Module 1 - Lesson 02

Literate Programming & Dynamic Documentation

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Outline

- Literate Programming - The `WEB` System
- Dynamic Documentation - `SWEAVE`
- The Next Generation - `knitr` + `rmarkdown`
- Universal Document Converter - `Pandoc`
- The **RStudio** "HUB" via `rmarkdown`

The WEB System by Donald Knuth

The first published literate programming environment was WEB. Donald Knuth introduced it back in 1981 combining his TeX typesetting system with the Pascal programming language.

Literate Programming

Donald E. Knuth
Computer Science Department, Stanford University, Stanford, CA 94305, USA

WEB

1

1. http://www.literateprogramming.com/knuthweb.pdf

More Literate Programming Tools

Since WEB was introduced in 1981, many other programs implementing literate programming have emerged over time including:

- CWEB also created by Donald Knuth with Silvio Levy which was adapted for the C and C++ programming language instead of Pascal
- Axiom developed by IBM
- Noweb
- Literate
- Funnel WEB
- Molly
- Codnar
- Jupyter Notebook (formerly IPython Notebook)
- R Notebooks

SWEAVE by Friedrich Leisch

Sweave: Dynamic Generation of Statistical Reports Using Literate Data Analysis

What is Sweave?

2

2. Friedrich Leisch. Sweave: Dynamic generation of statistical reports using literate data analysis. In Wolfgang Härdle and Bernd Rönz, editors, Compstat 2002 - Proceedings in Computational Statistics, pages 575-580. Physica Verlag, Heidelberg, 2002. ISBN 3-7908-1517-9.

The next evolution `<-` `knitr`

In 2012 Yihui Xie, created and released the `knitr` package for R to extend the capabilities of `SWEAVE` beyond LaTeX.

3

3. https://yihui.name/knitr/

The next evolution `<- ... + rmarkdown`

- In 2014, RStudio released `rmarkdown` to extend the `markdown` language originally intended to write documents for the "web" .[4]

- `rmarkdown` leverages `Pandoc` [5] to convert between formats: from HTML (readable by web browsers) to DOC (such as from Microsoft Word or Google Docs) to ODT (Libre Office) to PDF (portable document format) to others like EPUB (e-books), HTML5 slide shows (slidy, ioslides), and TeX based documents and slides (Beamer).

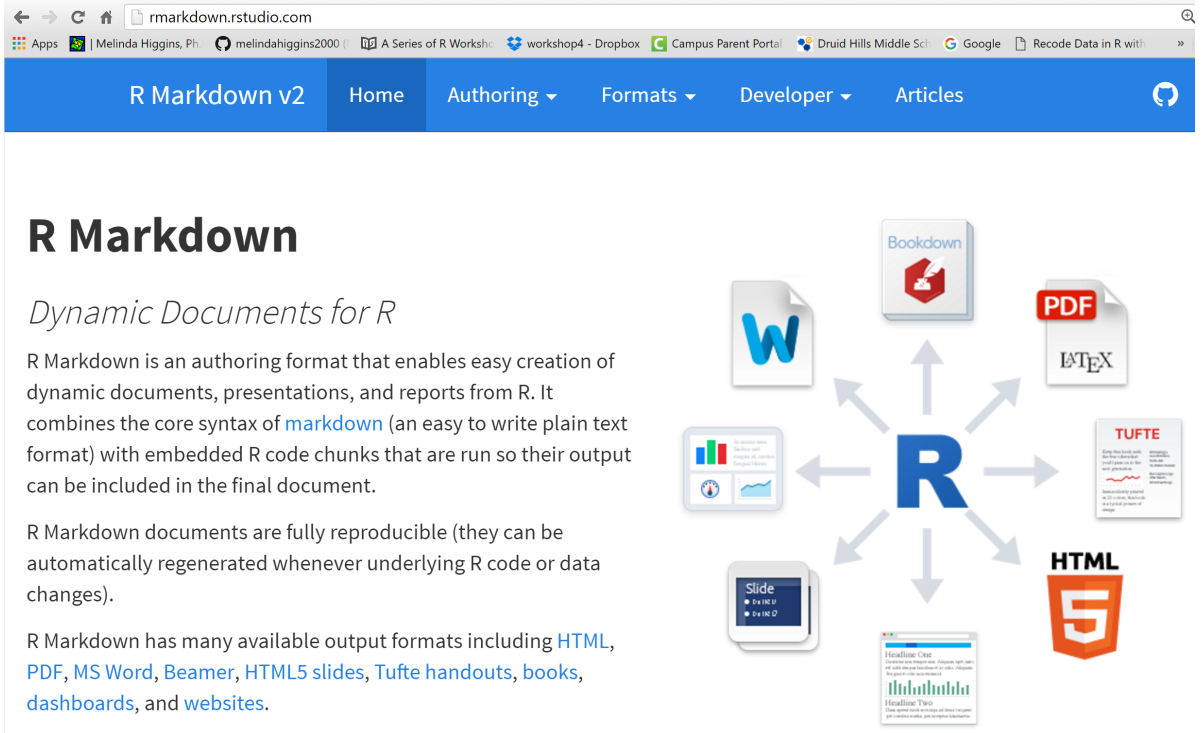
4. https://daringfireball.net/projects/markdown/syntax
5. http://pandoc.org/index.html

Pandoc https://pandoc.org/

…often called the for converting files from one format to another. Pandoc can convert documents in markdown, reStructuredText, textile, HTML, DocBook, LaTeX, MediaWiki markup, TWiki markup, OPML, Emacs Org-Mode, Txt2Tags, Microsoft Word docx, LibreOffice ODT, EPUB, or Haddock markup to

- HTML formats: XHTML, HTML5,Slidy, reveal.js, Slideous, S5, DZSlides.
- Word processor formats: Microsoft Word docx, OpenOffice/LibreOffice ODT, OpenDocument XML
- Ebooks: EPUB version 2 or 3, FictionBook2
- Documentation formats: DocBook, TEI Simple, GNU TexInfo, Groff man pages, Haddock markup
- Page layout formats: InDesign ICML
- Outline formats: OPML
- TeX formats: LaTeX, ConTeXt, LaTeX Beamer slides
- PDF via LaTeX
- Lightweight markup formats: Markdown (including CommonMark), reStructuredText, AsciiDoc, MediaWiki markup, DokuWiki markup, Emacs Org-Mode, Textile
- Custom formats: written in lua.

The RStudio"HUB"



Next in Lesson 03 …

Reproducible Principles & Practices

plus

Examples of Reproducible Documents & Templates