Dynamic documents in R

reproducible research with R Markdown

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R Markdown

Authoring framework: code and text in same document

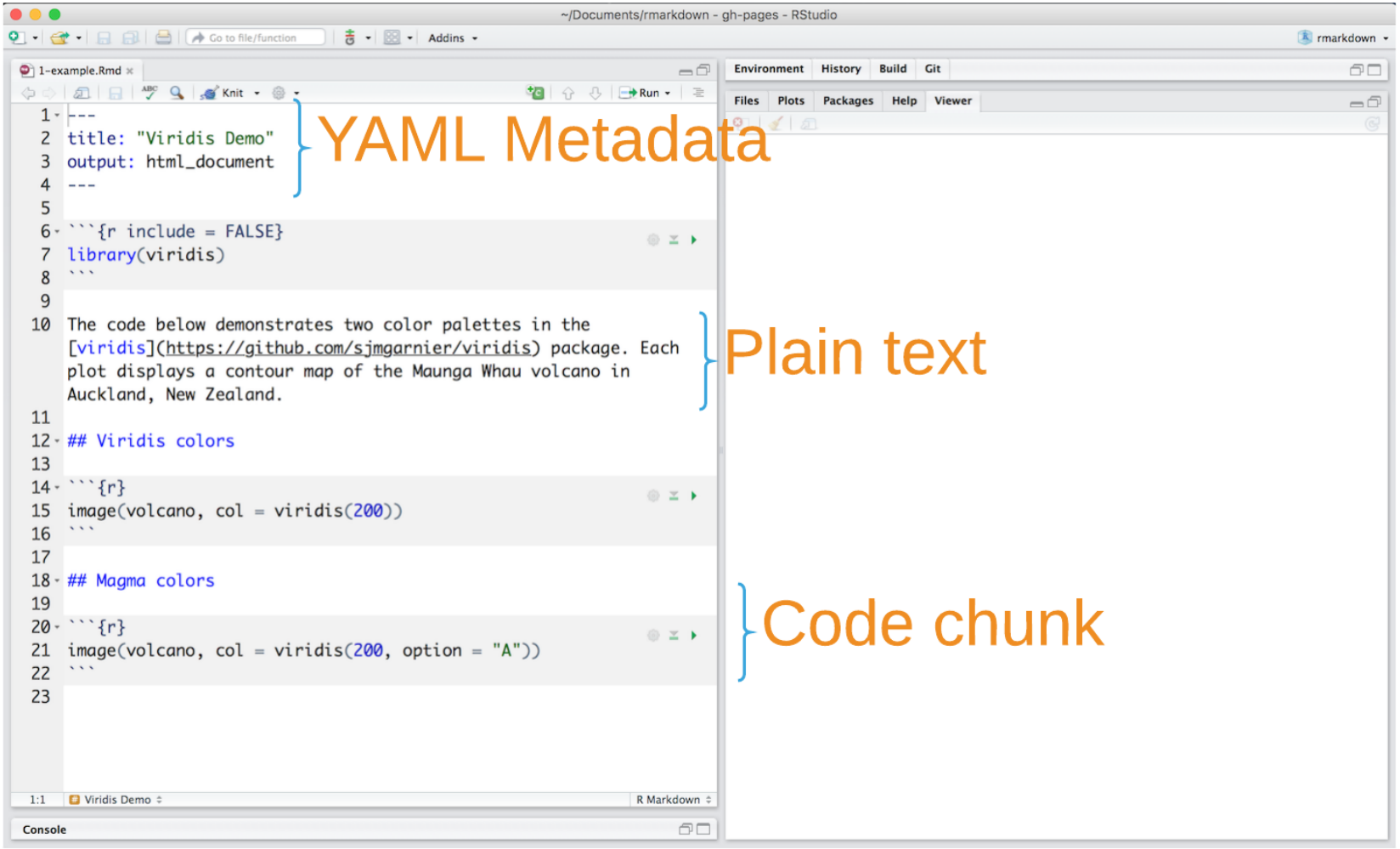
Reproducible: re-run your analysis

Flexible: Output to different formats easily


knitting

Your turn 1

Create a new R Markdown file. Go to File > New File > R Markdown. Press OK. Save the file and press the "Knit" button above.


~/Documents/rmarkdown - gh-pages - RStudio
Addins
rmarkdown
1-example.Rmd
Knit
Run
Environment
History
Build
Git
Files
Plots
Packages
Help
Viewer
1 ---
2 title: "Viridis Demo"
3 output: html_document
4 ---
5
6 ```{r include = FALSE}
7 library(viridis)
8 ```
9
10 The code below demonstrates two color palettes in the
[viridis](https://github.com/sjmgarnier/viridis) package. Each
plot displays a contour map of the Maunga Whau volcano in
Auckland, New Zealand.
11
12 ## Viridis colors
13
14 ```{r}
15 image(volcano, col = viridis(200))
16 ```
17
18 ## Magma colors
19
20 ```{r}
21 image(volcano, col = viridis(200, option = "A"))
22 ```
23
YAML Metadata
Plain text
Code chunk
1:1
Viridis Demo
R Markdown
Console

R Markdown

Prose

Code

Metadata

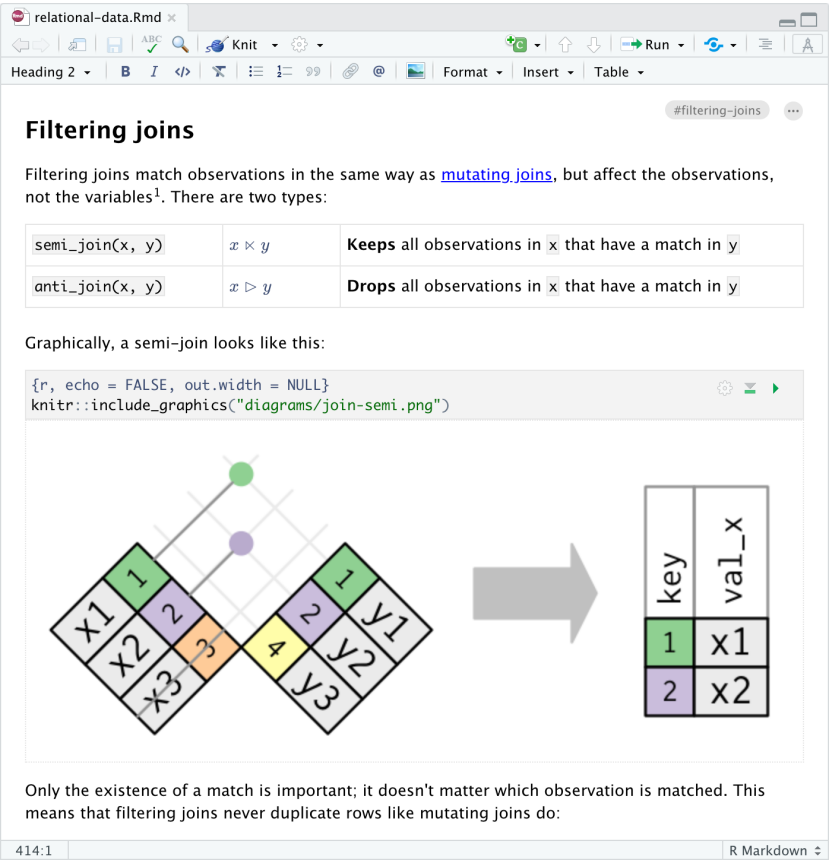
R Markdown

Prose = **Markdown**

Code

Metadata

Visual R Markdown



Basic Markdown Syntax

```
*italic*   **bold**

_italic_   __bold__
```

Basic Markdown Syntax

```
# Header 1

## Header 2

### Header 3
```

Basic Markdown Syntax

```
http://example.com

[linked phrase](http://example.com)
```

Learn more about Markdown Syntax with the ten-twenty minute tutorial on markdown at https://commonmark.org/help/tutorial.

Your turn 2 (open exercises.Rmd)

Read this short introduction to Visual R Markdown: https://rstudio.github.io/visual-markdown-editing/#/intro?id=getting-started

Use Visual R Markdown to stylize the text from the Gapminder website below. Experiment with bolding, italicizing, making lists, etc.

R Markdown

Prose

Code = **R code chunks**

Metadata

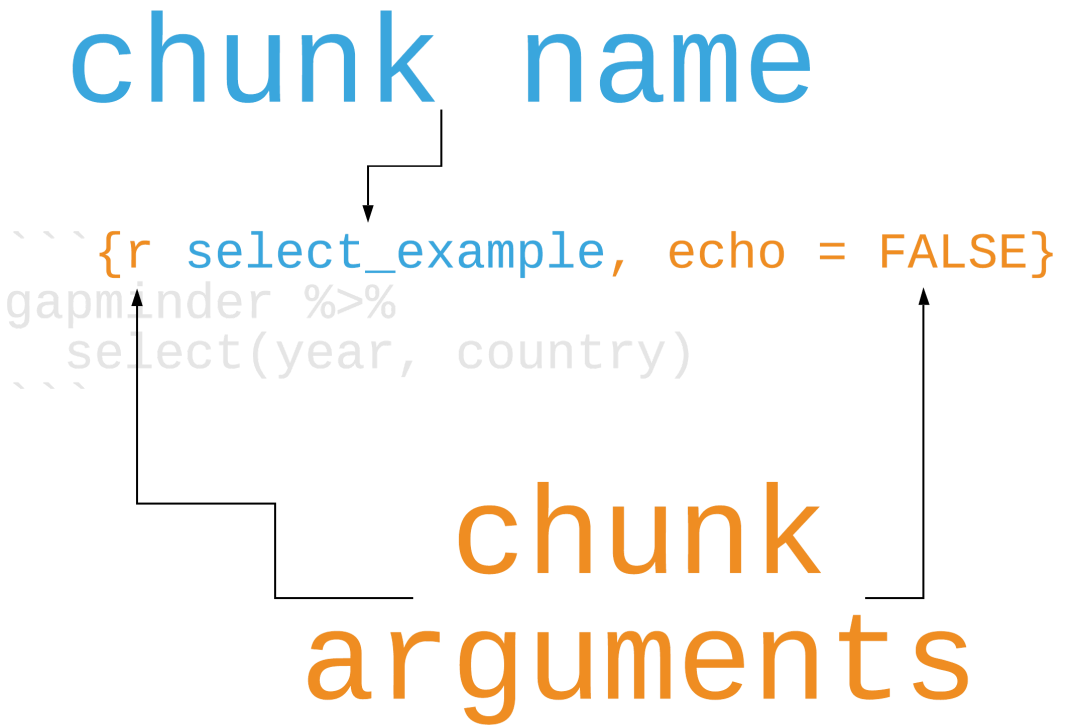
Code chunks

````
```{r select_example, echo = FALSE}
gapminder %>%
  select(year, country)
```
````

Code chunks


fences (3 backticks)
```{r select_example, echo = FALSE}
gapminder %>%
  select(year, country)
```

Code chunks


chunk name
```{r select_example, echo = FALSE}
gapminder %>%
select(year, country)
```
chunk
arguments

Chunk options

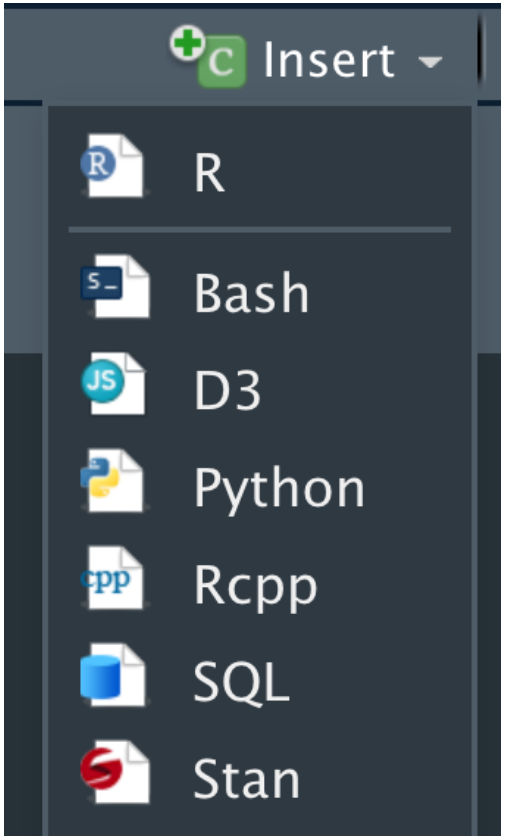
Option	Effect
include = FALSE	run the code but don't print it or results
eval = FALSE	don't evaluate the code
echo = FALSE	run the code and output but don't print code
message = FALSE	don't print messages (e.g. from a function)
warning = FALSE	don't print warnings
fig.cap = "Figure 1	caption output plot with "Figure 1"

See the knitr web page

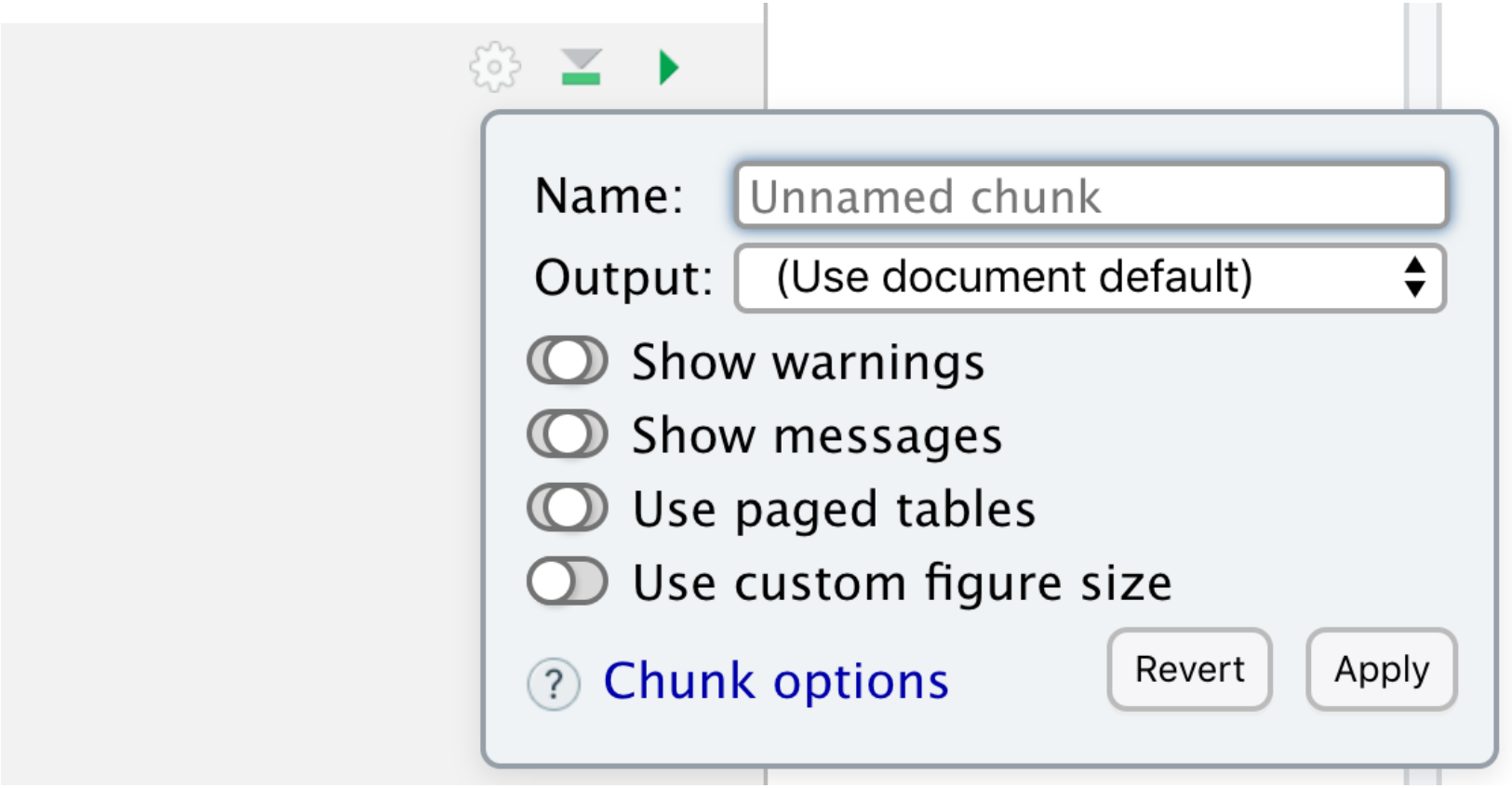
Engines

52! Including **Python**, **Julia**, **C++**, **SQL**, **SAS**, and **Stata**

Insert code chunks with cmd/ctrl + alt/option + I



Edit code chunk options



Your turn 3

Create a code chunk. You can type it in manually, use the keyboard short-cut (Cmd/Ctrl + Option/Alt + I), or use the "Insert" button above. Put the following code in it:

```
gapminder %>%
  slice(1:5) %>%
  knitr::kable()
```

Knit the document

Your turn 4

Add echo = FALSE **to the code chunk above and re-knit**

Remove echo = FALSE **from the code chunk and move it to** knitr::opts_chunk$set() **in the** setup **code chunk. Re-knit. What's different about this?**

Make sure to remove knitr::opts_chunk$set(echo = FALSE)

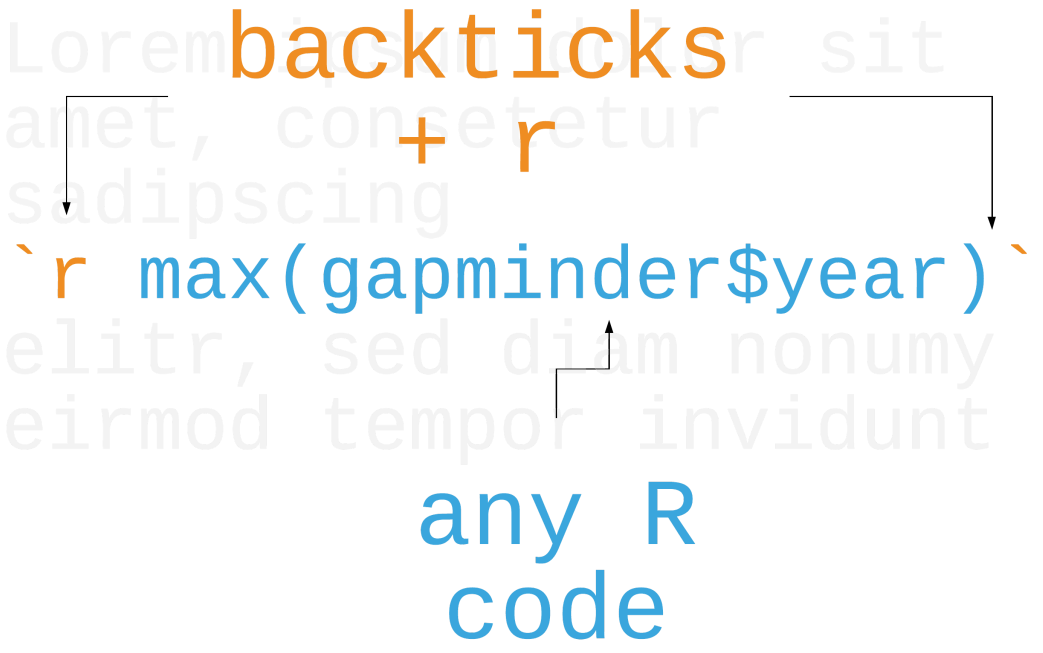
Inline Code

Lorem ipsum dolor sit amet, consetetur sadipscing

```
`r max(gapminder$year)`
```

elitr, sed diam nonumy eirmod tempor invidunt

Inline Code



Your turn 5

Remove eval = FALSE **so that R Markdown evaluates the code.**

Use summarize() **and** n_distinct() **to get the the number of unique years in gapminder and save the results as** n_years**.**

Use inline code to describe the data set in the text below the code chunk and re-knit.

R Markdown

Prose

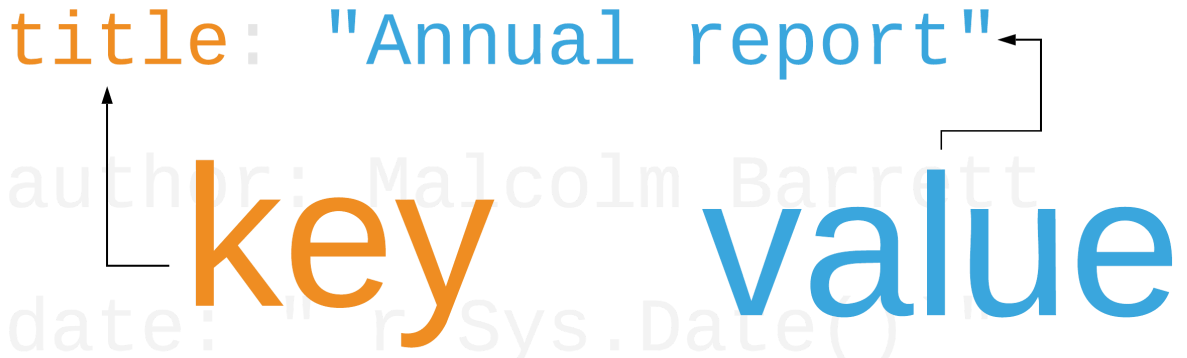
Code

Metadata = **YAML**

YAML Metadata

```
---
author: Malcolm Barrett
title: Quarterly Report
output:
  html_document: default
  pdf_document:
    toc: true
---
```

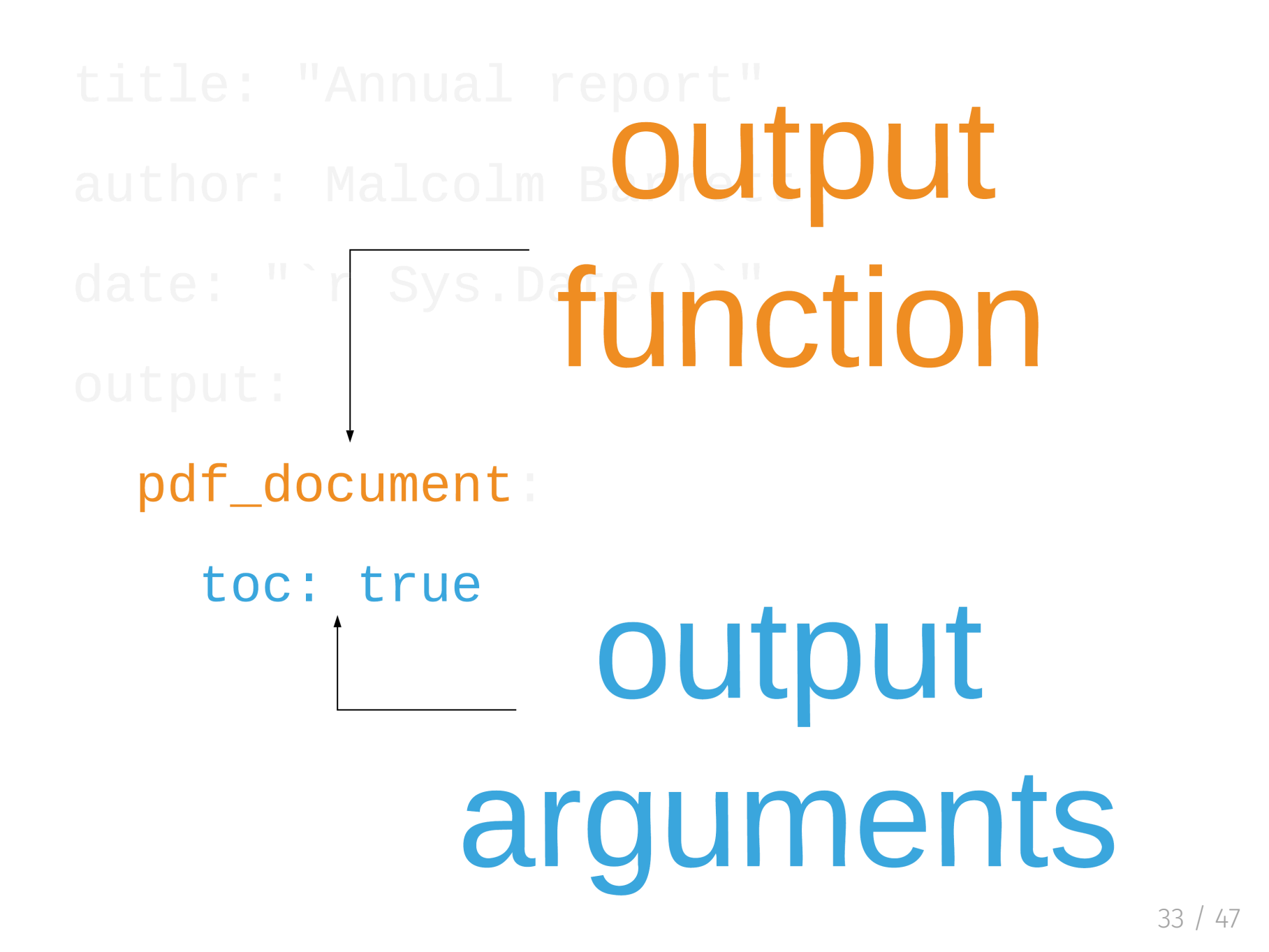
```yaml
title: "Annual report"
author: Malcolm Barrett
date: "`r Sys.Date()`"
output:
  pdf_document:
    toc: true
```


title: "Annual report"
key
value

```
title: "Annual report"
author: Malcolm Barrett
date: "`r Sys.Date()`"
output:
  pdf_document:
    toc: true
```

top level

nested


output
function
pdf_document:
toc: true
output
arguments

```
title: "Annual report"
author: Malcolm Barrett
date: "`r Sys.Date()`"
output:
  pdf_document:
    toc: true
```

pdf_document(toc = TRUE)

Output formats

Function	Outputs
html_document()	HTML
pdf_document()	PDF
word_document()	Word .docx
odt_document()	.odt
rtf_document()	.rtf
md_document()	Markdown
slidy_presentation()	Slidy Slides (HTML)
beamer_presentation()	Beamer Slides (PDF)
ioslides_presentation()	ioslides (HTML)
powerpoint_presentation()	Powerpoint Slides

Your turn 6

Set figure chunk options to the code chunk below, such as dpi, fig.width, and fig.height. Run knitr::opts_chunk$get() in the console to see the defaults.

Add your name to the YAML header using author: Your Name.

Change the YAML header above from output: html_document to output: distill::distill_article.

Set distill::distill_article to use the toc and code_folding options and re-knit

ymlthis

check out the ymlthis package for tools and documentation for working with YAML

https://r-lib.github.io/ymlthis/

Parameters

```
---
params:
  param1: x
  param2: y
  data: df
---
```

```
params$param1
params$param2
params$data
```

Your turn 7

Change the params option in the YAML header to use a different continent. Re-knit

```
gapminder %>%
  filter(continent == params$continent) %>%
  ggplot(aes(x = year, y = lifeExp, group = country, color = country
  geom_line(lwd = 1, show.legend = FALSE) +
  scale_color_manual(values = country_colors) +
  theme_minimal(14) +
  theme(strip.text = element_text(size = rel(1.1))) +
  ggtitle(paste("Continent:", params$continent))
```

Bibliographies and citations

Bibliographies and citations

Bibliography files: .bib, **Zotero**, **others**

Bibliographies and citations

Bibliography files: .bib**, Zotero, others**

Citation styles: .csl

Bibliographies and citations

Bibliography files: .bib**, Zotero, others**

Citation styles: .csl

[@citation-label]

Or just use Visual R Markdown's citation wizard!

Including bibliography files in YAML

```
---
bibliography: file.bib
csl: file.csl
---
```

Visual R Markdown can also manage this for you.

Your turn 8

Cite the Causal Inference book in text below. Using the citation wizard, find the right citation under My sources > Bibliography.

Add the American Journal of Epidemiology CSL to the YAML using csl: aje.csl

Re-knit

Make cool stuff in R Markdown!

bookdown

blogdown

these slides!

Resources

R Markdown: A comprehensive but friendly introduction to R Markdown and friends. Free online.

R for Data Science: A comprehensive but friendly introduction to the tidyverse. Free online.

R Markdown for Scientists: R Markdown for Scientists workshop material.