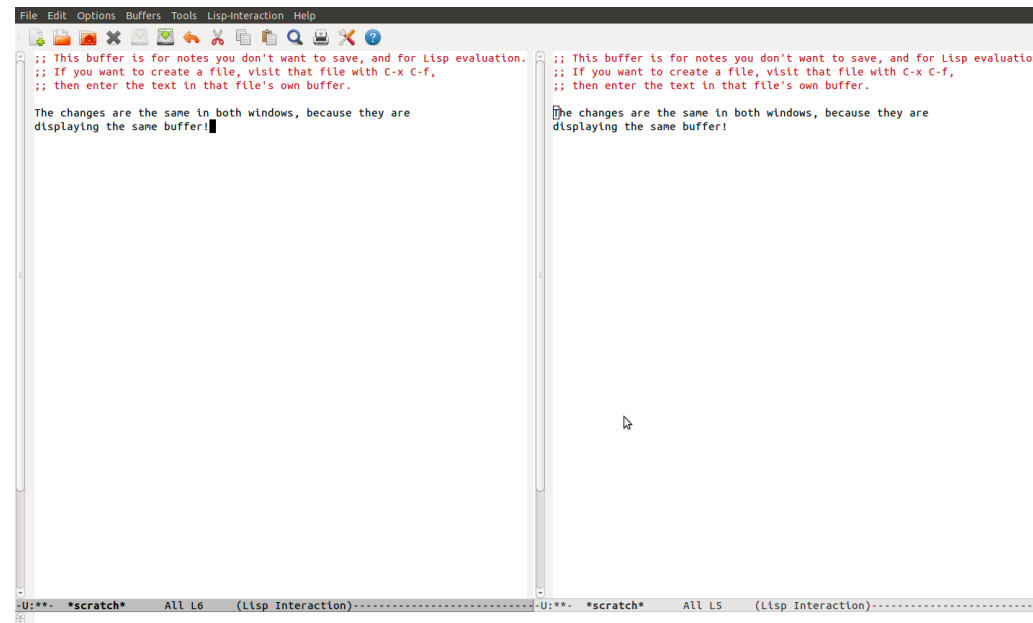
- You can open up **multiple windows** in the same frame
- You can have multiple windows displaying the **same buffer**



Credit: Jessica Hamrick <http://www.jesshamrick.com/2012/09/10/absolute-beginners-guide-to-emacs/>

Buffers and Windows

If you edit the buffer in the **left** window, the changes will be reflected in the **right** window, because they are both displaying the same buffer



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Buffers and Windows

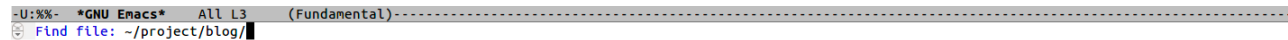
- C-x 0 close the active window
- C-x 1 close all windows except the active window
- C-x 2 split the active window vertically into two horizontal windows
- C-x 3 split the active window horizontally into two vertical windows
- C-x o change active window to next window

Closing a window does not mean that the buffer it is displaying is closed

Opening, saving, and closing buffers

To open a file and load it into a buffer, use **C-x C-f**

- This will open a prompt in the mini-buffer that says “Find file: ~/path/to/current/directory”.

A screenshot of the Emacs mini-buffer. The top bar shows the Emacs version and window title. The mini-buffer itself displays the prompt "Find file: ~/project/blog/" with a cursor at the end of the path.

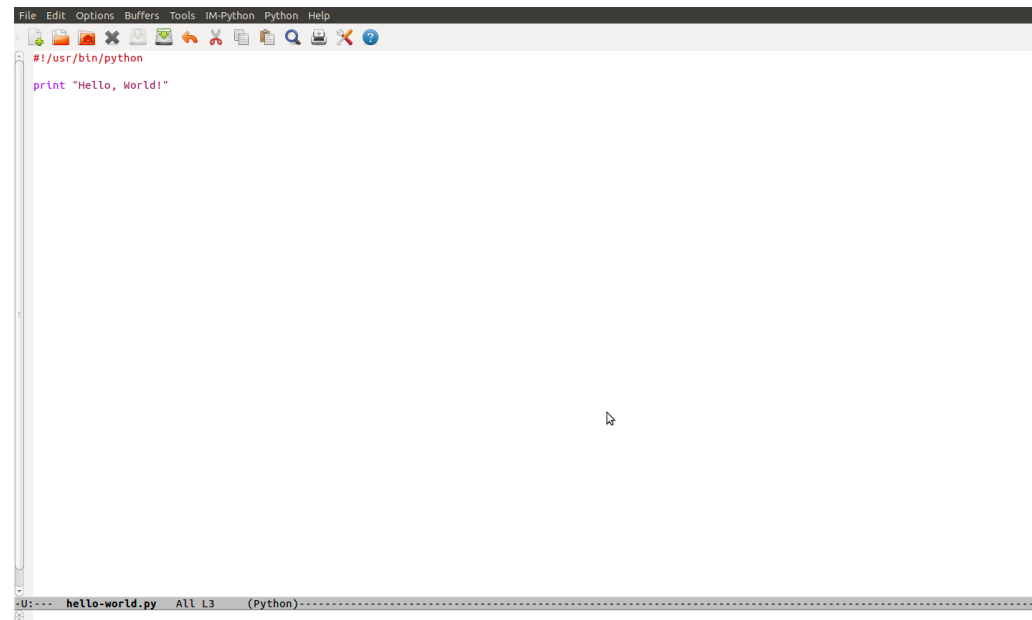
- You can then type in the name (and/or change the path) of the file you want:

A screenshot of the Emacs mini-buffer. The top bar is the same as the previous one. The mini-buffer now shows the prompt "Find file: ~/project/blog/emacs-tutorial/hello-world.py" with a cursor at the end of the path.

Opening, saving, and closing buffers

To open a file and load it into a buffer, use **C-x C-f**

Press enter, and a new buffer will be created with the file you specified



Opening, saving, and closing buffers

- If you make changes to the buffer and you want to save it back to the file on disk, use **C-x C-s**

```
-U:--- hello-world.py All L3 (Python)-----  
Wrote /home/jhamrick/project/blog/emacs-tutorial/hello-world.py
```

- If you want to save the buffer under a new file name (“Save As”), use **C-x C-w**, which will prompt you to specify the file name:

```
-U:--- hello-world.py All L3 (Python)-----  
Write file: ~/project/blog/emacs-tutorial/  
  
-U:--- hello-world.py All L3 (Python)-----  
Write file: ~/project/blog/emacs-tutorial/hello-world-different-name.py  
  
-U:--- hello-world-different-name.py All L3 (Python)-----  
Wrote /home/jhamrick/project/blog/emacs-tutorial/hello-world-different-name.py
```

- If the file already exists, it will double check to see whether you are actually intending to overwrite the existing file:

```
-U:--- hello-world-different-name.py All L3 (Python)-----  
File '~/project/blog/emacs-tutorial/hello-world-different-name.py' exists; overwrite? (y or n)
```

Opening, saving, and closing buffers

Once you are done with the buffer and want to actually close/kill it, use **C-x k**

- which will prompt you in the mini-buffer for the name of the buffer to kill (similar to the prompt given when switching buffers)
- If you don't specify a buffer, it will kill the active buffer by default.

A screenshot of the Emacs mini-buffer. The top line shows the file name 'hello-world-different-name.py', the line number 'All L3', and the language '(Python)'. The bottom line shows the prompt 'Kill buffer (default hello-world-different-name.py):' with a cursor at the end.

```
-U:--- hello-world-different-name.py All L3 (Python)-----  
Kill buffer (default hello-world-different-name.py):
```

Manipulating text

- Emacs has functions similar to the “cut”, “copy”, and “paste”
- However, Emacs uses different names:

kill operation is analogous to “cut”

yank is analogous to “paste”

- They are more sophisticated than cut and paste in that they manipulate multiple generations of cut and paste text

Manipulating text

- To select the region, move the **point** to one end and hit **C-space**
- You will see a message in the mini-buffer: “**Mark set**”
- Now move the point to the other end of the region;
this highlights the region

C-w kills the region

C-y yanks the region

M-w kills the region without deleting it

C-_ is how to undo the operation

Manipulating text

- Emacs has what is known as a **kill ring**
- This is a structure that keeps multiple instances (generations) of text that has been killed

C-y yanks the more recently killed region

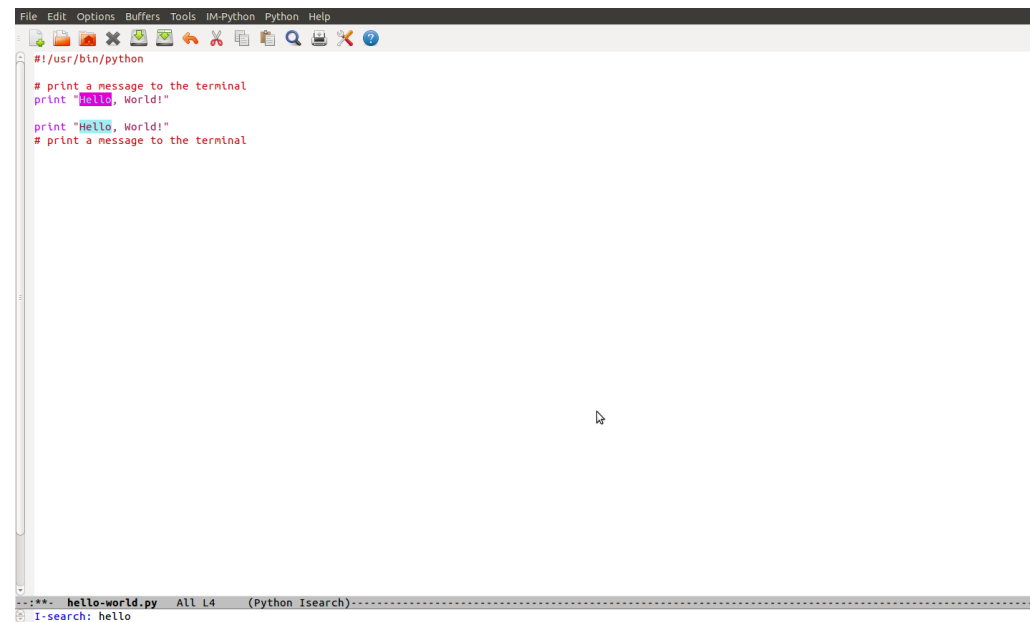
If, **without moving the point**, you then do **M-y**, the region killed before that is yanked, replacing the region just yanked

Repeating **M-y** yanks successively older generations of killed regions

Manipulating text

Search

When you reach the end of the search results, Emacs will display a “Failing I-search” message the mini-buffer

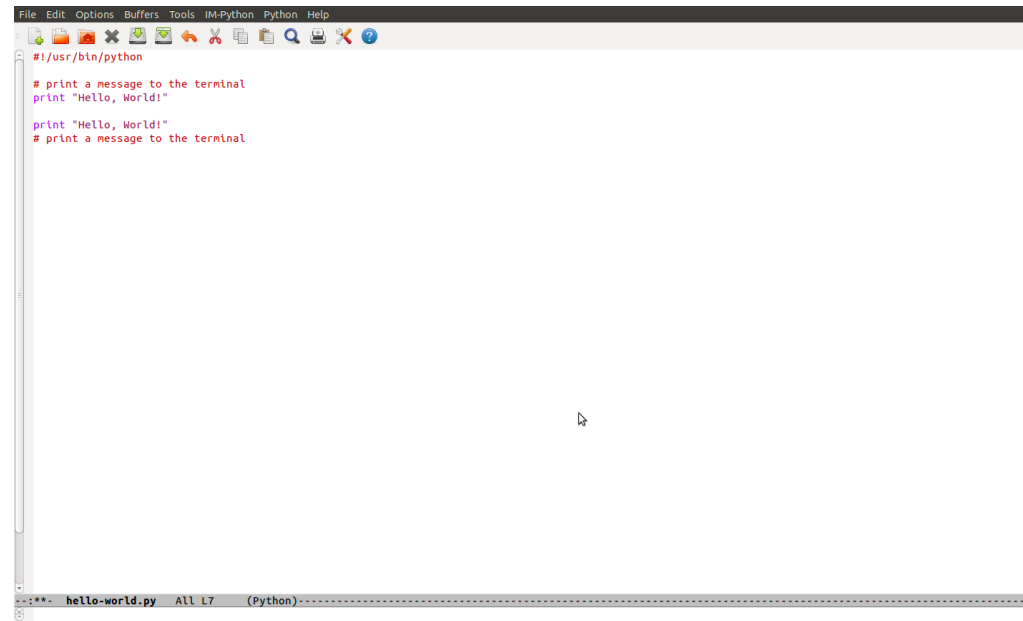


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Manipulating text

Find and replace

Let's replace Hello with Goodbye



The image shows a screenshot of the Emacs text editor. The window title bar includes menus: File, Edit, Options, Buffers, Tools, IM-Python, Python, and Help. Below the title bar is a toolbar with various icons. The main editing area contains a Python script with the following text:

```
#!/usr/bin/python
# print a message to the terminal
print "Hello, World!"
print "Hello, World!"
# print a message to the terminal
```

The status bar at the bottom of the window displays: `--:**- hello-world.py All L7 (Python)`. A mouse cursor is visible in the center of the editing area.

Credit: Jessica Hamrick <http://www.jesshamrick.com/2012/09/10/absolute-beginners-guide-to-emacs/>

Manipulating text

Find and replace

M-% and then enter the text you want to find

A screenshot of the Emacs editor interface. The top bar shows the file name 'hello-world.py', the buffer 'All L1', and the language '(Python)'. The main text area contains the command 'Query replace: Hello' with a cursor at the end of the word 'Hello'.

Then press enter

and enter the text you want to replace it with

A screenshot of the Emacs editor interface. The top bar shows the file name 'hello-world.py', the buffer 'All L1', and the language '(Python)'. The main text area contains the command 'Query replace Hello with: Goodbye' with a cursor at the end of the word 'Goodbye'.

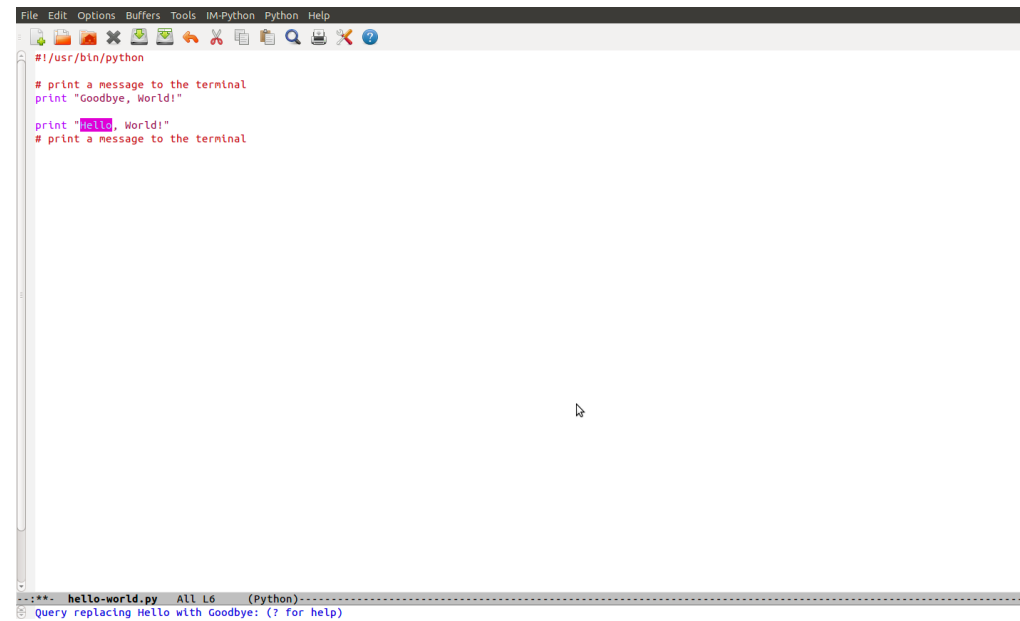
Emacs will highlight the text to be replaced

Manipulating text

Find and replace

Press 'space' to replace it or 'n' to skip it and go to the next one.

Press '!' to replace all queries.



Credit: Jessica Hamrick <http://www.jesshamrick.com/2012/09/10/absolute-beginners-guide-to-emacs/>

Exercise

Go through the built-in Emacs tutorial.

Here are three ways to start the tutorial:

1. Click the words Emacs Tutorial on the default screen that comes up when you start Emacs
2. Use the menu to select Help → Emacs Tutorial
3. Type **C-h t**
(type **ctrl-h**, then release **ctrl-h** and type the character **t**)

The tutorial takes most people about an 60-90 minutes to complete

It may be boring, but it is worth it, so persevere

Recommended Reading

Jessica Hamrick's *The Absolute Beginners Guide to Emacs*

<http://www.jesshamrick.com/2012/09/10/absolute-beginners-guide-to-emacs/>

A Guided Tour of Emacs

<https://www.gnu.org/software/emacs/tour/index.html>

GNU Emacs Reference Card

<https://www.gnu.org/software/emacs/refcards/pdf/refcard.pdf>

GNU Emacs Survival Card:

<https://www.gnu.org/software/emacs/refcards/pdf/survival.pdf>