

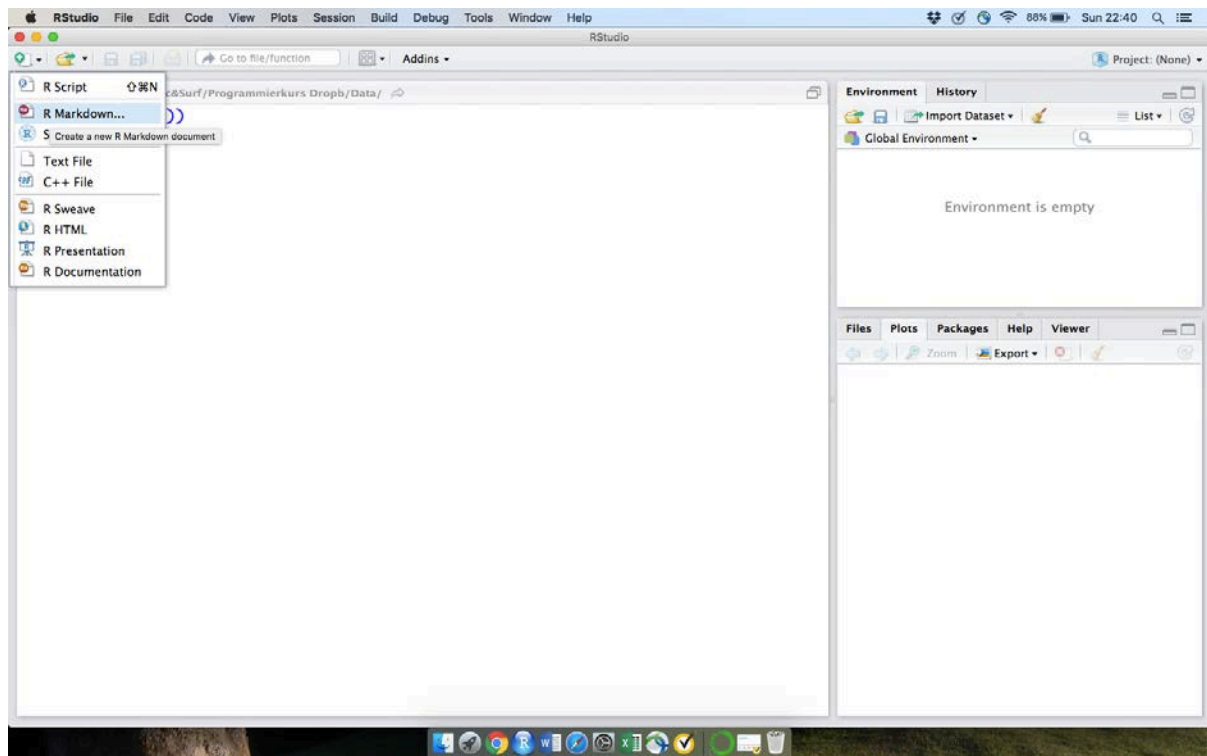
Getting ready for RMarkdown

RMarkdown is a framework that is integrated into RStudio. It allows for producing documents that directly integrate output from running R code, as well as text. Importantly, it is possible to program pieces of text, such that the text can react to output from running R code.

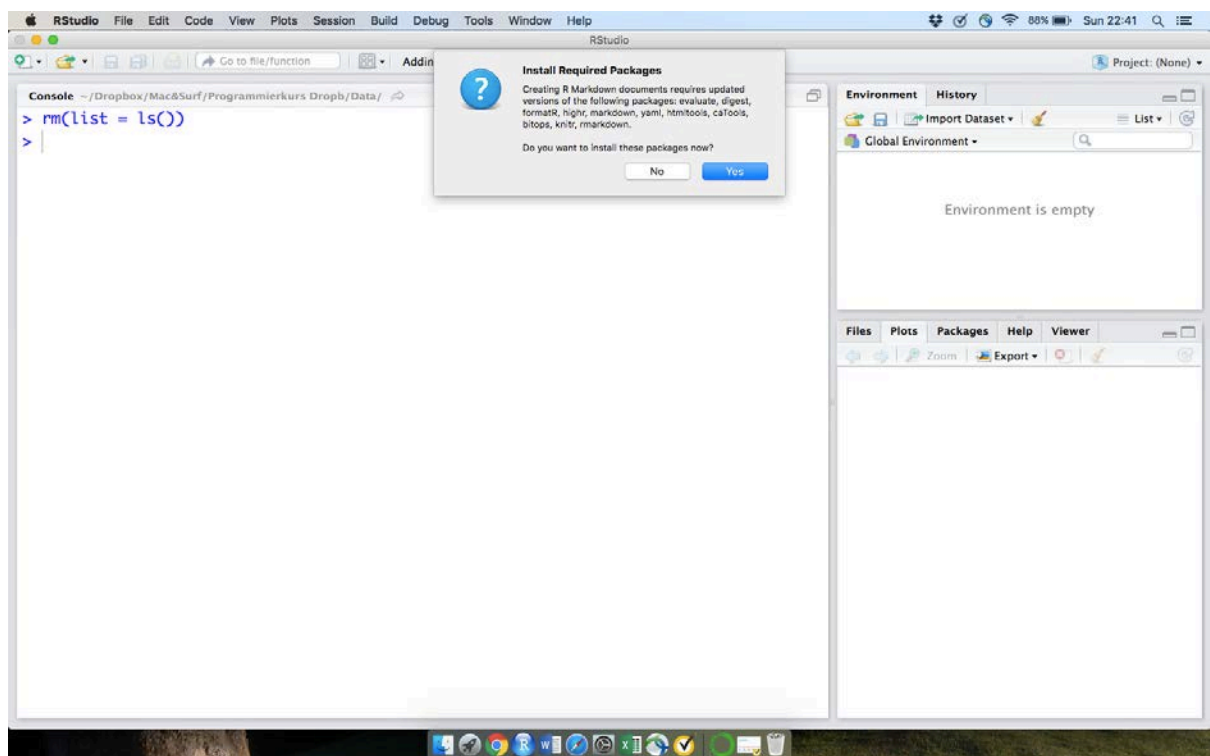
RMarkdown allows for compiling documents into html and pdf format. Word is also a possibility, but the functionality is quite reduced, compared to html and pdf. In order to enable RMarkdown, you have to install the RMarkdown package (see below). To compile documents to pdf format you may also have to install Latex, depending on your system. All relevant installations are explained below, separately for Macs and Windows.

Getting ready for RMarkdown on a Mac

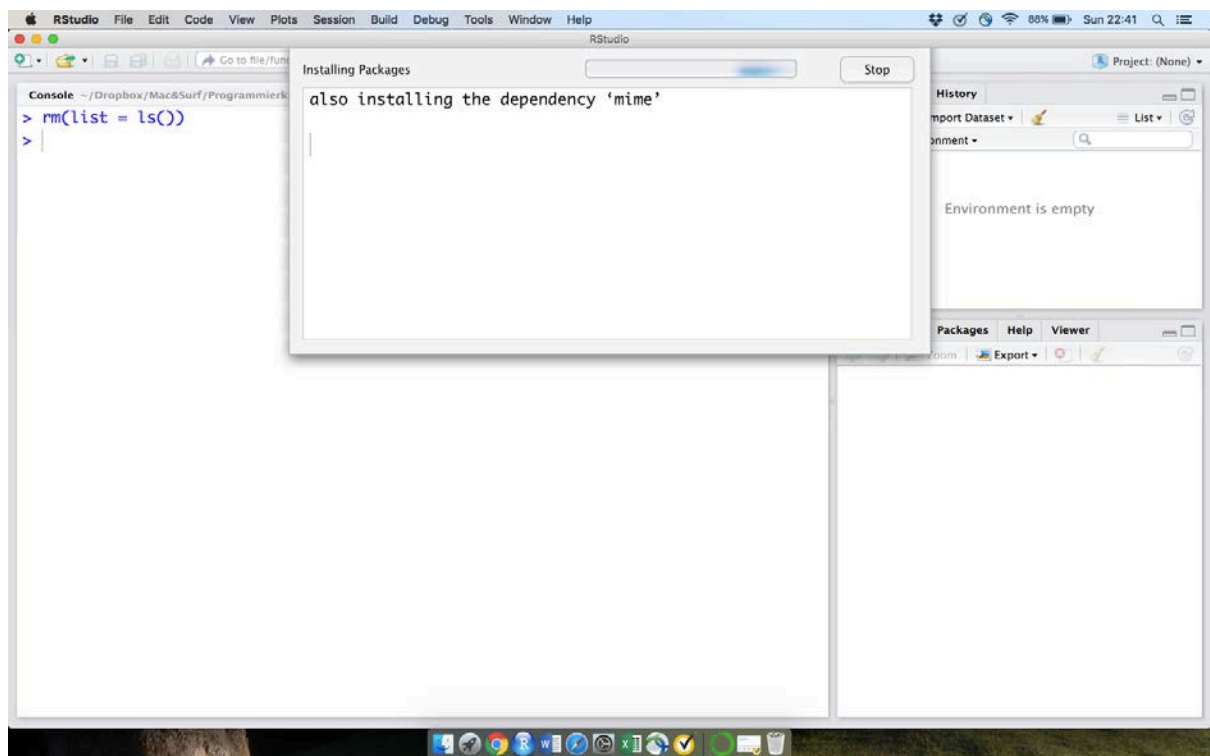
Open RStudio and choose “R Markdown” from the little plus menu as shown below.



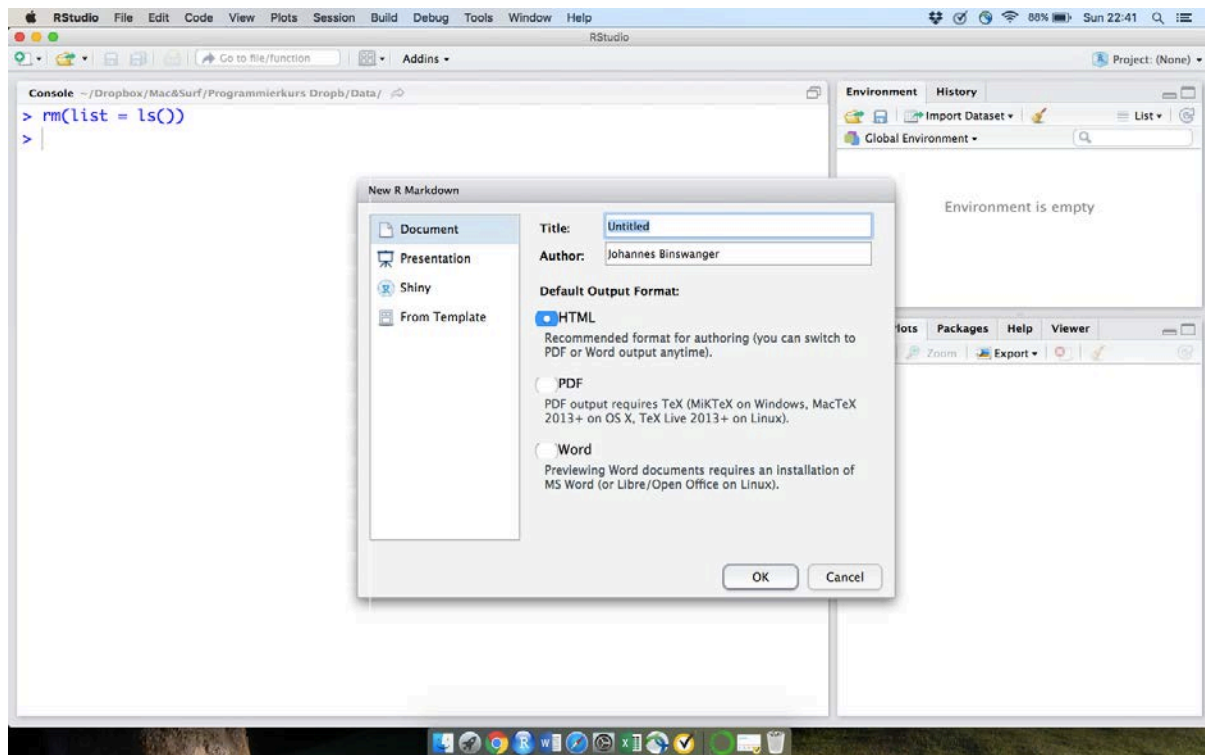
RStudio notices that this requires some new packages. Just click Yes.



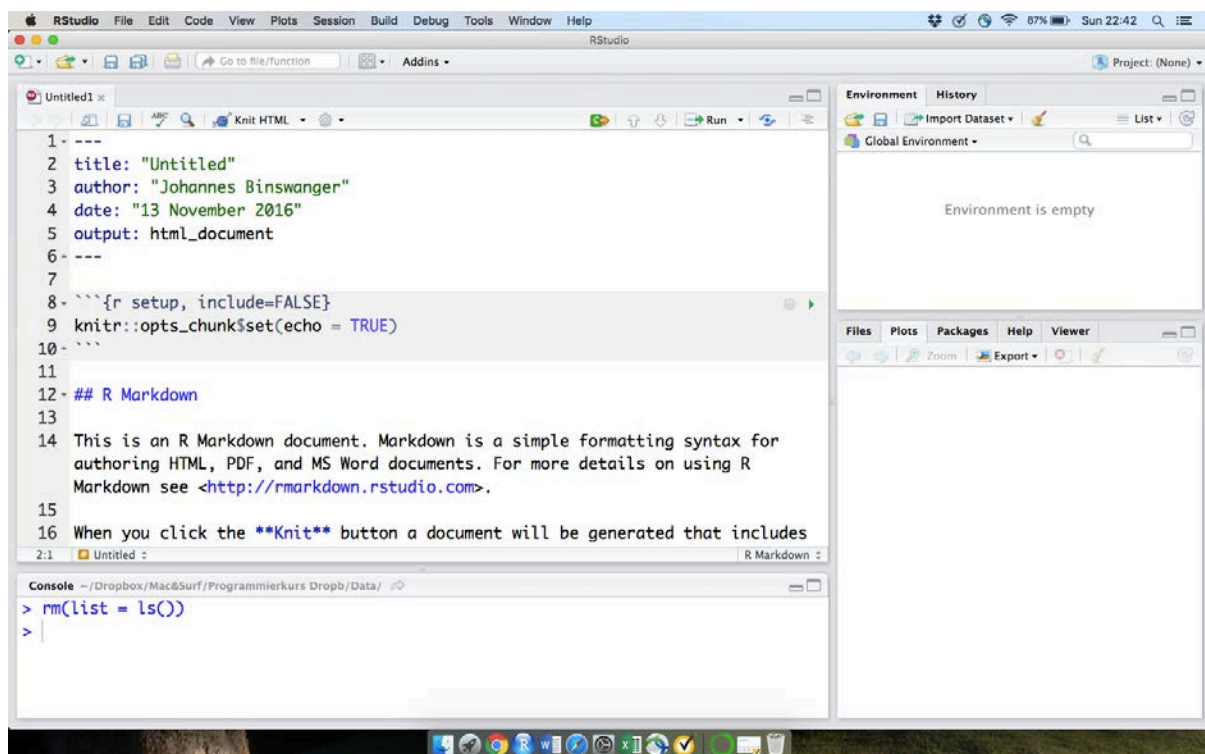
The installation is then running...



Now RStudio is ready for the compilation of a sample document that it provides. Just check it out, keep title and author as suggested, and choose HTML. Confirm with OK.

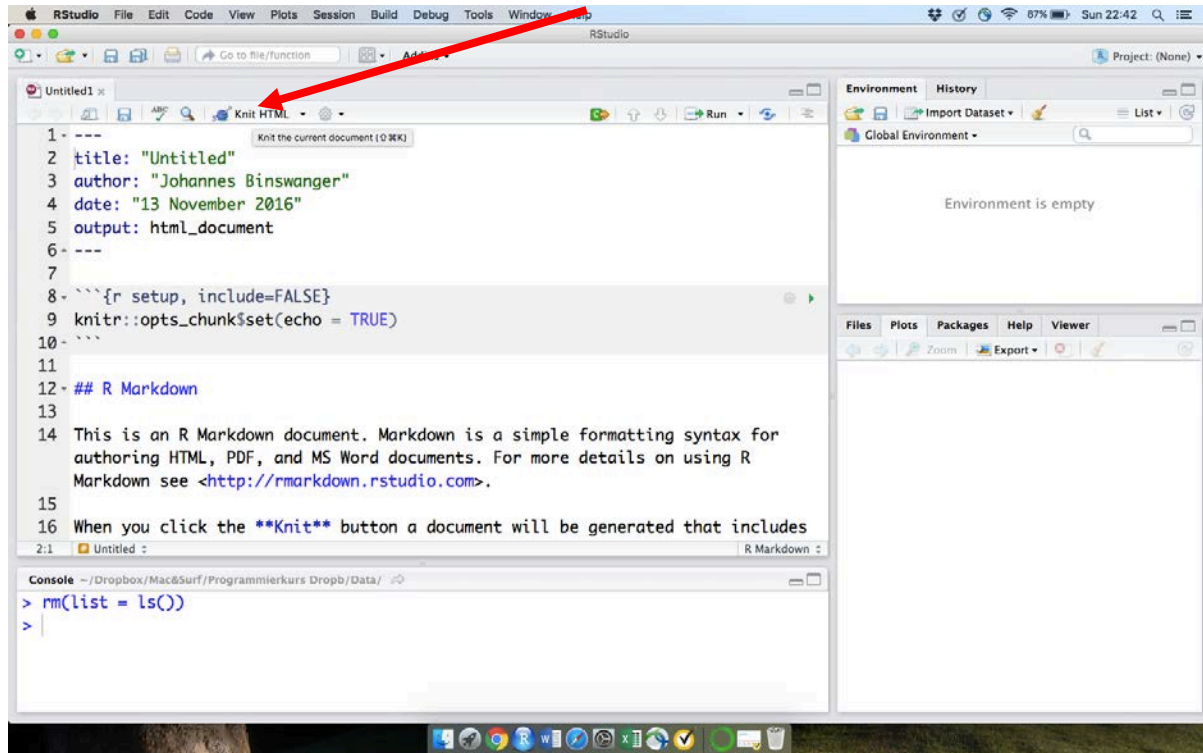


What you get is then the following sample document.

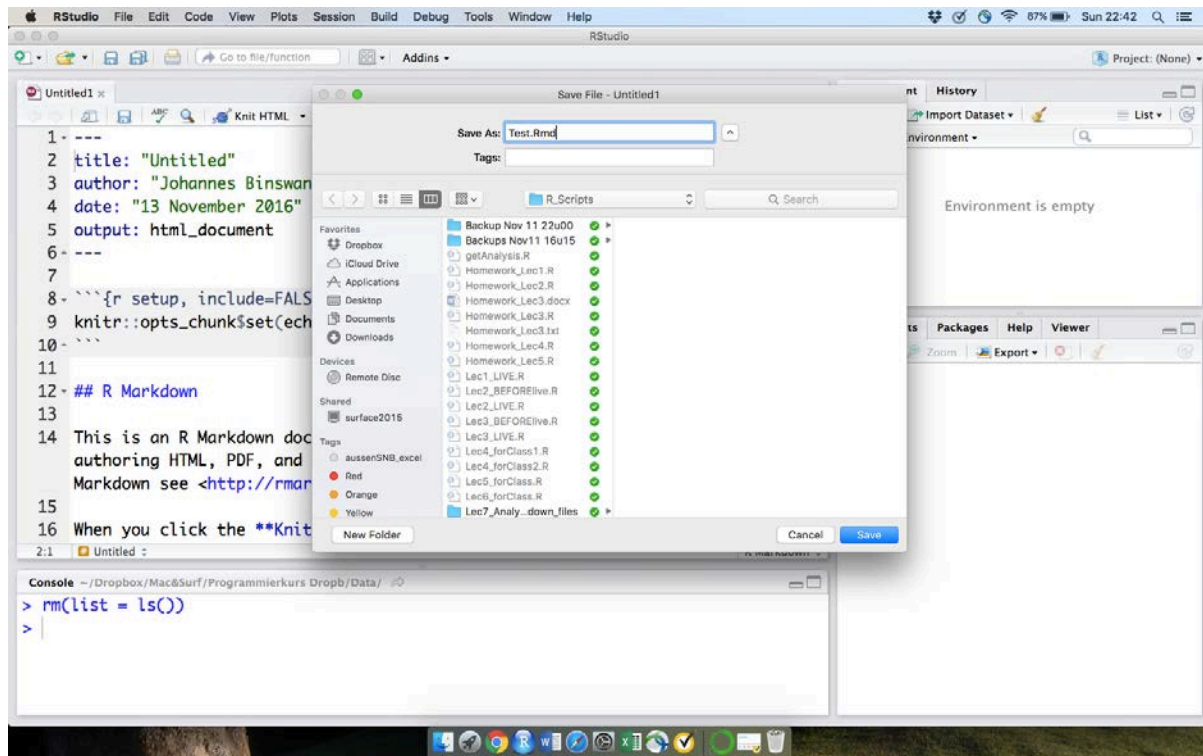


Choose Knit HTML

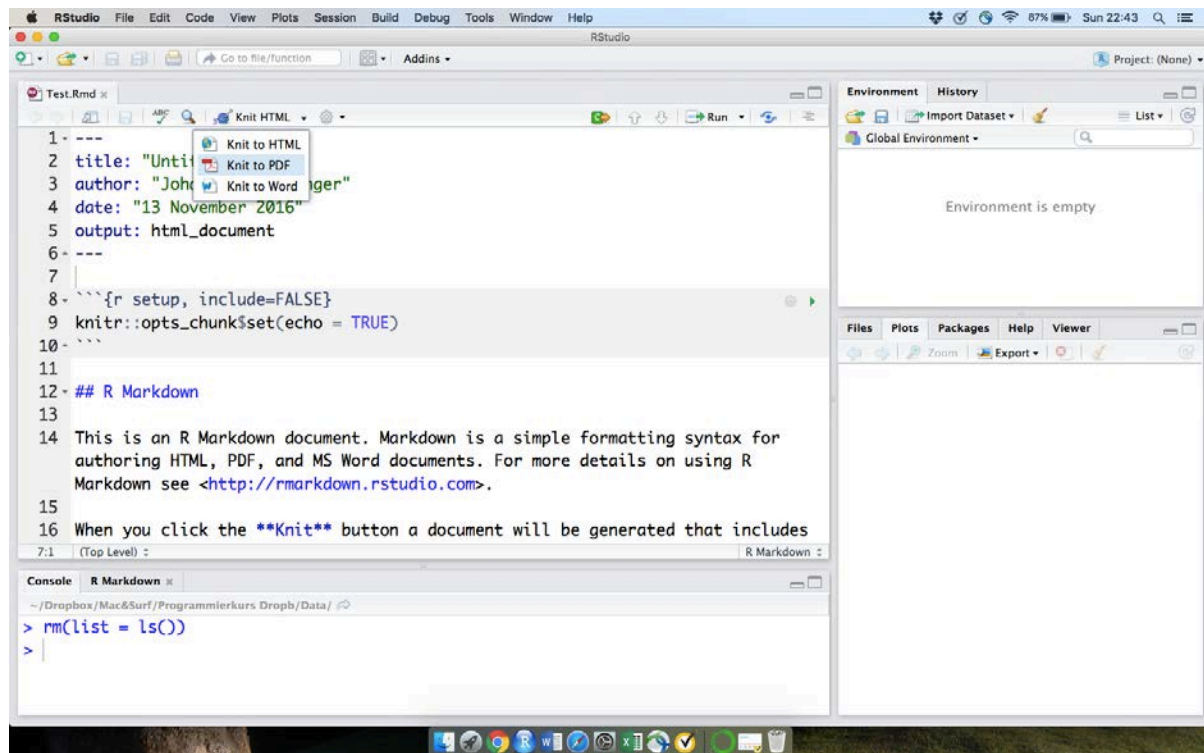
IMPORTANT: If there is any dot (".") in the date line (e.g. because your date appears in German in the form of "13. November 2016", make sure to remove the dot! Otherwise, you will get a compilation error.



You are asked to save your document. Choose a name such as “Test”. It is very important that you provide the extension `.Rmd`! Then save and enjoy the output.



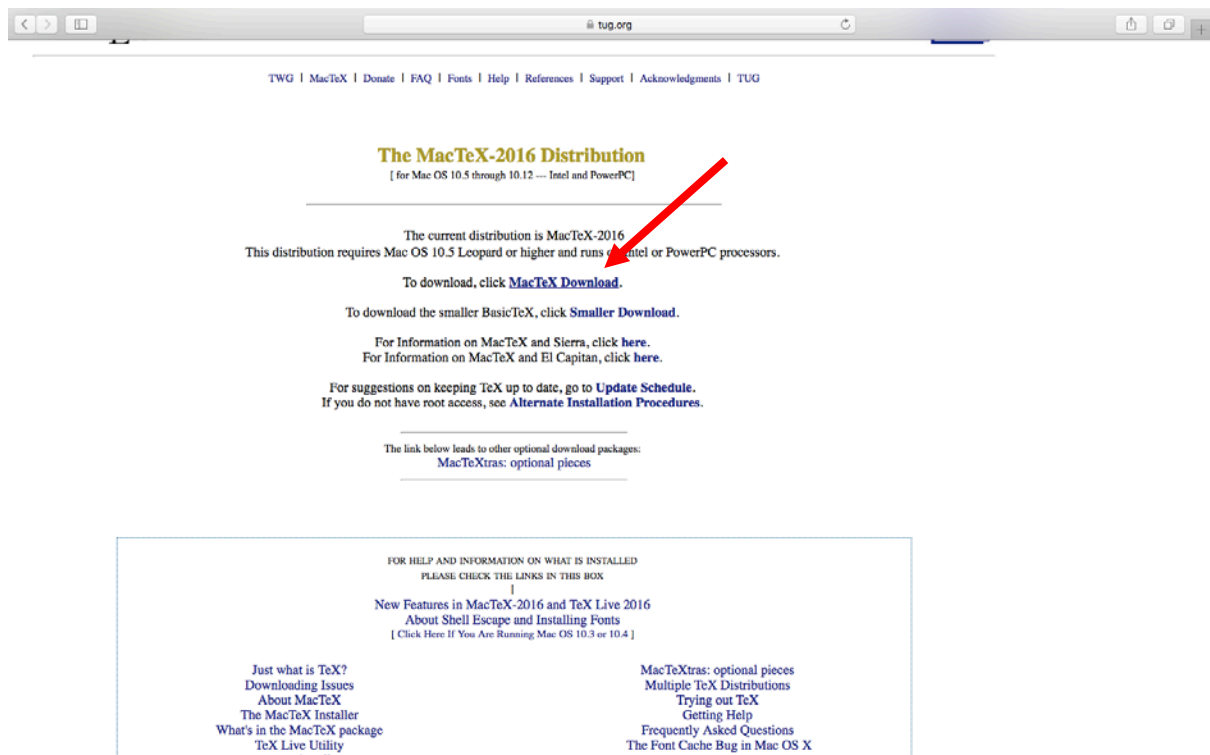
Now we want to compile to PDF, instead of HTML. Choose “Knit to PDF” from the menu.



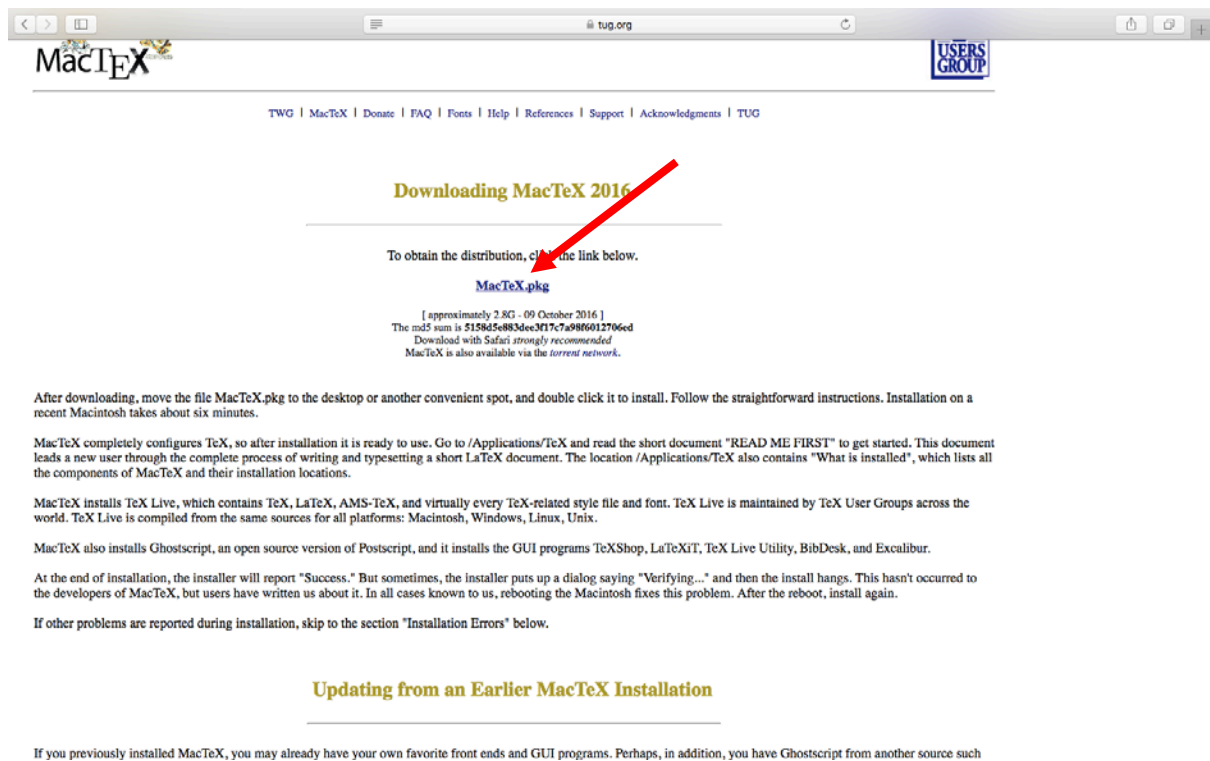
I expect that for some, if not most, of you this works. If it does not work, you have to go on with the below steps and install LaTeX. If you feel you have a flair for programming and consider using a very powerful open-source text editing program that is widely used among scientists, then you should install LaTeX anyway!

So, to install LaTeX on a Mac, go to <https://tug.org/mactex/>. The people from RStudio strongly suggest using Safari as a browser, not Chrome. I haven't tried whether it makes any difference but used Safari.


The tug.org page looks like this. Go to MacTeX Download (which will install Latex on your system).



Click on MacTeX.pkg



The download starts... It takes plus/minus 10 minutes. It may take (much) longer if your internet connection is slow.

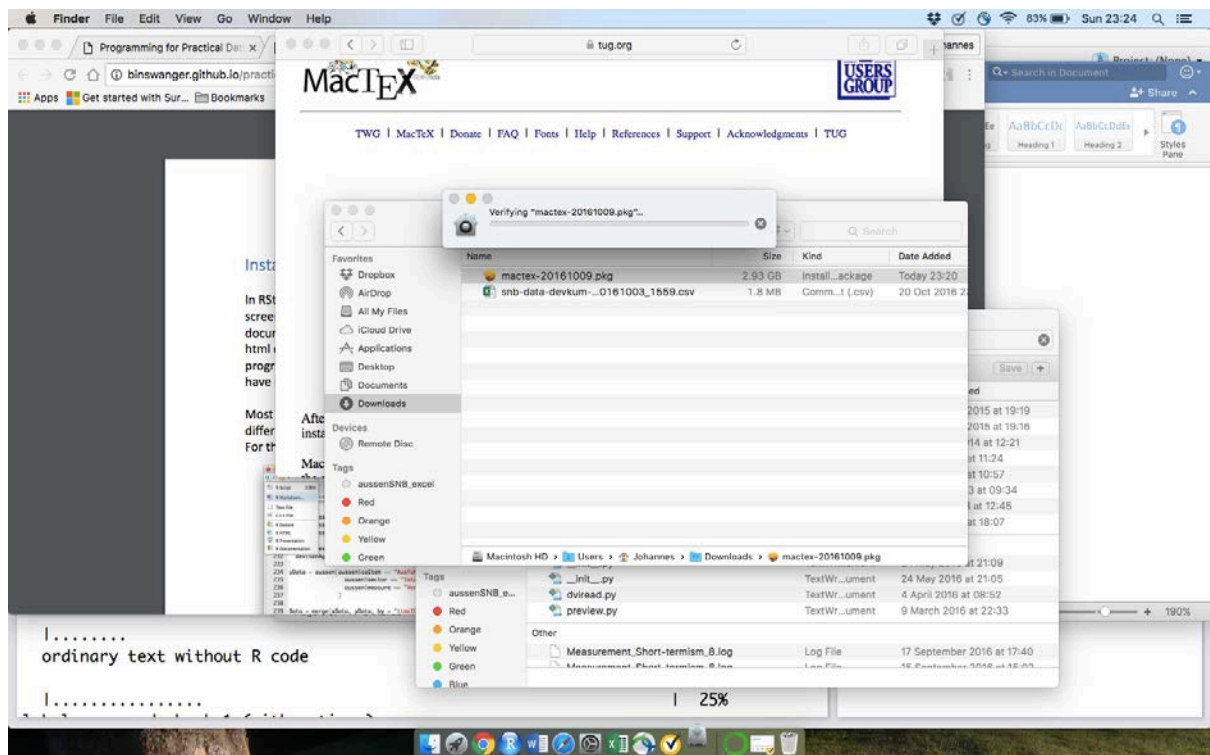


The screenshot shows the MacTeX website on a browser. The URL bar shows 'tug.org'. A download bar at the top right indicates 'mactex-20161009.pkg' is downloading, with a progress bar and the text '101.4 MB of 2.93 GB — 7 minutes remaining'. The page content includes the MacTeX logo, navigation links (TWG, MacTeX, Donate, FAQ, Fonts, Help, References, Support, Acknowledgments, TUG), and a section titled 'Downloading MacTeX 2016'. Below this, it says 'To obtain the distribution, click the link below.' and provides a link to 'MacTeX.pkg'. A note indicates the package is approximately 2.93 GB as of October 9, 2016, and provides a md5 sum: 5159d5e8b3dce3f17c7a986012706ed. It also mentions that the package is available via the torrent network. Further down, it states that after downloading, the file should be moved to the desktop and double-clicked to install. It also mentions that MacTeX completely configures TeX, so after installation it is ready to use. It goes to /Applications/TeX and reads the short document 'READ ME FIRST' to get started. It also mentions that MacTeX installs TeX Live, which contains TeX, LaTeX, AMS-TeX, and virtually every TeX-related style file and font. TeX Live is maintained by TeX User Groups across the world. TeX Live is compiled from the same sources for all platforms: Macintosh, Windows, Linux, Unix. It also mentions that MacTeX also installs Ghostscript, an open source version of Postscript, and it installs the GUI programs TeXShop, LaTeXiT, TeX Live Utility, BibDesk, and Excalibur. At the end of installation, the installer will report 'Success.' But sometimes, the installer puts up a dialog saying 'Verifying...' and then the install hangs. This hasn't occurred to the developers of MacTeX, but users have written us about it. In all cases known to us, rebooting the Macintosh fixes this problem. After the reboot, install again. If other problems are reported during installation, skip to the section 'Installation Errors' below.

Updating from an Earlier MacTeX Installation

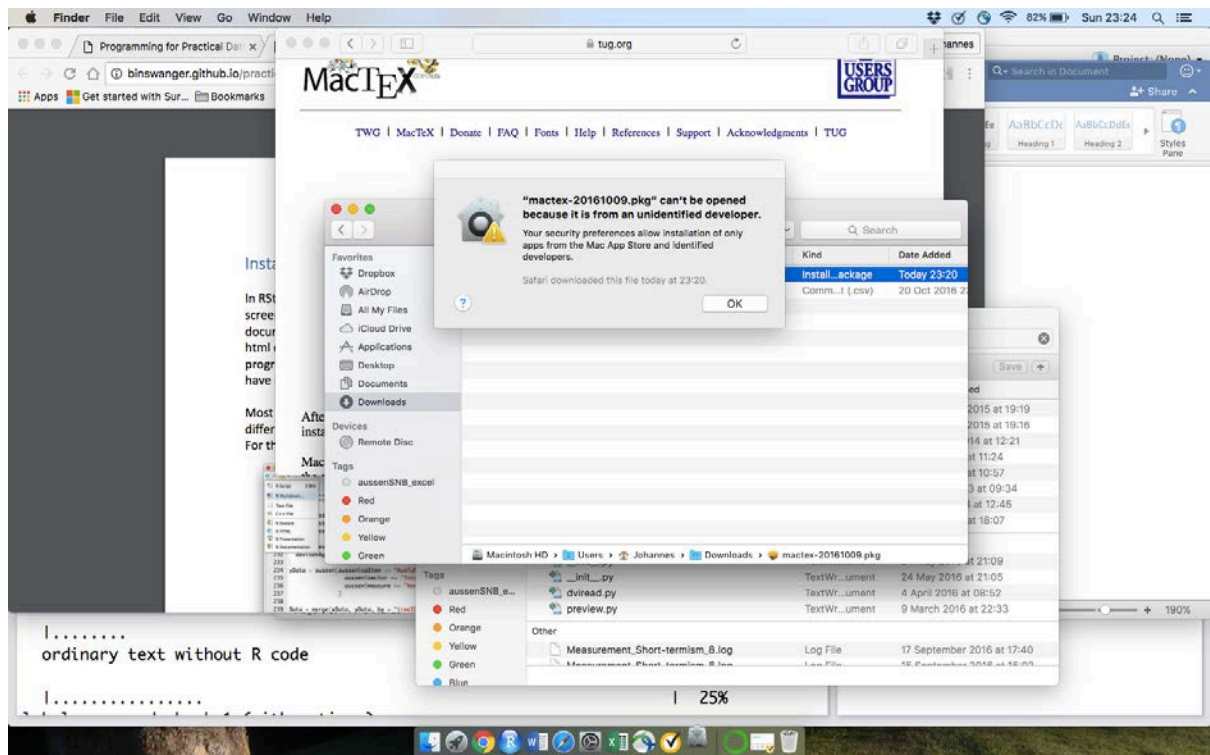
If you previously installed MacTeX, you may already have your own favorite front ends and GUI programs. Perhaps, in addition, you have Ghostscript from another source such

If you then just double click on the resulting item mactex-20161009.pkg, Apple may try to prevent you from doing harm to your machine....

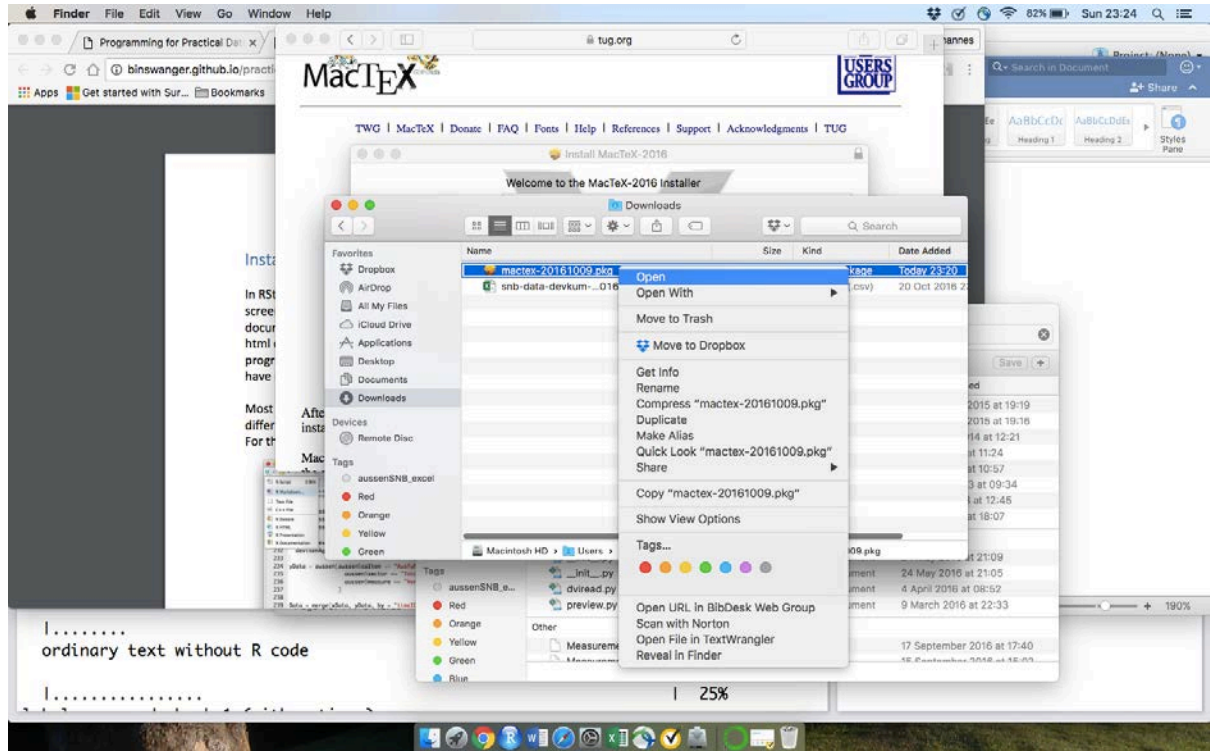


The screenshot shows a Mac desktop with several windows open. In the background, there is a Finder window showing the 'Downloads' folder, which contains the file 'mactex-20161009.pkg'. Overlaid on this is a 'Verifying "mactex-20161009.pkg"' dialog box. In the foreground, there is a 'MacTeX 2016' window showing a list of files and folders. The list includes 'aussenSNB_excel', 'aussenSNB_excel', 'divread.py', 'preview.py', 'Measurement_Short-termism_8.log', and 'Measurement_Short-termism_8.log'. The window also shows a progress bar and a '25%' completion indicator. The desktop background is a landscape image. The top of the screen shows the menu bar with 'Finder', 'File', 'Edit', 'View', 'Go', 'Window', and 'Help' menus. The status bar at the bottom shows the system clock as 'Sun 23:24' and the battery level as '83%'.

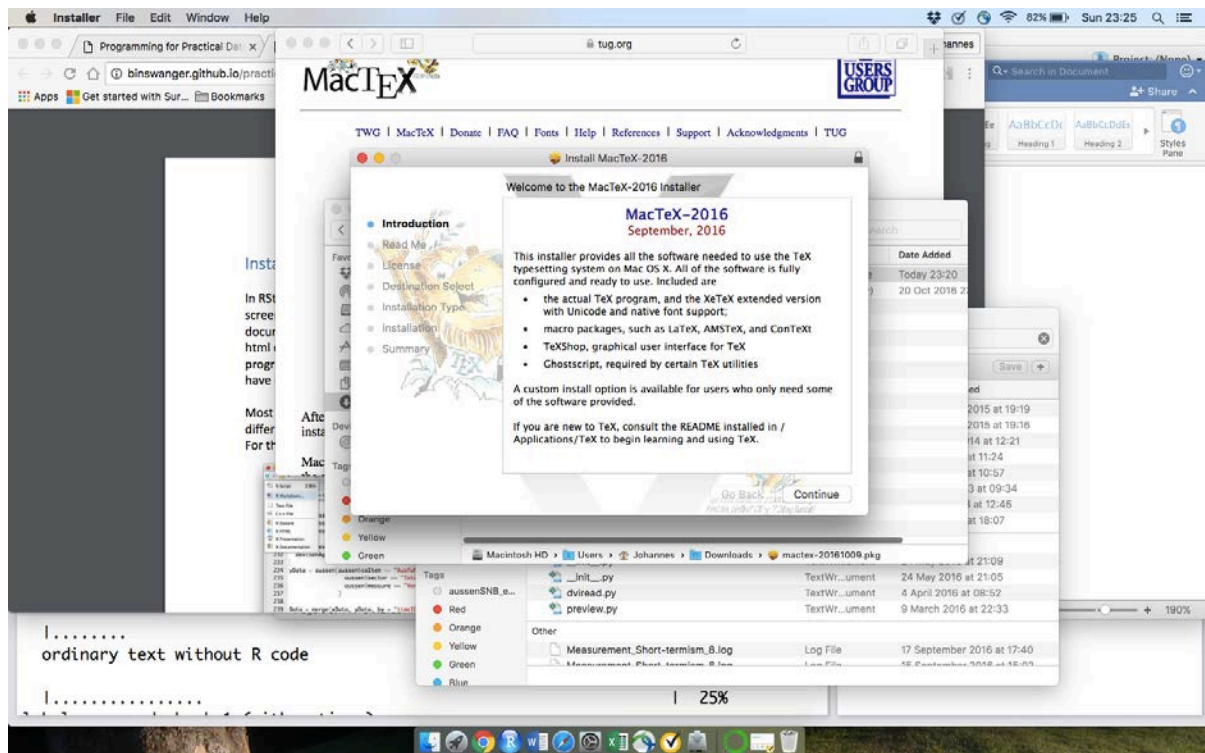
Apples paternalistic attitude...



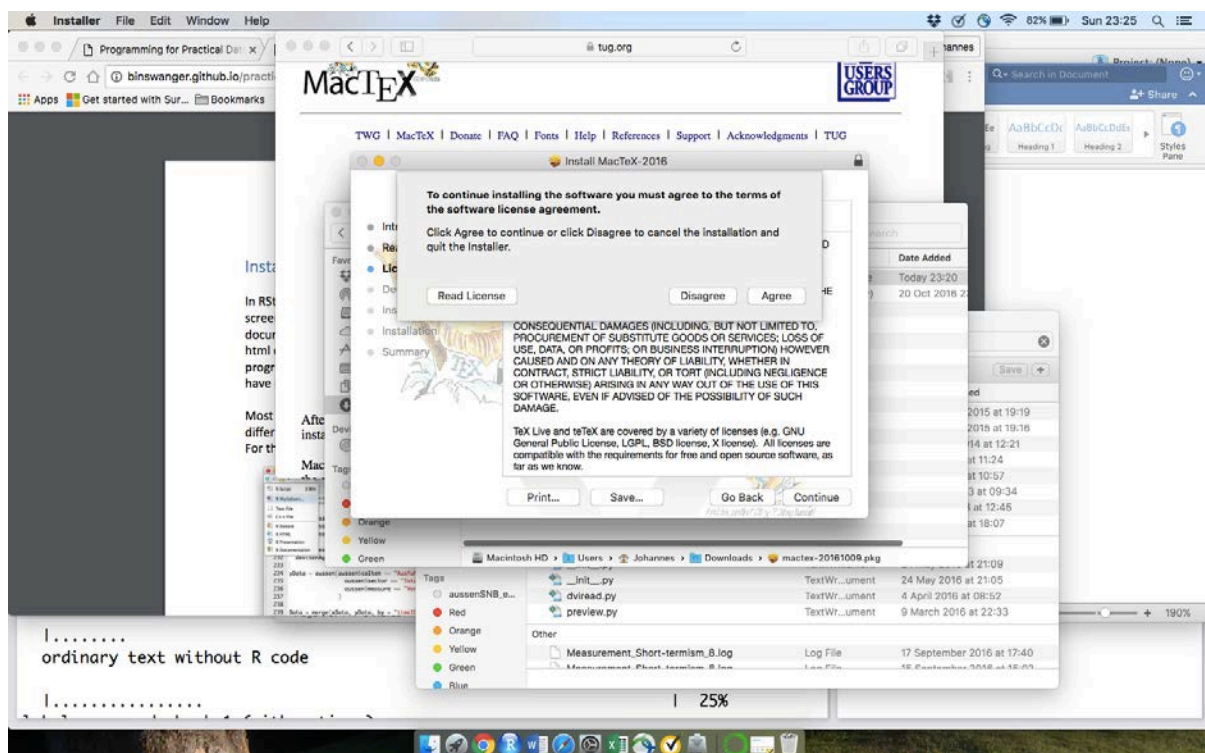
However, you are a grown-up and know how to work around it. Just right-click on the item and choose open.



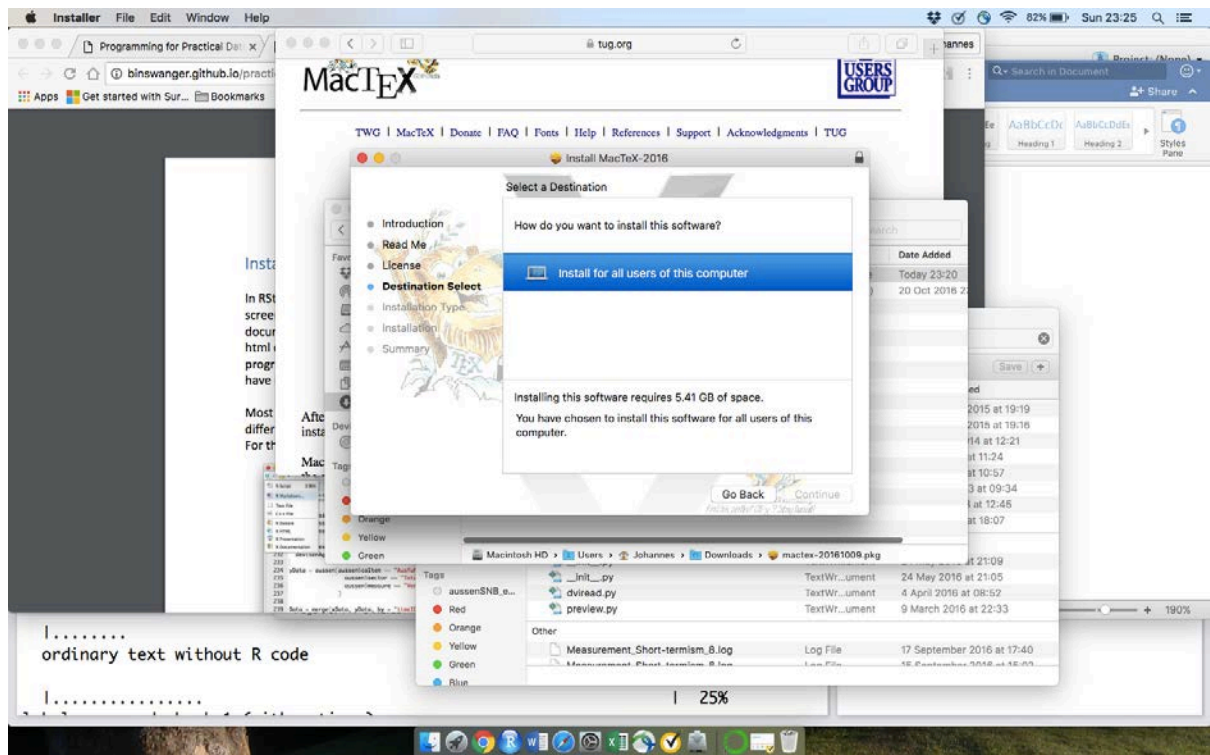
And the installation starts!



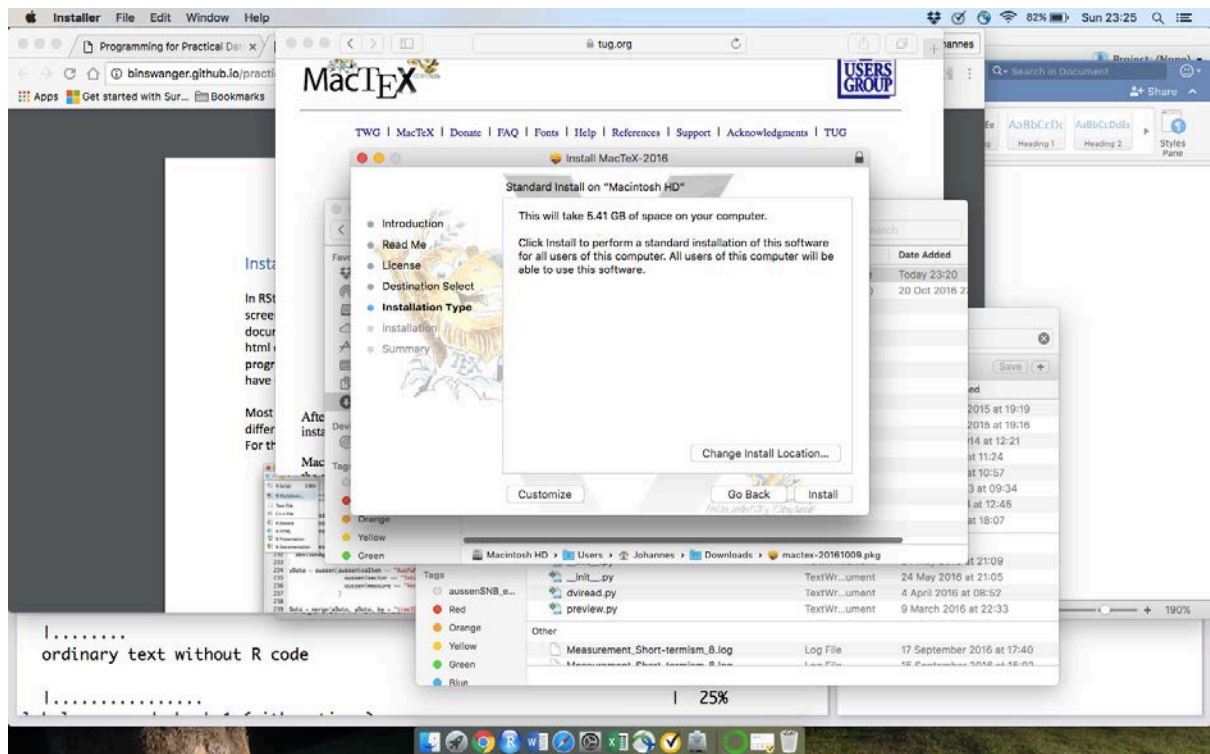
Agree...

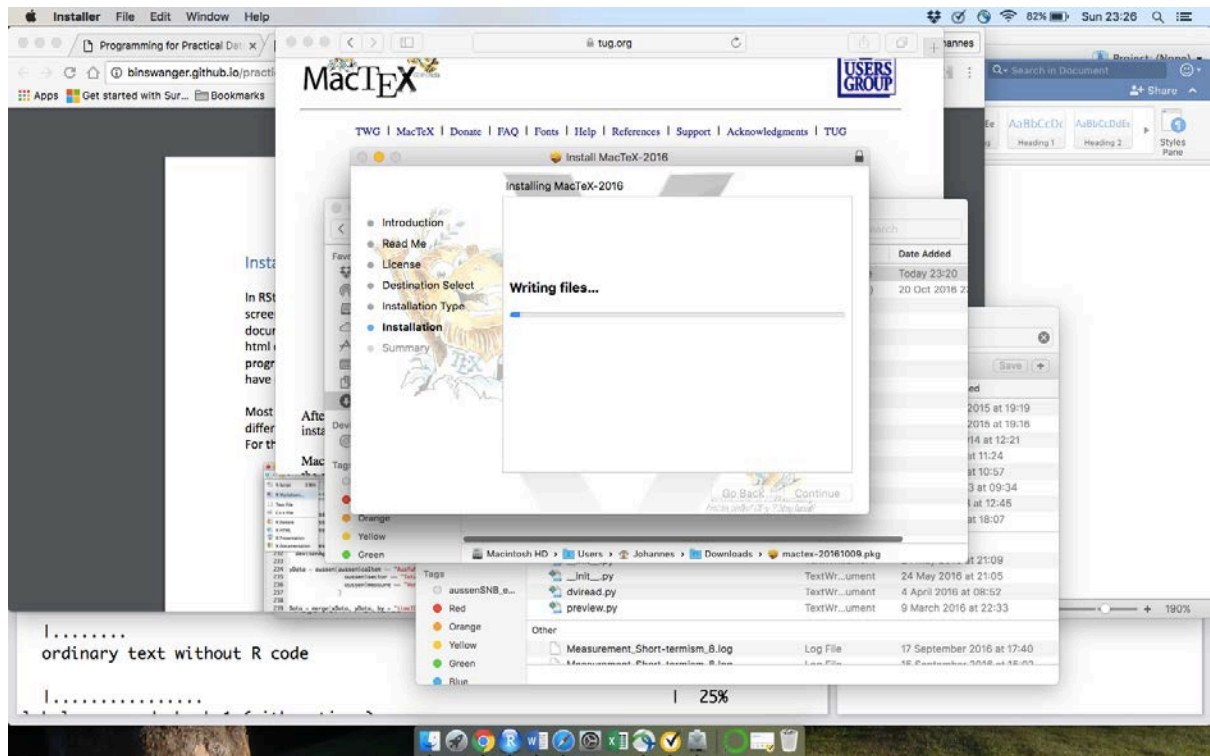


Choose some default settings as shown on the screenshots...

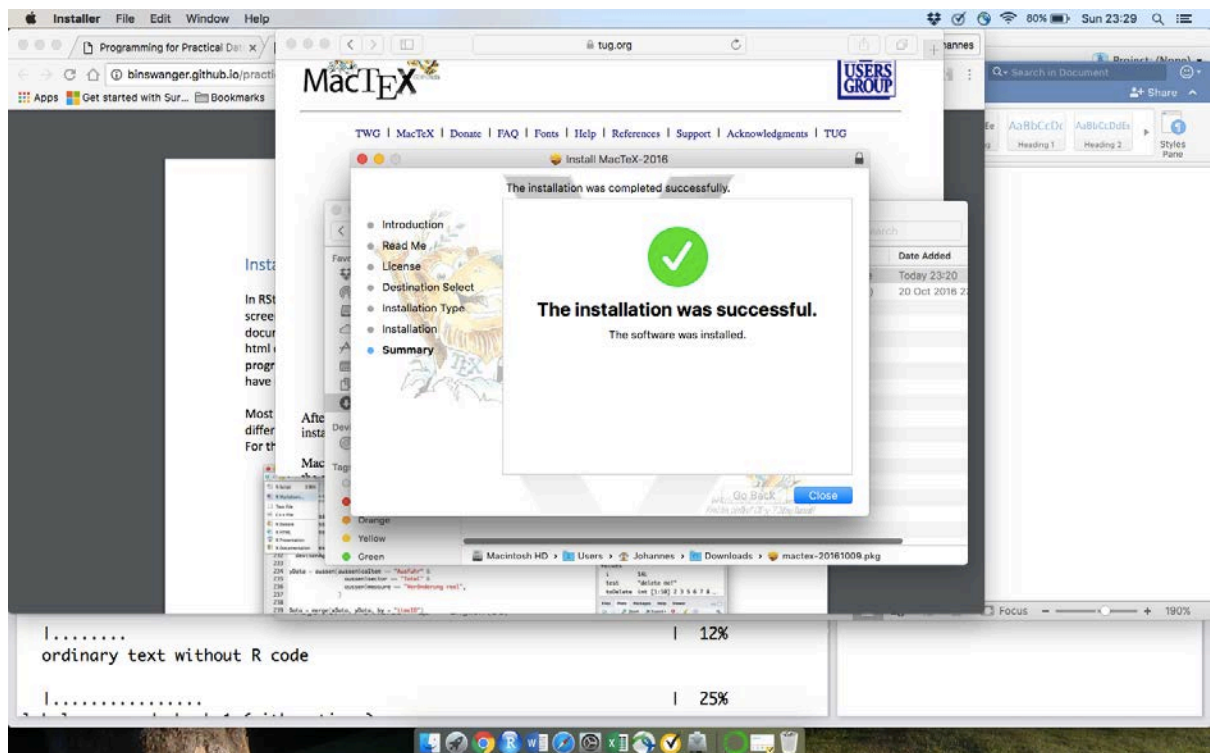


Accept the default...

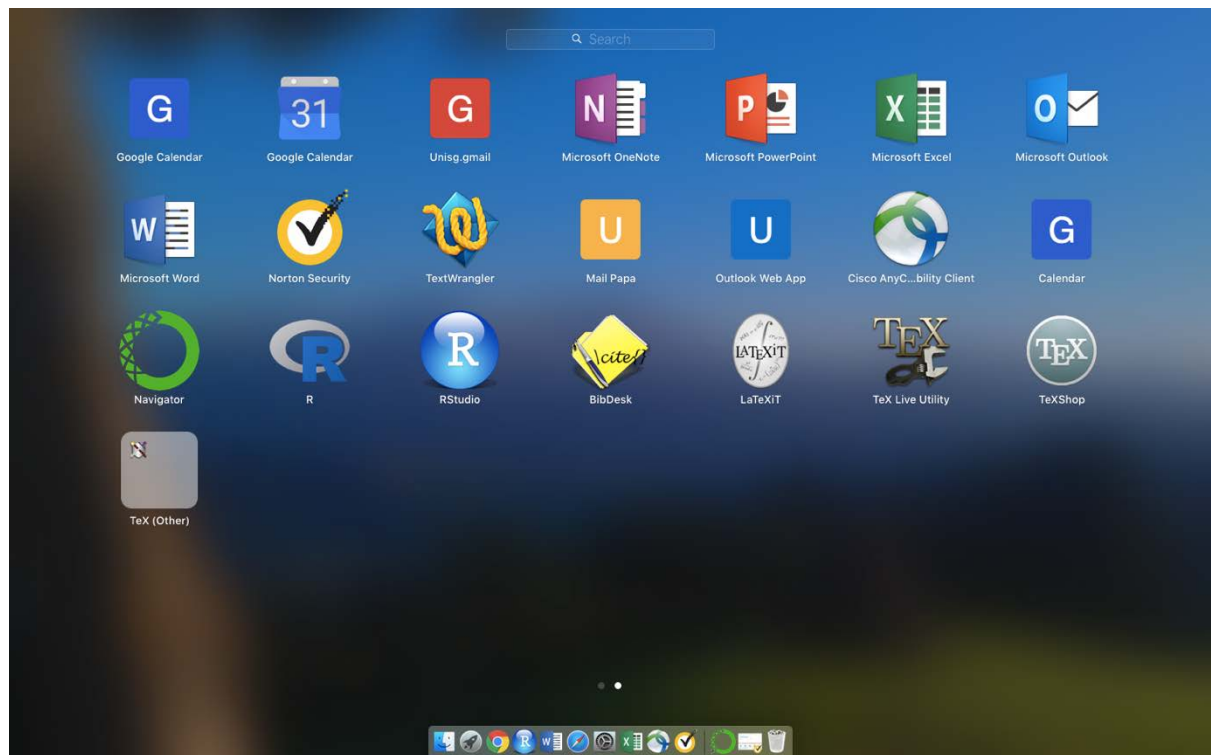




And, hopefully, you will get a success message.



If you go to the Launchpad, you can see some new items (it may look slightly different in your case).

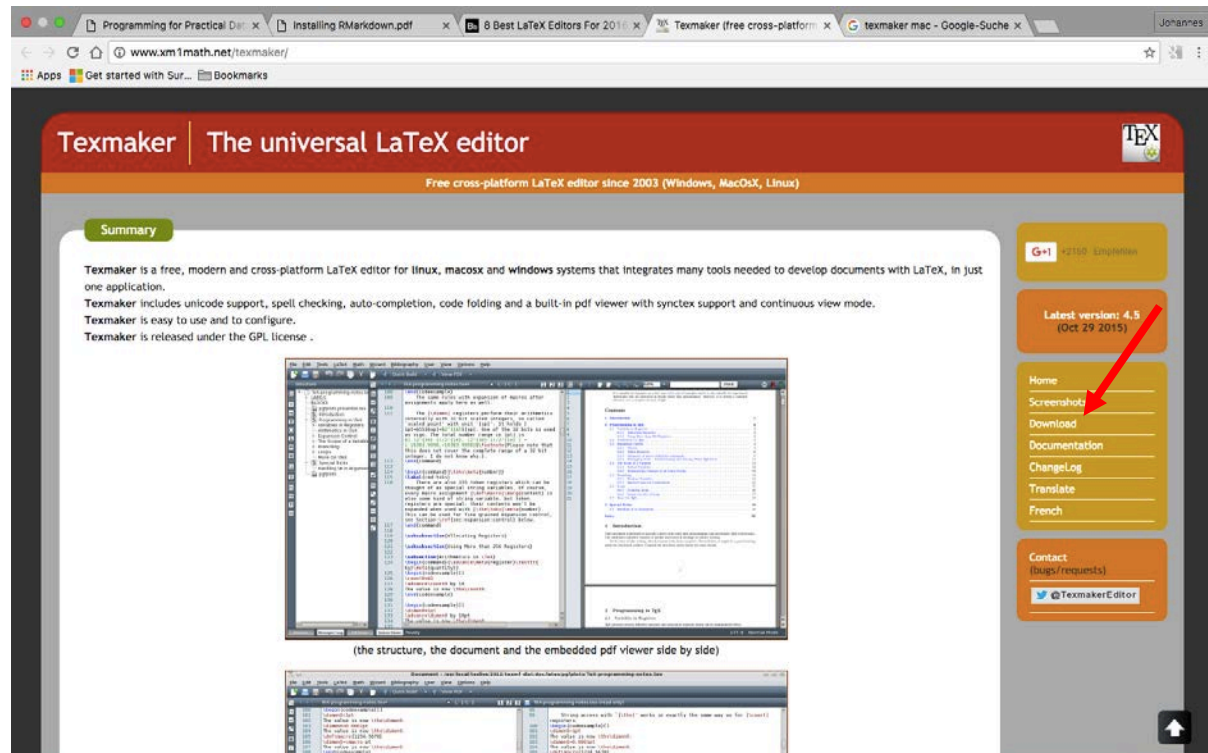


If you go now back to RStudio and your file “Test.Rmd” (or however you called it) and try “Knit to PDF”, it should work (if it did not already do so). If not, close RStudio and reopen it. If it still not works, restart your device.

Installing the Texmaker editor

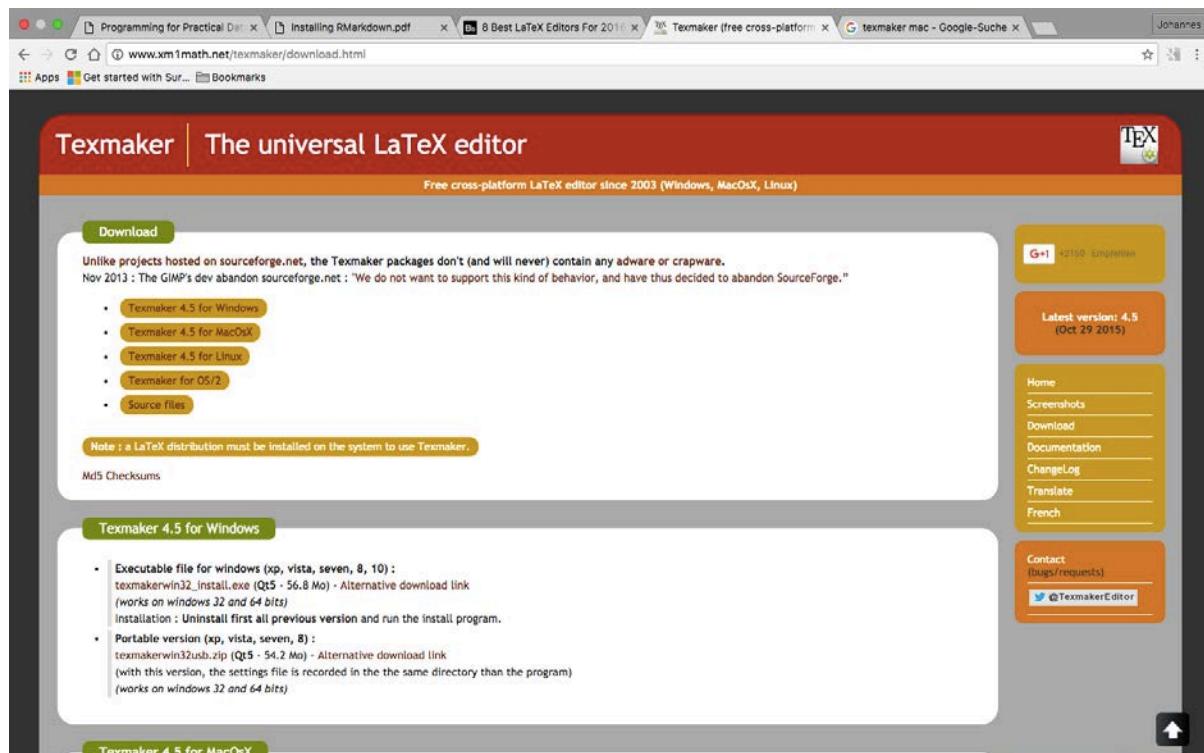
If you are curious about using LaTeX, or are interested in editing LaTeX documents, it makes sense that you download an editor. An editor for using LaTeX is what RStudio is for using R! There are several good editors. One of them is Texmaker. The screenshots below show you how you can download and install Texmaker, in case you are interested (it is not mandatory for this course).

To install Texmaker, go to its website as shown below, and go to Download.

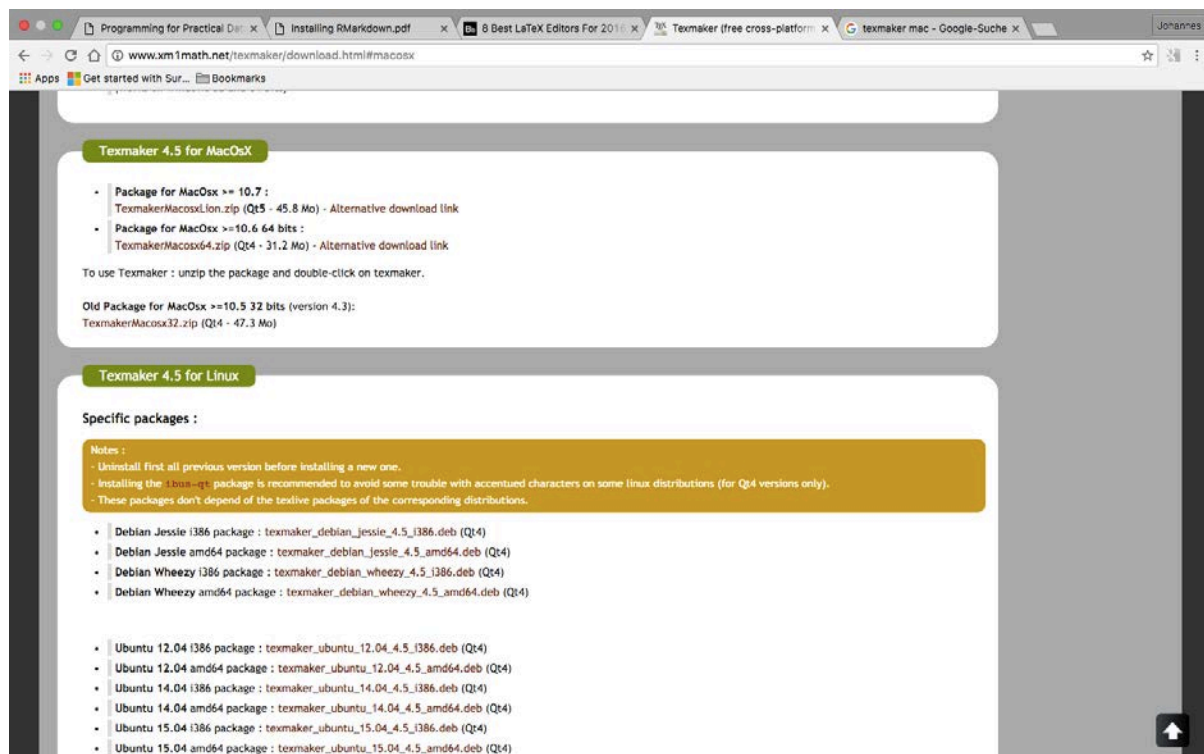


The screenshot shows the Texmaker website in a web browser. The browser's address bar displays `www.xm1math.net/texmaker/`. The website has a red header with the text "Texmaker | The universal LaTeX editor" and a sub-header "Free cross-platform LaTeX editor since 2003 (Windows, MacOSX, Linux)". On the right side, there is a sidebar with navigation links: "Home", "Screenshots", "Download", "Documentation", "ChangeLog", "Translate", and "French". A red arrow points to the "Download" link. Below the navigation links, there is a "Contact (bugs/requests)" section with a Twitter icon and the handle "@TexmakerEditor". The main content area on the left has a "Summary" section with the following text: "Texmaker is a free, modern and cross-platform LaTeX editor for linux, macosx and windows systems that integrates many tools needed to develop documents with LaTeX, in just one application. Texmaker includes unicode support, spell checking, auto-completion, code folding and a built-in pdf viewer with syntax support and continuous view mode. Texmaker is easy to use and to configure. Texmaker is released under the GPL license." Below the summary, there are two screenshots of the Texmaker interface. The top screenshot shows a LaTeX document with a sidebar for the document structure and an embedded PDF viewer. The bottom screenshot shows a LaTeX document with a sidebar for the document structure and an embedded PDF viewer. The text "(the structure, the document and the embedded pdf viewer side by side)" is placed between the two screenshots.

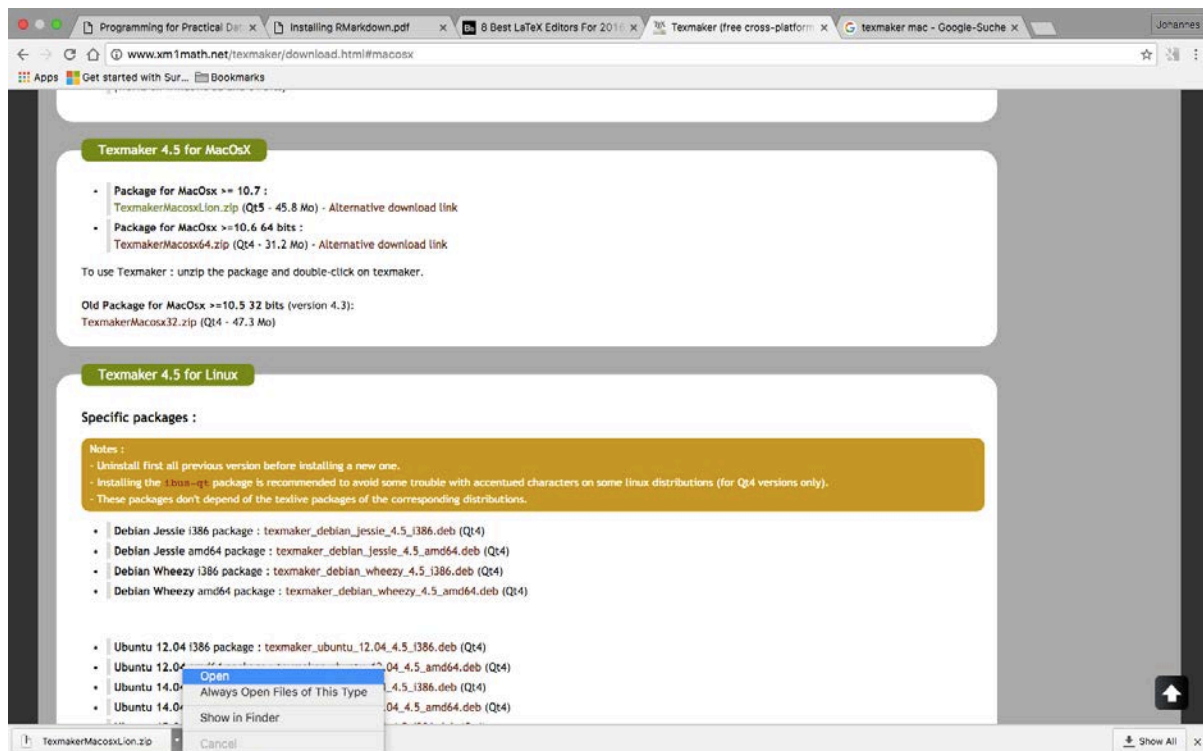
Then choose Texmaker for MacOSX



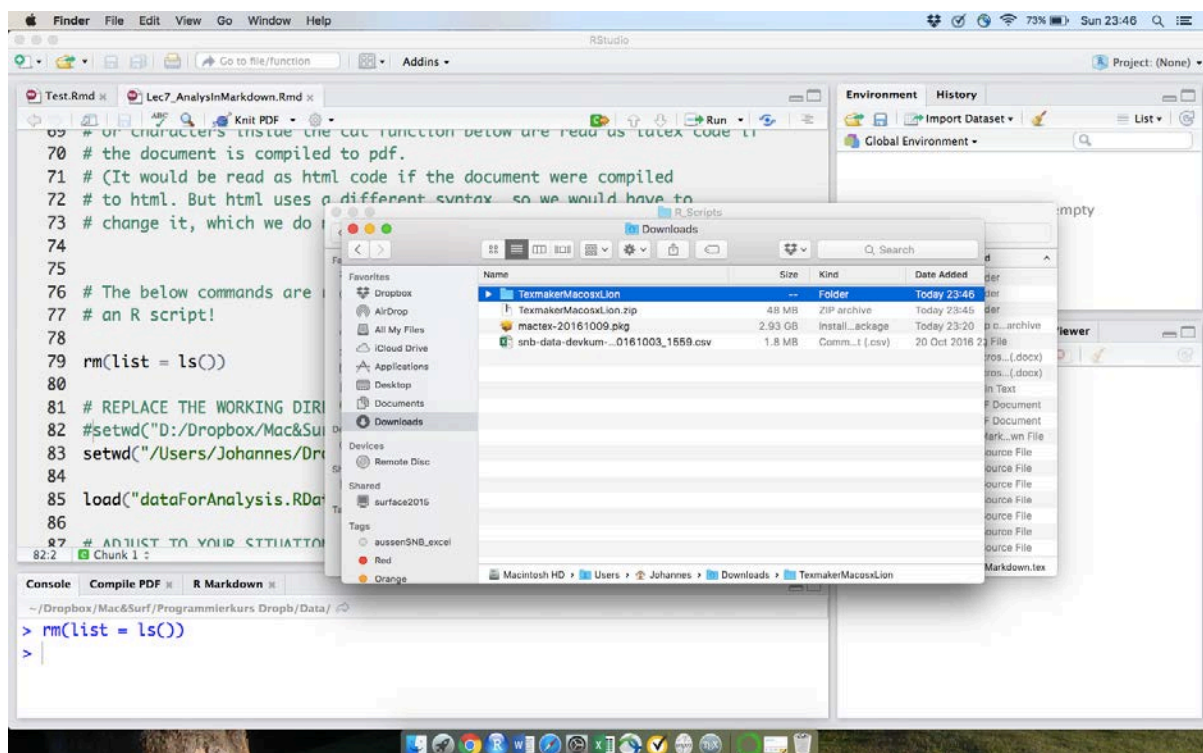
Check what system you have. My version of MacOSx is >=10.7. Click on the zip link there.



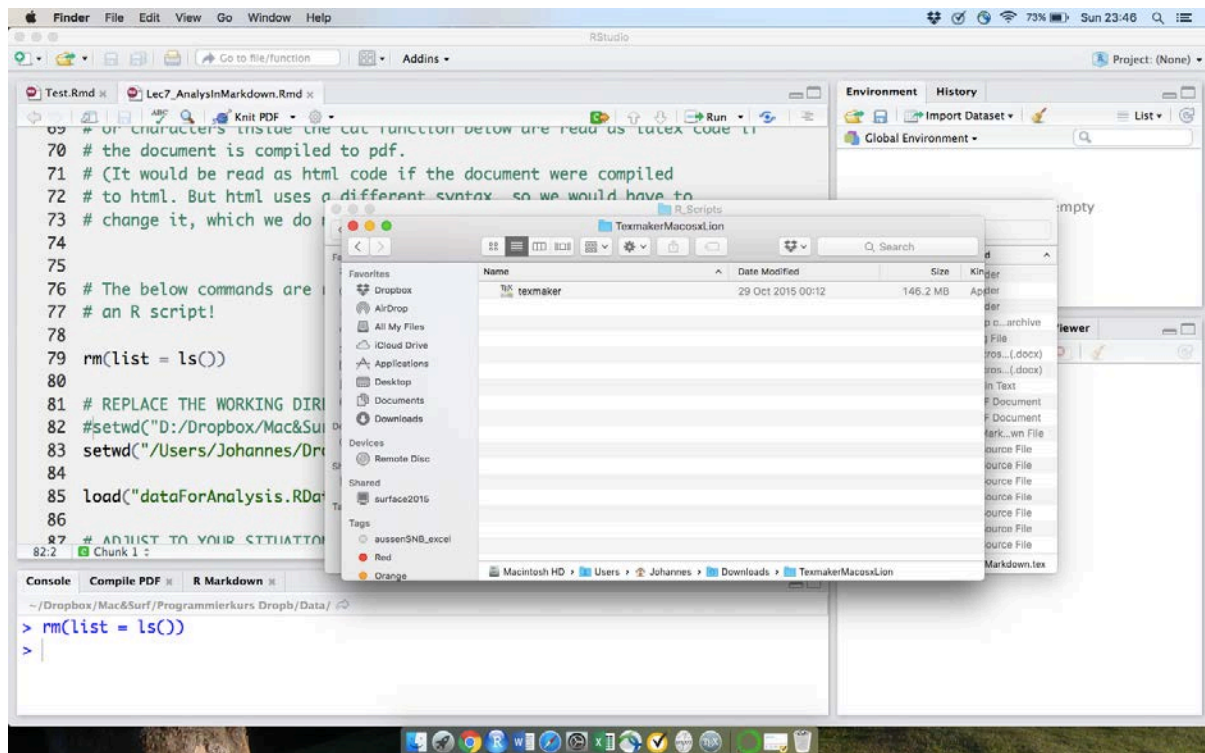
After the zip file is downloaded, open it.



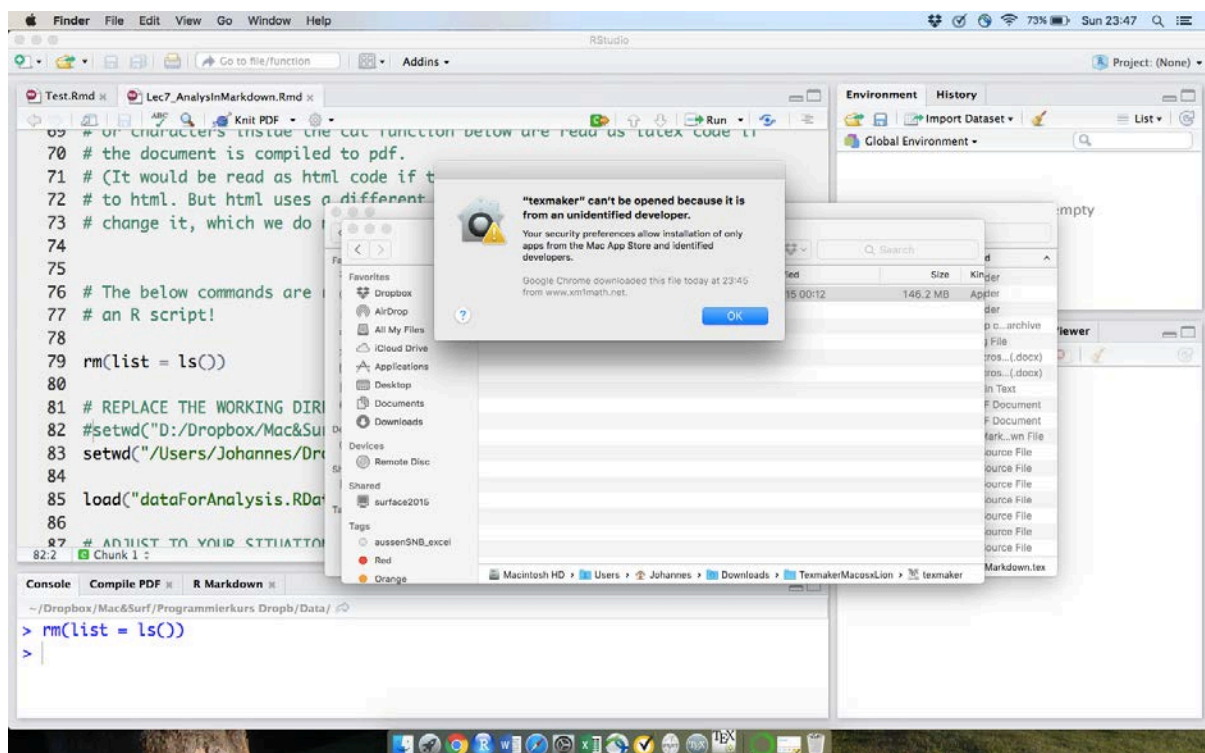
This extracts a folder called TextmakerMacosxLion. Click on that one.



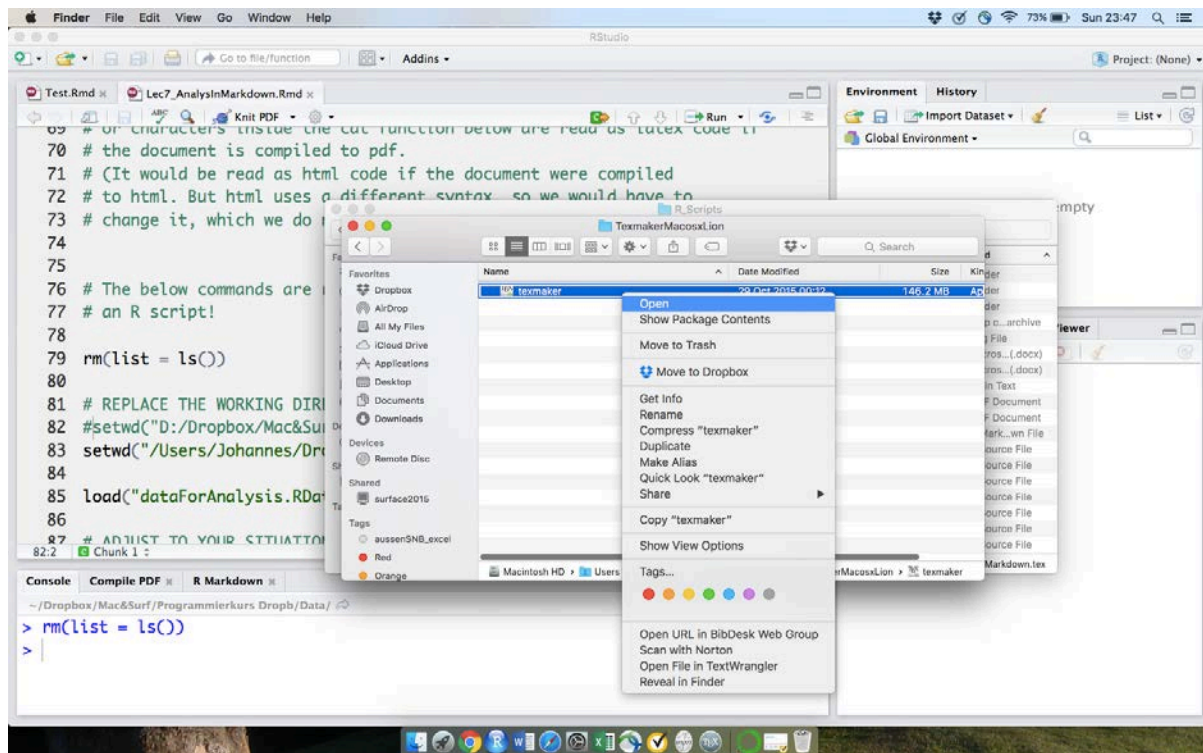
The folder contains an installation file called texmaker.



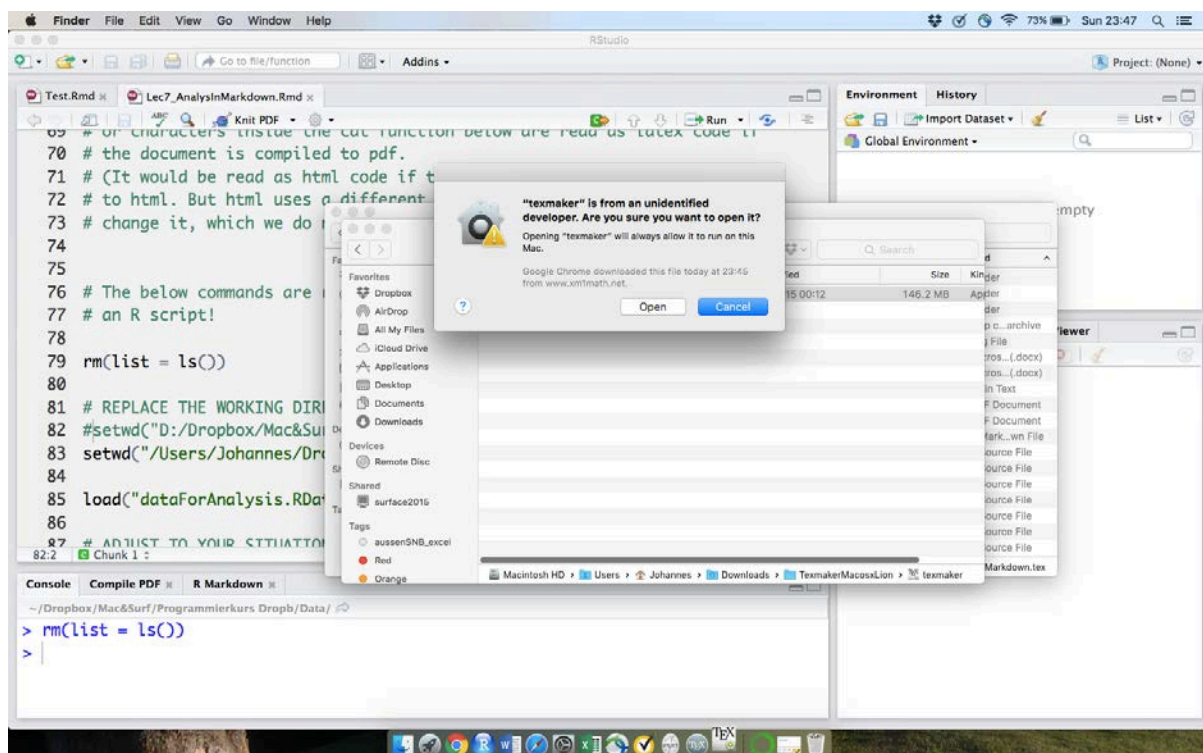
If you double-click it, Apple will block you.



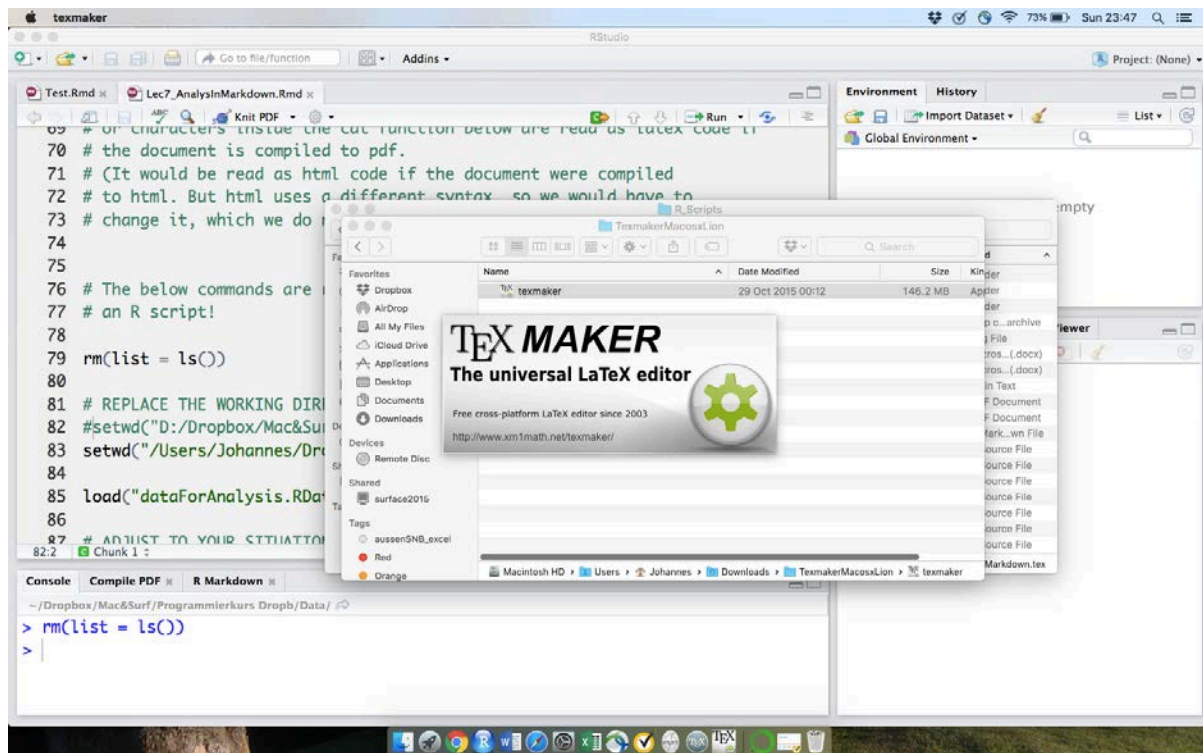
But since you know what you are doing, just right-click on it and choose Open.



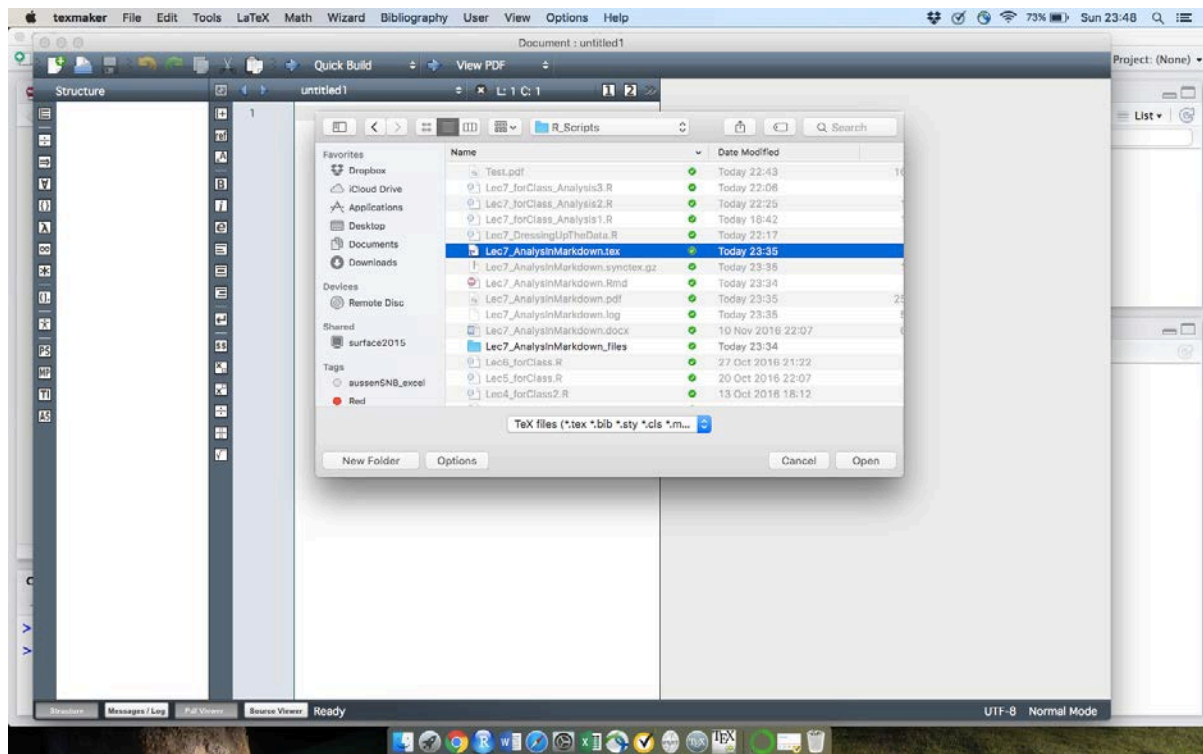
Conform Open and don't worry...



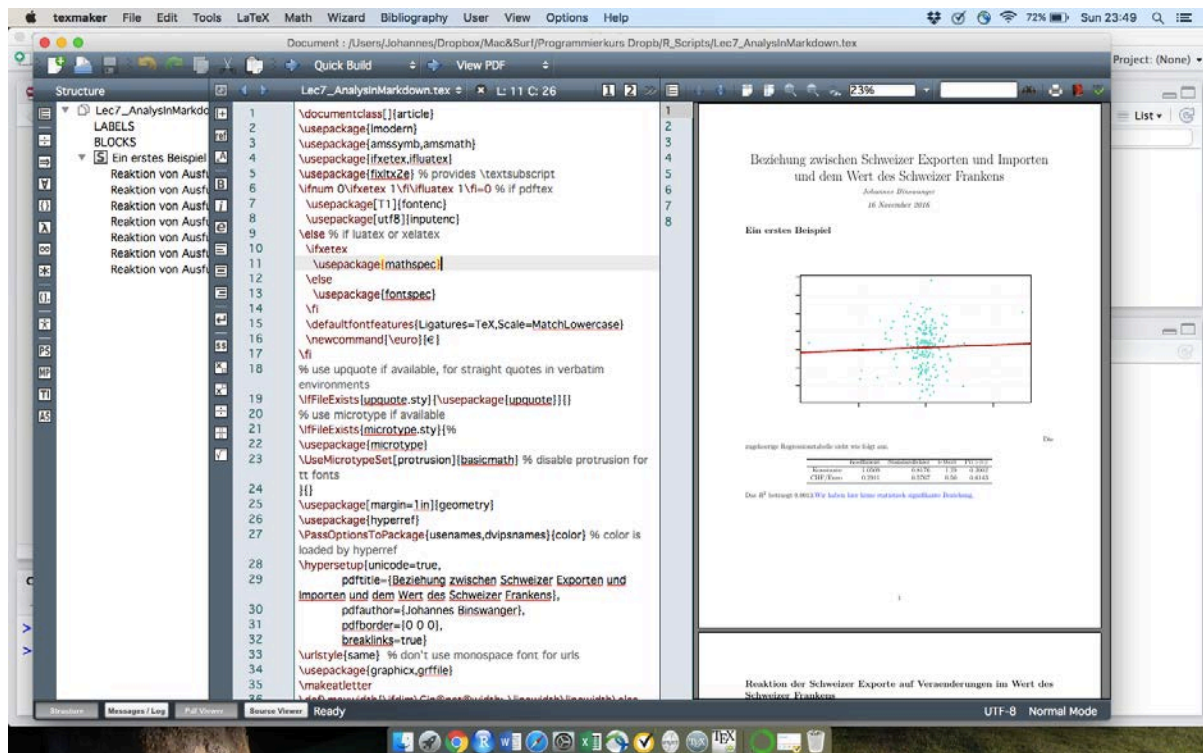
Now, Texmaker starts.



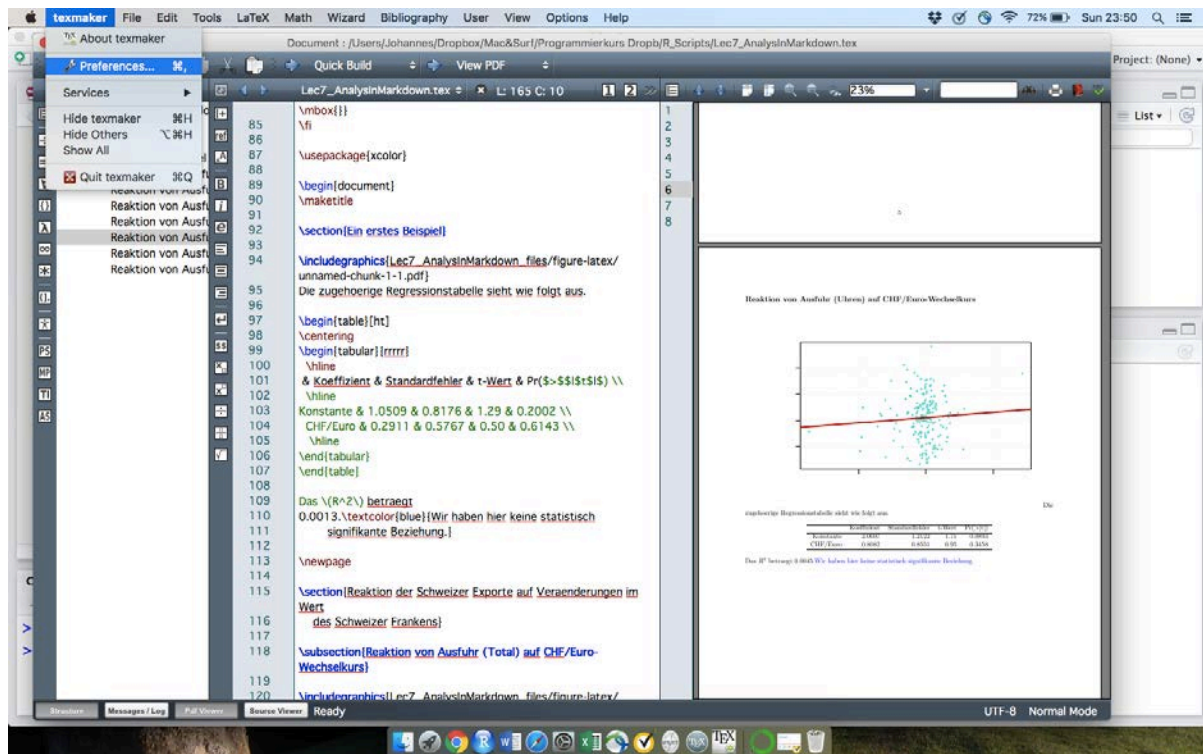
You can now open a texdocument. If you do not have any yet, wait until the lecture.



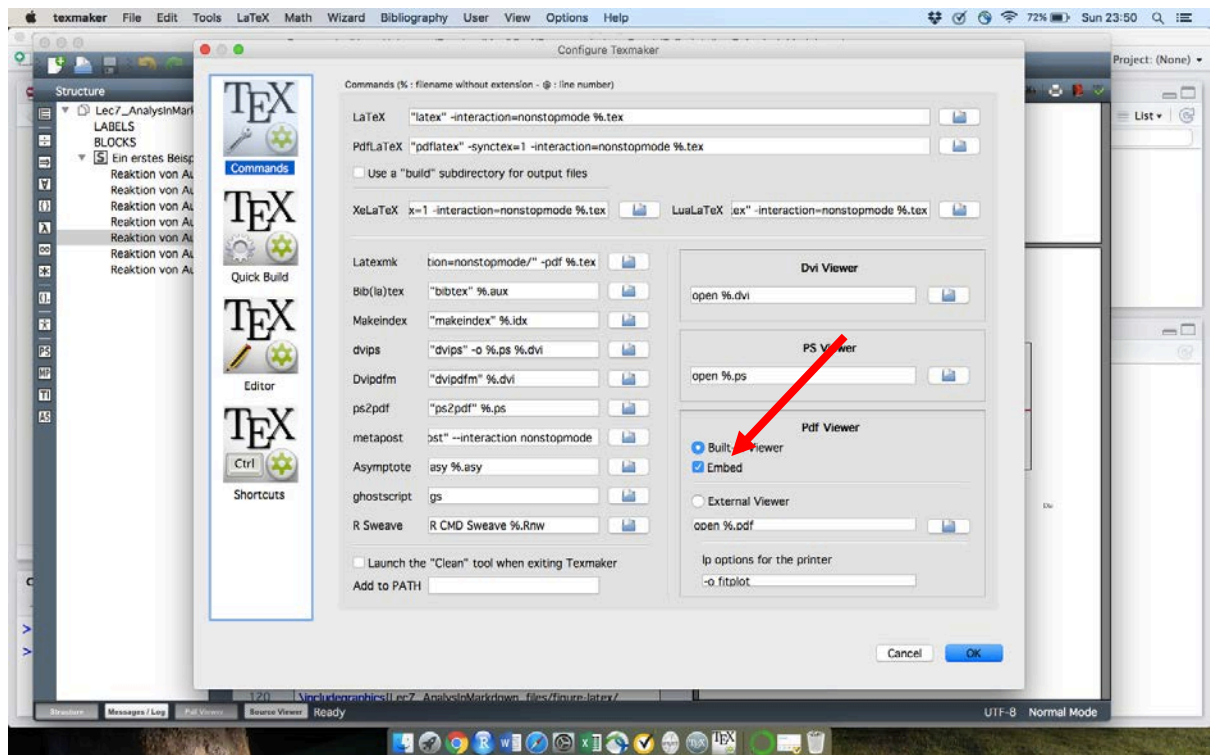
This is how the file that we will produce with RMarkdown looks when opened in Texmaker.



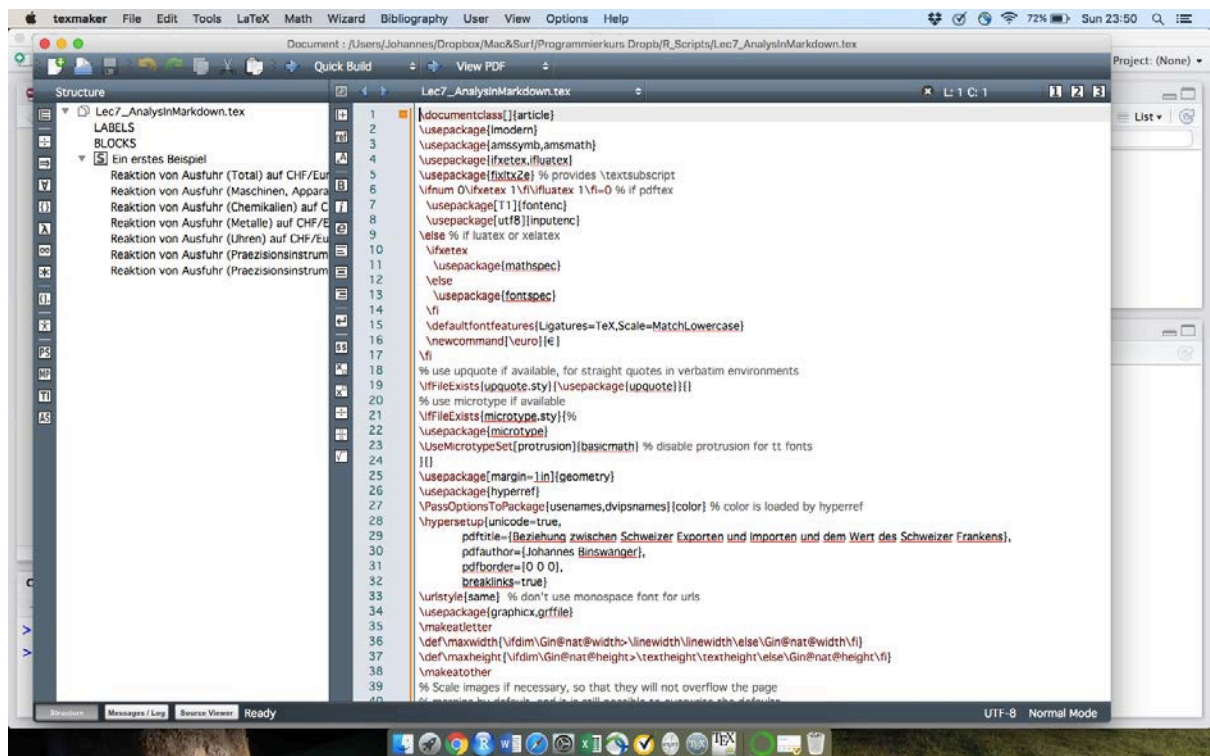
In the menu “texmaker” under Preferences you can customize Texmaker.



Personally, I like to uncheck the Embed option under “Commands”. But this is really just a personal preference.



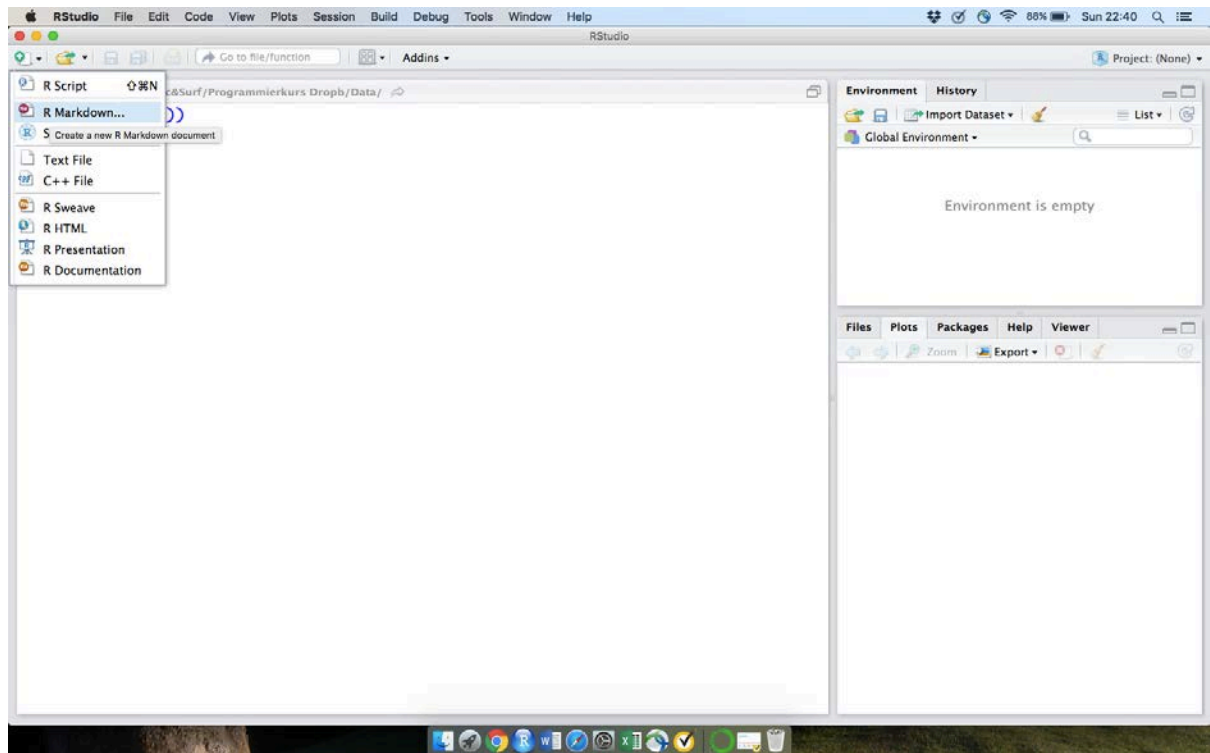
After unchecking the embed option, you only see the editor, the pdf is separate. I find it easier to edit the text this way.



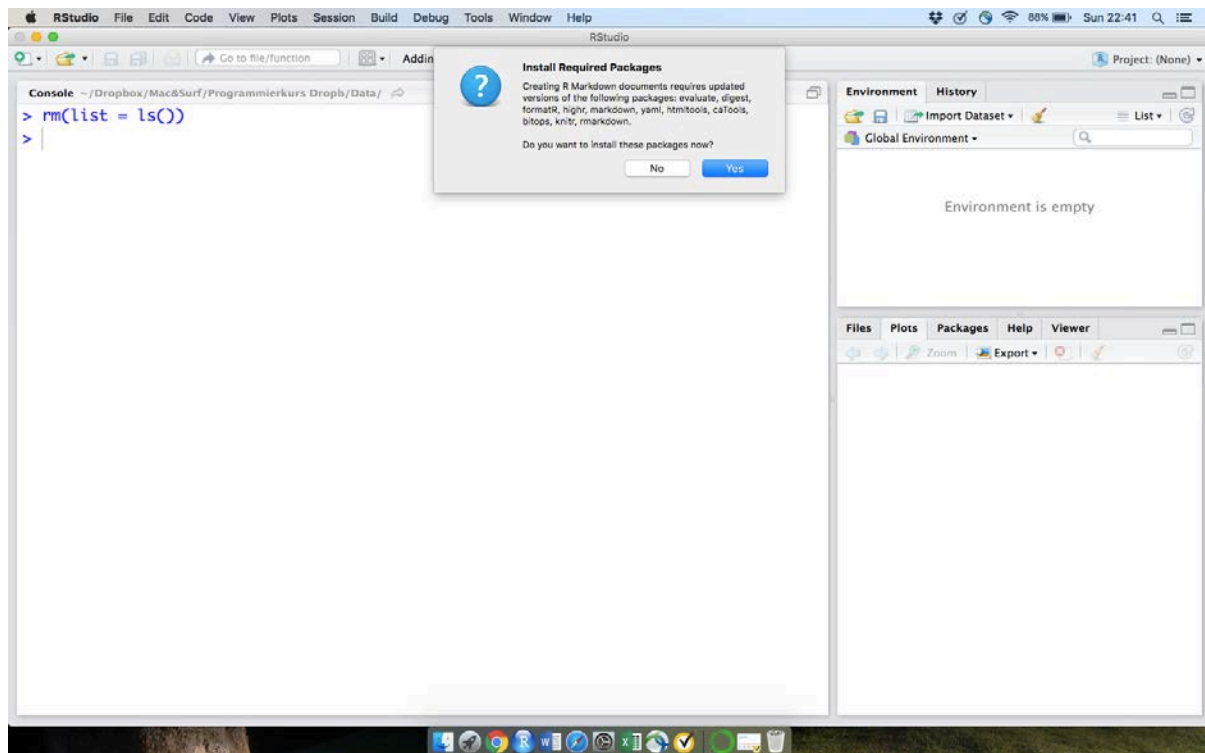
Getting ready for RMarkdown on Windows

Please note, the download and installation will take about 1 hour, and even more if your internet connection is a bit slow. So take your time!

The first steps are identical to the Mac case, so I reproduce some Mac images. Open RStudio and choose “R Markdown” from the little plus menu as shown below.

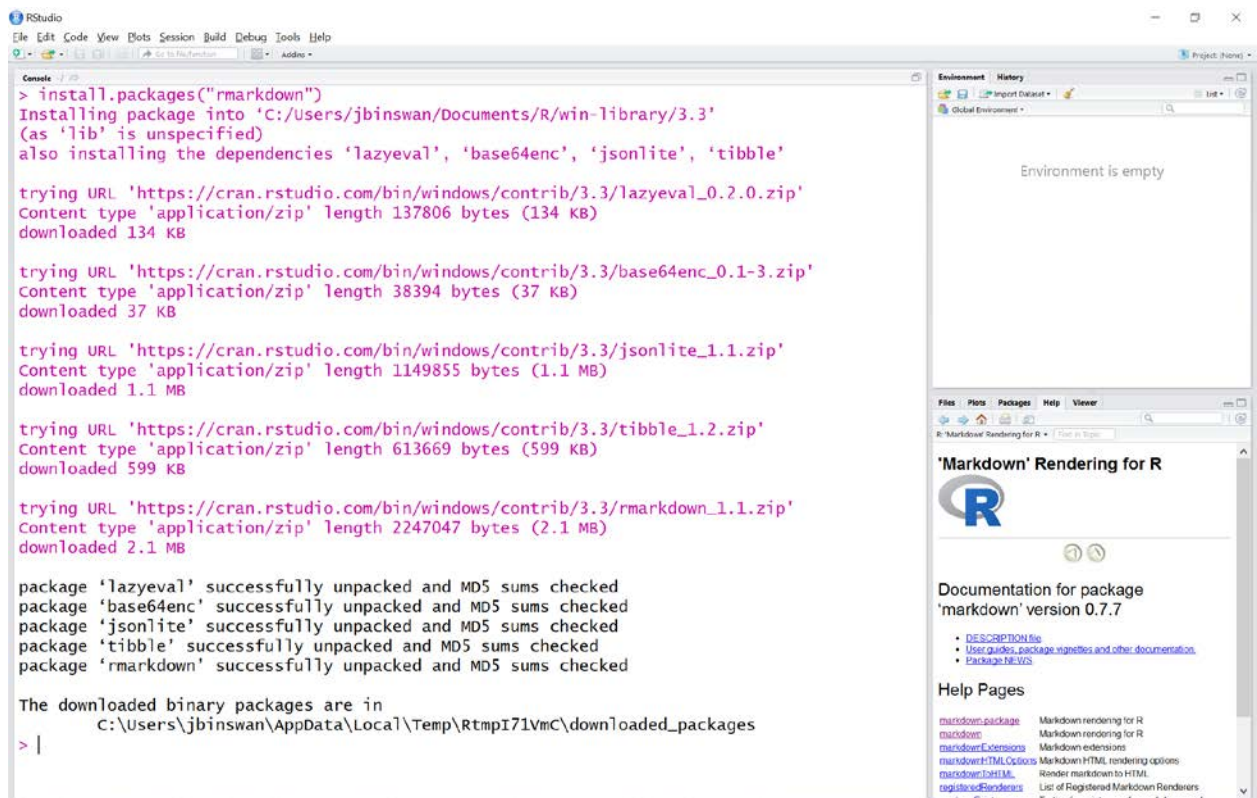


RStudio notices that this requires some new packages. Click Yes. If you are lucky, the packages get installed.

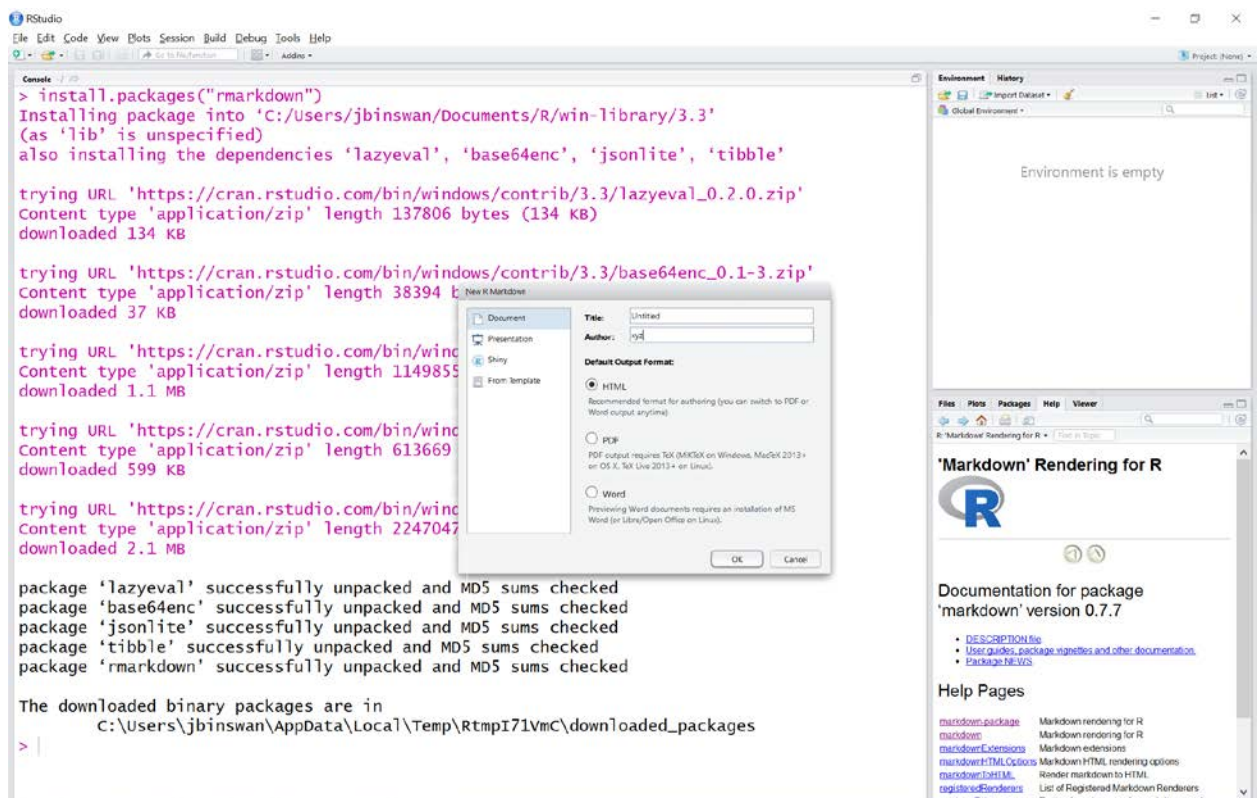


In my case of Windows 10, I saw numerous errors passing on the screen, and then nothing happened. And when I tried to repeat the process, I just got the same results. Luckily, I quickly got a workaround.

As a workaround, type `install.packages("rmarkdown")` into the **console**. Hopefully, this works.

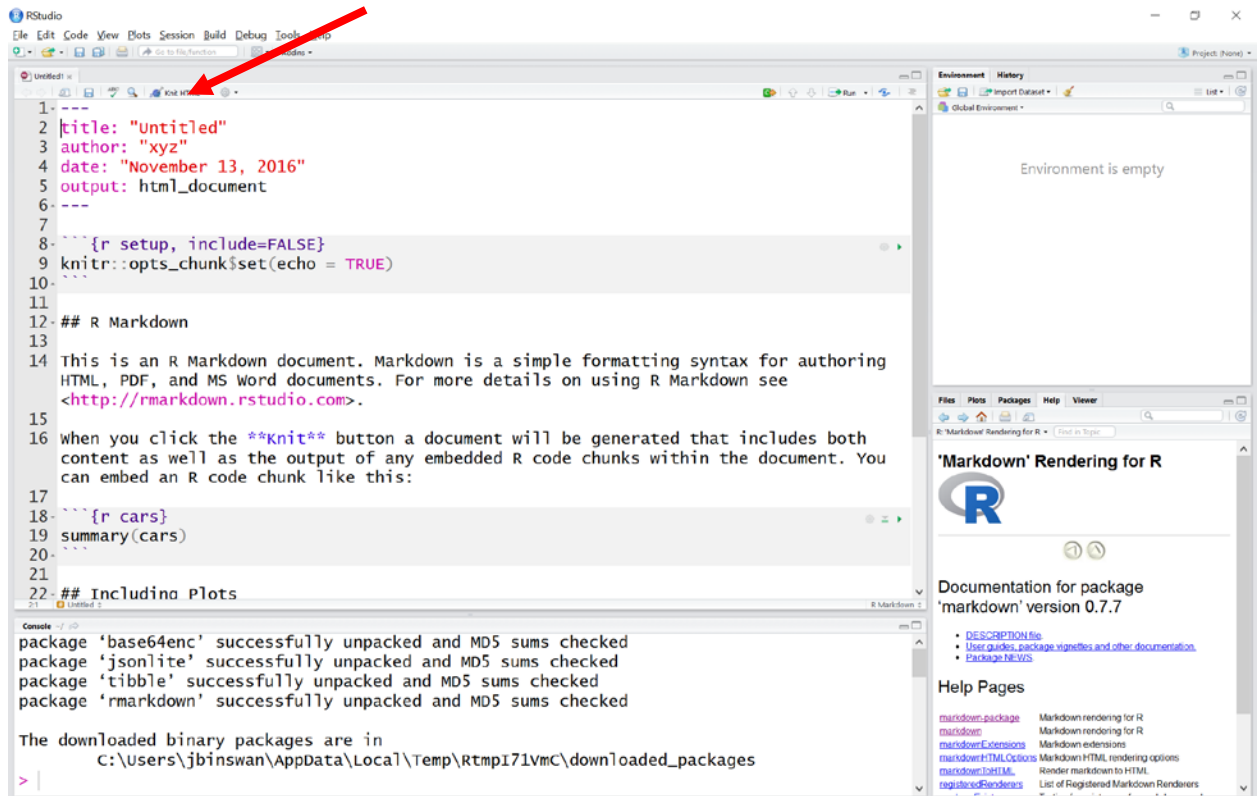


You are asked for some input. On the left side, keep Document selected, and keep HTML. Choose whatever Title or Author you like.

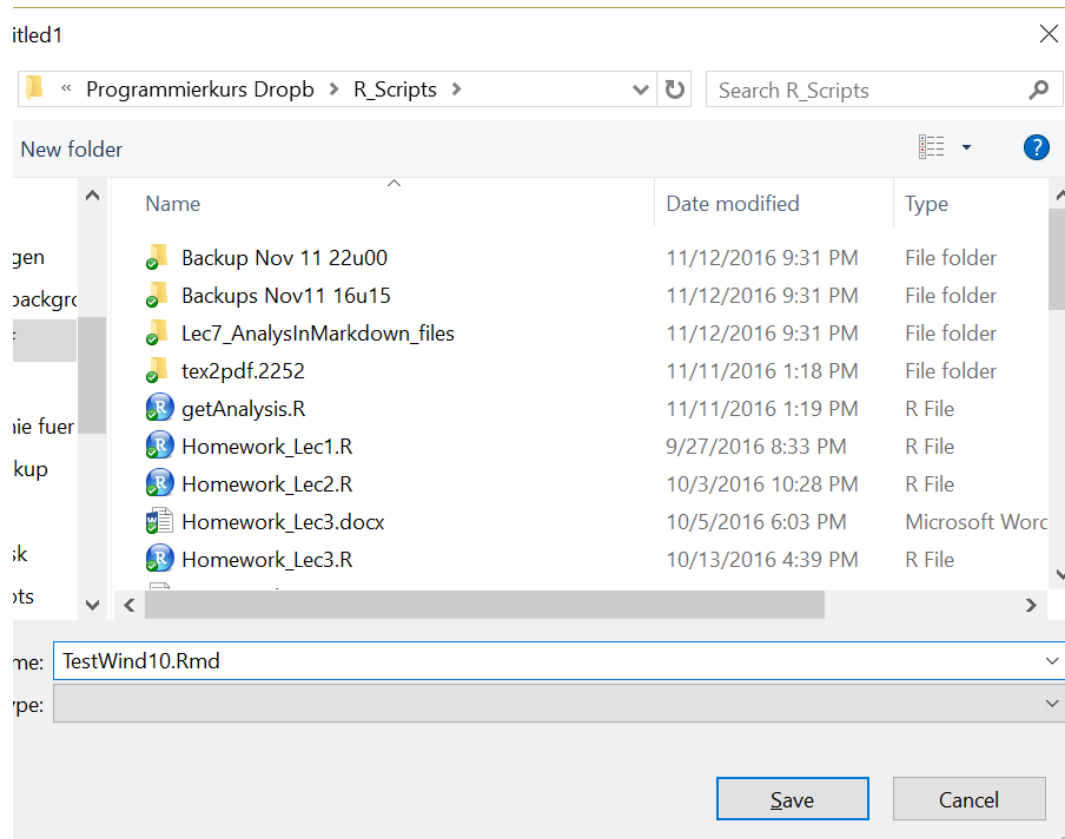


The result is as follows. This is just a sample provided by RStudio. Click “Knit to HTML”.

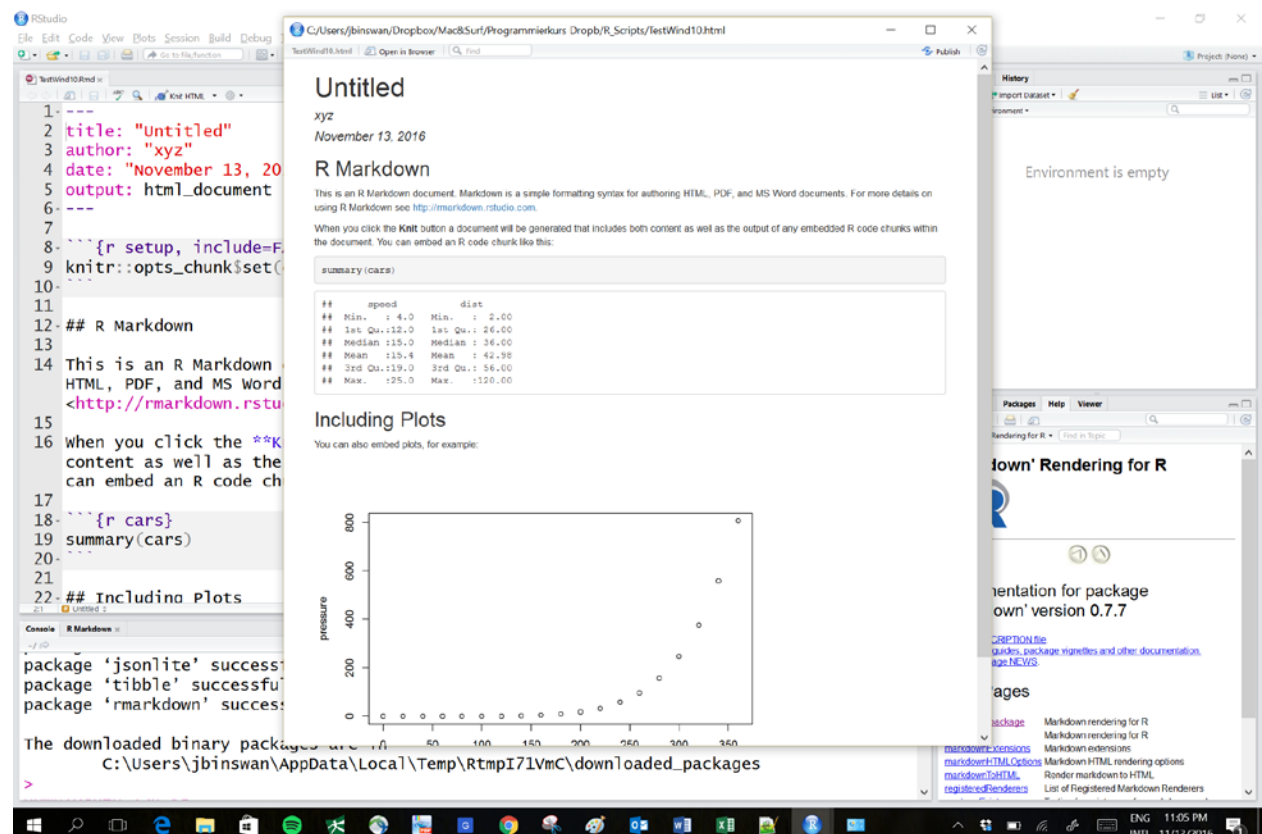
IMPORTANT: If there is any dot (“.”) in the date line (e.g. because yours appears in German in the form of “13. November 2016”, make sure to remove that dot! Otherwise, you will get a compilation error.



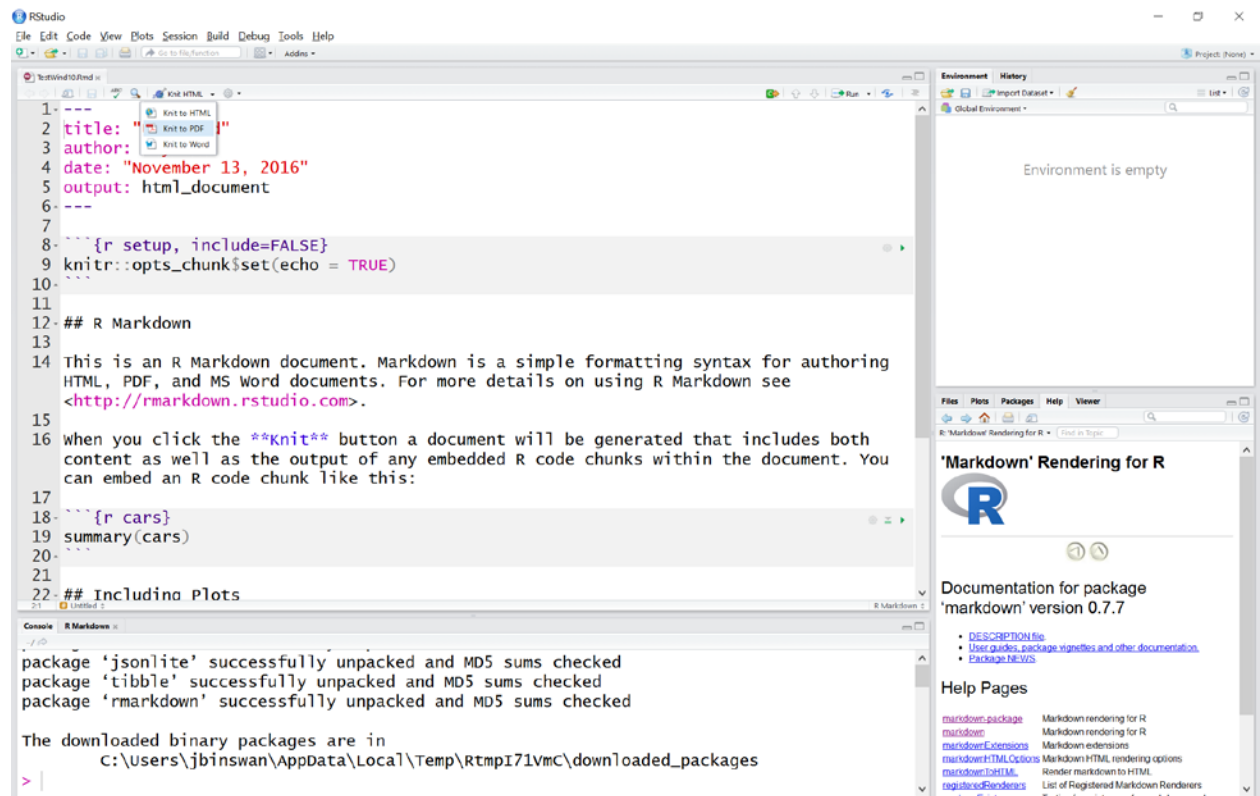
You are asked to save the above-shown file first. Choose whatever filename you like e.g. "Test". It is very important the file extension is .Rmd as shown below.



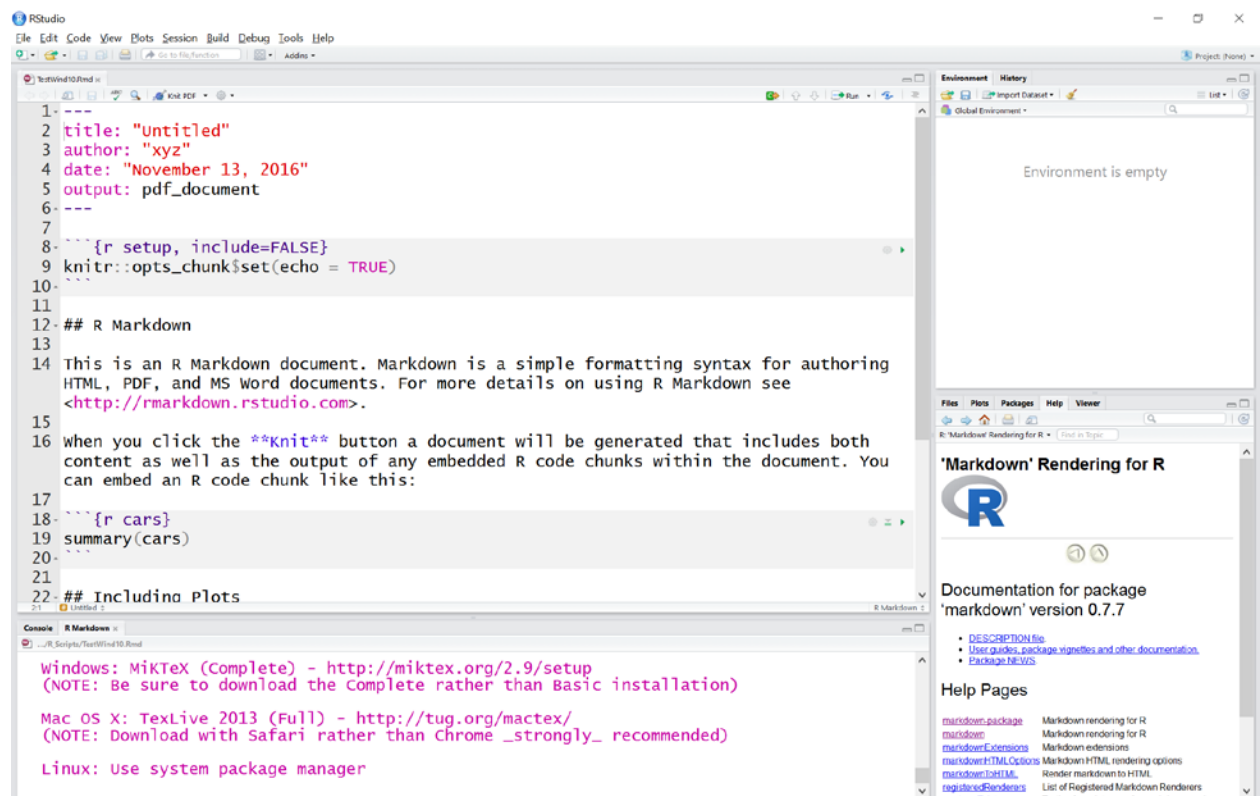
The resulting HTML file looks as follows.



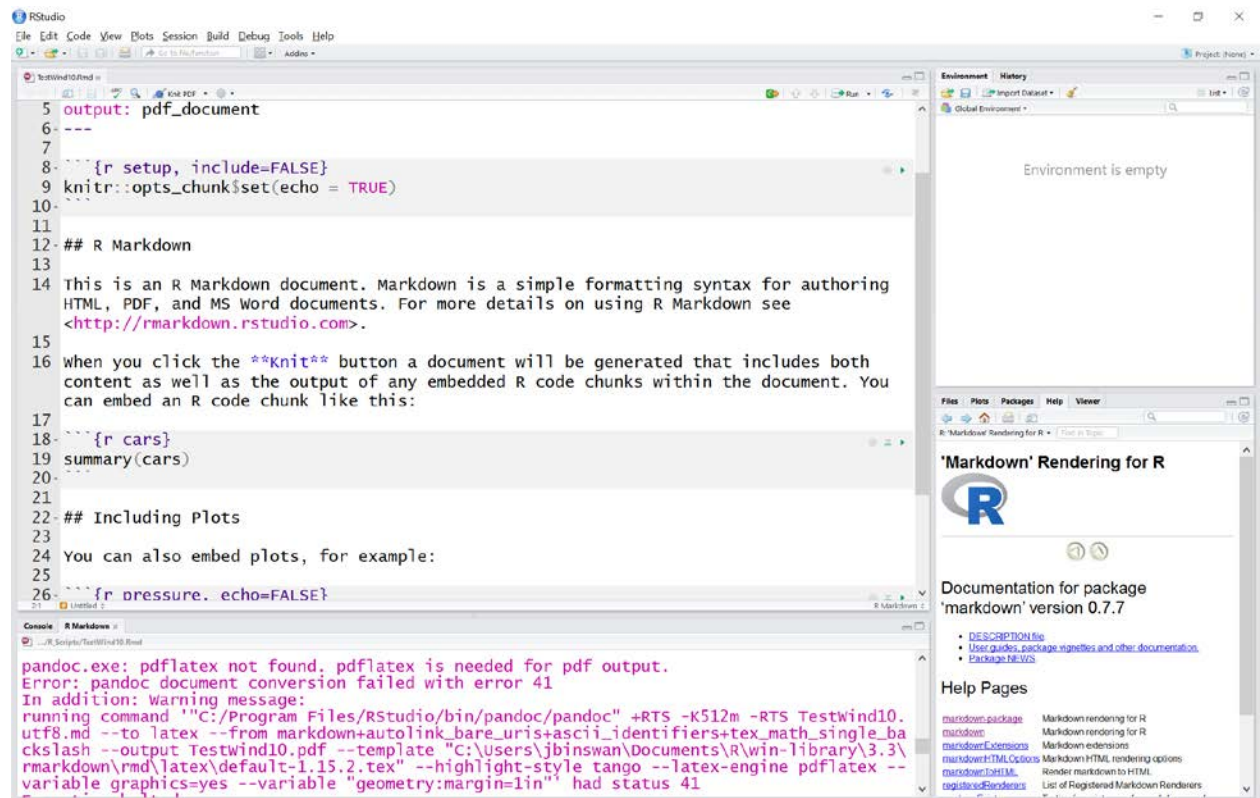
Now, try “Knit to PDF”.



Most likely, this will not work. But, friendly as it is, the RStudio console gives you a hint how to proceed. Also, it give the advice to download the Complete rather than the Basic installation of MiKTeX. This is why it will take so much time...



If you nevertheless insist on trying the compilation to pdf, you get an error.



The screenshot shows the RStudio interface. The main editor displays an R Markdown document with the following content:

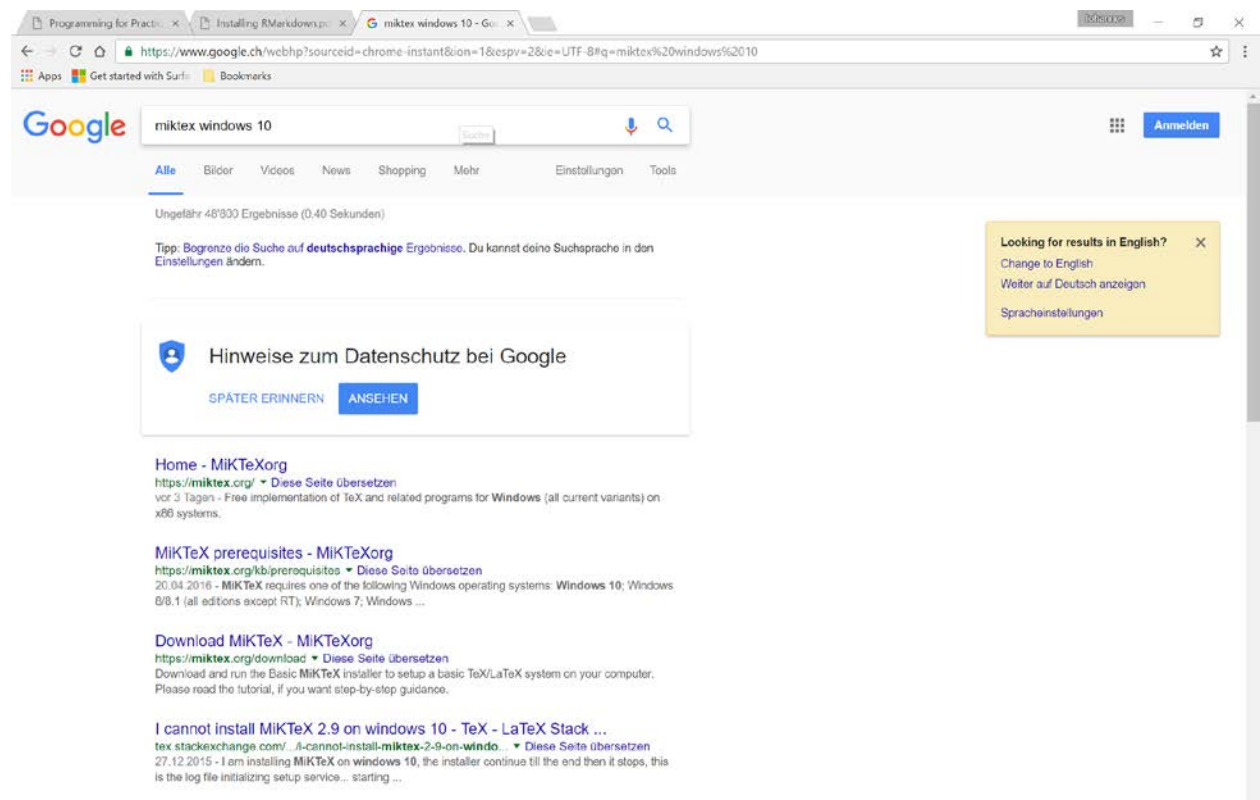
```
5 output: pdf_document
6 ---
7
8 {r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10
11 ## R Markdown
12
13 This is an R Markdown document. Markdown is a simple formatting syntax for authoring
14 HTML, PDF, and MS Word documents. For more details on using R Markdown see
15 <http://rmarkdown.rstudio.com>.
16
17 when you click the **knit** button a document will be generated that includes both
18 content as well as the output of any embedded R code chunks within the document. You
19 can embed an R code chunk like this:
20
21 {r cars}
22 summary(cars)
23
24 ## Including Plots
25
26 You can also embed plots, for example:
27
28 {r pressure, echo=FALSE}
```

The console at the bottom shows the following error message:

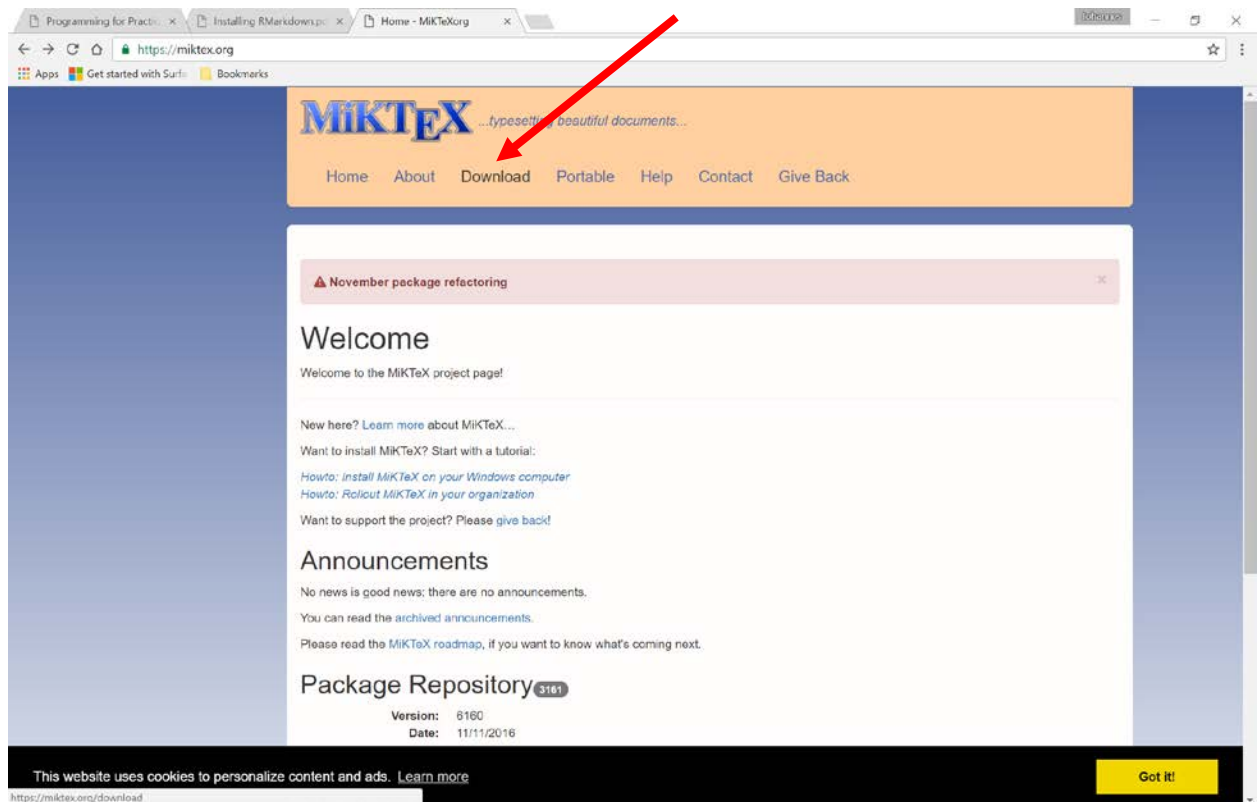
```
pandoc.exe: pdflatex not found. pdflatex is needed for pdf output.
Error: pandoc document conversion failed with error 41
In addition: Warning message:
running command '"C:/Program Files/RStudio/bin/pandoc/pandoc" +RTS -K512m -RTS TestWind10.
utf8.md --to latex --from markdown+autolink_bare_uris+ascii_identifiers+tex_math_single_ba
ckslash --output TestWind10.pdf --template "C:/users/jbinswan/Documents/R/win-library/3.3/
rmarkdown/rmd/latex/default-1.15.2.tex" --highlight-style tango --latex-engine pdflatex --
variable graphics=yes --variable "geometry:margin=1in"' had status 41
```

The right-hand pane shows the 'Environment' tab, which is empty, and the 'Viewer' tab, which displays the 'Markdown' Rendering for R documentation for package 'rmarkdown' version 0.7.7.

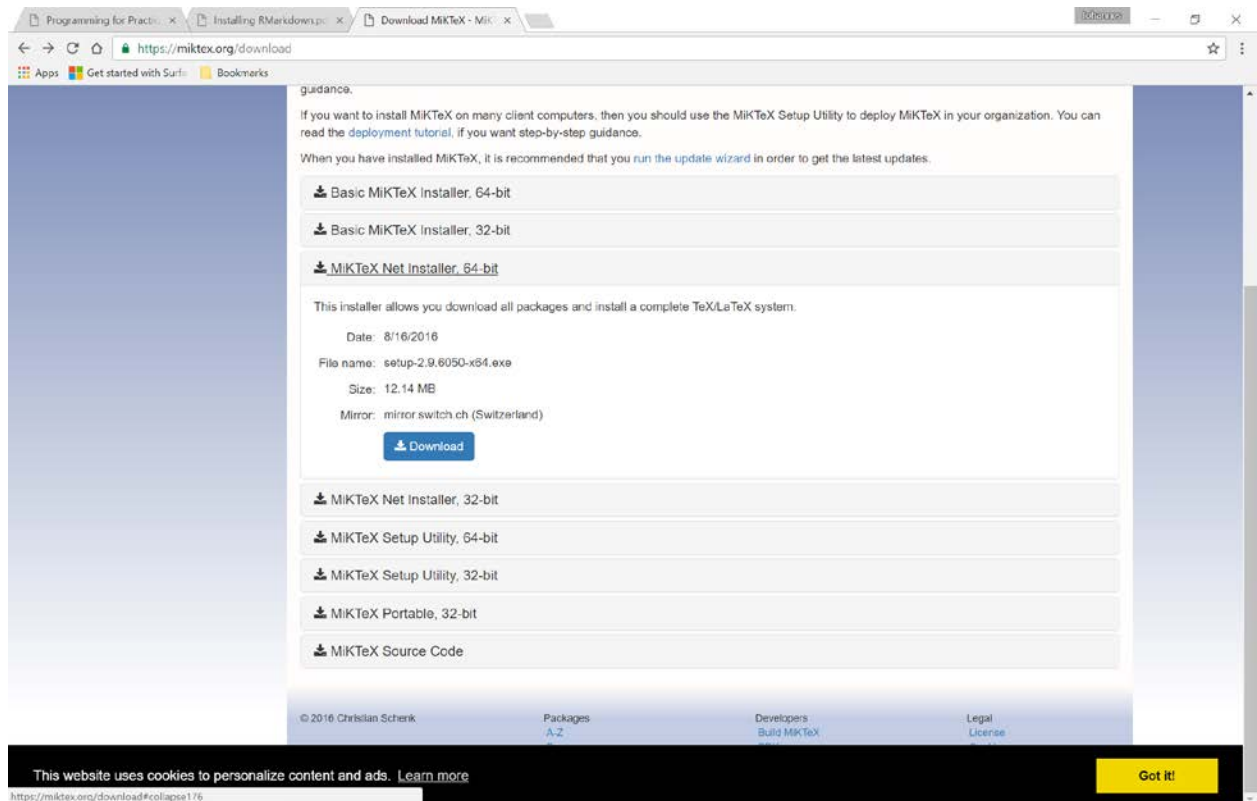
Go to the MiKTeX website.



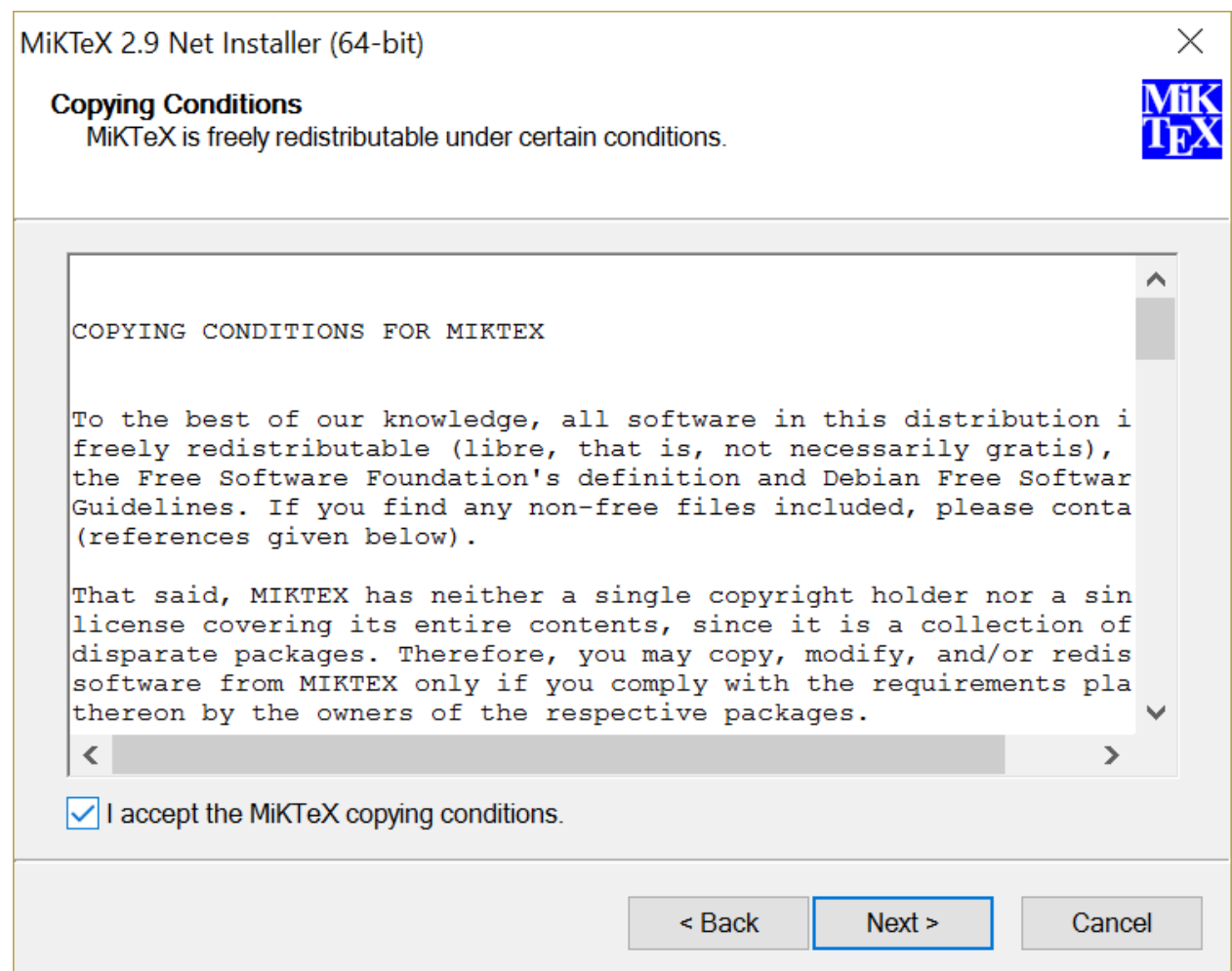
Go to Download



Do NOT choose the Basic installation but rather the MikTeX Net Installer. Most likely, you will need the 64-bit version. But if your system is 32-bit, then choose that version. Then click Download.



You need to check a few things as shown on the screenshots below



MiKTeX 2.9 Net Installer (64-bit)



Task

Choose the task you want carried out.



☒ **Download MiKTeX**

MiKTeX will be downloaded into a directory on your computer.

[Connection Settings...](#)

☐ **Install MiKTeX**

MiKTeX will be installed from a directory on your computer.

< [B](#)ack

[N](#)ext >

Cancel

MiKTeX 2.9 Net Installer (64-bit)



Package Set

Select the packages you want installed.



☐ Basic MiKTeX

A directory will be created which contains the basic MiKTeX distribution.

This is the recommended option. MiKTeX can be configured to install missing packages automatically (in the course of use).

☒ Complete MiKTeX

A directory will be created which contains the complete MiKTeX distribution.

Don't use this option unless you have a fast and reliable Internet connection.

< Back

Next >

Cancel

MiKTeX 2.9 Net Installer (64-bit)



Download Source

Choose a download source.



Download the MiKTeX distribution from:

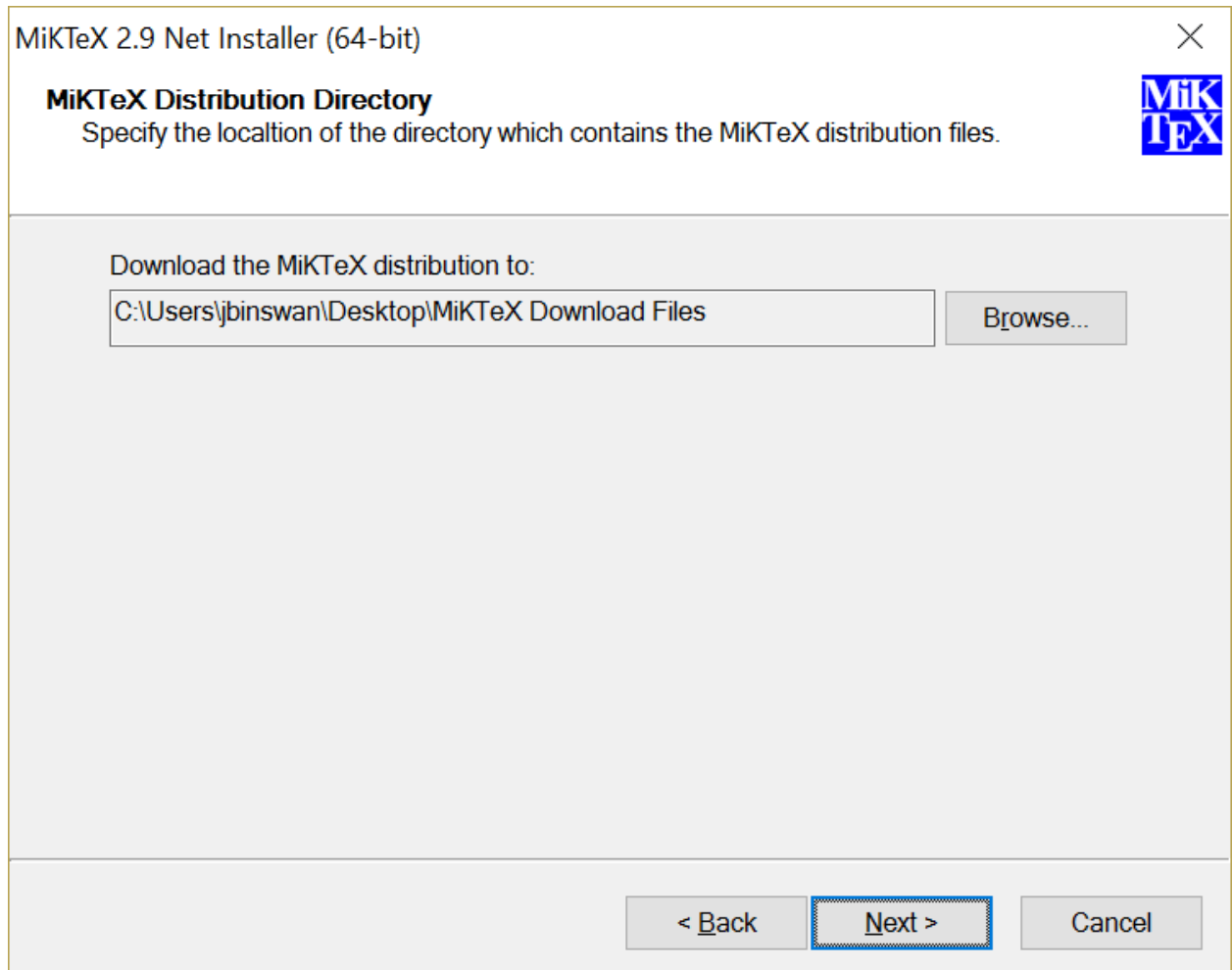
Country	Protocol	Host	Version	
South Africa	FTP	ftp.sun.ac.za	12-Nov-16	
South Africa	HTTP	ftp.sun.ac.za	12-Nov-16	
Sweden	HTTP	ftp.acc.umu.se	12-Nov-16	
Switzerland	FTP	mirror.switch.ch	12-Nov-16	
Switzerland	HTTP	mirror.switch.ch	12-Nov-16	
Taiwan	FTP	ftp.yzu.edu.tw	12-Nov-16	
Taiwan	HTTP	ftp.yzu.edu.tw	12-Nov-16	
Thailand	HTTP	ctan.megagod.net	12-Nov-16	
United Kingdom	FTP	mirror.ox.ac.uk	12-Nov-16	
United Kingdom	HTTP	mirror.ox.ac.uk	12-Nov-16	
United States	HTTP	mirror.hmc.edu	12-Nov-16	
United States	FTP	mirror.jmu.edu	12-Nov-16	
United States	HTTP	mirror.jmu.edu	12-Nov-16	

< Back


Next >

Cancel

It makes sense to have the installation files on the Desktop. Note that this is only about the DOWNLOAD! Installation comes later.



MiKTeX 2.9 Net Installer (64-bit) ✕

MiKTeX Distribution Directory 

Specify the location of the directory which contains the MiKTeX distribution files.

Download the MiKTeX distribution to:

MiKTeX 2.9 Net Installer (64-bit)



Information

Review the settings.



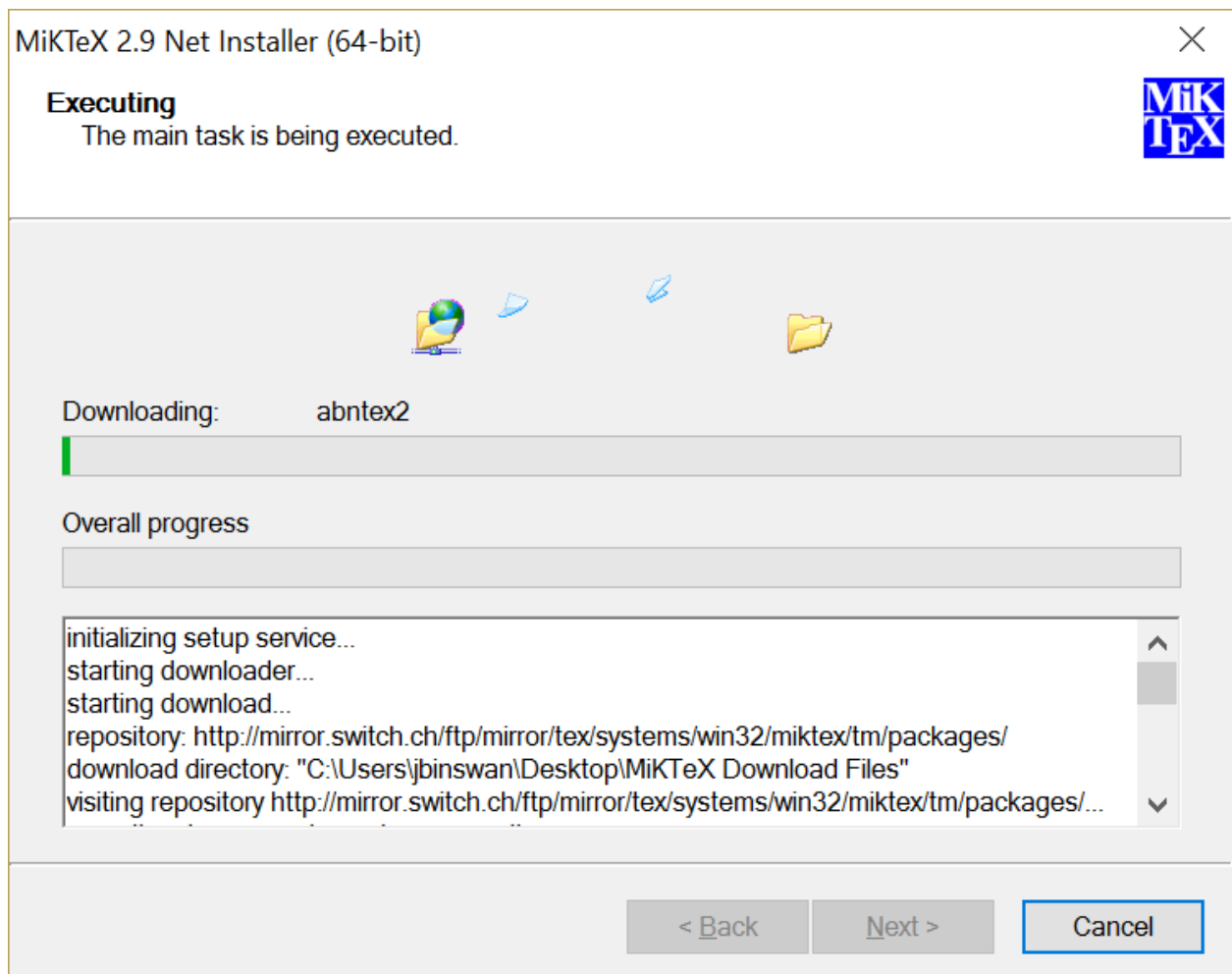
MiKTeX Setup Wizard has enough information to start the task. If you want to review or change any of the settings, click Back. If you are satisfied with the settings, click Start.

Download all packages from
http://mirror.switch.ch/ftp/mirror/tex/systems/win32/miktex/tm/packages/
to
C:\Users\jbinswan\Desktop\MiKTeX Download Files

< Back

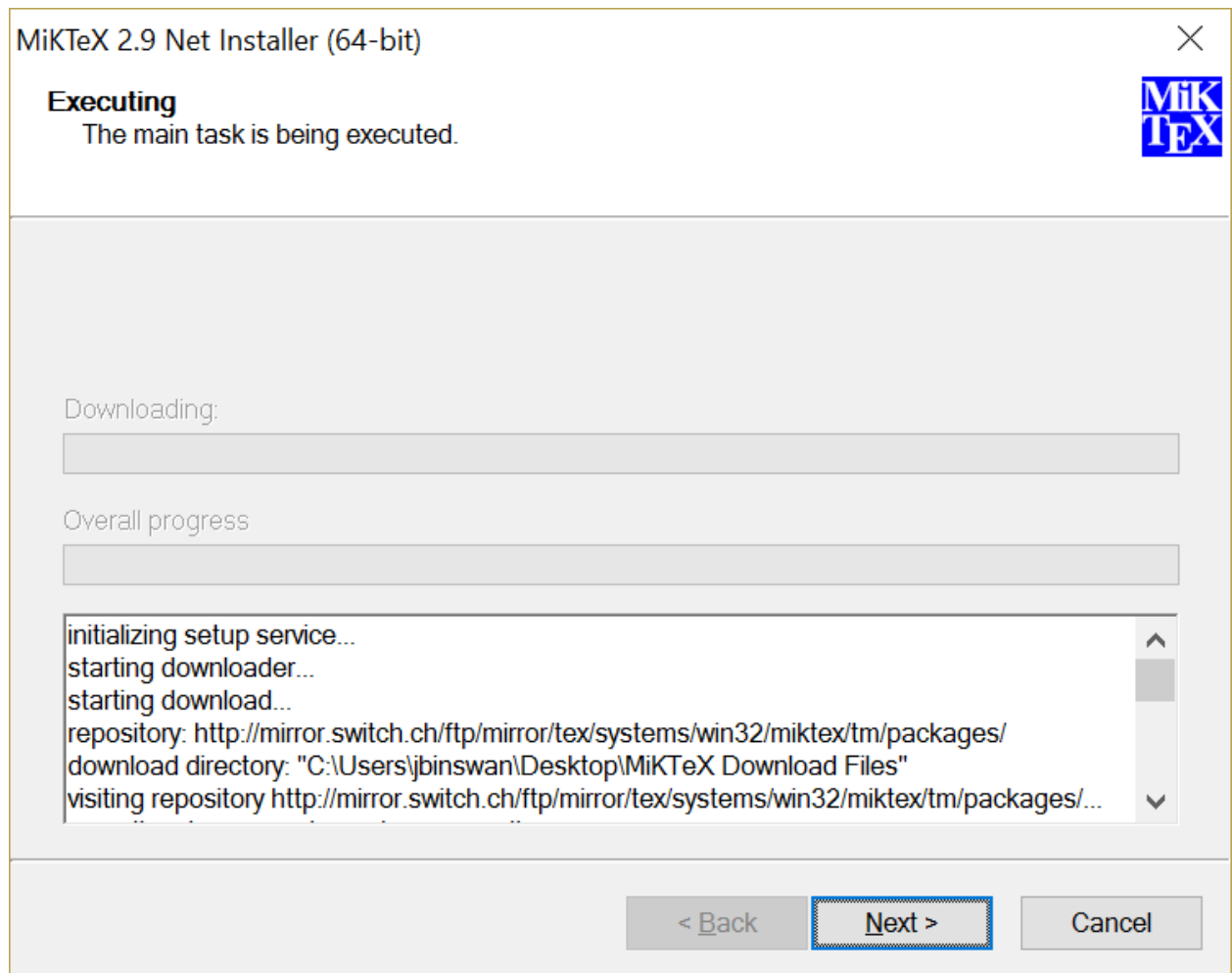
Start

Cancel

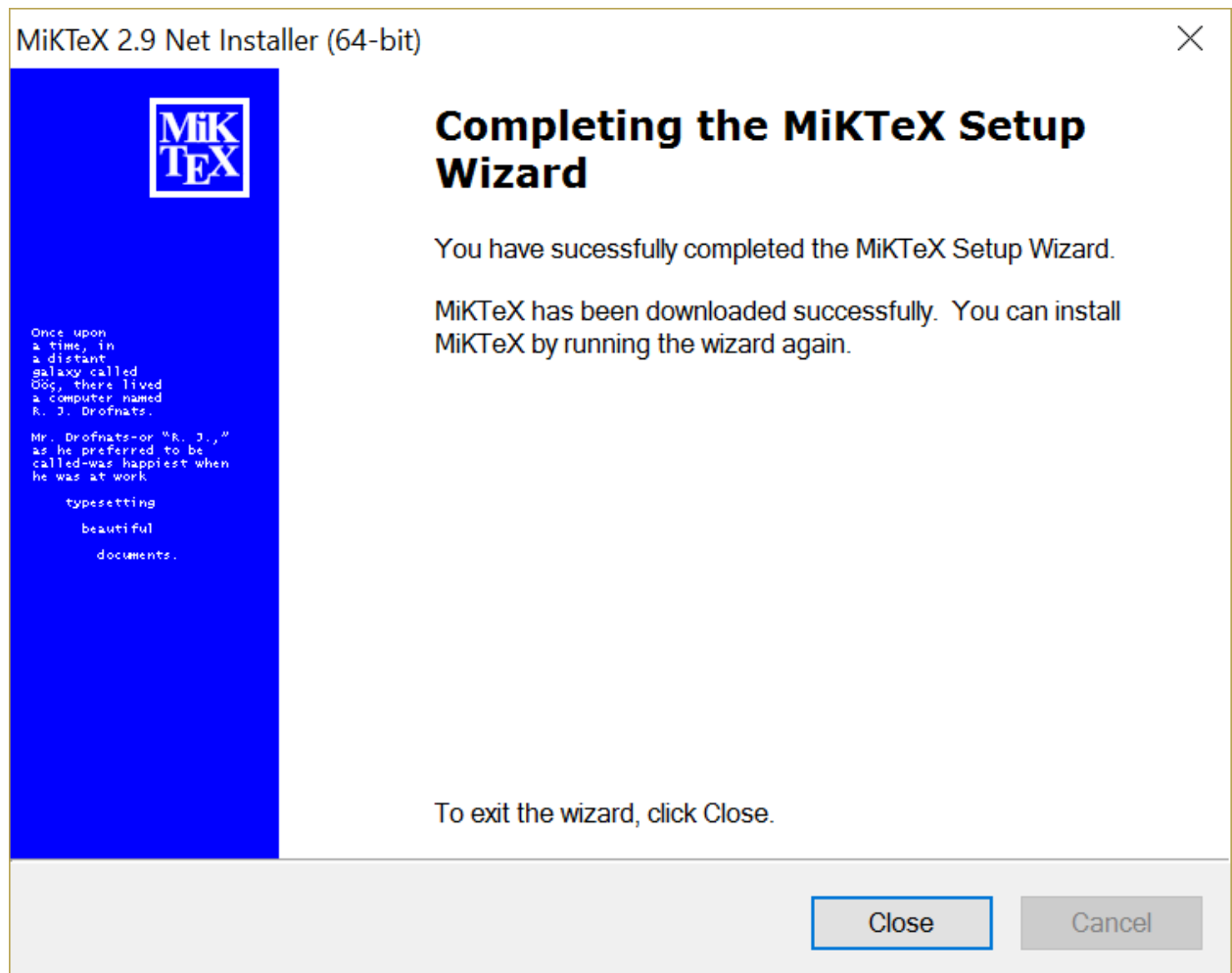


This takes VERY LONG!!

Click Next when the download is finished.

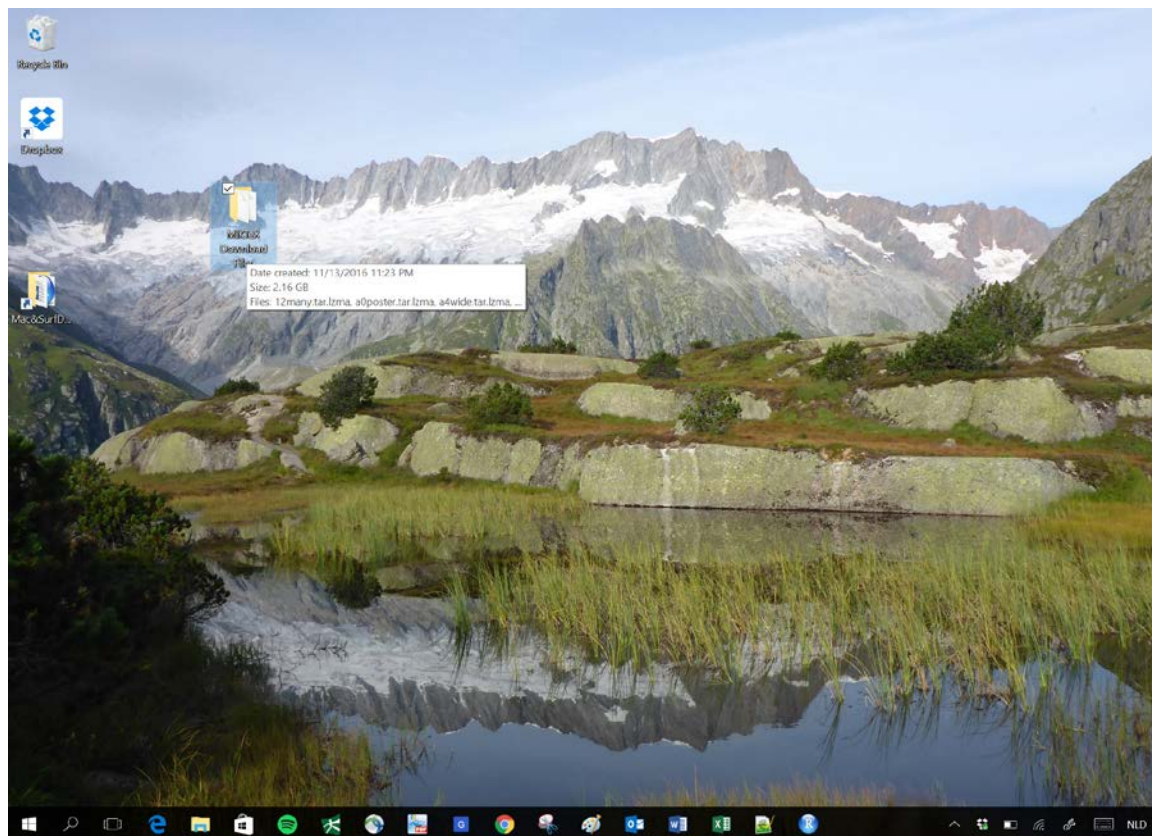


And the download is done...

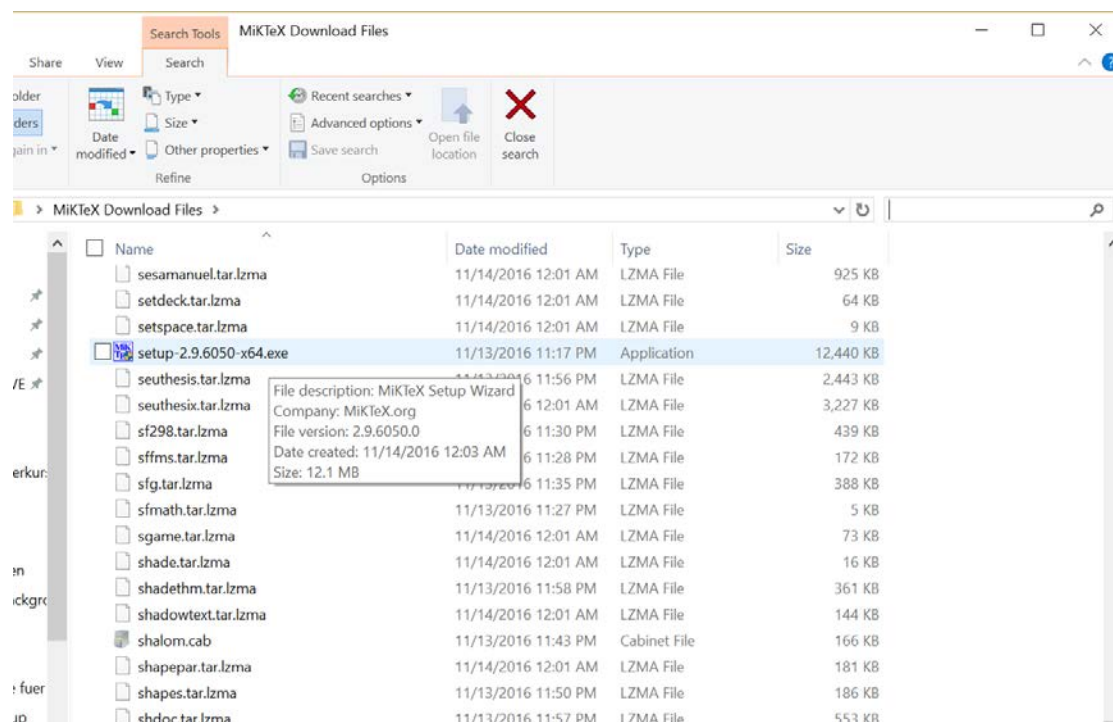


But not yet the installation...

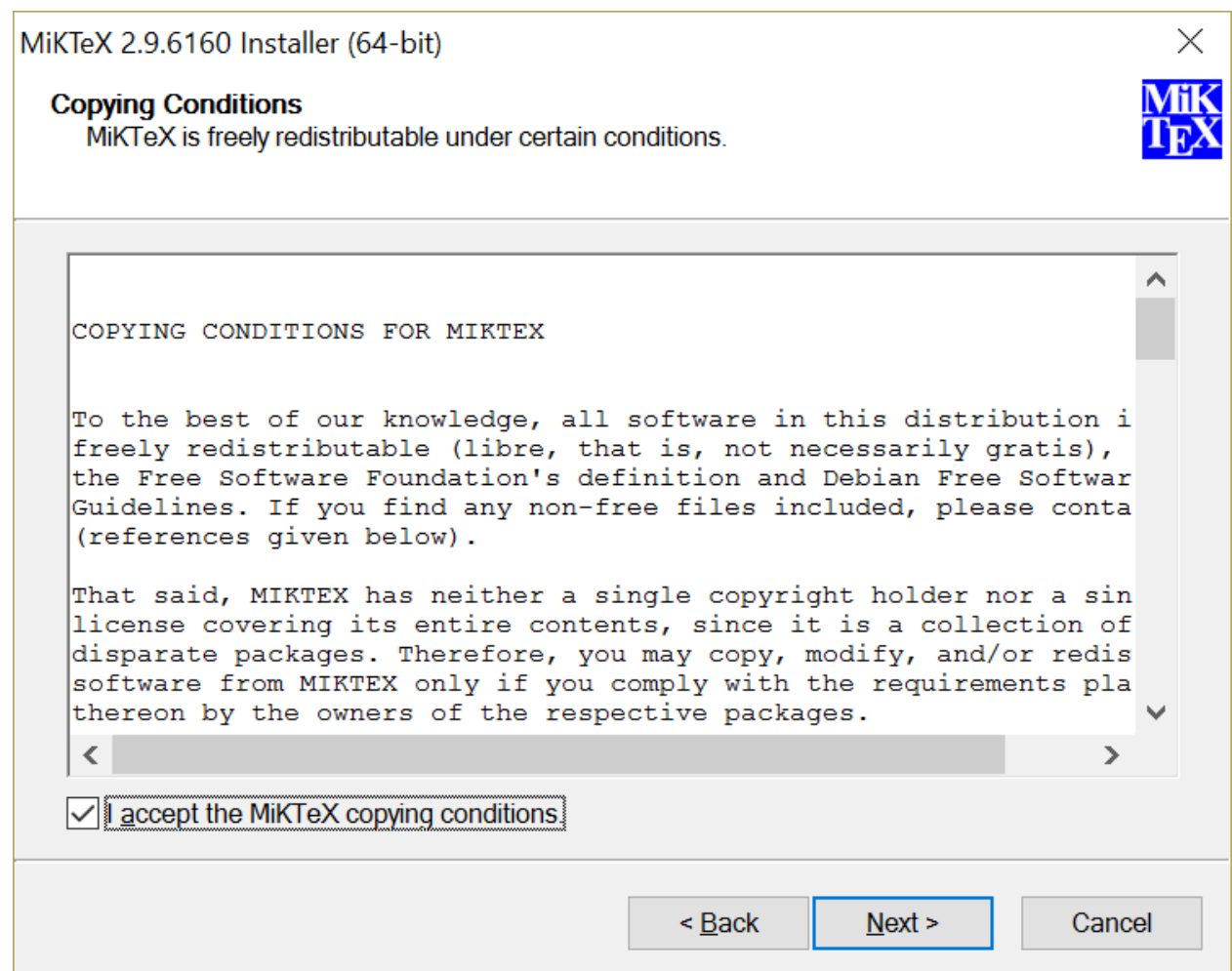
On your desktop (or wherever you put it) you should see a folder with the MiKTeX Download Files.



Open the folder. It contains tons of files; scroll down to the `setup-2.9.6050-x64.exe` file and double-click it.



Again, you need to check some cases and make some choices as shown below.



Package Set

Select the packages you want installed.



☐ Basic MiKTeX

This is the recommended option. MiKTeX can be configured to install missing files automatically (in the course of use).

☒ Complete MiKTeX

< Back

Next >

Cancel

MiKTeX 2.9.6160 Installer (64-bit)



Shared Installation

You have the option to share the MiKTeX installation with other users.



Install MiKTeX for:

- ☒ Anyone who uses this computer (all users)
- ☐ Only for: jbinswan

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Next >

Cancel

Most of the time, the default installation directory makes sense.

MiKTeX 2.9.6160 Installer (64-bit) ✕

Installation Directory
Choose a location for the installation directory.



Install MiKTeX to:

MiKTeX 2.9.6160 Installer (64-bit)



Settings

Set your preferences.



Preferred paper: ▼

Install missing packages on-the-fly: ▼

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Next >

Cancel

Information

Review the settings.



MiKTeX Setup Wizard has enough information to start the task. If you want to review or change any of the settings, click Back. If you are satisfied with the settings, click Start.

Install all packages to
C:\Program Files\MiKTeX 2.9

Install MiKTeX for all users

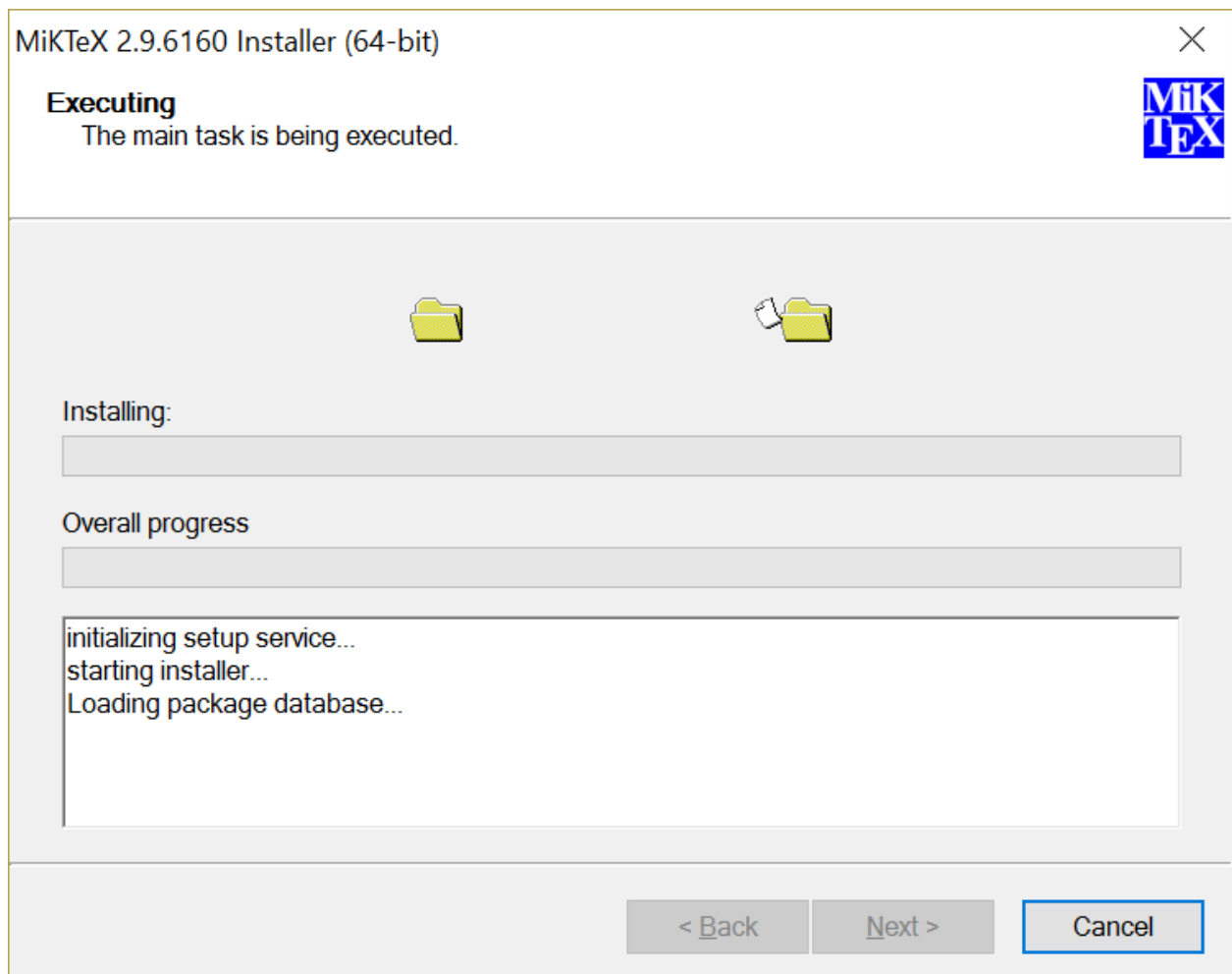
Preferred paper size is A4

Packages will be installed after confirmation by user

< Back

Start

Cancel



Again, this takes quite long!

MiKTeX 2.9.6160 Installer (64-bit)



Executing

The main task is being executed.



Installing:

Overall progress

Parsing "C:\Program Files\MiKTeX 2.9\fonts\map\dvips\dutchcal\dutchcal.map"... Parsing "C:\P
"C:\Program Files\MiKTeX 2.9\fonts\map\dvips\lato\lato.map"... Parsing "C:\Program Files\MiK
\opensans\opensans.map"... Parsing "C:\Program Files\MiKTeX 2.9\fonts\map\dvips\overlock\
\dvips\avantgar\uag.map"... Parsing "C:\Program Files\MiKTeX 2.9\fonts\map\dvips\antiqua\ua
Parsing "C:\Program Files\MiKTeX 2.9\fonts\map\dvips\bookman\ubk.map"... Parsing "C:\Prog
Parsing "C:\Program Files\MiKTeX 2.9\fonts\map\dvips\romandelyrd.map"... Parsing "C:\Progr

< Back

Next >

Cancel



Completing the MiKTeX Setup Wizard

You have successfully completed the MiKTeX Setup Wizard.

Once upon
a time, in
a distant
galaxy called
OOo, there lived
a computer named
R. J. Drofnats.

Mr. Drofnats-or "R. J.,"
as he preferred to be
called-was happiest when
he was at work.

typesetting
beautiful
documents.

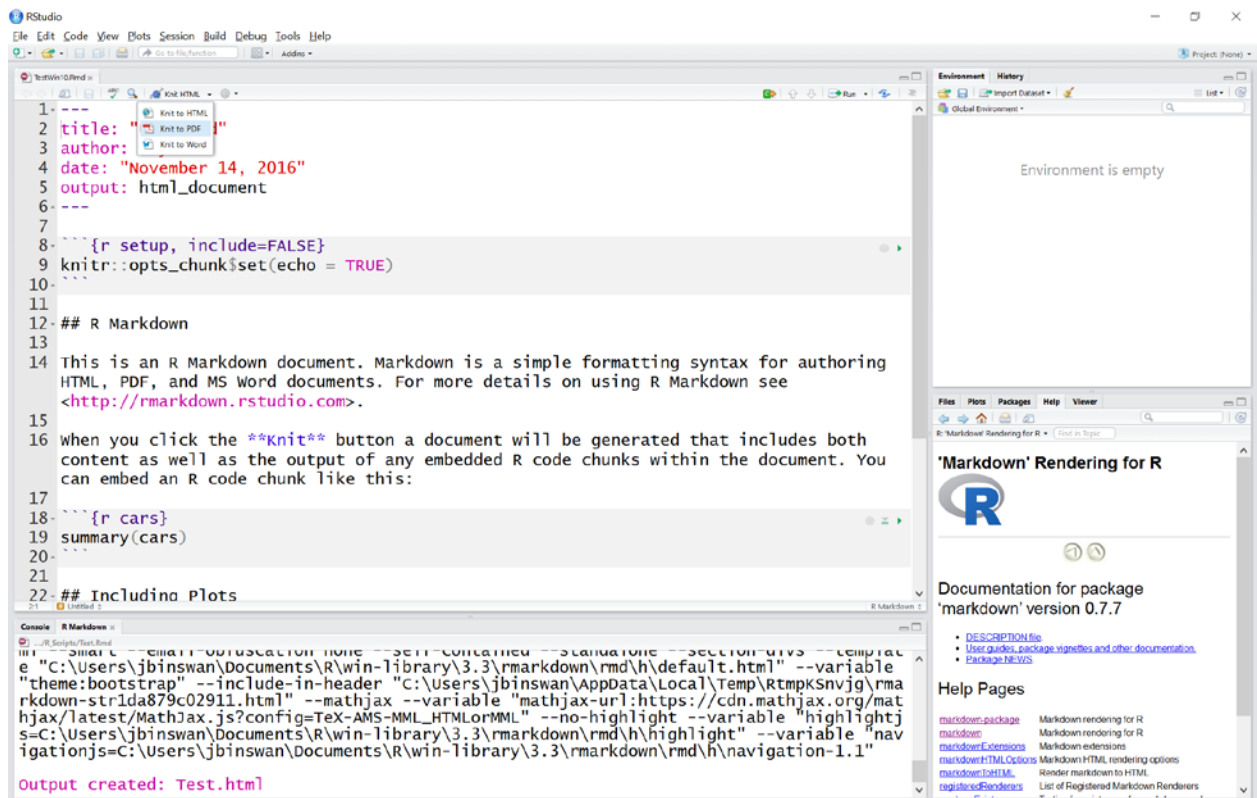
☐ Show the release notes

To exit the wizard, click Close.

Close

Cancel

Now close and reopen RStudio. Then choose “Knit to PDF”. It should work now. (If not, restart your computer.)



If you are curious about working with Latex, you need an editor (as you need RStudio for working with R). See the Mac section above in this document about [how to install Texmaker](#). The installation is very similar to the Mac case, so there is no need to guide you through the process. Note that the installation of Texmaker is not mandatory for this course.