STATS 2107
Statistical Modelling and Inference II

Practical 4: Write

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Contents

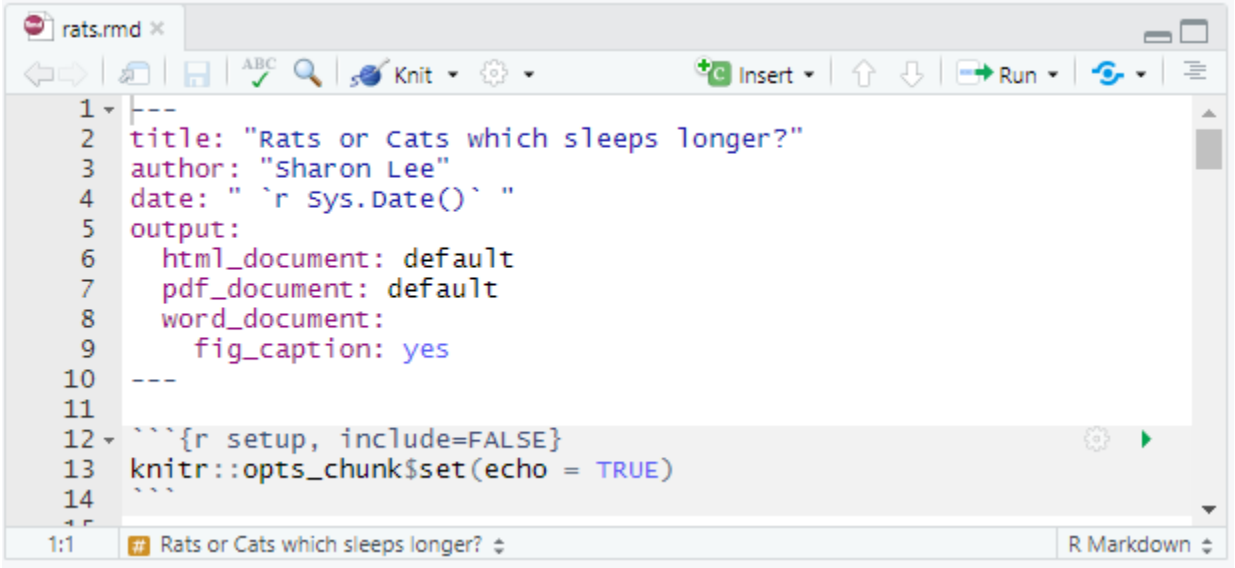
In this practical, we start to look at how to write reports with R code embedded in them

My first report in R

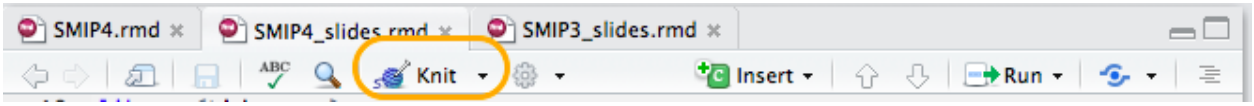
Rmarkdown is a simple way to write reports with embedded R in it.

- Download the file `rats.rmd` from canvas.
- Open it in Rstudio.

It should look something like this:



- Click the button `Knit`.



- You should get something like this:

Rats or Cats which sleeps longer?

Sharon Lee

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Introduction

In this analysis, we will address the question of which has the longer average sleeping patterns: rats (Rodentia) or cats (Carnivora).

Data

The data is contained in the `msleep` dataset in the `tidyverse` package. This is loaded:

```
library(tidyverse)
data("msleep")
```

The data consists of 83 Species with 11 variables measured on it.

Filter data

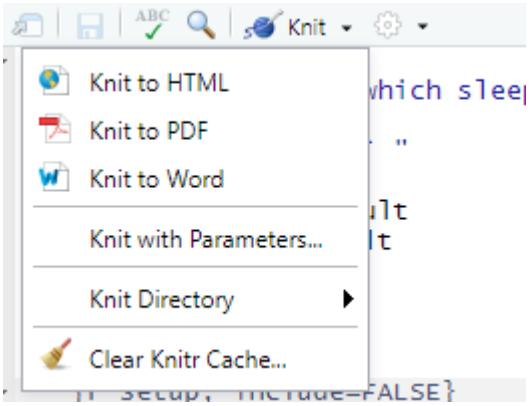
We are only interested in the variables:

- **order:** which is a categorical nominal variable and gives the Order of the Species.

Rstudio runs the file through R, finds all of the R code - produces the output, tables and figures and then converts it all to a webpage (HTML file).

Other formats

HTML not good enough for you - picky, then you can `knit` other forms. Click the little arrow next to `knit`.



Choose `Knit to PDF` for a pdf (you will need to have installed latex on your computer for this to work), or `Knit to Word` for a Word document.

Text formatting

You can format your text using very simple extra characters in your text:

Emphasis

Use the following to bold or italicise your text:

```
*italic*   **bold**

_italic_   __bold__
```

Headers

Use the following to create sections and subsections in your report:

```
# Header 1 - section

## Header 2 - subsection

### Header 3 - subsubsection
```

Lists

Use the following to create lists and sublists in your report.

```
Unordered List
* Item 1
* Item 2
    + Item 2a (this is two tabs)
    + Item 2b
Ordered List
1. Item 1
2. Item 2
3. Item 3
    + Item 3a
    + Item 3b
```

R commands

To have R commands in our report, we use

Insert your commands into this.

The commands and any output will be included in your final report.

Tables

The easiest way to produce a table in Rmarkdown is to produce the table you want and then pass it into the command `kable`.

```
table %>%  knitr::kable(caption = "My caption")
```

See the example in `rats.rmd`.

Figures

Any set of R commands that produce an figure will automatically be added. To add captions we put them in at the start like this:

```
```{r, fig.cap = "My caption"}
```

Maths

To add maths in a line we use `$math$`. For example

> The sample mean is denoted `$\bar{X}$`.

gives

> The sample mean is denoted $\bar{X}$.

Note that a lot of the maths commands start with `\`. Maths on its own line is done with

```
$$
  maths
$$
```

For example

```
$$
\bar{X} = \frac{1}{n}\sum^n_{i = 1}X_i
$$
```

gives

$$\bar{X} = \frac{1}{n}\sum^n_{i=1} X_i$$

Finally, if we want multiple lines of maths we use

```
$$
\begin{aligned}
 First line & stuff\\
 Second line & stuff\\
\end{aligned}
$$
```

The `\\` tells R that we need a new line, while the `&` tells R how to line the lines up.

For example

```
$$
\begin{aligned}
var(Y) &= E[ (Y - E[Y])^2 ]\\
       &= E[Y^2] - E[Y]^2
\end{aligned}
$$
```
```

gives

$$\begin{aligned} var(Y) &= E[(Y - E[Y])^2] \\ &= E[Y^2] - E[Y]^2 \end{aligned}$$

How to get more help: