Intro to RMarkdown

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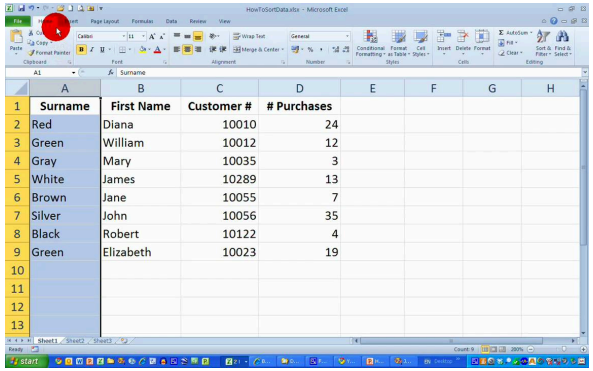
Schloss lab meeting

1-25-16

Old school: research reports

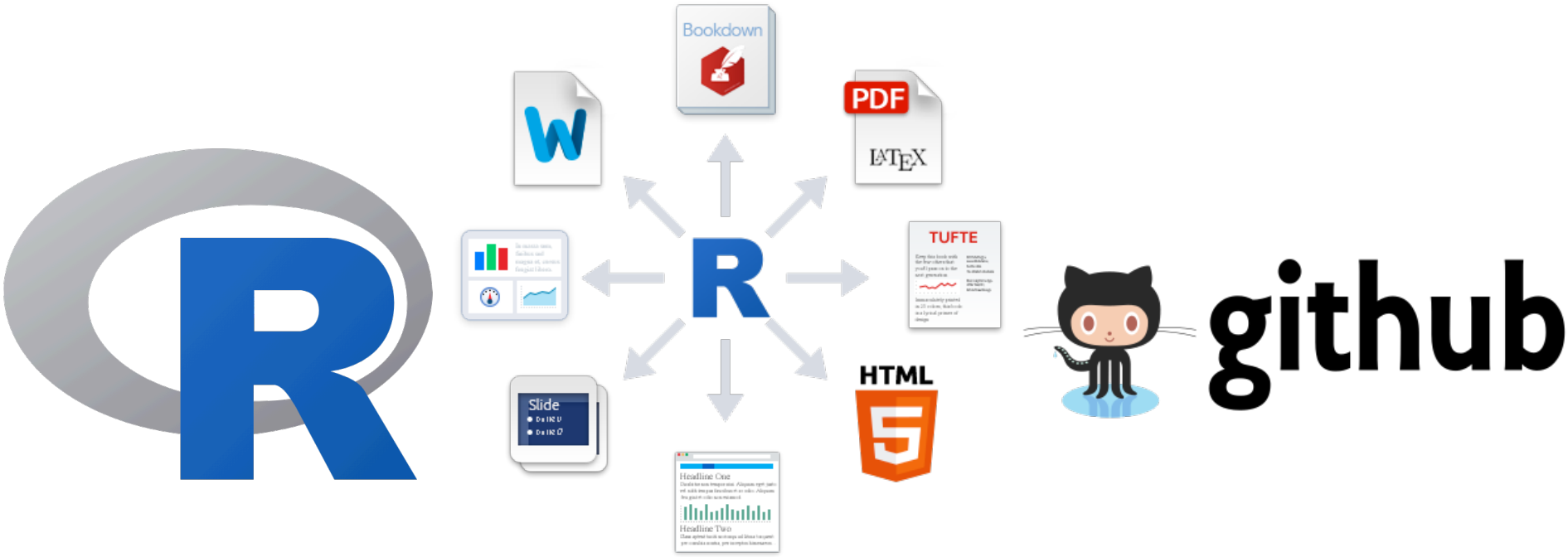


	A	B	C	D	E	F	G	H
1	Surname	First Name	Customer #	# Purchases				
2	Red	Diana	10010	24				
3	Green	William	10012	12				
4	Gray	Mary	10035	3				
5	White	James	10289	13				
6	Brown	Jane	10055	7				
7	Silver	John	10056	35				
8	Black	Robert	10122	4				
9	Green	Elizabeth	10023	19				
10								
11								
12								
13								

But what if something changes? What if you repeat an experiment? What if you find out your values were calculated improperly?

What if someone wants to use your data? See how you did something? Are you going to have your PI send them Excel formulas??

New school: reproducible reports



- If you need to change a value – do it once in R
- Report generated through RMarkdown will incorporate the new value into calculations and reports
- Need to add a figure? Can do that without renumbering by hand
- Someone wants your data or formulas? Easy!

NOTHING
worth having
COMES EASY

R + Markdown = RMarkdown

chunks.Rmd

Knit HTML | Chunks

```
1  R Code Chunks
2  ==========================================
3
4  With R Markdown, you can insert R code
   chunks including plots:
5
6  ```{r qplot, fig.width=4, fig.height=3,
   message=FALSE}
7  # quick summary and plot
8  library(ggplot2)
9  summary(cars)
10 qplot(speed, dist, data=cars) +
11       geom_smooth()
12 ```
13
```

RStudio: Preview HTML

Preview: ~/chunks.html | Save As | Publish

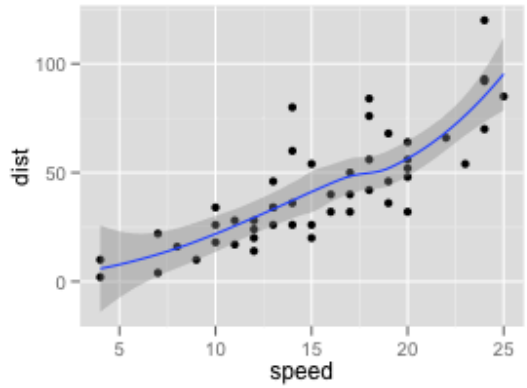
R Code Chunks

With R Markdown, you can insert R code chunks including plots:

```
# quick summary and plot
library(ggplot2)
summary(cars)
```

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2
##  1st Qu.:12.0   1st Qu.: 26
##  Median :15.0   Median : 36
##  Mean   :15.4   Mean   : 43
##  3rd Qu.:19.0   3rd Qu.: 56
##  Max.   :25.0   Max.   :120
```

```
qplot(speed, dist, data = cars) + geom_smooth()
```



The bones of an .Rmd- Header

```
---
title: "Diamonds- A girl's best friend or a waste
output:
  html_document:
    keep_md: TRUE
---
```

```
---
title: "Spatial variation of the native colon microbiota in healthy adults"
csl: aacr.csl
fontsize: 12pt
output:
  pdf_document:
    includes: null
    keep_tex: yes
  html_document: default
  word_document: default
sansfont: Arial
header-includes:
- \usepackage{setspace}
- \doublespacing
- \usepackage{lineno}
- \linenumbers
- \renewcommand{\familydefault}{\sfdefault}
- \usepackage{graphicx}
geometry: margin=1.0in
bibliography: references.bib
---
```

Chunks and parameters

```
```{r dependencies, echo=FALSE, warning = FALSE, message=FALSE}
pack_used <- c('randomForest','ggplot2', 'pROC', 'knitr','dplyr','AUCRF', 'tidyr', 'caret', '
'cowplot')
for (dep in pack_used){
  if (dep %in% installed.packages()[,"Package"] == FALSE){
    install.packages(as.character(dep), repos = 'http://cran.us.r-project.org',
                     quiet=TRUE);
  }
  library(dep, verbose=FALSE, character.only=TRUE)
}
```
```

Chunk parameters

- There are tons
  - Code evaluation
  - Results
  - Plots

  https://www.rstudio.com/wp-content/uploads/2015/03/rmarkdown-reference.pdf

Text and formatting

- Headers, bullets, bold, italics
  - # Header
    - ## smaller header
  - * bullet
    - + sub bullet
  - **bold**, _italic_
- Inline values
  - “There were `r length(thing)` things in the room”
  - “There were 8 things in the room”

Demo a basic RMD

Exercises!

- https://github.com/kjflynn/rmd_labmeeting

Advanced tricks from senior members of the lab

- Anyone?

Advanced exercise

- Create a bibliography for your report using bibtex
- Cite a paper about diamonds
- Create a file called references.bib in the repo
- Put the bibtex citation in there
- https://www.doi2bib.org/
- Reference in the text using [@paper]