Installing TinyTeX Offline

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1 Introduction

This document provides background and instructions on setting up R to create PDF documents with RMarkdown in settings where it is difficult to install LaTeX (a document preparation system that is able to compile to PDF) on your computer (e.g. due to IT restrictions within an organisation). The common issues are:

1. A LaTeX distribution cannot be installed on your computer due to lack of IT administrative rights.
2. You have a LaTeX distribution installed already but it does not contain all of the LaTeX packages required for RMarkdown to knit to PDF — when R tries to install the missing LaTeX packages, it cannot do this due to IT security restrictions in the network's firewall.

Both of these problems can be circumvented by installing the TinyTeX R package *offline*.

2 TinyTeX

TinyTeX is a custom LaTeX distribution created by Yihui Xie (a prominent developer at RStudio) that is *lightweight* and contains only the LaTeX packages you need to create PDF documents from RMarkdown. This is a key feature of TinyTeX, as LaTeX distributions can often be (overly) large and contain many unnecessary packages (e.g MiKTeX, proTeXt), whereas others may not contain all of the packages required to compile a PDF from RMarkdown. When there are missing LaTeX packages, R will try to download them automatically but this may be blocked due to the network's firewall.

2.1 Installing TinyTeX

First install the tinytex R package and load the library.

```
install.packages("tinytex")
library(tinytex)
```

From here, you would usually run `use_tinytex()`, which would tell R to pull off everything required for TinyTeX to work but if you are blocked from doing so, you will need to install a prebuilt version of TinyTex instead.

2.2 Installing TinyTeX Offline

A prebuilt version for **Windows** from August 2018 can be downloaded from

https://ci.appveyor.com/api/projects/yihui/tinytex/artifacts/TinyTeX.zip

Note that prebuilt versions are unlikely to be maintained (see Figure 1) but this version should work fine for a while, at least.

2. **Do you provide prebuilt binaries of TinyTeX?**

No. Technically it is easy, but I don't really understand the implications of the TeX Live license. Specifically, the license says:

> [...] TeX Live has neither a single copyright holder nor a single license covering its entire contents, since it is a collection of many independent packages. Therefore, you may copy, modify, and/or redistribute software from TeX Live only if you comply with the requirements placed thereon by the owners of the respective packages.

That sounds complicated to me. I don't have time to examine the license and terms of all these packages. Installing over the network is fast enough after all.

Figure 1: Prebuilt versions of TinyTeX will probably not be maintained – see https://yihui.name/tinytex/faq

After downloading the prebuilt version of TinyTeX, extract the contents of the zip file to a location on your computer (note that extracting to a network drive is likely to be much slower). Then in R, run the function:

```
tinytex::use_tinytex()
```

This opens a pop-up box, select the location of the extracted TinyTeX files (Figure 2).

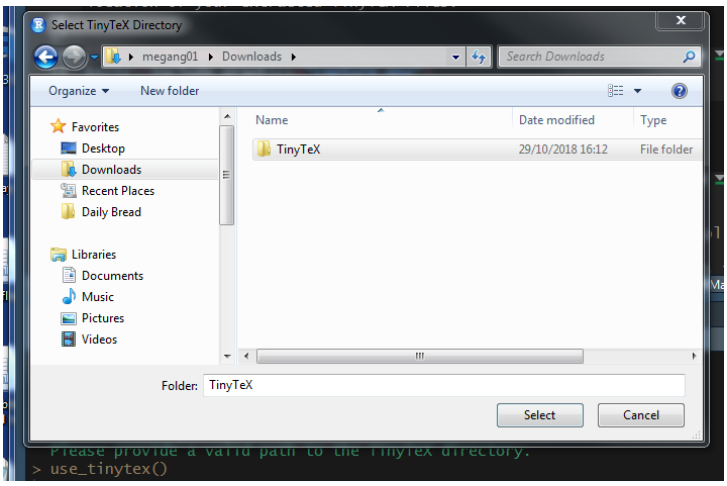


Figure 2: Pop-up box for selecting where you extracted the prebuilt TinyTex files to.

The following message may appear after running `use_tinytex()` (noting that the directories will be the location that you selected rather than the one shown here).

```
Use of uninitialized value in bitwise or (|) at
C:\Users\megang01\DOWNLO~1\TinyTeX\texmf-dist\scripts\texlive\tlmgr.pl line 1482.

Restart R and your editor and check if tinytex::tinytex_root() points to
C:/Users/megang01/Downloads/TinyTeX
```

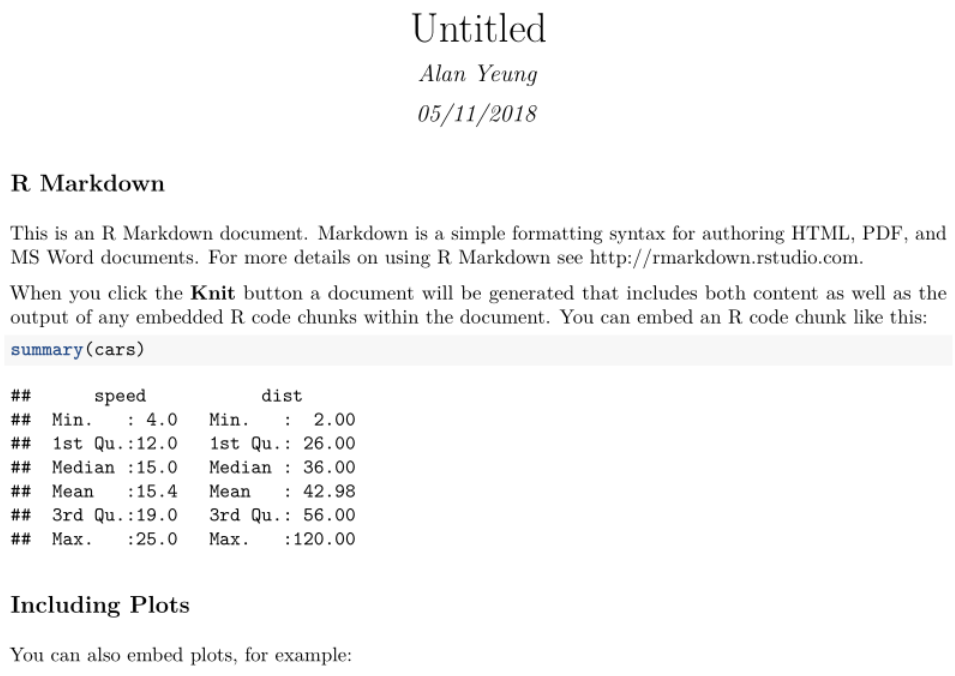
Most of this message can be ignored but the instructions should be followed. Restart R and RStudio (close down RStudio completely and start it back up) and run `tinytex::tinytex_root()` to check that TinyTeX is pointing to the specified location. If it is, then you should be ready to knit to PDF.

3 Testing

You can test if everything works by creating the RStudio template PDF in RMarkdown. In RStudio:

New File –> R Markdown –> Select 'PDF' as the output format –> Click 'Knit' in RStudio

You should get something like what is shown in Figure 3.



Untitled

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R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      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
```

Including Plots

You can also embed plots, for example:

Figure 3: Output from knitting the RStudio template to PDF.

3.1 This Document

The process outlined in this document was used to create this guide. The bookdown package in R was used to assist with figure numbering and referencing. Further details on the R setup used to create this document can be produced by running `devtools::session_info()`.

```
devtools::session_info()
```

```
## - Session info ---------------------------------------------------------
##  setting  value
##  version  R version 3.5.1 (2018-07-02)
##  os       Windows 7 SP 1
##  system   i386, mingw32
##  ui       RTerm
##  language (EN)
##  collate  English_United Kingdom.1252
##  ctype    English_United Kingdom.1252
##  tz       Europe/London
##  date     2018-11-05
##
## - Packages -------------------------------------------------------------
##  package     * version date       lib source
##  assertthat    0.2.0   2017-04-11 [1] CRAN (R 3.5.1)
##  backports     1.1.2   2017-12-13 [1] CRAN (R 3.5.0)
##  base64enc     0.1-3   2015-07-28 [1] CRAN (R 3.5.0)
##  bookdown      0.7     2018-02-18 [1] CRAN (R 3.5.1)
##  callr         3.0.0   2018-08-24 [1] CRAN (R 3.5.1)
##  cli           1.0.1   2018-09-25 [1] CRAN (R 3.5.1)
##  crayon        1.3.4   2017-09-16 [1] CRAN (R 3.5.1)
##  debugme       1.1.0   2017-10-22 [1] CRAN (R 3.5.1)
##  desc          1.2.0   2018-05-01 [1] CRAN (R 3.5.1)
##  devtools      2.0.1   2018-10-26 [1] CRAN (R 3.5.1)
##  digest        0.6.18  2018-10-10 [1] CRAN (R 3.5.1)
##  evaluate      0.12    2018-10-09 [1] CRAN (R 3.5.1)
##  fs            1.2.6   2018-08-23 [1] CRAN (R 3.5.1)
##  glue          1.3.0   2018-07-17 [1] CRAN (R 3.5.1)
##  htmltools     0.3.6   2017-04-28 [1] CRAN (R 3.5.1)
##  knitr         1.20    2018-02-20 [1] CRAN (R 3.5.1)
##  magrittr      1.5     2014-11-22 [1] CRAN (R 3.5.1)
##  memoise       1.1.0   2017-04-21 [1] CRAN (R 3.5.1)
##  pkgbuild      1.0.2   2018-10-16 [1] CRAN (R 3.5.1)
##  pkgload       1.0.2   2018-10-29 [1] CRAN (R 3.5.1)
##  prettyunits   1.0.2   2015-07-13 [1] CRAN (R 3.5.1)
##  processx      3.2.0   2018-08-16 [1] CRAN (R 3.5.1)
##  ps            1.2.0   2018-10-16 [1] CRAN (R 3.5.1)
##  R6            2.3.0   2018-10-04 [1] CRAN (R 3.5.1)
##  Rcpp          0.12.19 2018-10-01 [1] CRAN (R 3.5.1)
##  remotes       2.0.2   2018-10-30 [1] CRAN (R 3.5.1)
##  rlang         0.3.0.1 2018-10-25 [1] CRAN (R 3.5.1)
##  rmarkdown     1.10    2018-06-11 [1] CRAN (R 3.5.1)
##  rprojroot     1.3-2   2018-01-03 [1] CRAN (R 3.5.1)
##  sessioninfo   1.1.0   2018-09-25 [1] CRAN (R 3.5.1)
##  stringi       1.2.4   2018-07-20 [1] CRAN (R 3.5.1)
##  stringr       1.3.1   2018-05-10 [1] CRAN (R 3.5.1)
##  testthat      2.0.1   2018-10-13 [1] CRAN (R 3.5.1)
##  usethis       1.4.0   2018-08-14 [1] CRAN (R 3.5.1)
##  withr         2.1.2   2018-03-15 [1] CRAN (R 3.5.1)
##  xfun          0.4     2018-10-23 [1] CRAN (R 3.5.1)
##  yaml          2.2.0   2018-07-25 [1] CRAN (R 3.5.1)
##
## [1] C:/Users/megang01/Documents/R/R-3.5.1/library
```