

Structure of Quarto notebooks

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Table of contents

1	Learning objectives	1
2	Quarto notebooks vs. rendered documents	1
3	Structure of a Quarto notebook (Qmd file)	2
3.1	Header	2
3.2	Text areas	3
3.3	Code areas	4
4	Structure of a rendered document	4
5	References	5

1 Learning objectives

- Understand the structure of the Quarto notebook.
- Understand the difference and relationships between notebooks and rendered documents.

2 Quarto notebooks vs. rendered documents

A Quarto notebook and its corresponding rendered document(s) serve different purposes but are closely connected.

- The **Quarto notebook** is the **source document** (.Qmd) where content is edited.
- The **rendered document** is the **output** generated from the Quarto notebook.

Common rendered document formats include:

- HTML for interactive web-based reports.
- PDF for professional and printable documents.
- Word for editable text-based outputs.

A single Quarto notebook can be rendered into multiple formats. While there may be some limitations when targeting different formats, this flexibility is one of Quarto's core strengths, making it a powerful tool for creating versatile and reusable documents.



Figure 1: Process of transforming a Quarto document from its source format to the final rendered output. Artwork by Allison Horst.

3 Structure of a Quarto notebook (Qmd file)

There are three basic components to a Quarto notebook:

- a unique (YAML) header,
- (markdown) text areas, and
- code areas (and corresponding output).

3.1 Header

At the top of the Quarto notebook, you will see something that looks as follows:

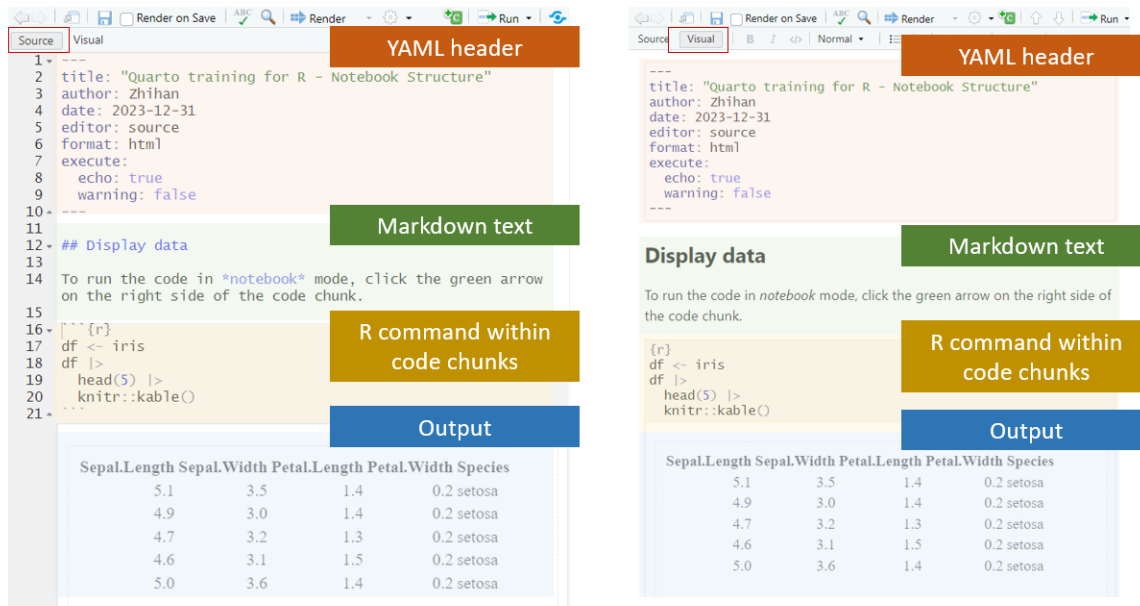


Figure 2

```
1 ---
2 title: "Quarto training for R - Notebook Structure"
3 author: Zhihan
4 date: 2023-12-31
5 editor: source
6 format: html
7 execute:
8   echo: true
9   warning: false
10 ---
```

This section is called the **YAML header** and it contains commands and metadata about the Quarto notebook. There is only one unique header in a Quarto notebook and it is always surrounded by `---` lines on the top and bottom of the section.

YAML is a data format that has the form of a **key: value pairing** to store data. The keys in this case are *title* and *format*; they are some of many settings that Quarto has available to use. The values are those that follow the key (e.g., “Untitled” for *title*). These key data are used to store the settings that Quarto will use to render the output document.

More HTML options: [HTML Options](#)

3.2 Text areas

In white background areas, you find **Markdown text** which will appear as regular text in the rendered document.

```
12 ▾ ## Display data
13
14 To run the code in *notebook* mode, click the green arrow
15 on the right side of the code chunk.
```

Markdown is actually a markup language, which can have formatting such as headings, italics, bold, numbers, and bullets.

3.3 Code areas

Code chunks, typically shown within gray backgrounds, execute commands in Quarto.

```
16 ▾ ```{r}
17 df <- iris
18 df |>
19   head(5) |>
20   knitr::kable()
21 ▴ ```
```

In the example provided, R code is being run and identified with the `{r}` tag. These commands may handle data processing, cleaning, or the generation of visual outputs that are integrated into the final document.

4 Structure of a rendered document

The rendered document translates the notebook's structure, content, and code outputs into a polished, static format for presentation or sharing.

Header

Quarto training for R - Notebook Structure

AUTHOR

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Text

Display data

To run the code in *notebook* mode, click the green arrow on the right side of the code chunk.

R command within code chunks

```
df <- iris
df |>
  head(5) |>
  knitr::kable()
```

Output

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa

5 References

- [The Epidemiologist R Handbook](#)
- [Analytically reproducible documents](#)