-Ladies Helsinki

Reporting with R Markdown

February 17 - @Töölö Library

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Today's agenda:

- Learning reproducible research concept
- Starting with creating projects
- Creating a rmarkdown file
- Learning basic rmarkdown features
- Making simple analysis inside rmarkdown with tidyverse
- Sharing documents with the world!

Sources

- https://monashdatafluency.github.io/r-rep-res/
- https://rstudio.com/wp-content/uploads/2015/02/rmarkdown-cheatsheet.pdf
- https://rmarkdown.rstudio.com
- https://yihui.org/knitr/

Reproducible Research

- Future you or someone can take your files, run the analysis and get the same results (figures, tables, numbers, etc.).

- Well documented research, well documented codes, well explained reasons behind your analysis

- Collaborate and share results via Git + GitHub

- R markdown is a good way to write and communicate your research

Workflow: Projects

1

New Project

Create Project

New Directory
Start a project in a brand new working directory

Existing Directory
Associate a project with an existing working directory

Version Control
Checkout a project from a version control repository

Cancel

2

New Project

Back

Project Type

Empty Project
Create a new project in an empty directory

R Package
Create a new R package

Shiny Web Application
Create a new Shiny web application

Cancel

3

New Project

Back

Create New Project

Directory name:
rladieshelsinki

Create project as subdirectory of:
~/Desktop

Browse...

Create a git repository

Open in new session

Create Project

Cancel

Packages

&

Loading Data

Install.Packages & Library

Install the Packages by running the codes in the Console

- `install.packages("tidyverse")`

Then load the packages by running the following codes

- `library(tidyverse)`

R Markdown

What is Markdown?

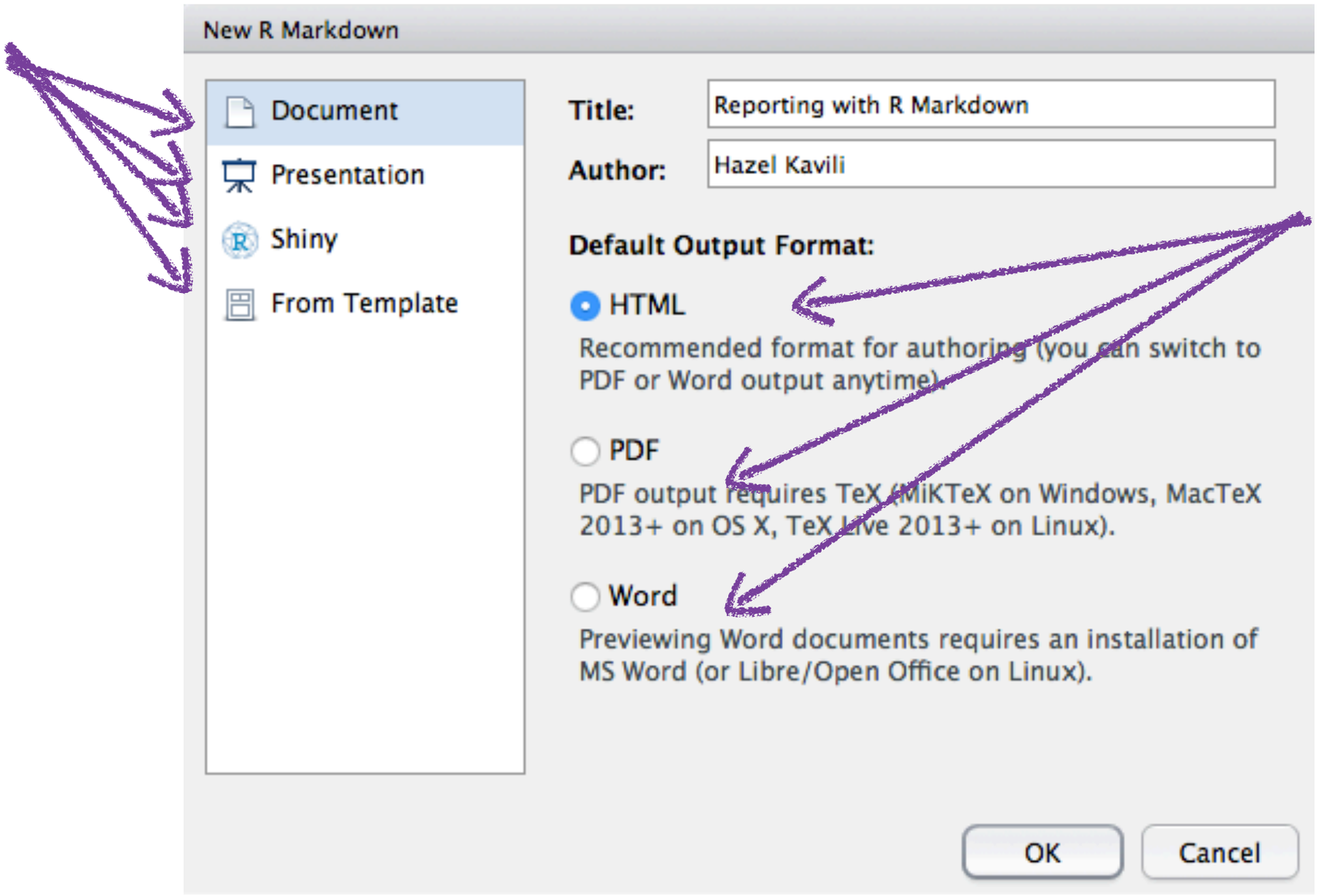
- Markdown is a particular type of markup language
- Markup languages are designed produce documents from plain text
- PDF, Word, HTML
- Like LaTeX but more human friendly :)

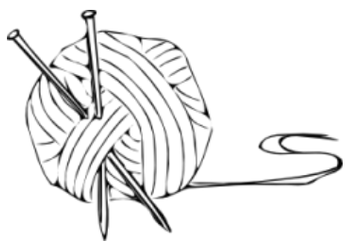
Why use Markdown?

- It is flexible
- Focus on content rather than coding debugging errors
- Markdown files can easily be converted to many different formats
- Fastest way to internet

Starting with R Markdown

- File -> New File -> R Markdown

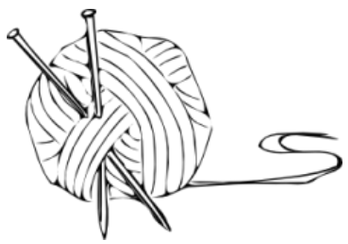




R Markdown

YAML header

```
---
title: “Reporting with R Markdown"
author: "Hazel Kavili"
date: "3/11/2017"
output: html_document
---
```



R Markdown Basics

```
# Header1

## Header2

### Header3

#### Header4

##### Header5

###### Header6
```

Header1

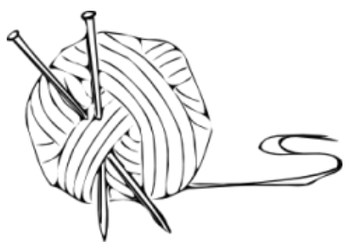
Header2

Header3

Header4

Header5

Header6



R Markdown Basics

- *Italics* and **Bold**

```
### My style
Hello I am Hazel from
**Istanbul** and I am
a **huge** fan of
*Harry Potter*
```

My style

Hello I am Hazel from **Istanbul** and I am a **huge** fan of *Harry Potter*

- Add list

```
### My ordered list
1. apple
2. banana
3. milk
```

My ordered list

1. apple
2. banana
3. milk

R Markdown Basics

- Add link

[caption](link)

[mygithub](https://github.com/UniversalTourist)

- Add picture

![caption](path)

![earth](/file_path/earth.jpg)

R Markdown Basics

- Inline equations

```
####Area of a circular
region
$A = \pi*r^{2}$
```

Area of a circular region

$A = \pi * r^2$

```
####The mass-energy
equivalence is described
by the famous equation
$$E=mc^2$$
```

The mass-energy equivalence is described by the famous equation

$$E = mc^2$$

R Markdown Basics

- Change font colors

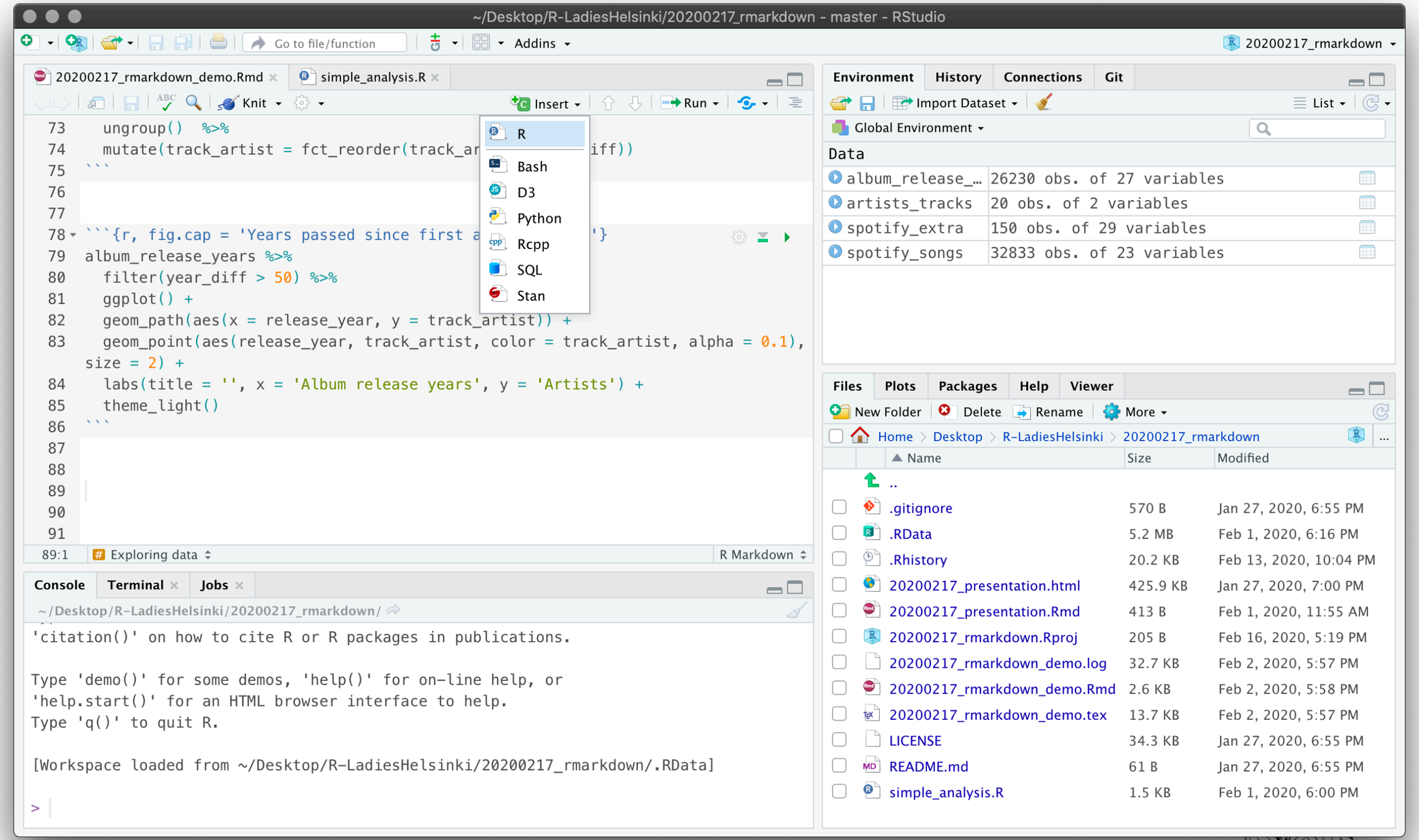
Change font colors

Roses are red,
violets are blue.

Change font colors

Roses are red, violets are blue.

Code Chunks


~/Desktop/R-LadiesHelsinki/20200217_rmarkdown - master - RStudio
Go to file/function
Addins
20200217_rmarkdown
20200217_rmarkdown_demo.Rmd
simple_analysis.R
Knit
Insert
Run
ungroup() %>%
mutate(track_artist = fct_reorder(track_ar iff))
```
```{r, fig.cap = 'Years passed since first a '}
album_release_years %>%
filter(year_diff > 50) %>%
ggplot() +
geom_path(aes(x = release_year, y = track_artist)) +
geom_point(aes(release_year, track_artist, color = track_artist, alpha = 0.1), size = 2) +
labs(title = '', x = 'Album release years', y = 'Artists') +
theme_light()
```
R
Bash
D3
Python
Rcpp
SQL
Stan
89:1
Exploring data
R Markdown
Console
Terminal
Jobs
~/Desktop/R-LadiesHelsinki/20200217_rmarkdown/
'citation()' on how to cite R or R packages in publications.
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
[Workspace loaded from ~/Desktop/R-LadiesHelsinki/20200217_rmarkdown/.RData]
>
Environment
History
Connections
Git
Import Dataset
List
Global Environment
Data
album_release_... 26230 obs. of 27 variables
artists_tracks 20 obs. of 2 variables
spotify_extra 150 obs. of 29 variables
spotify_songs 32833 obs. of 23 variables
Files
Plots
Packages
Help
Viewer
New Folder
Delete
Rename
More
Home
Desktop
R-LadiesHelsinki
20200217_rmarkdown
Name
Size
Modified
..
.gitignore 570 B Jan 27, 2020, 6:55 PM
.RData 5.2 MB Feb 1, 2020, 6:16 PM
.Rhistory 20.2 KB Feb 13, 2020, 10:04 PM
20200217_presentation.html 425.9 KB Jan 27, 2020, 7:00 PM
20200217_presentation.Rmd 413 B Feb 1, 2020, 11:55 AM
20200217_rmarkdown.Rproj 205 B Feb 16, 2020, 5:19 PM
20200217_rmarkdown_demo.log 32.7 KB Feb 2, 2020, 5:57 PM
20200217_rmarkdown_demo.Rmd 2.6 KB Feb 2, 2020, 5:58 PM
20200217_rmarkdown_demo.tex 13.7 KB Feb 2, 2020, 5:57 PM
LICENSE 34.3 KB Jan 27, 2020, 6:55 PM
README.md 61 B Jan 27, 2020, 6:55 PM
simple_analysis.R 1.5 KB Feb 1, 2020, 6:00 PM
```

Code Chunks

````
```{r}
A <- 10
a <- 3
print(paste("A is", A))
print(paste("a is", a))
cat("A and a are equal? = ", A == a)
```

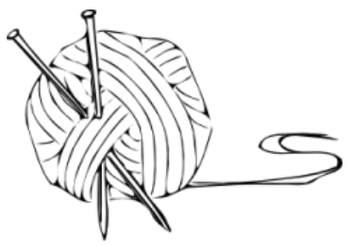

*important
```{r engine = pyhton}
python_code
```
````

Code Chunks

````
```{r}
summary(cars)
nrow(cars)
```


```{r}
plot(pressure)
```
````

R Markdown Basics

- echo = FALSE —> not display code - only results
- eval = FALSE —> not run or not show results - only display code
- results = ‘hide’ —> not display results - only run and display code
- error = FALSE —> not display error
- warning = FALSE —> not display warnings
- message = FALSE —> not display messages

R Markdown Basics

```{r,echo = FALSE}
“four” + “five”
```

```{r, warning = FALSE, error = FALSE}
“four” + “five”
```

Code Chunks

````
```{r, fig.width=5, fig.height=4,echo=TRUE}

plot(mpg$displ, mpg$hwy)

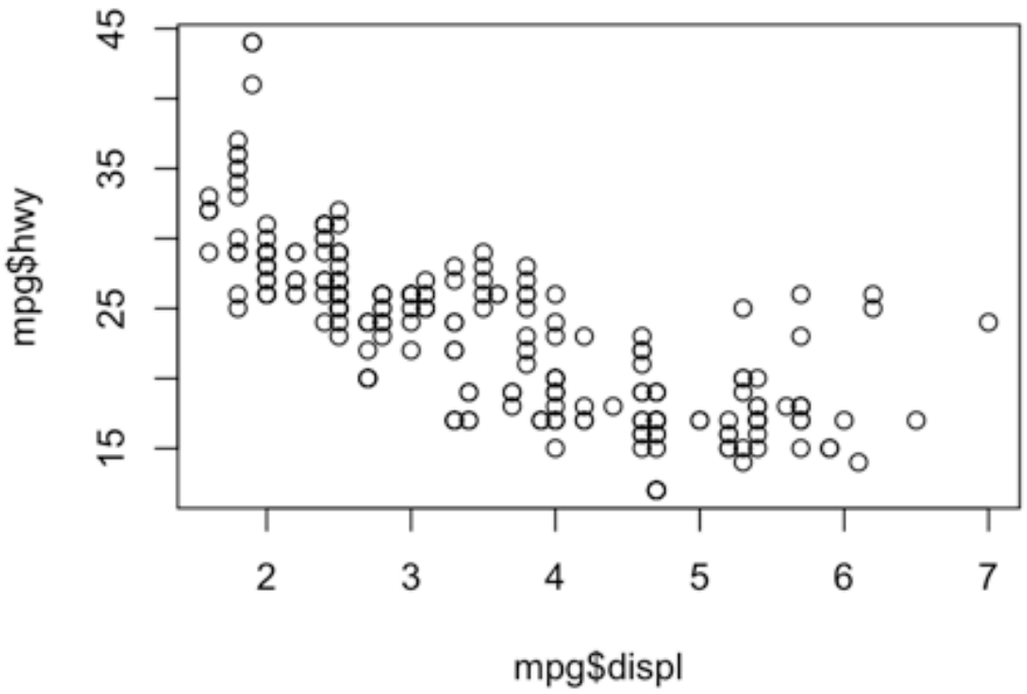
ggplot(data = mpg) +
geom_point(aes(x = displ, y = hwy,
               color = class))


```
````



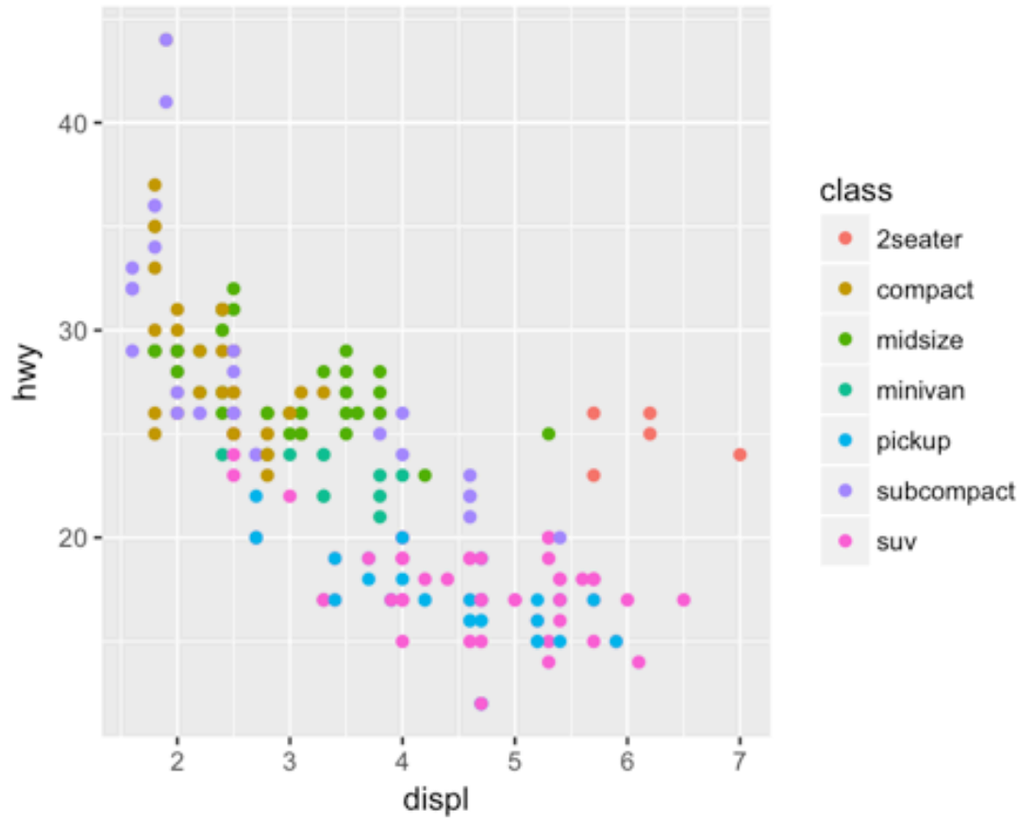
R Markdown Basics

```
plot(mpg$displ, mpg$hwy)
```



base plot

```
ggplot(data = mpg) + geom_point(mapping = aes(x = displ, y = hwy, color = class))
```

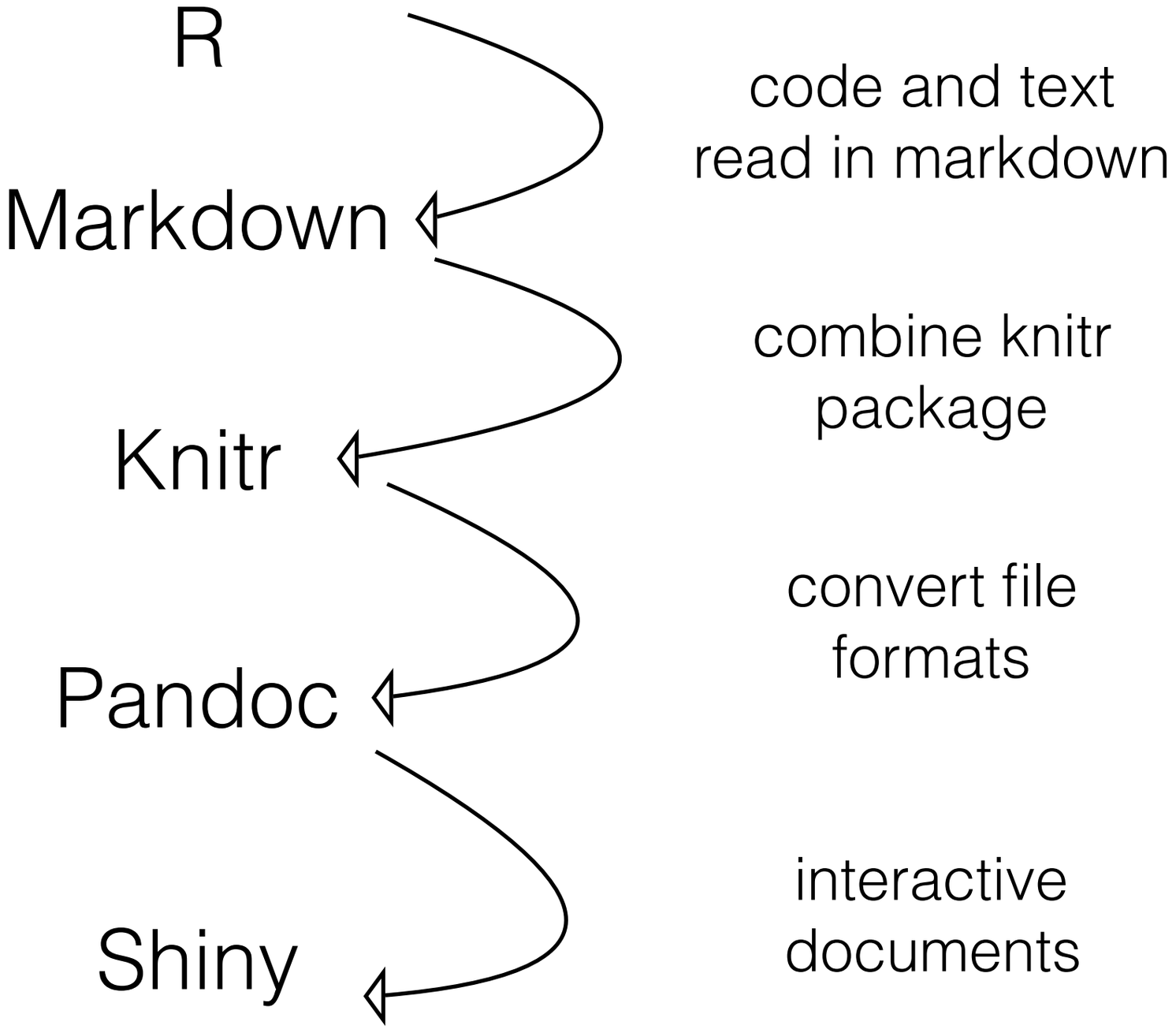


ggplot2

Important!

- You'll need to define any R objects that rmarkdown document uses
- You'll need to load any packages that rmarkdown uses
- **The document won't have access to the objects that exist in your current R session**

R Markdown


R
Markdown
Knitr
Pandoc
Shiny
code and text
read in markdown
combine knitr
package
convert file
formats
interactive
documents

Important!

- If you want PDF documents you need:
  - Windows user: **MikTex**
  - MacOS user: **MacTex**
  - Linux user: **Use package manager**
- You need ~5GB disk space

- Easy to use if you write LaTeX and easy to save to your working directory
- Download “Daum Equation Editor”

Demo!

Thank you for joining us…

-Ladies Helsinki

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@ZofiatheWitch