

# ICO Workshop R & RStudio

## Part 2

*Markdown & Quarto*

Sven De Maeyer & Tine van Daal

2nd - 4th July, 2024

1 / 35

## Overview

- What is markdown --- ([Go to that section](#))
- Integrating Markdown and R code --- ([Go to that section](#))
- Creating a basic Quarto document --- ([Go to that section](#))

2 / 35

# 1. What is markdown?

3 / 35

## Markdown

- 'low end' text editor system
- make content that can be read on different systems
- mainly easy way to generate **html** files
- you write in 'plain text' and an interpreter generates an nice edited version

4 / 35

# Basic syntax

Element	Markdown Syntax
Heading	# H1 ## H2 ### H3
Bold	<b>bold text</b>
Italic	<i>italicized text</i>
Blockquote	>blockquote
Ordered List	1. First item 2. Second item 3. Third item
Unordered List	- First item - Second item - Third item
Code	`code`
Horizontal Rule	---
Link	[title](https://www.example.com)
Image	![alt text](image.jpg)

5 / 35

# Extension

Element	Markdown Syntax
Table	Syntax   Description     -----   -----     Header   Title     Paragraph   Text
Fenced Code Block	``` { "firstName": "John", "lastName": "Smith", "age": 25 } ```
Footnote	Here's a sentence with a footnote. [^1] [^1]: This is the footnote.
Heading ID	### My Great Heading {#custom-id}
Definition List	term : definition
Strikethrough	~~The world is flat.~~
Task List	- [x] Write the press release - [ ] Update the website - [ ] Contact the media

6 / 35

## 2. Integrating Markdown and R code

7 / 35

### Rmarkdown & Quarto

Two roads with the same destination, but...

#### Rmarkdown

- developed 10 years ago by RStudio company
- an R package
- only works in RStudio
- still supported but no major advances in development
- generates pdf, html and word-docs

#### Quarto

- recently developed by RStudio company
- stand alone software
- integrates with RStudio but also with other software
- cross-language platform (python, Julia, Observable, ...)
- all new cool new stuff will be implemented in Quarto
- generates pdf, html, word, open-office, ppt, ePub, Observable JS, Jira Wiki, websites, online books, etc
- CEO of RStudio company announced the development of an online editing application (like google docs)

8 / 35

# How Quarto works...



9 / 35

## Quarto info

If you want to learn more about Quarto, a lot of information is available at

<https://quarto.org/docs/guide/>

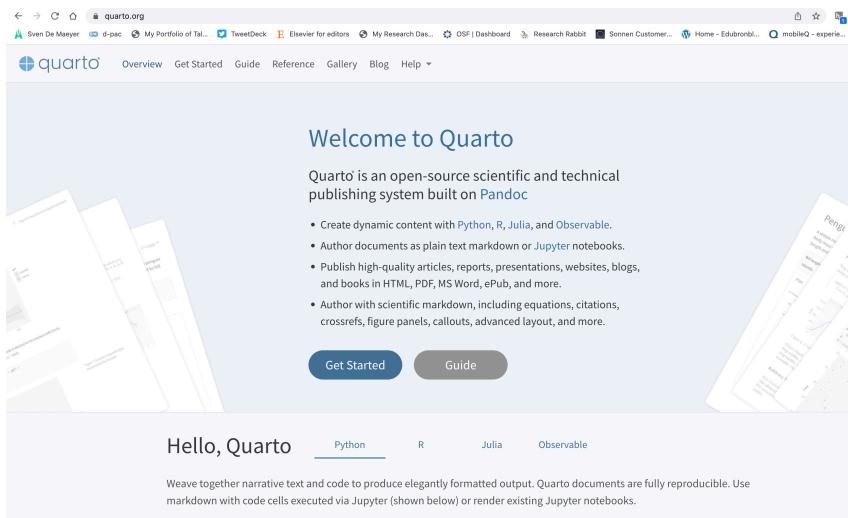
AND

there are great extensions!

see: <https://quarto.org/docs/extensions/>

10 / 35

# Installing Quarto



The screenshot shows the Quarto.org homepage. At the top, there's a navigation bar with links like Overview, Get Started, Guide, Reference, Gallery, Blog, and Help. Below the navigation is a large banner titled "Welcome to Quarto". The banner features a collage of various document types and software interfaces. It includes a bulleted list of features:

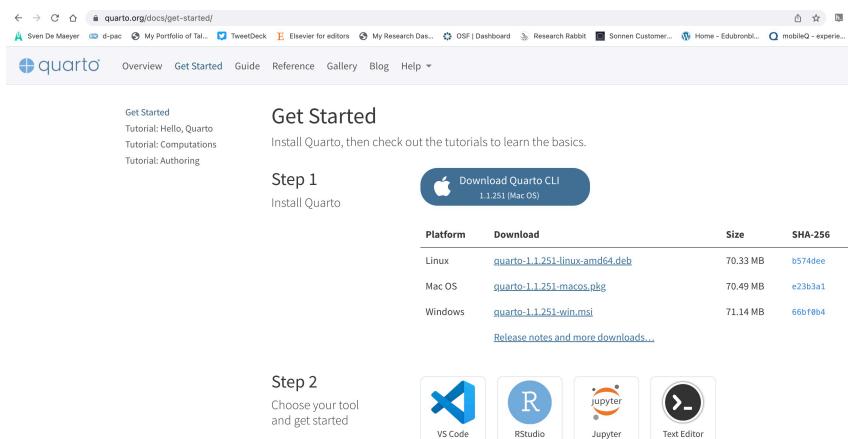
- Create dynamic content with Python, R, Julia, and Observable.
- Author documents as plain text markdown or Jupyter notebooks.
- Publish high-quality articles, reports, presentations, websites, blogs, and books in HTML, PDF, MS Word, ePub, and more.
- Author with scientific markdown, including equations, citations, crossrefs, figure panels, callouts, advanced layout, and more.

At the bottom of the banner are two buttons: "Get Started" (blue) and "Guide" (grey). Below the banner, the page title "Hello, Quarto" is displayed, followed by tabs for Python (selected), R, Julia, and Observable. A text box below the tabs says: "Weave together narrative text and code to produce elegantly formatted output. Quarto documents are fully reproducible. Use markdown with code cells executed via Jupyter (shown below) or render existing Jupyter notebooks."

Click on GET STARTED

11 / 35

# Installing Quarto



The screenshot shows the "Get Started" section of the Quarto.org documentation. At the top, there's a navigation bar with links like Overview, Get Started, Guide, Reference, Gallery, Blog, and Help. Below the navigation, the title "Get Started" is displayed, followed by the sub-instruction "Install Quarto, then check out the tutorials to learn the basics." Under "Step 1" (Install Quarto), there's a "Download Quarto CLI" button with the Mac OS version (1.1.251) highlighted. Below the button is a table showing download links for different platforms:

Platform	Download	Size	SHA-256
Linux	<a href="#">quarto-1.1.251-linux-amd64.deb</a>	70.33 MB	b574dee
Mac OS	<a href="#">quarto-1.1.251-macos.pkg</a>	70.49 MB	e23b3a1
Windows	<a href="#">quarto-1.1.251-win.msi</a>	71.14 MB	66bf0b4

Below the table is a link "Release notes and more downloads..." and a note "Step 2 Choose your tool and get started" followed by icons for VS Code, RStudio, Jupyter, and Text Editor.

Choose the correct version for your pc

Install the software and restart RStudio

12 / 35

# Check the installation

You should see the option to open a new "Quarto document" in RStudio

13 / 35

## 3. Creating a basic Quarto document

14 / 35

# A first basic hands-on exploration of Quarto

 Let's create a first Quarto Document...

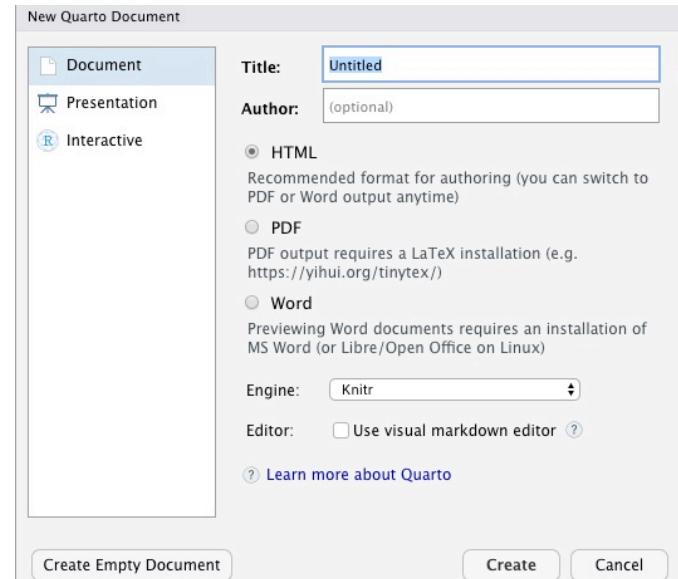
*The following slides are some screen shots of what we all did together, hands-on 😊*

15 / 35

## Open a New File

- Click on **File**
- Choose **New File**
- Choose **Quarto Document...**

### Result:

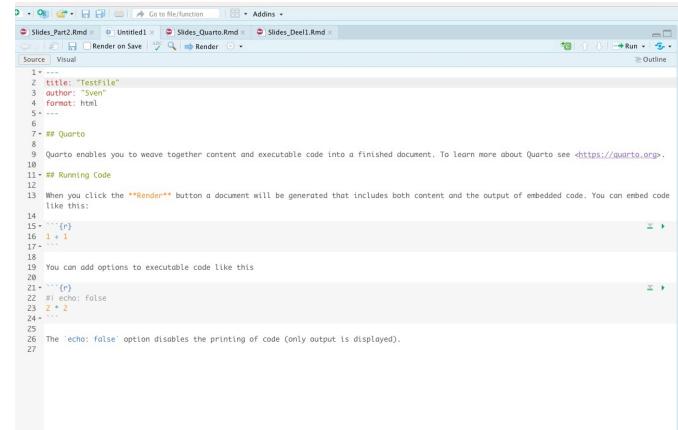


16 / 35

# Fill in some basic info

- Fill in a **title** and an **author**
- Click on **Create**

## Result:



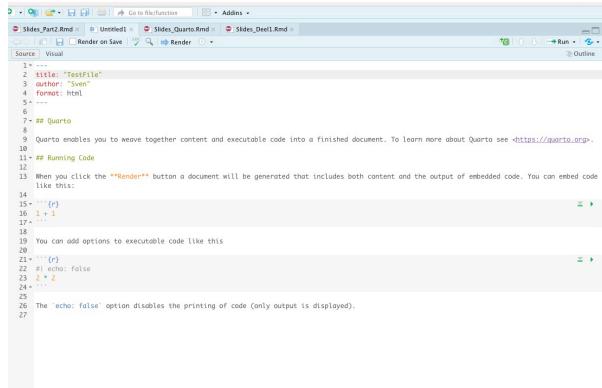
The screenshot shows the Quarto editor interface with the 'Source' tab selected. The code block contains the following content:

```
1 ...
2 title: "Testfile"
3 author: "Sven"
4 format: html
5 ...
6
7 ## Quarto
8
9 Quarto enables you to weave together content and executable code into a finished document. To learn more about Quarto see <https://quarto.org>.
10
11## Running Code
12
13 When you click the **Render** button a document will be generated that includes both content and the output of embedded code. You can embed code like this:
14
15```{r}
16 1 + 1
17```
18
19 You can add options to executable code like this
20
21```{r echo: false}
22 2 + 2
23```
24
25
26 The `echo: false` option disables the printing of code (only output is displayed).
27
```

17 / 35

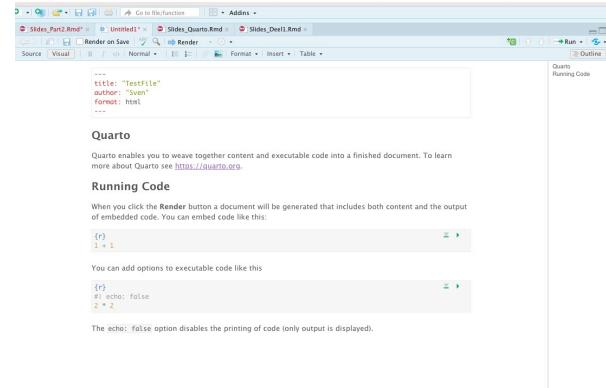
# Two different views

## Source editor



The screenshot shows the Quarto editor interface with the 'Source' tab selected. The code block contains the same content as the 'Result' screenshot, demonstrating the raw 'markdown' language used in the source editor.

## Visual editor



The screenshot shows the Quarto editor interface with the 'Visual' tab selected. The visual representation of the content is identical to the source code, showing the rendered document structure.

= raw 'markdown' language

= like a worddoc editor (see what you get)

18 / 35

# Two parts of a Quarto document

## YAML

```
---
```

```
title: "TestFile"
```

```
author: "Sven"
```

```
format: html
```

```
---
```

To set some of the parameters (aka **Metadata**)

## Your narrative:

Titles +  
text +  
code +  
output +  
tables +  
figures (generated by code) +  
images +  
(exeternal and internal) links +  
references +  
embeded content (e.g., YouTube Video)  
etc.

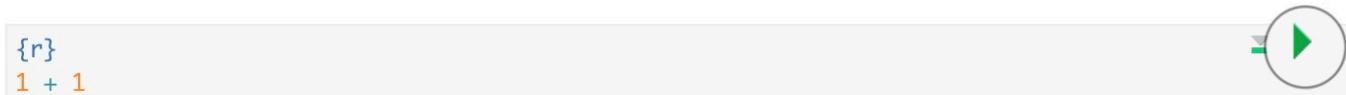
19 / 35

## Code chunks

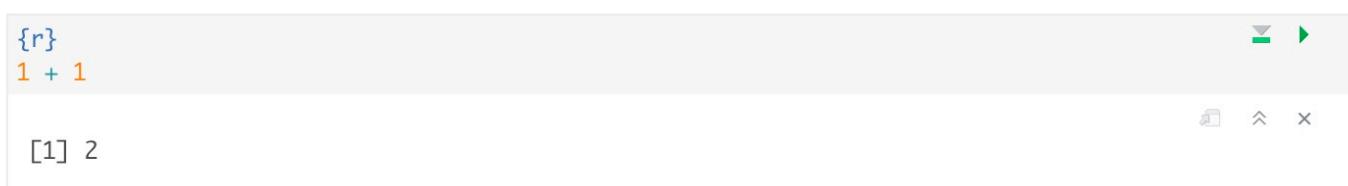
All R-code can be written in **Code chunks**

While constructing your Quarto document you can RUN code chunks

Click the green arrow (top-right corner of code chunk)



As a result you get the output printed in your Quarto document



20 / 35

# Code chunks

**ATTENTION!**: The order of code chunks do matter. If you want to run all the code in the code chunks before a certain code chunk, you can click on the button aside of the green arrow (downward green arrow)

21 / 35

## Adding a new code chunk



Or with a short-cut (on your keyboard)...

Windows: **ctrl + alt + i**

22 / 35

# Code chunk options

You can add options to executable code like this

```
{r}
#| echo: false
2 * 2
```

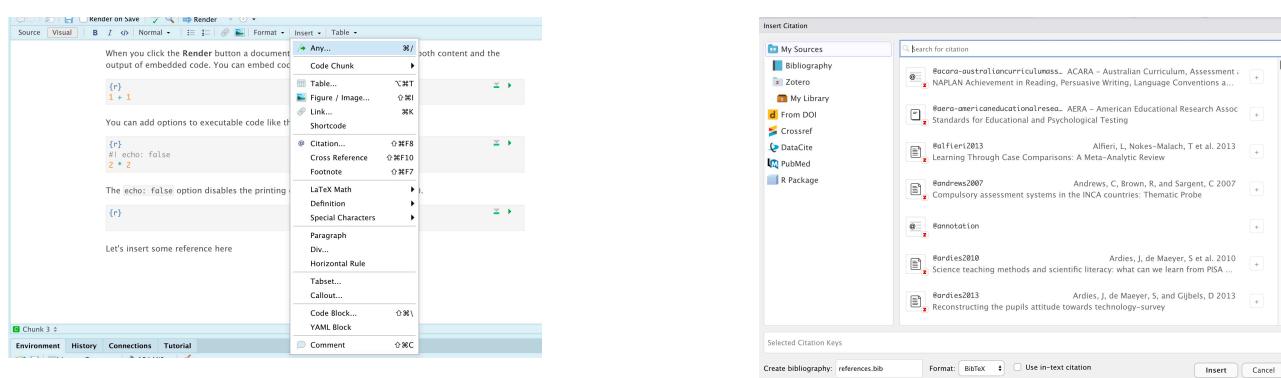
- #| include: false /rightarrow code and output (result) are hidden but code is executed
- #| echo: false: only results are printed, code is hidden
- #| message: false hides messages coming from R related to running the code
- #| warning: false hides warnings coming from running the code
- #| error: false hides error messages coming from running the code
- #| fig.cap = "...." adds a caption for a figure created

More detailed information: <https://yihui.org/knitr/options/>

23 / 35

# Inserting references

You can easily insert citations and references



24 / 35

# Inserting references

If you work with **Zotero** there is an easy integration! (<https://www.zotero.org/>)

Search references based on DOI

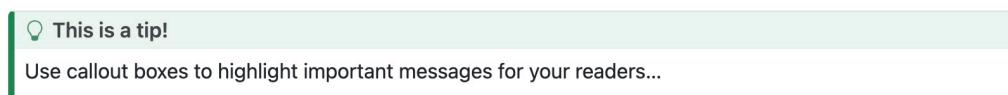
Easy to find and insert citations of R packages installed on your computer

25 / 35

# Inserting a callout

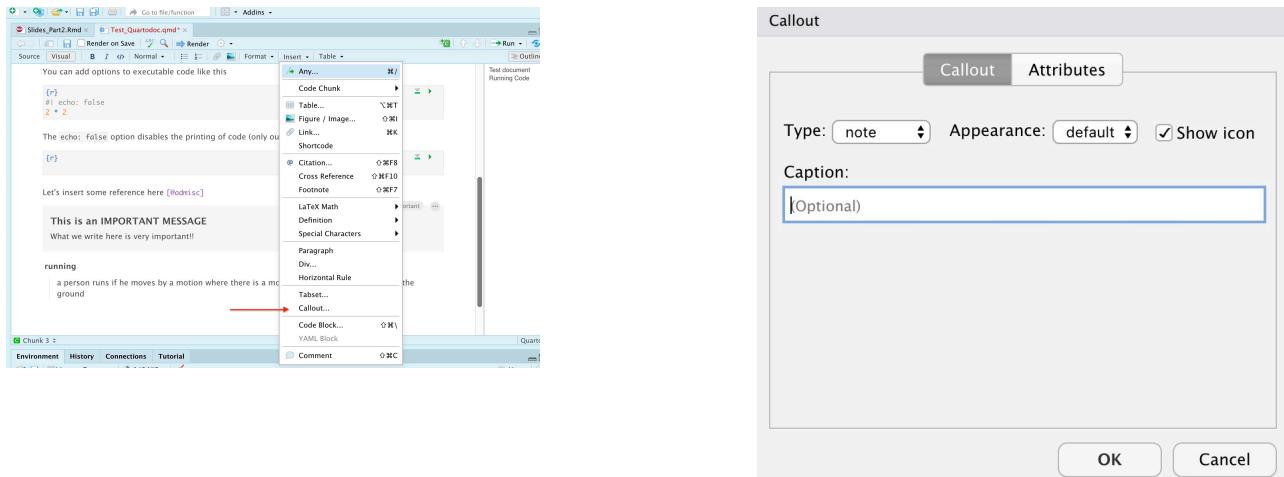
To highlight some specific piece of text you can use a callout

It will generate something like this in your final html document:



26 / 35

# Inserting a callout



27 / 35

# Adding a Tabset

In an html file you can also add Tabsets... They look like this in the resulting html file:

Task      Solution

Peter has a challenging task. He wants to know the square root of the number 16000. Help him to do this calculation making use of your R skills!

Task      Solution

```
sqrt(16000)
```

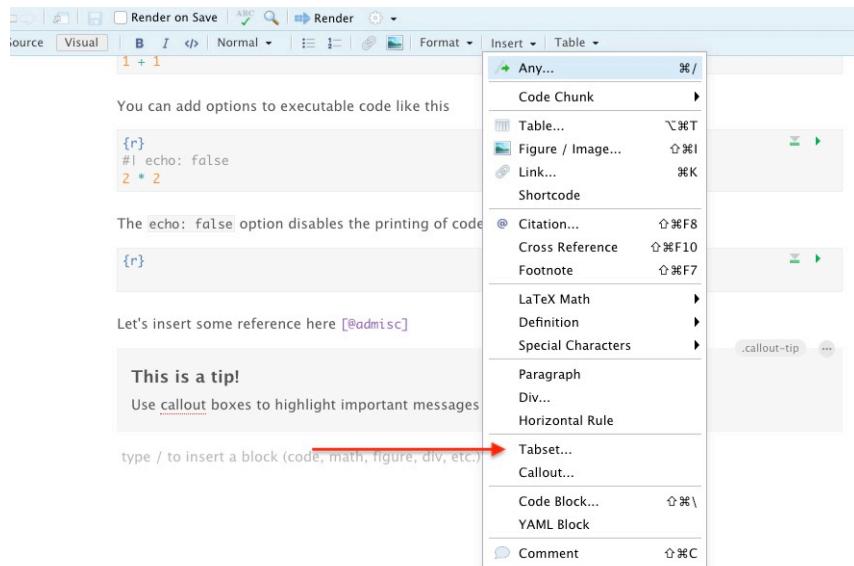
```
[1] 126.4911
```

This is a way to save space on the canvas and keep your file tight and neat.

28 / 35

# Adding a Tabset

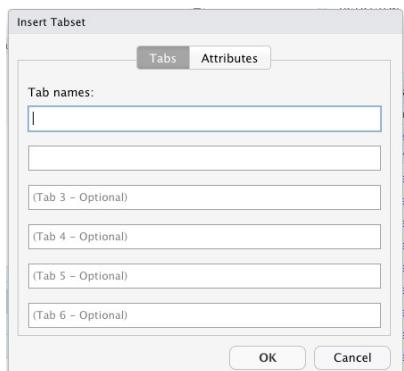
Go to **Insert** and choose **Tabset**



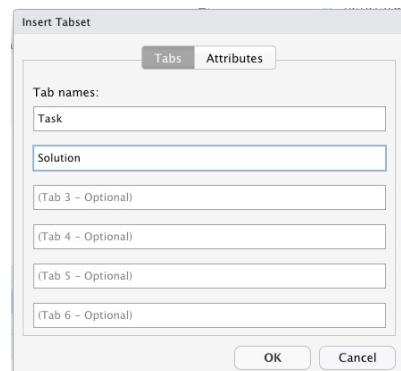
29 / 35

# Adding a Tabset

This opens the following menu:



You can fill in the titles for each tab in the Tabset:



30 / 35

# Adding a Tabset

In the Quarto document you now have a section to make content for each tab in the Tabset:

The screenshot shows the Quarto editor interface. At the top, there's a toolbar with various icons like Render on Save, Render, and Source/Visual tabs. Below the toolbar, a message says "The echo: false option disables the printing of code (only output is displayed)." A code block `{r}` is present. A callout box with the title "This is a tip!" provides instructions: "Use callout boxes to highlight important messages for your readers...". Below this, a red box highlights a panel titled "Task" containing the text: "Peter has a challenging task. He wants to know the square root of the number 16000. Help him to do this calculation making use of your R skills!". Another panel titled "Solution" contains the code `sqrt(16000)`.

31 / 35

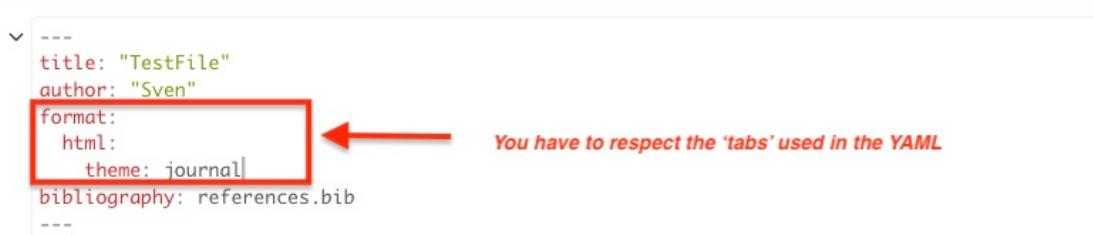
# Changing your theme

If you don't like the formatting of the rendered html file, there are some other themes that can be used!

See: <https://quarto.org/docs/output-formats/html-themes.html>

This is something you can tweak in the YAML of the file

For instance, let's choose the formatting according to the `journal` theme



32 / 35

# Changing your theme

Let's try another one: superhero!

This one is clearly different from the default theme.

Of course, if you feel adventurous you can build your own theme (e.g., to meet the branding of your university)

The screenshot shows a Quarto document titled "TestFile" with the author "Sven". The sidebar features three sections: "Table of contents", "Test document", and "Running Code". The main content area contains code snippets, a tip box with the text "This is a tip! Use callout boxes to highlight important messages for your readers...", and a reference section at the bottom.

33 / 35

# Tweaking your theme in the YAML

Some elements of formatting can be easily added in the YAML

See <https://quarto.org/docs/output-formats/html-basics.html>

For instance, let's also add a *table of contents* (toc) that contains all headers up till level 3

```
---  
title: "Testfile"  
author: "Sven"  
format:  
html:  
  theme: journal  
  toc: true  
  toc-level: 3  
bibliography: references.bib  
---
```

The screenshot shows a Quarto document titled "TestFile" with the author "Sven". The sidebar features three sections: "Table of contents", "Test document", and "Running Code". The main content area contains code snippets, a tip box with the text "This is a tip! Use callout boxes to highlight important messages for your readers...", and a reference section at the bottom.

34 / 35

# Code folding

By default all the code is shown for code chunks that have not set the option `#| echo: false`

This behaviour can be changed in the YAML by introducing the `code-fold: true` option

```
---
```

```
title: "TestFile"
author: "Sven"
format:
  html:
    theme: journal
    toc: true
    toc-level: 3
    code-fold: true ← Hide the code by default
    code-summary: "Show me the code" ← Text printed in the html file
bibliography: references.bib
---
```

## TestFile

AUTHOR  
Sven

Table of contents  
| Test document  
Running Code

### Test document

Quarto enables you to weave together content and executable code into a finished document. To learn more about Quarto see <https://quarto.org>.

### Running Code

When you click the **Render** button a document will be generated that includes both content and the output of embedded code. You can embed code like this:

▶ Show me the code | ← Code is hidden !!  
[1] 2