

Make

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Make

- Make is a utility for managing projects
- Make is especially useful for projects that involve several inter-related programs/scripts in different languages
- Consider an example where we have:
 1. A data file `theirData.csv`
 2. A Perl program that processes this data `dataProc.pl`
 3. The output of that Perl program `myData.csv`
 4. An R program `figure.R` that reads in `myData.csv` and produces a figure
 5. The resulting figure `figure.eps`
 6. A Latex document that reads in that figure `document.tex`
 7. The output of that Latex Document
`document.dvi`, `document.ps`, `document.pdf`

A Makefile

```
##A Makefile for creating document.*
##Brian Caffo 11/17/04
myData.csv : theirData.csv dataProc.pl
    ./dataProc.pl < theirData.csv > myData.csv
figure.eps : figure.R myData.csv
    R --no-save < figure.R
document.dvi : document.tex figure.eps
    latex document.tex
document.ps document.pdf : document.dvi
    dvips document.dvi -o
    dvi2pdf document.dvi
    : document.dvi document.ps document.pdf
clean :
    rm -rf *~
```

Details

- The make file is stored in a file called `Makefile` by default
- Emacs has an environment for autoindenting and color coding make files
- typing `make` at the shell prompt will generate the pdf, ps and dvi files
- typing `make myData.csv` will make that file
- Make only creates the necessary files. If you only edit the `document.tex` file and type `make document.dvi` it will only run `LATEX`. If you change `theirData.csv` it will rerun everything.

More on Make

- O'Reilly has a good book on Make
- Most Unix/Linux programs are distributed with make
Usually typing `make` compiles all the necessary files
Typing `make install` will put all the files in the right place
- Make is a wonderful tool (as the example illustrates) for doing reproducible research
- After you are done with a paper, organize the code and create a `Makefile` so that people can reproduce your research
- The R “tools.zip” package, contains a version of Make for Microsoft Windows that you can run at the DOS prompt
- Cygwin also has make