Reproducible Research Reporting in R with Markdown - Quarto

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Outline

- Why Markdown?
- Understanding the anatomy of Quarto
- Markdown essentials
- Figures and tables
- Static Vs Interactive plots

What is Markdown

- Markdown is a simple markup language for formatting plain text
  - Headings
  - Lists,
  - Links
  - Bold, italics, etc. . . that can be rendered to HTML, PDF, Word, and more.

Why reproducible reporting

- Analyses are often done in R, but results are copied manually into Word/PowerPoint.
- This manual process is slow, error-prone, and hard to reproduce.
- Quarto/R-markdown lets you combine code, text, tables, and figures in one document.

Quarto

- **Quarto** is a next-generation, open-source framework for reproducible publishing.
- It supports R, Python, Julia, and multiple output formats.
- If you've used R Markdown: Quarto is its modern successor with more features, but the core ideas are the same.

R markdown Vs Quarto

Source Visual

```
---
title: "Reproducible Reporting using Quarto"
format: html
editor: visual
bibliography: references.bib
---

# Introduction

This is a quarto practical using the **Mortality** and
[**Gapminder**](https://www.gapminder.org/) dataset.

## Installing and loading packages

### Installing packages

For packages, it is important to set the CRAN mirror to avoid issues during
installation, and it's a good practice to install packages before rendering.

```{r}
#| label: install-packages
#| include: false  ## to avoid the code chunk in the output
options(repos = c(CRAN = "https://cloud.r-project.org"))
install.packages(c("skimr", "labelled", "gapminder", "plotly", "gt"))
```
```

ource Visual | B I </> | Header 3 | Format | Insert | Table

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Anatomy of Quarto

YAML header

```
---
title: "Reproducible Reporting using Qua
format: html
editor: visual
---
```

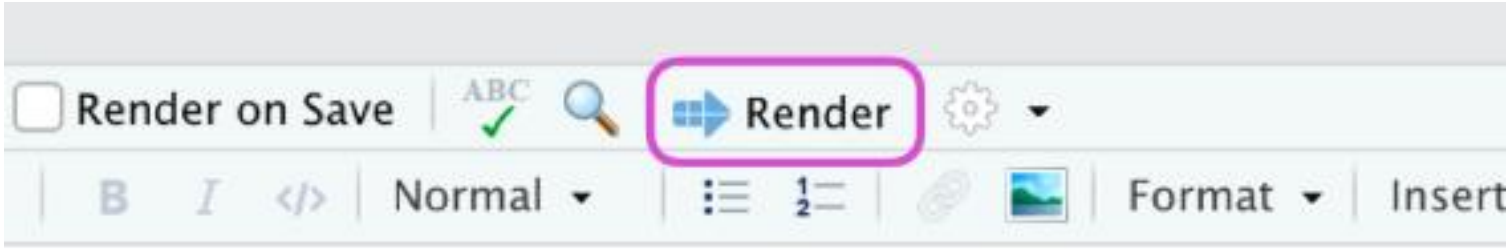
- **Metadata** of our document.
- What kind of document are you creating (HTML, PDF, Word, slides)
- Document title, author, date
- Formatting options (themes, layout, toc, code folding, highlighting)
- Bibliography and citations

Code chunks

- Code chunk begins with {R}
- Optional chunk option in YAML style #|

```r
{r}
#| label: load-packages
#| message: false
#| warning: false
library(tidyverse)
library(haven)
library(skimr)
library(gapminder)
library(gt)
library(plotly)
```

How Quarto works?



Basic Markdown

Headings

Markdown Syntax	Output
`# Heading 1`	Heading 1
`## Heading 2`	Heading 2
`### Heading 3`	Heading 3
`#### Heading 4`	Heading 4
`##### Heading 5`	Heading 5

Basic Markdown . . . .

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Text Formatting

Markdown Syntax	Output
`*italics*, **bold**, ***bold italics***`	*italics*, **bold**, ***bold italics***
`superscript^2^ / subscript~2~`	superscript^2 / subscript$_2$
`~~strikethrough~~`	~~strikethrough~~
`` `verbatim code` ``	`verbatim code`

Links

```
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Diagrams

Quarto has native support for embedding Mermaid and Graphviz diagrams. This enables you to create flowcharts, sequence diagrams, state diagrams, Gantt charts, and more using a plain text syntax inspired by markdown.

For example, here we embed a flowchart created using Mermaid:

````
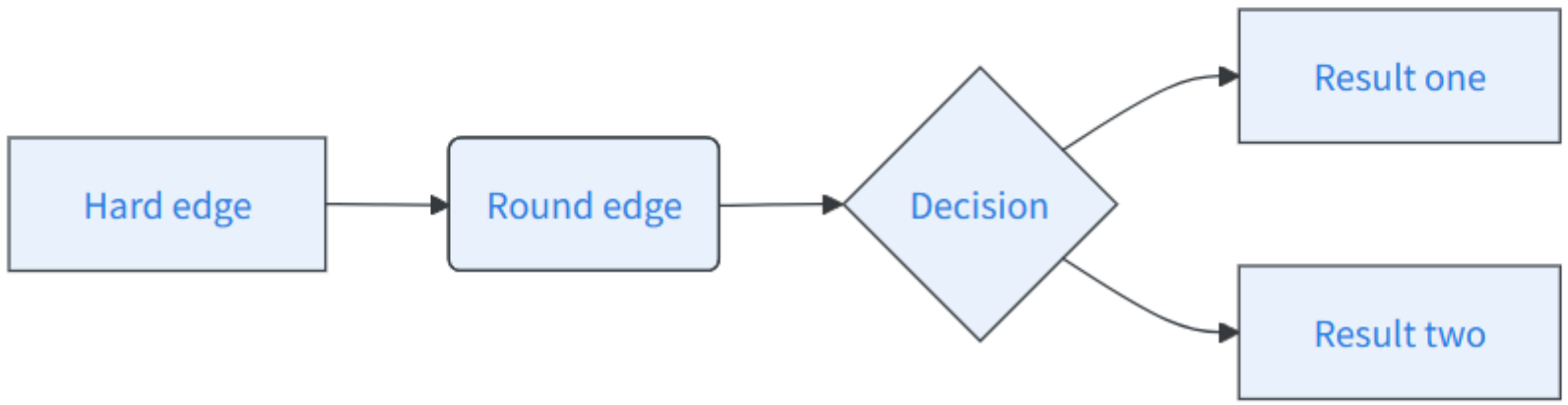
```{mermaid}
flowchart LR
  A[Hard edge] --> B(Round edge)
  B --> C{Decision}
  C --> D[Result one]
  C --> E[Result two]
```
````



Exercise

- Using the Gapminder dataset, create a table of life expectancy by GDP per capita for sub-Saharan Africa.
- Add the visualisation of the life expectancy of Ethiopia from 1952 to 2007 using a line graph.

Thank You!