

UNIT 1: SETTING UP THE ENVIRONMENT- GETTING R READY

1.0 OVERVIEW

This Unit will cover the basic aspects that will allow you to get the R environment ready for use. You will learn how to install R and use R as well as how to get access to the help feature. The various aspects covered in this unit include:

- Introduction to R
- Installation of RStudio
- Console and Script Editor
- Installation of R Packages
- R Calculator
- R help

1.1 LEARNING OUTCOMES

Upon completion of this unit you will be able to:

- Explain the R environment.
- Install and use RStudio.

1.2 INTRODUCTION TO THE R

“R was created by Ross Ihaka and Robert Gentleman at the University of Auckland, New Zealand, and is currently developed by the R Development Core Team” (tutorialspoint, 2018).

R is open-source programming language which can be used as a powerful statistical tool. A major part of statistics is to Data analysis which converts “data into knowledge, insight and understanding”. Being open-source, new packages for R are made available to cater for new developments. R consists of statistical algorithms which are inbuilt such as machine learning and mathematical models. R includes powerful capabilities such as easy and quick generation charts and plots and well as the capability to integrate with Big data and perform Big Data Analytics (Patil, 2016).

R is an interpreted computer language which accommodates for basic programming constructs such as branching, loops and functions. Moreover, R allows the integration with other programming languages such as C, C+, Python and .Net (tutorialspoint, 2018).

1.3 FEATURES OF R

Some of the important features of R include:

- 1 Simple, well-developed, effective programming language.
- 2 effective data manipulation and storage.
- 3 provision of a suite of operators for calculations (arrays, lists, vectors and matrices).
- 4 provision of an integrated collection of tools for data analysis.
- 5 Provision of graphical facilities for data analysis.

(tutorialspoint, 2018)

1.4 R AND R STUDIO

R is a programming language which can be downloaded using the comprehensive **R** archive network (CRAN) (Grolemund and Wickham, 2017).

RStudio is an Integrated Development Environment (IDE) for R programming and provides a friendly user interface (Grolemund and Wickham, 2017).

For this unit, RStudio will be used as the development environment.

1. Installation of R Studio

This section provides the basic steps to get the environment ready and follows the guidelines of Grolemund and Wickham (2017). Follow the following steps to get your environment ready.

1. Download an open source version of RStudio from <http://www.rstudio.com/download>.

<p>Note: For this module, RStudio Version 1.1.383 has been used. You might have slight variations if you use another version.</p>
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2. Install the software from the download. Select any privacy agreements and recommended settings.

2. Console

The R Console is where computations are performed. An expression can be input and evaluated in the console and the results will be output in the console depending on the expression evaluated or a graph might be displayed in the output window. To retrieve the last expression evaluated the arrow keys can be used in the console. To stop evaluated the current expression, the Esc key can be used.

If you followed the steps in section 4 correctly, RStudio should now be ready and should be looking something similar to Fig.1.1. You should now be ready to use the console.

Note:

1. If you have closed RStudio after installation, don't panic. You just have to re-open it.
2. Important aspects on screen layouts will be circled in Red as shown in **Figure 1**.

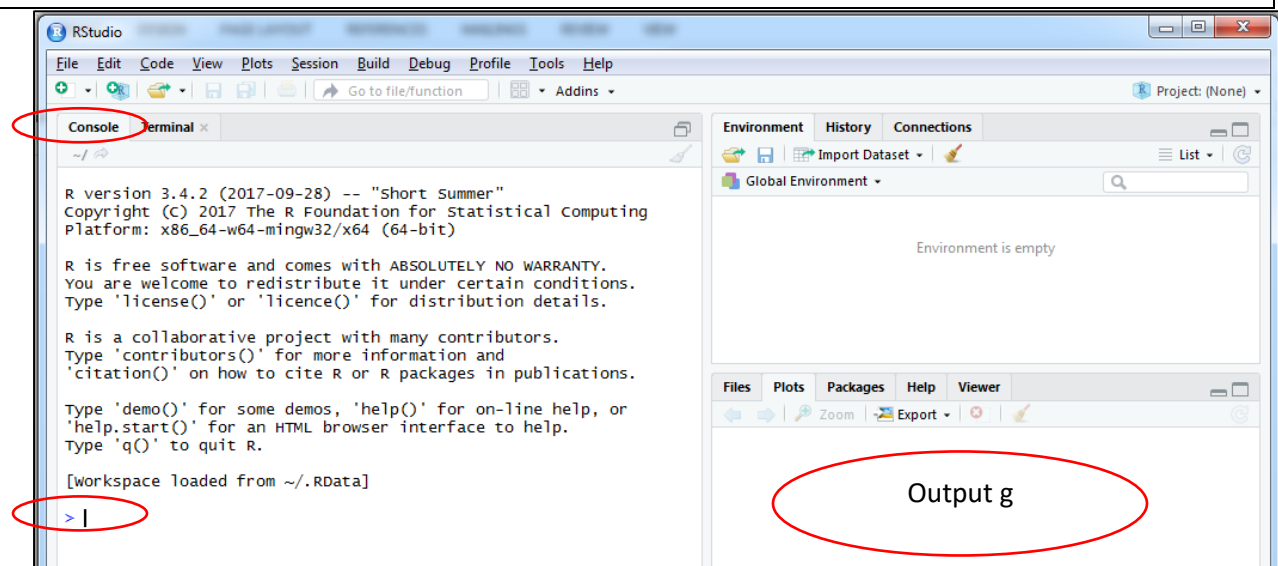


Figure 1: R studio

In **Figure 1**, the console and output area is visible.

Note: that the Output area will still be blank for the moment.

3. Script Editor

Using the console, you will not be able to reuse existing codes. You can therefore use the Script Editor instead of the Console to be able to reuse your files. You can create a file using the Script Editor and run it several times. Follow the following steps to create a file.

1. Click File>New>RScript as shown in **Figure 2** to create a file using the script Editor.

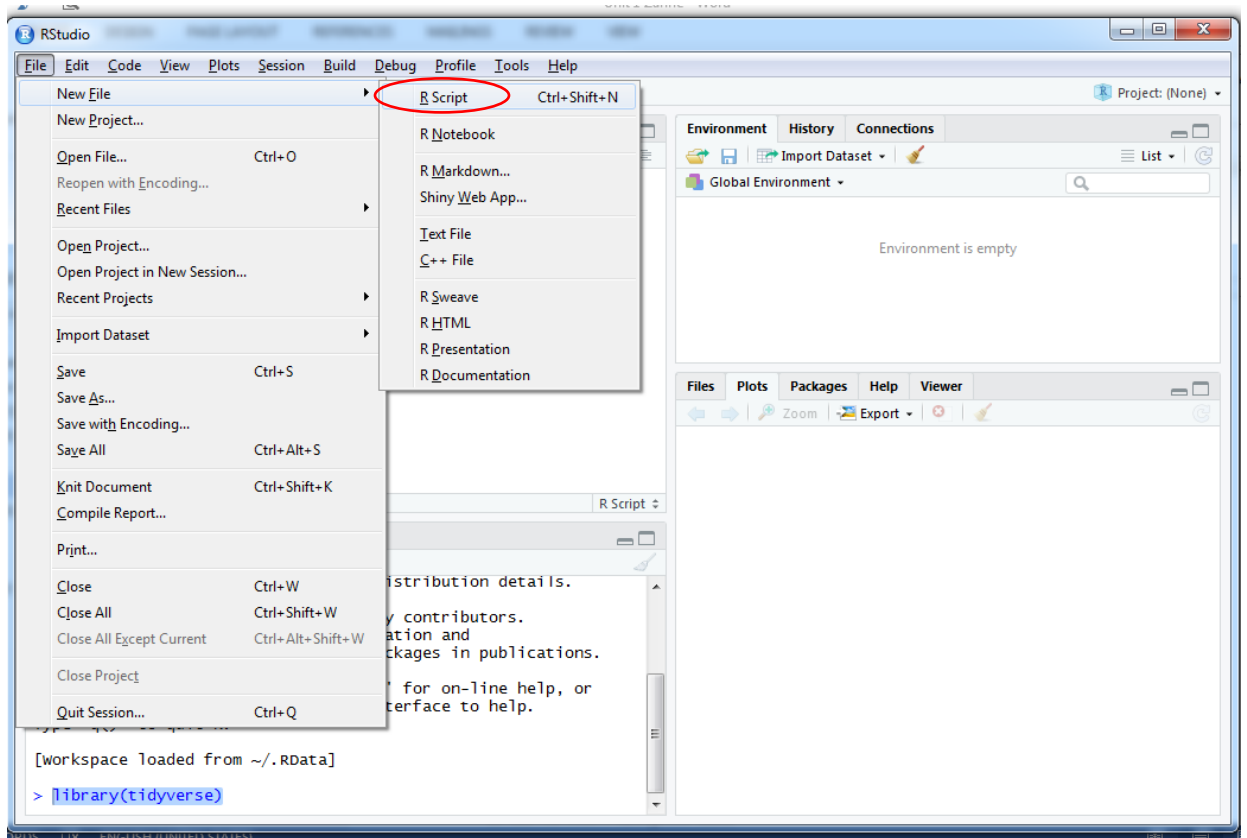


Figure 2: Create New R Script

2. You can type R codes in the R Script Editor and save it for future use. Just type the following line of text and Save it.

```
>install.packages("tidyverse")
```

Note:

1. You can use file>Save As **OR** the Save icon to save your file in your preferred location.
2. In this Unit, we will be using the Console and not the Script Editor. In subsequent units, you might be using the Script Editor to save and run your files.

4. Installation of R Packages

R provides a wide number of packages which can be called as and when needed in the R environment (Patil, 2016). “An *R package* is a collection of functions, data, and documentation that extends the capabilities of base R” Grolemond and Wickham (2017). The majority of the packages that you will use for Unit 1 – 3 are part of tidyverse.

Follow the following instruction to install the tidyverse package.

1. Type the single line of code just after the blinking cursor after the arrow in the Console area as shown below and press enter

```
> install.packages("tidyverse")
```

Note:

1. R will download the packages from CRAN and install them on to your computer.
2. Make sure you have internet connectivity to install the package.

2. To be able to use functions and objects from tidyverse, you now have to load it with the `library()` function as shown below. Type the command in the console and press Enter.

```
>library(tidyverse)
```

Many other excellent packages, which are not part of tidyverse are also available. These packages allow addressing problems in different domains. As we move along, you will be instructed to install other packages if needed.

5. R Calculator

A mathematical expression can be input in the console window and the script is evaluated and output in the console. More details regarding mathematical operators and functions will be covered in Unit 2.

8.1 Self-Learning Activities

1. In the console, type $5+4$ and press Enter. What can you observe?
2. Type $5-2$ in the console and press Enter. What do you observe now?
3. Type $5\%2$ in the console and press Enter. What can you observe now?

6. R help

If you are having problems with R Studio, you can use the R help feature.

1. From the main, click on Help>R Help
2. You will see the Help screen appearing in the output window
3. You can type topics next to the search icon and press enter to see documentations available
4. Alternatively, google is always a rich source of information and help

Figure 3 provides a screenshot of the R Help.

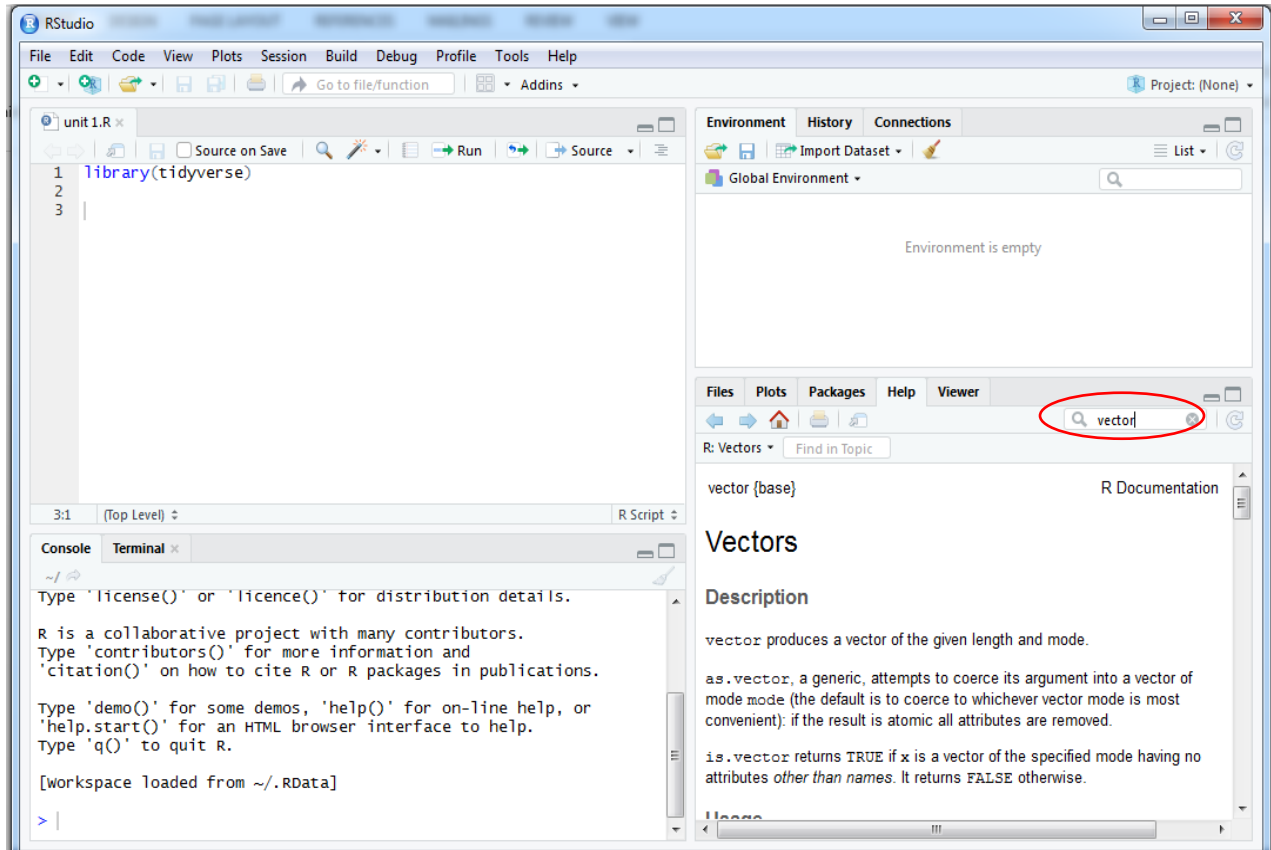


Figure 3: R Help

1.5 SUMMARY

This Unit provides a high level overview of R and the platform to be used to doing R programming. The basic setups and installation to get the R Studio environment ready have been provided. Some of the basic features in R Studio such as the difference between using the Console and the Script Editor, R package installation, R calculator and R help have been discussed in this Unit.

1.6 REFERENCES

Grolemund, G. and Wickham, H., 2017. *R for data science*. O'Reilly, January 2017, First Edition

Patil, S., 2016. Big Data Analytics Using R. *International Research Journal of Engineering and Technology (IRJET)*, 4.

Tutorialspoint, 2016. R-Overview. Online. Available from:

https://www.tutorialspoint.com/r/r_overview.htm. [Accessed 06.02.2018]

1.7 FURTHER READINGS

The following provides useful links to R Programming:

1. Ebook - R for Data Science - <http://r4ds.had.co.nz/>
2. Tutorial - R Tutorial - <https://www.tutorialspoint.com/r/>
3. YouTube - Business Analytics with R -
<https://www.youtube.com/watch?v=TGo9F0QyBuE>