

Introduction to literate programming with Quarto

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These practical exercises will build on your existing knowledge, giving you an opportunity to practice, apply, and learn more about what you can do with Quarto. We will use the .qmd file you've developed from the introduction session to customize it further and explore other tools that can be incorporated.

Practical exercise 1

Let's add items to the YAML header to customize the website's overall appearance and functionality. To do this, we will change the **theme** and add **navigation**.

- [Click here for a list of themes](#) from the Quarto website
- Choose a theme and add it to the YAML header:

```
format:
  html:
    theme: *insert name of chosen theme here*
```

A **navigation** feature gives the reader an overview of document contents and an easy way to click through it.

- Insert side navigation by adding it to the YAML header:

```
website:
  sidebar:
    style: "docked"
    search: true
```

The side navigation shows the sections of your document according to your headings. Let's add appropriate headings in the next exercise.

Practical exercise 2

Add **headings** to organize the sections of your website. Insert **##** followed by the name of your section to add a heading. Add the following headings where suitable:

- ##** Introduction
- ##** Data
- ##** Literature
- Render your website to see how the headings appear in the navigation panel.

In the following exercises, it can be useful to put new additions in the appropriate sections.

Practical exercise 3

Exercises 3, 4, and 5 should be placed within the "Data" section of your website.

Another way you can display information is in a **table**.

To create a table in Quarto, we will use **pipe syntax** –

- | vertical bars (pipes) separate the columns
- --- dashes in the second row identify the first row as the table headers and sets it apart from the other rows in the table

Let's use this format to display values from Diet 1 in a table.

- Copy and paste the following into a **code chunk**:

```
diet1 <- subset(ChickWeight, Diet == 1)
summary(diet1)
```

- Run the code or render to look at the values

- Copy and paste the **pipe syntax** below then enter the values for **Weight** and **Time** in the **table**:

```
| Statistic | Weight | Time |
|-----|-----|-----|
| Minimum | 35.00 | 0.00 |
| 1st Quarter | ... | ... |
| Median | ... | ... |
| Mean | ... | ... |
| 3rd Quarter | ... | ... |
| Maximum | ... | ... |
```

It can be helpful to enter the syntax in **Source mode**, then switch to **Visual mode** to insert the values. In Visual mode, the table that was entered in pipe syntax now looks like the final rendered table, making it easier to add new information.

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Practical exercise 4

Add **columns** to your website to display information side by side. Here's how:

- Start column section with `::::: columns`
- Begin the first column with `::: column`
- Add content and end with `:::`
- Start a second column with `::: column`
- Add content and end it with `:::`
- End entire section with a final `::::: :`

It will look like this:

```
1  :::::: columns
2  ::: column
3  This is the content in the first column.
4  :::
5  ::: column
6  This is the content in the second column.
7  :::
8  :::::: :
```

Let's use columns to insert bullet points next to a graph.

- Start a column section (`::::: columns`) and begin the first column (`:::`)
- In this first column, copy the following into a **code chunk** to create a graph on the different diets of the chicks:

```
library(ggplot2)

ggplot(ChickWeight, aes(x = Time, y = weight,
  color = Diet)) +
  geom_smooth(se = FALSE) +
  labs(
    title = "Average Growth Trajectories by Diet",
    x = "Time (days)",
    y = "Weight (grams)",
    color = "Diet"
  )
```

- Below the code chunk, end the column (`:::`) and begin a second column (`::: column`)
- Copy and paste the following to create a bulleted list:

- Each line represents one chick
- Weight generally increases over time
- There is noticeable variability between chicks

- End the column (`:::`) and then end the column section (`::::: :`)

[Click here to check out more ways to customize the layout.](#)

Practical exercise 5

You can use `{r} expr`` to add **computed values** directly in the written text.

- Copy the following into a **code chunk** to compute the average final weight of chicks at the last time point:

```
avg_final_weight <- mean(subset(ChickWeight, Time
  == max(Time))$weight)
```

- In **markdown text**, copy and paste the following to insert the average value rounded to 1 decimal point into a sentence:

"By the end of the experiment, the average chick weight was `{r} round(avg_final_weight, 1)`` grams."

- In another **code chunk**, combine the numbers 45, 87, 120, 150, 210 using the `c()` function and assign it to the name `sample_weights`

- Complete the following sentence by inserting the average of the `sample_weights` using the `mean()` function as a **computed value** using `{r} ...``

"The average weight of 5 selected chicks is ..."