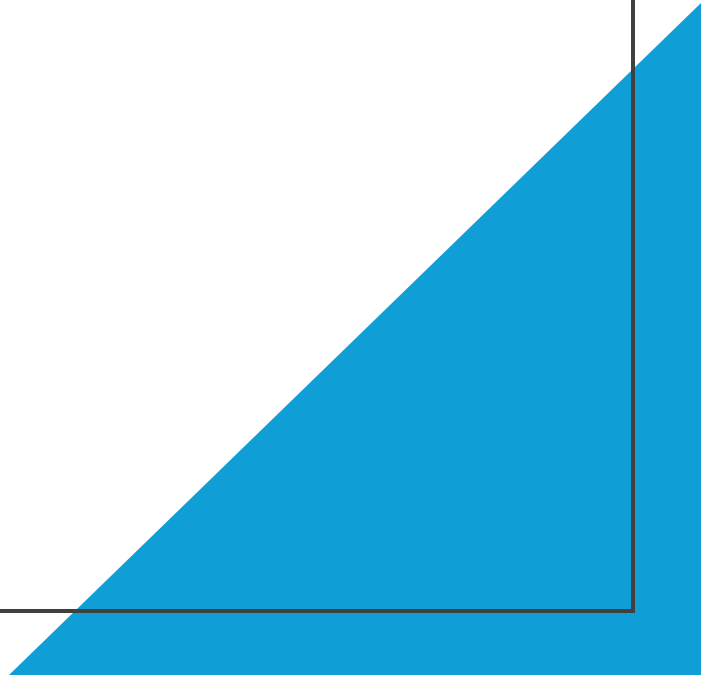


# BINF 6210 Software Tools

- R-Markdown
- Date: Nov 6, 2025



# Learning objectives

- **Part 1 : Background**
  - What is R-Markdown?
  - Why is it useful?
- **Part 2 : Knitr**
  - How to make HTML, PDF, Word files in R-studios

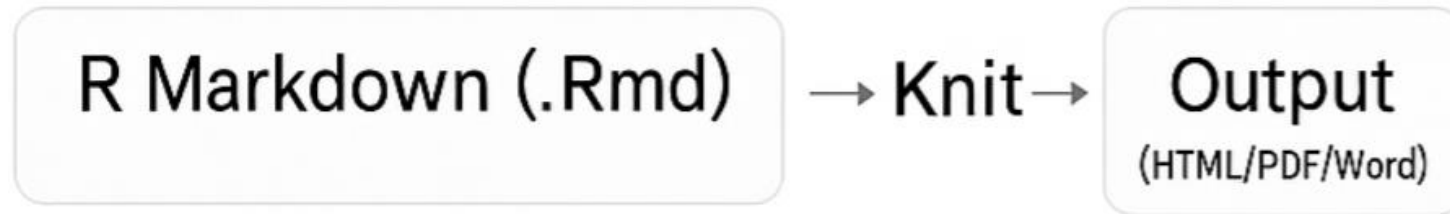
# Background

## What is it?

R Markdown is a framework for creating dynamic documents that combine R code, text, output in single file.

```
title: "Report"
output: html_document

#5 Summary
r summary(cars)
**
```



- Integrate code, text, visualization

# Combine code, plots and text dynamically!

YAML header

Written sections (markdown)

Code chunk (R, Bash, Python etc.)

The screenshot displays the RStudio interface with an R Markdown document titled 'Untitled.Rmd' open in the editor. The document is divided into three main sections, each highlighted by a bracket on the left:

- YAML header:** Lines 1-7 of the document, containing metadata for the document's title, author, date, output format, and runtime.
- Written sections (markdown):** Lines 9-15, containing introductory text about interactive R Markdown documents and a section header for 'Inputs and Outputs'.
- Code chunk:** Lines 17-26, containing R code that sets up a Shiny input panel with a select input for the number of bins and a slider input for the bandwidth adjustment, followed by a renderPlot function call.

The right pane shows the rendered output of the document, titled 'Untitled'. It includes the author's name 'Garrett', the date 'July 10, 2014', and a paragraph explaining the interactive nature of the document. Below this is a section titled 'Inputs and Outputs' with a paragraph explaining the use of Shiny inputs and outputs. The input panel shows a 'Number of bins' dropdown set to 20 and a 'Bandwidth adjustment' slider set to 1. The output is a histogram titled 'Geyser eruption duration' with a density curve overlaid.

```
1 ---
2 title: "Untitled"
3 author: "Garrett"
4 date: "July 10, 2014"
5 output: html_document
6 runtime: shiny
7 ---
8
9 This R Markdown document is made interactive using Shiny. Unlike the more
10 traditional workflow of creating static reports, you can now create
11 documents that allow your readers to change the assumptions underlying
12 your analysis and see the results immediately.
13
14 To learn more, see [Interactive Documents](http://rmarkdown.rstudio.com
15 /authoring_shiny.html).
16
17 ## Inputs and Outputs
18
19 You can embed Shiny inputs and outputs in your document. Outputs are
20 automatically updated whenever inputs change. This demonstrates how a
21 standard R plot can be made interactive by wrapping it in the Shiny
22 `renderPlot` function. The `selectInput` and `sliderInput` functions
23 create the input widgets used to drive the plot.
24
25 ```{r, echo=FALSE}
26 inputPanel(
27   selectInput("n_breaks", label = "Number of bins:",
28               choices = c(10, 20, 35, 50), selected = 20),
29   sliderInput("bw_adjust", label = "Bandwidth adjustment:",
30               min = 0.2, max = 2, value = 1, step = 0.2)
31 )
32 renderPlot({
```

Number of bins: 20 Bandwidth adjustment: 0.2 1 2

Geyser eruption duration

Density

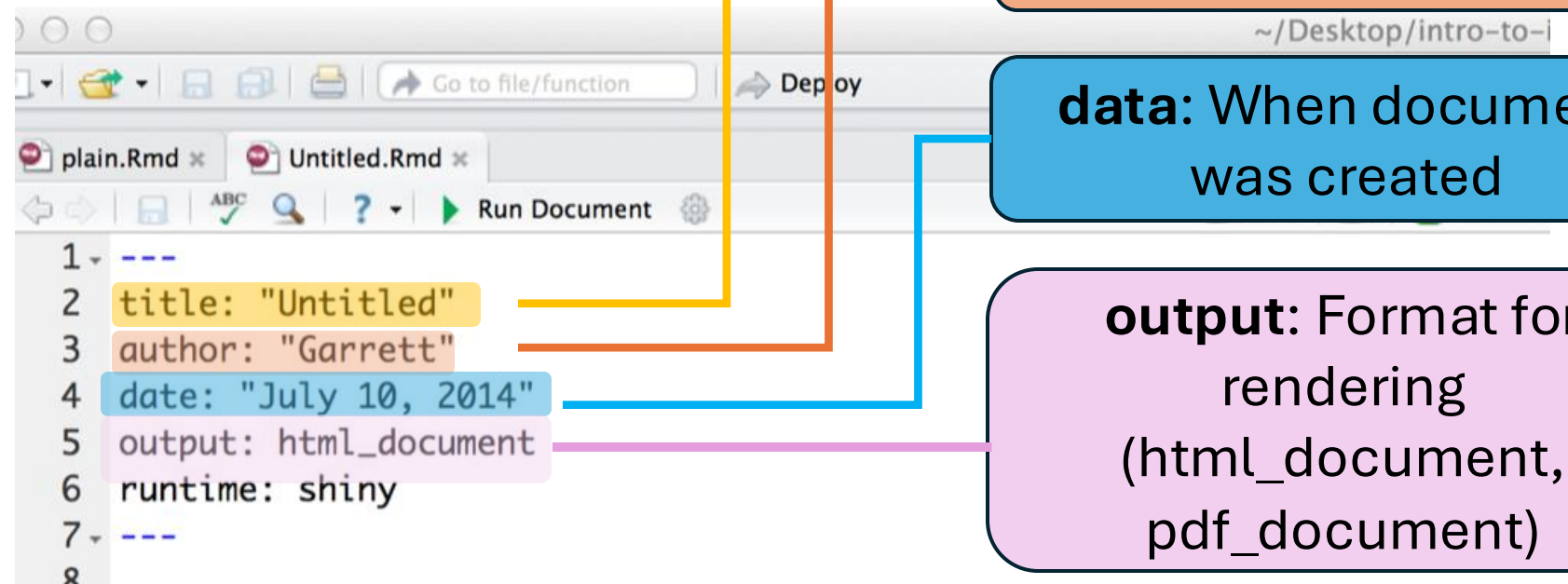
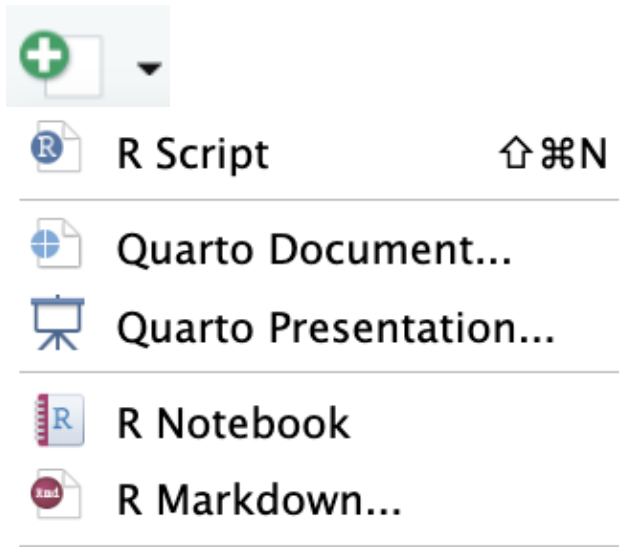
1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

# YAML header

Defines metadata for R-markdown.

Header starts and ends with “---”.

Controls output format



**title:** Document title

**author:** Name of author

**date:** When document was created

**output:** Format for rendering (html\_document, pdf\_document)

# Markdown

Markdown is a markup language to format texts and documents

---

## Feature Syntax

---

Header     `## Header`

**Bold**     `**Bold**`

*Italics*     `*Italics*`

[Link](#)     `[text](url)`

Code     ``code``

---

Creates **clickable link**

```
8
9 This R Markdown document is made interactive using Shiny. Unlike the more
  traditional workflow of creating static reports, you can now create
  documents that allow your readers to change the assumptions underlying
  your analysis and see the results immediately.
10
11 To learn more, see \[Interactive Documents\](http://rmarkdown.rstudio.com/authoring_shiny.html).
12
13 ## Inputs and Outputs
14
15 You can embed Shiny inputs and outputs in your document. Outputs are
  automatically updated whenever inputs change. This demonstrates how a
  standard R plot can be made interactive by wrapping the plot in the
  `renderPlot` function. The `selectInput` and `textInput` functions
  create the input widgets used to drive the plot.
```

**## Creates section header**

**Embedded code**

# Code chunks



Code chunks allow you to embed code inside your document. Chunk are enclosed by `` ``` and include options to control output

Options	Purpose
<code>echo = FALSE</code>	Show output only
<code>echo = TRUE</code>	Show code and output
<code>include = FALSE</code>	Show nothing (run code)
<code>eval = TRUE, include = FALSE</code>	Show nothing (don't run code)

`` ``` **Starts** code chunk

**Coding** language used

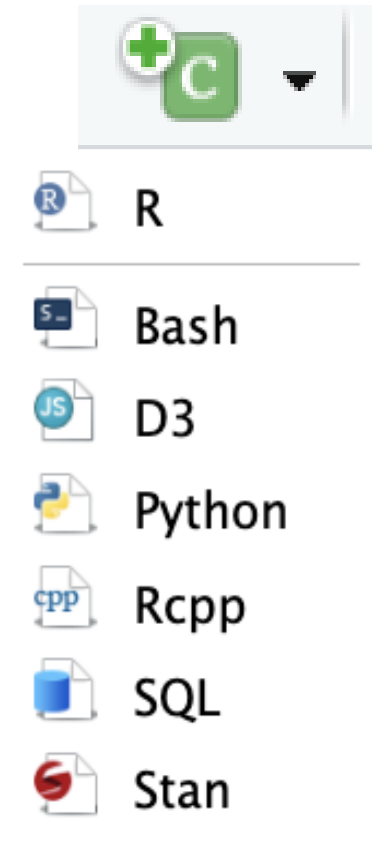
Shows **output** only

```
17- ` `` {r, echo=FALSE}
18  inputPanel(
19    selectInput("n_breaks", label = "Number of bins",
20               choices = c(10, 20, 35, 50), select = "none")
21    sliderInput("bw_adjust", label = "Bandwidth adjustment",
22               min = 0.2, max = 2, value = 1, step = 0.2)
23  )
24
25
26- renderPlot({
11:95 [f] (Top Level) ↕
```



# Code in R, Python, Bash and more!

R markdown supports multiple languages. You can embed code each type in a single file



```
227 ▾ ##### Bash
228
229 ▾ ```{bash}
230   ls *.Rmd
231 ▾ ```
232
233 ▾ ##### Python
234
235 ▾ ```{python}
236   x = 'hello, python world!'
237   print(x.split(' '))
238 ▾ ```
239
```

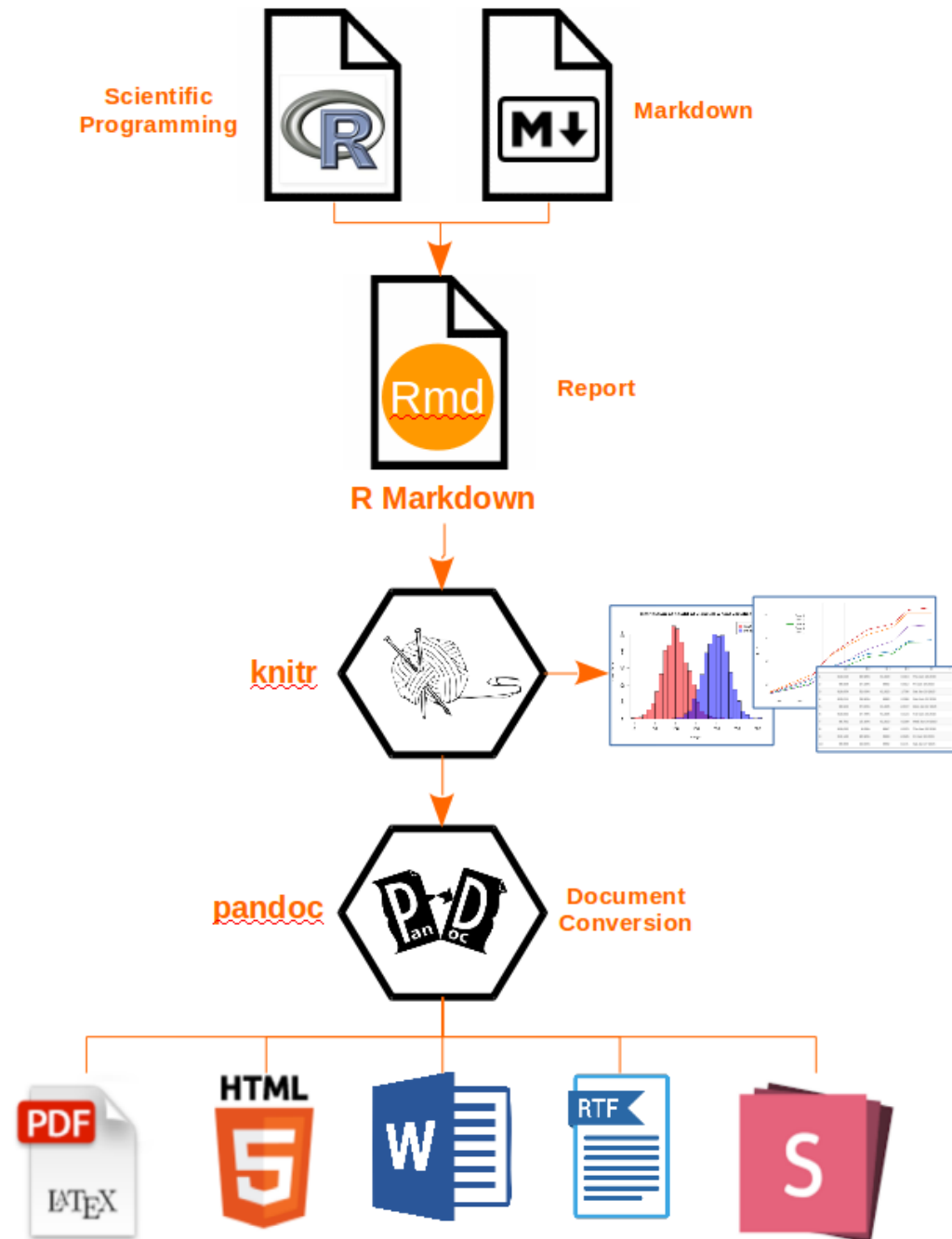
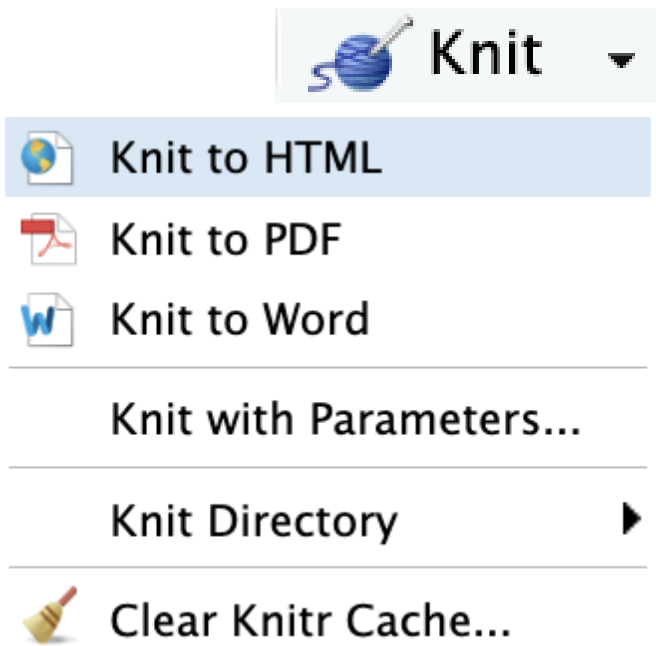
Language	Chunk header
R	{r}
Python	{python}
Bash	{bash}



# Knitr: Make beautiful reports!

Works with R markdown to create:

- HTML – Interactive document
- PDF – Formal document
- Word – Editable report



# Next step

- Download **RMarkdown\_pdf** (The RMD file) – from Courselink
  - **Author:** Brittany MacIntyre
- Explore the R markdown file and generate different file types!