Basic Skills in R Markdown: the pdf file

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Introduction

This document provides basic tools to produce a html file using R markdown. The best way to use this document is to run the file in R studio and then read the .Rmd file to see how the output was created. The file can be used to produce a very basic html document an you can add later more components to you document.

Sections and subsections

This is a an example of a R markdown file that produces htnl output. This is a section in the document.

Subsection

This text apears in a subsection

Subsubsection

This text is a part of a subsection.

Including R code

Print R code and output

This is an example how to include R code and output in the document. We use the airquality data as an example.

```
x<-na.omit(airquality$Ozone)
print(x)
```

```
##   [1]  41  36  12  18  28  23  19   8   7  16  11  14  18  14  34   6  30  11
##  [19]   1  11   4  32  23  45 115  37  29  71  39  23  21  37  20  12  13 135
##  [37]  49  32  64  40  77  97  97  85  10  27   7  48  35  61  79  63  16  80
##  [55] 108  20  52  82  50  64  59  39   9  16  78  35  66 122  89 110  44  28
##  [73]  65  22  59  23  31  44  21   9  45 168  73  76 118  84  85  96  78  73
##  [91]  91  47  32  20  23  21  24  44  21  28   9  13  46  18  13  24  16  13
## [109]  23  36   7  14  30  14  18  20
## attr(,"na.action")
##  [1]   5  10  25  26  27  32  33  34  35  36  37  39  42  43  45  46  52  53  54
## [20]  55  56  57  58  59  60  61  65  72  75  83  84 102 103 107 115 119 150
## attr(,"class")
## [1] "omit"
```

Do not print the R code but print the output

If we do not want to print the R code, but we want to see the output use the option echo=FALSE:

```
##   [1]  41  36  12  18  28  23  19   8   7  16  11  14  18  14  34   6  30  11
##  [19]   1  11   4  32  23  45 115  37  29  71  39  23  21  37  20  12  13 135
##  [37]  49  32  64  40  77  97  97  85  10  27   7  48  35  61  79  63  16  80
##  [55] 108  20  52  82  50  64  59  39   9  16  78  35  66 122  89 110  44  28
##  [73]  65  22  59  23  31  44  21   9  45 168  73  76 118  84  85  96  78  73
##  [91]  91  47  32  20  23  21  24  44  21  28   9  13  46  18  13  24  16  13
## [109]  23  36   7  14  30  14  18  20
## attr(,"na.action")
##  [1]   5  10  25  26  27  32  33  34  35  36  37  39  42  43  45  46  52  53  54
## [20]  55  56  57  58  59  60  61  65  72  75  83  84 102 103 107 115 119 150
```

```
## attr(,"class")
## [1] "omit"
```

Items

This is a text that contains items:

- Item 1
- Item 2
- Item 3
- Item 4

Use R as a part of your text

Example: summary statistics

The mean Ozone level is

```
x<-na.omit(airquality$Ozone)
mean(x)
```

```
## [1] 42.12931
```

with variance is equal to

```
var(x)
```

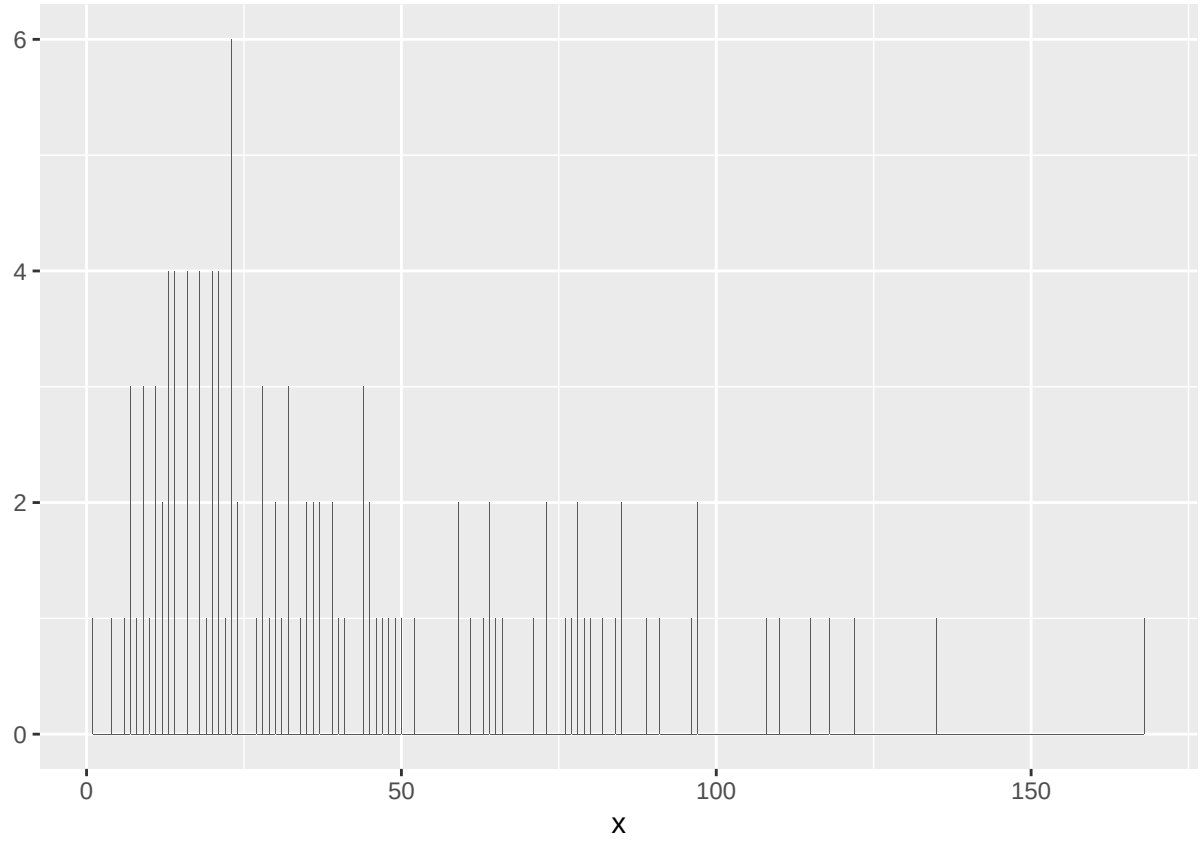
```
## [1] 1088.201
```

Graphical displays in the document

A histogram for the Ozone level can be produced using the function qplot with the option geom = "histogram":

```
Ozone.R<-data.frame(x)
qplot(x, data = Ozone.R, geom = "histogram", binwidth = 0.1)
```

```
## Warning: `qplot()` was deprecated in ggplot2 3.4.0.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```



To add a caption to the figure we use {r figchp1,fig.cap="Sepal length (III)"}.

```
Ozone.R<-data.frame(x)
qplot(x, data = Ozone.R, geom = "histogram", binwidth = 0.1)
```

We can refer to the figure from the text in the document. For example, Figure @ref(fig:figchp2) presents a histogram that was produced using the function qplot() function.

```
Ozone.R<-data.frame(x)
qplot(x, data = Ozone.R, geom = "histogram", binwidth = 0.1)
```

How to add a link to your document

Materials about R markdown are widely available online.

- For a YouTube tutorial about R markdown by Jalayer Academy see YTRmd1.
- For a second YouTube tutorial about R markdown by Roger Peng see YTRmd2.

A usefull link to a R Markdown:

- For a free online book about R markdown see see RMDbook.

How to create a math formula

To create a math formula, for example a linear regression model of the form

$$y_i = \alpha + \beta \times x_i + \varepsilon_i,$$

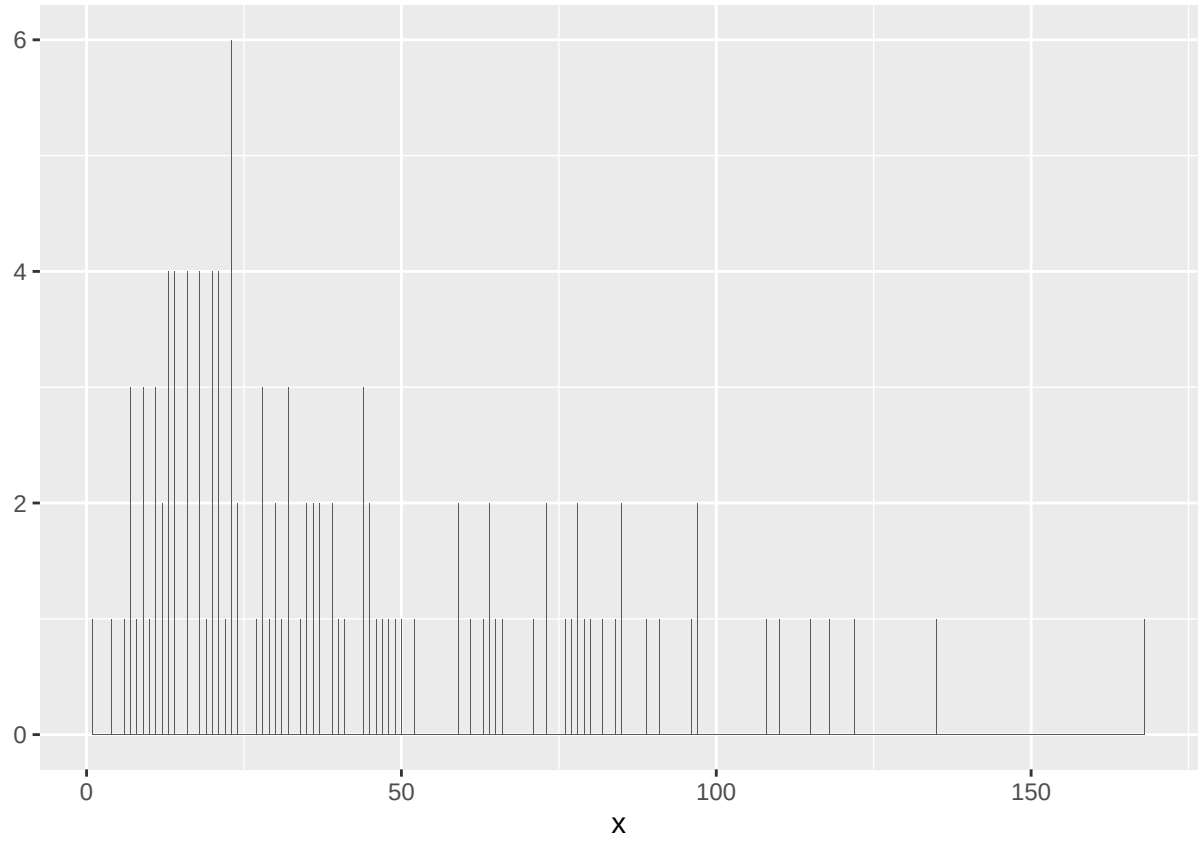


Figure 1: Sepal length (III)

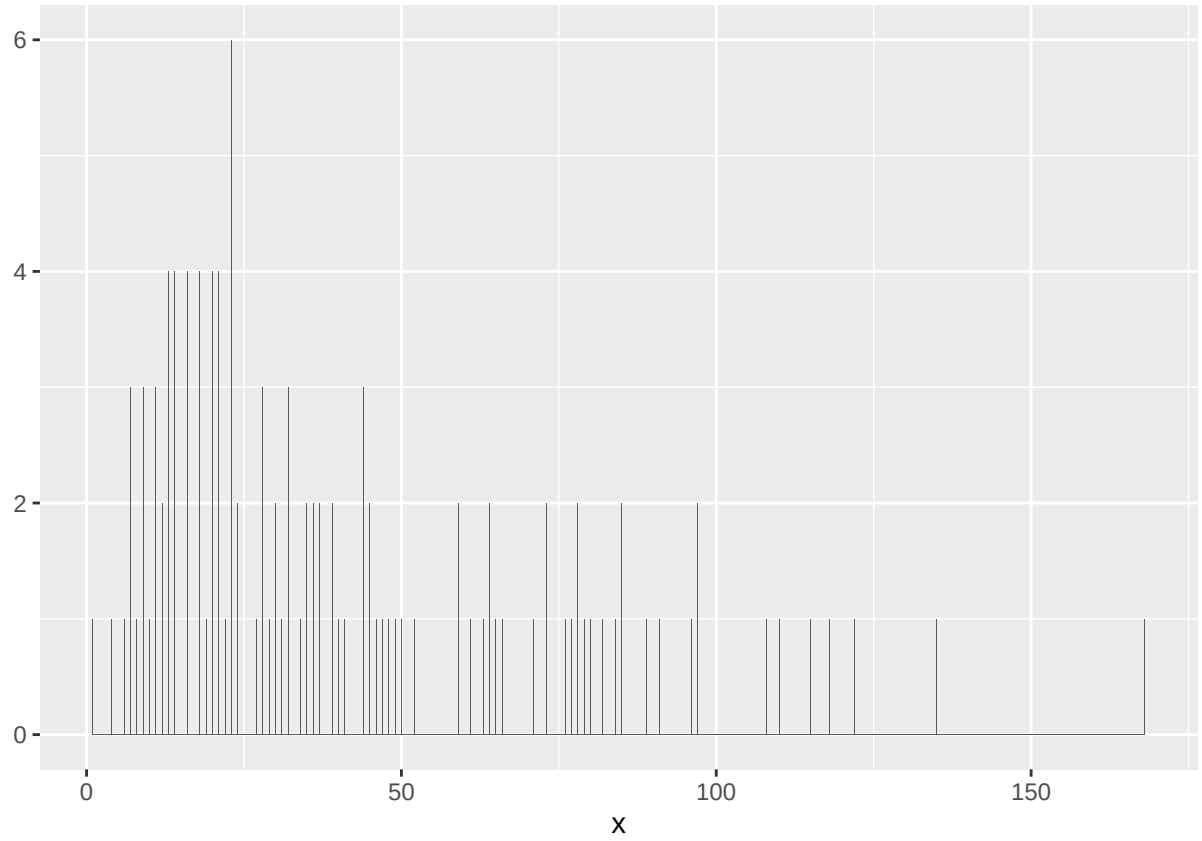


Figure 2: Sepal length (III)

we need to use $LaTeX$ syntax.

Just do it

Analysis of the cars data

Fit a linear regression model to the cars datasets in which the response is the stopping distance and the predictor is the car speed.

Expected outout

Write a short report with the following structure

- Introduction
- The cars data (including a scapter plot of the data)
- Modeling (formulate the model for the cars data)
- Application to the data: present the results including the R object with the regression output. Plot os the data
  and fitted model and isgnostic plots.

In your report, include the R code as a part of the text. Produce both html and pdf outputs.