

Org-mode coding assignment

This file contains the first Org-mode assignment, a glossary of terms, and a sample solution in the programming language C instead of R. The main challenge is not the programming language but managing the complexity of writing a "literate" program, which includes layout like headlines, links, documentation, source code and result elements. Note that the sample solution also lists relevant references at the end¹.

Assignment

Create an Org-mode file with the following characteristics:

- A headline: * My first Org-mode file.
- A paragraph that explains what the following code block does.
- A R source code block:

```
#+name: [name]
#+begin_src [header]
  [statements]
#+end_src
```

- In the source block, replace [name] by mtcars.
- In the header of the source block, replace [header] by these arguments:

```
:session *R*
:results output
:tangle first.R
:exports both
:comments both
:var DATA="mtcars"
```

- In the body of the code block, replace the [statements] by a single command preceded by a comment:

```
## print structure of mtcars data frame
str(DATA)
```

- Save the file as YourName.org (e.g. MarcusBirkenkrahe.org)
- Upload the file to [this GitHub repo](#): /birkenkrahe/ds205/assignments/org-mode

Example solution in C (not R)

Note: when you look at this as a PDF or on GitHub, you will not see the Org commands delimited by #+. Org-mode files are meant to be edited/viewed in Emacs.

- My first Org-mode file
 - The function puts() prints out a string (text in quotes) to the screen.
 - In the code block, the syntax is highlighted (which colors are used exactly depends on the Emacs theme used).
 - The code block header has the following arguments:

HEADER ARGUMENT	MEANING
-----------------	---------

HEADER ARGUMENT	MEANING
:main yes	wrap puts statement in int main(void) { } function
:includes stdio.h	include standard input/output header file
:tangle first.c	export source code as C file first.c ("tangle")
:exports both	both result and source code will be exported
:comments both	link source code and org files, add comments to source
:results raw	insert output directly in org format into org file

```
// print a string
puts("hello world");
```

hello world hello world

Executing the program on the command line

In Emacs (provided the C compiler gcc is available and in the PATH):

```
M-x eshell
gcc -o first first.c
./first.exe
```

```
emacs@LCIVYZ1B3
c:/Users/birkenkrahe/Documents/GitHub/ds205/assignments/org-mode:
total used in directory 884 available 334.1 GiB
drwxrwxrwx 1 Birkenkrahe None 0 12-30 08:43 ..
drwxrwxrwx 1 Birkenkrahe None 4096 12-30 14:02 .
-rw-rw-rw- 1 Birkenkrahe None 1334 12-30 12:35 first.c
-rwxrwxrwx 1 Birkenkrahe None 48432 12-30 13:59 first.exe
drwxrwxrwx 1 Birkenkrahe None 0 12-30 13:58 img
-rw-rw-rw- 1 Birkenkrahe None 6568 12-30 14:00 README.org
-rw-rw-rw- 1 Birkenkrahe None 844136 12-30 08:40 README.pdf

1 1\%%- org-mode<ds205> All (7,52) (Dired by name)

~/Documents/GitHub/ds205/assignments/org-mode $
~/Documents/GitHub/ds205/assignments/org-mode $ gcc -o first first.c
~/Documents/GitHub/ds205/assignments/org-mode $ ./first.exe
hello world
~/Documents/GitHub/ds205/assignments/org-mode $

2 1\--- *eshell* Bot (396,0) (Eshell)
```

References

- GCC, the GNU Compiler Collection. [URL: gcc.gnu.org](http://gcc.gnu.org).
- GitHub: software hosting platform. [URL: github.com](http://github.com).
- Kernighan, Brian W.; Ritchie, Dennis M. (February 1978). The C Programming Language (1st ed.). Englewood Cliffs, NJ: Prentice Hall. ISBN 0-13-110163-3. [URL: archive.org](http://archive.org).
- Knuth (1992). Literate Programming. Stanford: CSLI. [URL: stanford.edu](http://stanford.edu).
- mtcars: Motor Trend Car Road Tests. [URL: rdocumentation.org](http://rdocumentation.org).
- R Core Team (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. [URL: r-project.org](http://r-project.org).
- str: Compactly Display the Structure of an Arbitrary R Object. [URL: rdocumentation.org](http://rdocumentation.org).
- tecosaur (n.d.). The Org Manual: 16 Working with Source Code [website]. [URL: orgmode.org](http://orgmode.org).

Glossary

Your org files and notebooks do not always have to have glossaries, but if you have non-trivial information ready to be summarized or visualized, you should use tables and graphs to do so.

TERM	EXPLANATION
Org-mode headline	Starts with one ore more * characters
Org-mode code block	An executable (in some language) block of text
Org-mode code block header	Language and optional arguments
Argument	Some data passed on for further processing
Function	Algorithm $f(x)$ expecting an argument x
String	Data type representing text
Begin/End statement	Symbol to signal the start/end of a command
File	Storage unit in a computer
GitHub repo	Cloud storage platform
Uploading	Sending so that file exists locally and remotely

Footnotes:

¹ The references have URLs, and these URLs have inline links. To add a link in GNU Emacs Org-mode, use the key sequence `C-x C-l [link] RET (~org-insert-link)`. In published Org files, references should be used in the text as inline citations like in the example below, which links the first mention of C to a reference.

Create a C source block in (Kernighan/Ritchie, 1978).

This is also why there are so many references - one reference for every non-trivial concept or software tool used!

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[Validate](#)