INTRODUCTION TO MARKDOWN

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MIROR TRAINING EVENT

UGent

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WHAT IS MARKDOWN?

- Tool to convert plain text into formatted text
- Main goal is to focus on the content rather than the formatting
- Easier to learn than LateX (although LateX is preferred for complex documents)
- Markdown is also a syntax for styling text on the GitHub platform

- R Markdown: R code embedded in a Markdown document
- use .Rmd extension in R studio
- R Markdown converted to standard Markdown using 'knitr' package
- Workflow: R Markdown => Markdown => html/pdf/word

MARKDOWN SYNTAX

This is an H1 header format

This is an H2 header format

This text will be in italics

This text will be in bold

Unordered list:

- First
- Second
- Third

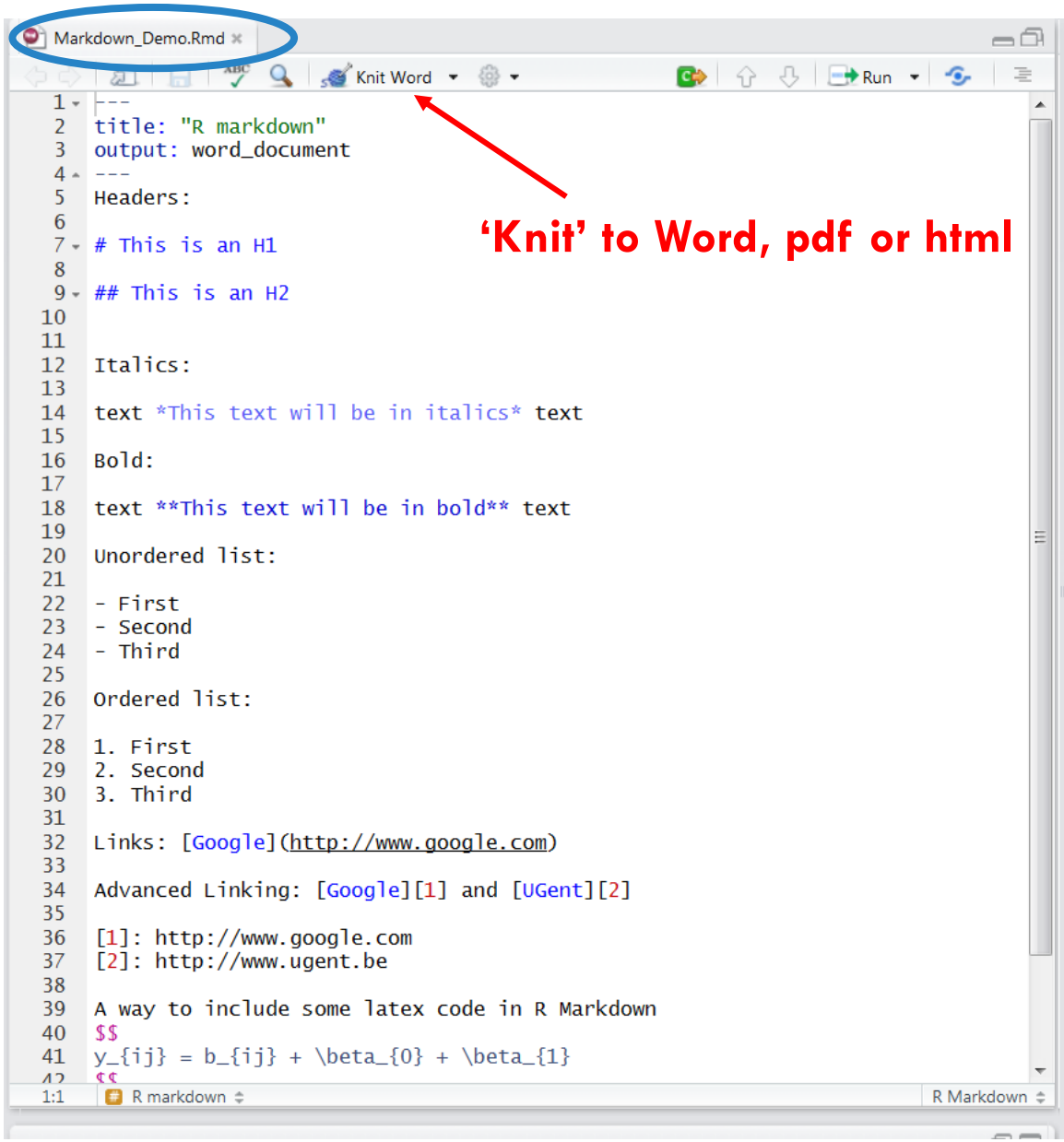
Ordered list:

1. First item
2 Second item
3. Third item

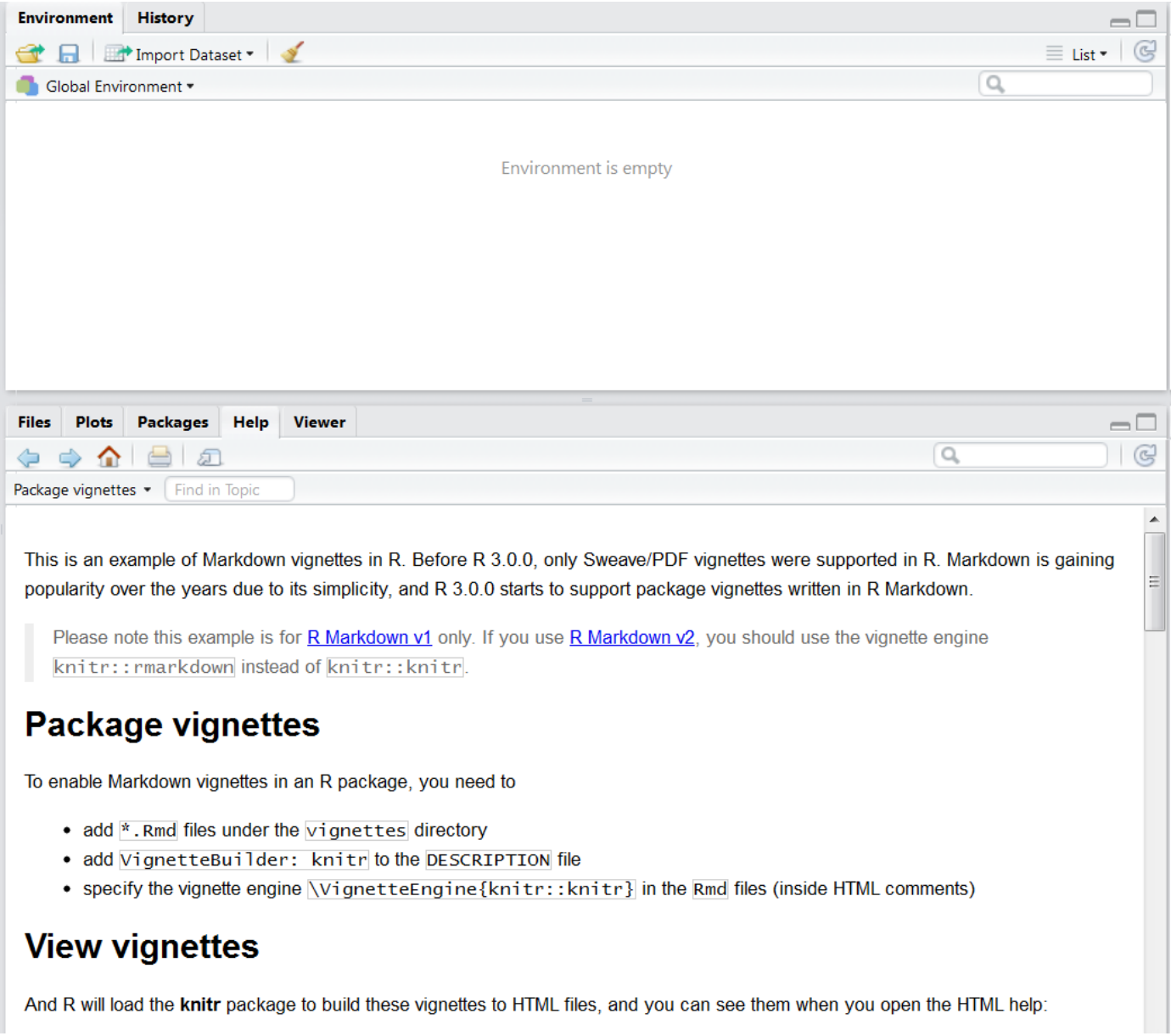
Links:
[Google](http://www.google.com)

Advanced links:
Advanced Linking: [Google][1] and [UGent][2]
[1]: http://www.google.com [2]: http://www.ugent.be

Using Markdown in R studio



'Knit' to Word, pdf or html



MARKDOWN=> MS WORD

```
---
title: "R markdown"
output: word_document
---
Headers:

# This is an H1

## This is an H2


Italics:

text *This text will be in italics* text

Bold:

text **This text will be in bold** text

Unordered list:

- First
- Second
- Third

Ordered list:

1. First
2. Second
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Links: [Google](http://www.google.com)

Advanced Linking: [Google][1] and [UGent][2]

[1]: http://www.google.com
[2]: http://www.ugent.be

A way to include some latex code in R Markdown
$$
y_{ij} = b_{ij} + \beta_{0} + \beta_{1}
$$
```

=>

R markdown

Headers:

This is an H1

This is an H2

Italics:

text *This text will be in italics* text

Bold:

text **This text will be in bold** text

Unordered list:

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A way to include some latex code in R Markdown

$$y_{ij} = b_{ij} + \beta_0 + \beta_1$$

WHAT IS KNITR?

- R package designed for dynamic report generation in R
- Script contains a mixture of text and R code, which is when processed replaced by text and output, including figures and tables
- Uses R as programming language and a documentation language (LateX, Markdown)
- Inline R code within the text and separate code chunks

Advantage: you do not need to copy and paste your R output anymore!

USING PACKAGE 'KNITR' IN R STUDIO

Markdown_Demo.Rmd | KnitR_Demos.Rmd | RMDKnitr_Demo.Rmd

Knit Word | Run

'Knit' to Word, pdf or html

```
---
title: "KnitR_Demo"
output: word_document
---

```{r global_options, include=FALSE}
library(knitr)
knitr::opts_chunk$set(fig.width=12, fig.height=8,
                      echo=FALSE, warning=FALSE, message=FALSE)
```

Cars is a built-in dataset in R. This dataset has `r nrow(cars)` rows.
We can also see our dataset using the head command as follows:
```{r chunk1}
head(cars)
```

Tables using kable:
```{r chunk_table}
x <- rnorm(100)
y <- 2*x + rnorm(100)
lr <- lm(y~x)

kable(summary(lr)$coeff, digits = 2, row.names = FALSE,
      col.names = c("Estimate","Standard Error","t-value","p-value"),
      caption = "Linear Regression",
      format.args = list(decimal.mark = ","))
```

We can see the summary statistics using by embedding an R code chunk like this:
```{r chunk2}
summary(cars)
```

You can also embed plots, for example:
```{r chunk3, echo=FALSE, eval = TRUE, fig.width=6}
hist(cars$speed)
```
Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing the R code generating the plot.
Also, if we write `eval = FALSE` parameter in the code chunk, the R code will not be executed.
```

Code chunk

Inline R code

Code chunk

Code chunk

Code chunk

Code chunk

28:4 (Top Level) R Markdown

Console

Environment History

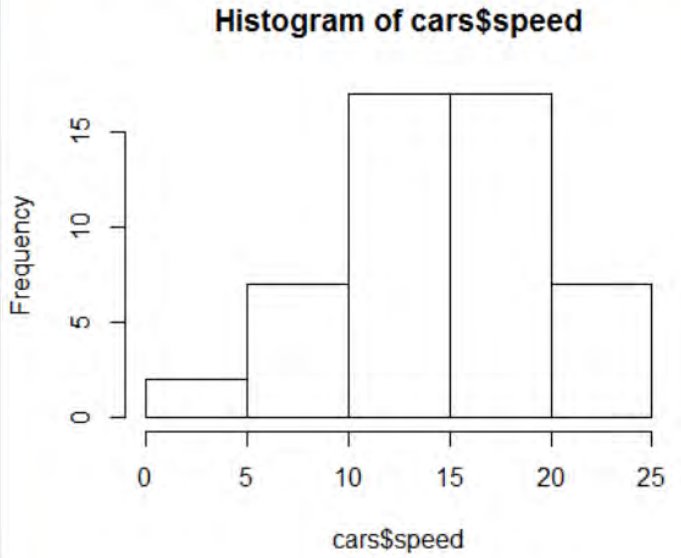
Import Dataset | List

Global Environment

Environment is empty

Files Plots Packages Help Viewer

Zoom | Export



CODE CHUNKS

- **echo=FALSE**: to hide the R code in the final report
- **results="hide"**: to hide the results/output (figures are shown!)
- **include=FALSE**: to have the chunk evaluated, but neither the code nor its output is displayed
- **warning=FALSE** and **message=FALSE**: to suppress any R warnings or messages from being included in the final report

R CODE + TEXT => REPORT

````
---
title: "KnitR_Demo"
output: word_document
---

```{r global_options, include=FALSE}
library(knitr)
knitr::opts_chunk$set(fig.width=12, fig.height=8,
                      echo=FALSE, warning=FALSE, message=FALSE)
```

Cars is a built-in dataset in R. This dataset has `r nrow(cars)` rows.
We can also see our dataset using the head command as follows:
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x <- rnorm(100)
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lr <- lm(y~x)

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      col.names = c("Estimate","Standard Error","t-value","p-value"),
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We can see the summary statistics using by embedding an R code chunk like this:
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hist(cars$speed)
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Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing the R code generating the plot.
Also, if we write `eval = FALSE` parameter in the code chunk, the R code will not be executed.
````

Use ‘kable’ for tables

Plot

=>

KnitR_Demo

Cars is a built-in dataset in R. This dataset has 50 rows. We can also see our dataset using the head command as follows:

```
##   speed dist
## 1     4    2
## 2     4   10
## 3     7    4
## 4     7   22
## 5     8   16
## 6     9   10
```

Tables using kable:

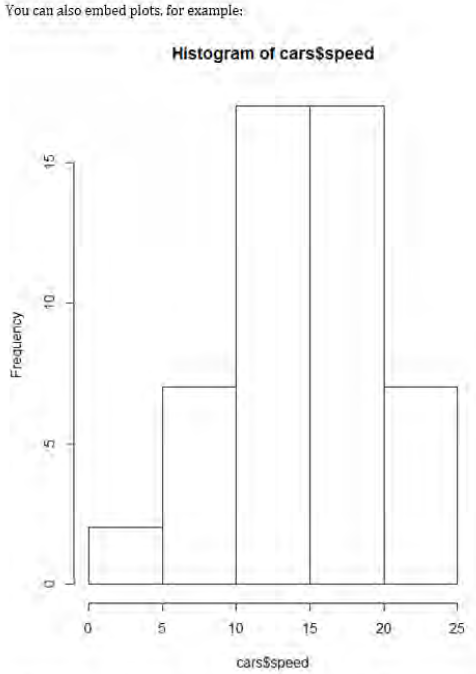
Linear Regression

Estimate	Standard Error	t-value	p-value
-0.07	0.1	-0.71	0.48
1.88	0.1	18.62	0.00

We can see the summary statistics using by embedding an R code chunk like this:

```
##      speed           dist       
##  Min.   : 4.0   Min.   :  2.00  
##  1st Qu.:12.0   1st Qu.: 26.00  
##  Median :15.0   Median : 36.00  
##  Mean   :15.4   Mean   : 42.98  
##  3rd Qu.:19.0   3rd Qu.: 56.00  
##  Max.   :25.0   Max.   :120.00
```

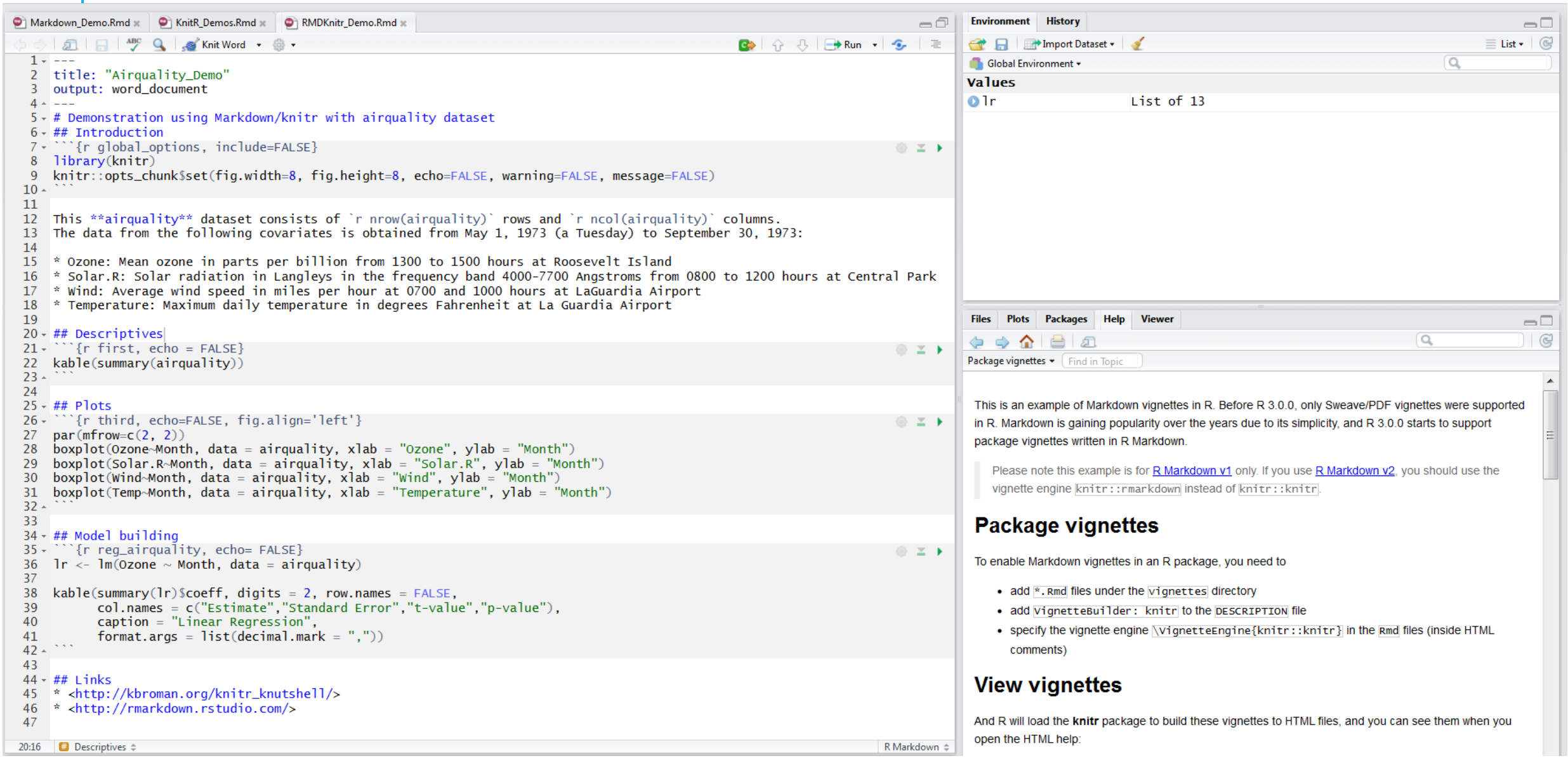
You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing the R code generating the plot. Also, if we write `eval = FALSE` parameter in the code chunk, the R code will not be executed.

For more complex tables consider ‘pander’ or ‘stargazer’

EXAMPLE OF A SMALL REPORT



OUTPUT: MS WORD DOCUMENT

Airquality_Demo

Demonstration using Markdown/knitr with airquality dataset

Introduction

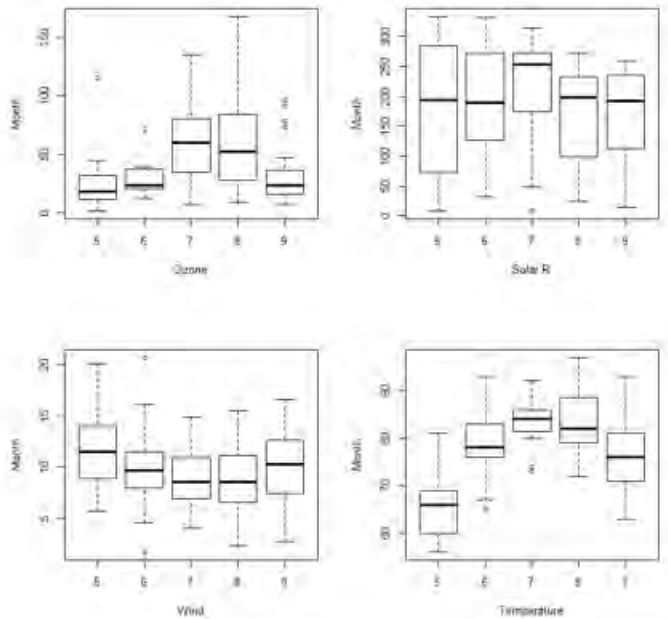
This **airquality** dataset consists of 153 rows and 6 columns. The data from the following covariates is obtained from May 1, 1973 (a Tuesday) to September 30, 1973:

- Ozone: Mean ozone in parts per billion from 1300 to 1500 hours at Roosevelt Island
- Solar.R: Solar radiation in Langleys in the frequency band 4000-7700 Angstroms from 0800 to 1200 hours at Central Park
- Wind: Average wind speed in miles per hour at 0700 and 1000 hours at LaGuardia Airport
- Temperature: Maximum daily temperature in degrees Fahrenheit at La Guardia Airport

Descriptives

Ozone	Solar.R	Wind	Temp	Month	Day
Min. : 1.00	Min. : 7.0	Min. : 1.700	Min. :56.00	Min. :5.000	Min. : 1.0
1st Qu.: 18.00	1st Qu.:115.8	1st Qu.: 7.400	1st Qu.:72.00	1st Qu.:6.000	1st Qu.: 8.0
Median : 31.50	Median :205.0	Median : 9.700	Median :79.00	Median :7.000	Median :16.0
Mean : 42.13	Mean :185.9	Mean : 9.958	Mean :77.88	Mean :6.993	Mean :15.8
3rd Qu.: 63.25	3rd Qu.:258.8	3rd Qu.:11.500	3rd Qu.:85.00	3rd Qu.:8.000	3rd Qu.:23.0
Max. :168.00	Max. :334.0	Max. :20.700	Max. :97.00	Max. :9.000	Max. :31.0
NA's :37	NA's :7	NA	NA	NA	NA

Plots



Model building

Linear Regression

Estimate	Standard Error	t-value	p-value
15,66	15,17	1.03	0,30
3,68	2,07	1,78	0,08

Links

- http://kbroman.org/knitr_knutshell/
- http://rmarkdown.rstudio.com/

MORE INFORMATION

- For more details on using R Markdown see rmarkdown.rstudio.com
- For more details on using knitr see kbroman.org/knitr_knutshell
- For more details on Markdown for GitHub see guides.github.com/features/mastering-markdown/

Thank you for your attention!