Introduction to Org Mode for ESS users

part of the ESS intro series

Greg Minshall

April 15, 2021

Org Mode

"If Emacs is the distribution, Org Mode is the entire desktop environment one runs on top of it."
Emacs Org Mode is an outline-structured, plain text, file format and backing software that allows you to (among many other things)

- markup text via asteriskizing, `equalizing`, ~~plusizing~~, *slashizing*, `tildeizing`, underscorizing, etc.
- export a file, or a subtree of it, as, e.g., an .html or .pdf file
- take notes
- create agendas (items with date elements)
- organize your LIFE!
- do calculations – good support for math, LaTeX, etc.
- table support for storing information (including support for formulae)

Babel – Org Mode support for programming

One can write source code in "source blocks". Source blocks have the following attributes:

- a name (optional)
- source code, one language per source block (though, if desired, multiple languages per file)
- "header arguments", parameters which define how a source block interacts with its environment

"To a source block", you can

- evaluate it ([C-c C-c][1]) to produce results, which, in turn, may be used as input to another source block. NB: there are security issues here: you will need to customize the Emacs variable `org-babel-load-languages` , and you will be prompted each time before a code block is evaluated
- export ([C-c C-e]) the code, its results, or both, with other parts of the .org file, into a .html, .pdf, or other format file
- tangle it ([C-c C-v t]), that is, write the source code itself into a separate file, that might be used as input to a compilation or some other packaging step, or be a stand alone script (`Rscript`, say).
- edit it, either in place in the Org buffer, or "stand alone" in an *OrgSrc* buffer ([C-c ’][1]), with the major mode set to that of the language (so, for R, ESS[R]).

[1] with `point` in the source block

R source blocks

In particular, one can have a source block with R code

```
#+begin_src R :results value
    "here, the last value executed is the result"
#+end_src

#+begin_src R :results output
    cat("here, the output is the result\n")
#+end_src
```

To evaluate a source block, type `[C-c C-c]` or `[C-c C-v e]`. To edit this source block in an OrgSrc buffer with major mode `ESS[R]`, type `[C-c ']`. To close the OrgSrc buffer and return to the Org buffer, type `[C-c ']` again.

Header arguments

:noweb allows code from another place in the org file to be inserted at a point in the current org file when evaluating or exporting.

:var allows results of other computations in an org file to be used as input to this source block

:results defines how results are collected after evaluation of the source block, and how (or whether) they are inserted into the org buffer

:session outlined on next slide

:tangle name of file to which to *tangle* the contents of this source block

`:session` header argument

- Normally, Org Mode evaluates a source block by forking a new R subprocess, passing it the code (and any variables to be used as input), letting the code run, capturing the results, and then disposing of the R subprocess. This ensures that code runs in a fresh environment.
- Often, especially when doing statistical analysis, we would like to build up state over time, by executing various code blocks, and/or by poking in the environment.
- Also, we may want to debug our code in a convenient way.

The `:session` header argument causes evaluation of a source block to take place in a long-running inferior ESS (`iESS`) process; all source code blocks with the same `:session` name run in the same `iESS` process.

A style of working

In Emacs, I find that I flit between three buffers:

- the .org file
  - often doing minor in-line edits in a source block
- an OrgSrc edit buffer
  - for more major edits (and get font lock, etc.)
  - these buffers come and go, as needed
- the R `:session` buffer to
  - run code
  - examine state
  - debug as needed

Other resources

- the official Quick Start guide, a very good introduction to Org Mode
- the Org Mode web page
- the Org Mode worg site (you may find it useful to take a linear stroll through the worg site map)
- the other presentations in this ESS intro series
- the beamer slides for this tutorial are here (pdf)
- a .org file for experimenting (an HTML version here and a PDF one here)

Tutorials, Videos

There are some nice tutorials:

- a somewhat older one is from Erik Iverson, org-mode-R-tutorial.org
- a more recent one from Vikas Rawal, orgpapers.org

And, some videos, including:

- Rainer König's screencasts about Org Mode (also available as a course on Udemy)
- DT ("Distro Tube"?) has yet another introductory video.

Farewell

Thank you for "attending" this tutorial. I hope it has given you a sense of Org Mode. This has been more of a teaser than an exhaustive introduction, but the resources listed above should be enough to ease you into using R with Org Mode.

Acknowledgements

Thanks to all the authors, maintainers, and cooperative users of R, Emacs, ESS, and the like. While I retain responsibility for errors, for specific suggestions on this tutorial I thank C Berry and V Arel-Bundock.