Using  for everything at NIVA

You might as well do it right…

R on Windows – What do we install?

Base R installation.
Includes the R language and essential packages.

Rtools

Additional non-R functionalities,
for example to compile packages from source.

Graphical user interface and additional features.
This is what you use everyday.

R on Windows – How do we install?

https://cloud.r-project.org/bin/windows/base/

Rtools

https://cloud.r-project.org/bin/windows/Rtools/

https://www.rstudio.com/products/rstudio/download/

Pro Tip: Use Chocolatey!

- = p !
- Like **apt** OS)
- https://c
- https://r ndows10-setup/

```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

PS C:\WINDOWS\system32> choco upgrade all
Chocolatey v0.10.15
Upgrading the following packages:
all
By upgrading you accept licenses for the packages.
7zip v19.0 is the latest version available based on your source(s).
7zip.install v19.0 is the latest version available based on your source(s).
adobereader v2019.012.20035 is the latest version available based on your source(s).
autohotkey.portable v1.1.30.03 is the latest version available based on your source(s).
cccp v2015.10.18 is the latest version available based on your source(s).
chocolatey v0.10.15 is the latest version available based on your source(s).
chocolatey-core.extension v1.3.3 is the latest version available based on your source(s).
docker-desktop v2.1.0.1 is the latest version available based on your source(s).
Firefox v68.0.1 is the latest version available based on your source(s).
gimp v2.10.12 is the latest version available based on your source(s).
git v2.22.0 is the latest version available based on your source(s).
git.install v2.22.0 is the latest version available based on your source(s).
InkScape v0.92.4.20190121 is the latest version available based on your source(s).
InnoSetup v6.0.2 is the latest version available based on your source(s).
julia v1.1.1 is the latest version available based on your source(s).
KB2919355 v1.0.20160915 is the latest version available based on your source(s).
KB2919442 v1.0.20160915 is the latest version available based on your source(s).
miktex v2.9.7152 is the latest version available based on your source(s).
miktex.install v2.9.7152 is the latest version available based on your source(s).
miniconda3 v4.6.14 is the latest version available based on your source(s).
musicbee v3.3.7115 is the latest version available based on your source(s).
notepadplusplus v7.7.1 is the latest version available based on your source(s).
notepadplusplus.install v7.7.1 is the latest version available based on your source(s).
qpdf v8.4.2 is the latest version available based on your source(s).
R.Project v3.6.1 is the latest version available based on your source(s).
R.Studio v1.2.1335 is the latest version available based on your source(s).
rtools v3.5.0.4 is the latest version available based on your source(s).
Silverlight v5.1.50907.0 is the latest version available based on your source(s).
slack v4.0.1 is the latest version available based on your source(s).
strawberryperl v5.30.0.1 is the latest version available based on your source(s).
zotero v5.0.73 is the latest version available based on your source(s).

Chocolatey upgraded 0/31 packages.
 See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
PS C:\WINDOWS\system32>
```

R on Windows – How do we install?


```
choco install r.project
```

Rtools

```
choco install rtools
```

RStudio®

```
choco install r.studio
```

R at NIVA – Installing packages

R at NIVA – Installing packages

- Per default, R installs packages within the Documents folder
- At NIVA, the Documents folder is not physically on your machine, but on the NIVA server
- That's not good for installing and using packages!
- We need to "hack" a custom solution ☺

R at NIVA – Installing packages

R at NIVA – Installing packages

- Defaults:

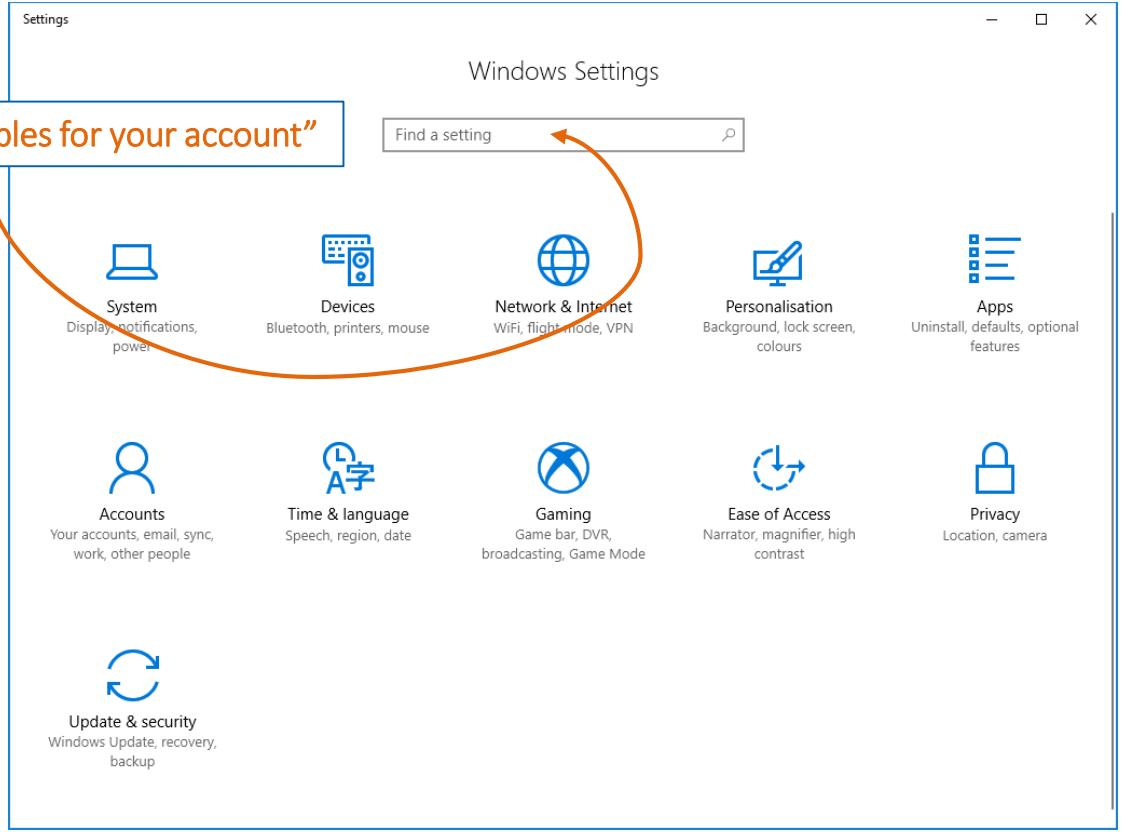
  C:\Program Files\R\R-3.6.0\library

  C:\Users\Documents\[your user name]\R\win-library\3.6

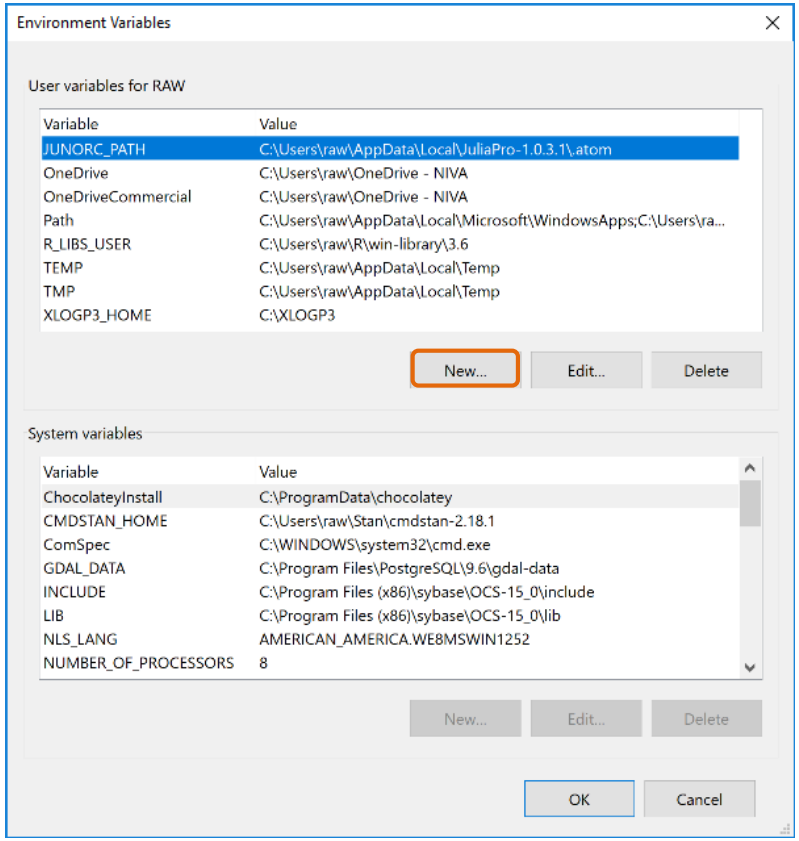
- **Smart**: C:\Users\[your user name]\R\win-library
- But how does R know where to install packages?
- **R_LIBS_USER**

R at NIVA – Installing packages

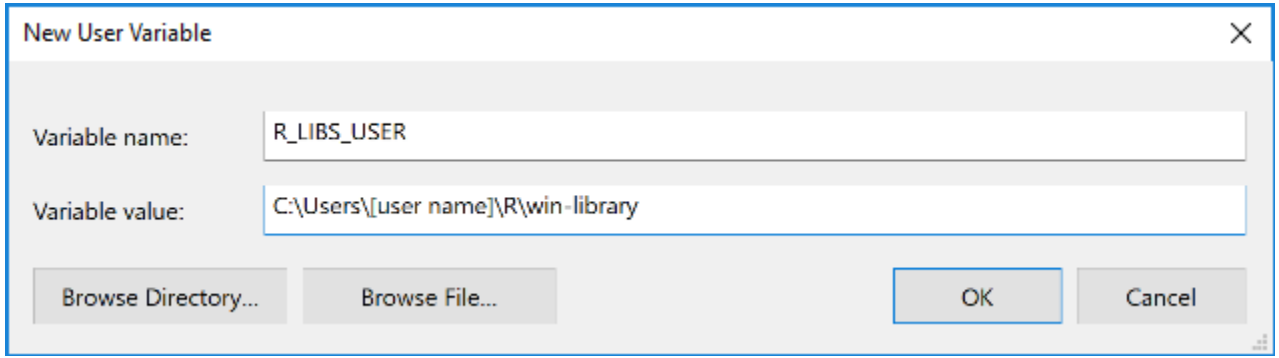
"Edit environment variables for your account"



R at NIVA – Installing packages



R at NIVA – Installing packages



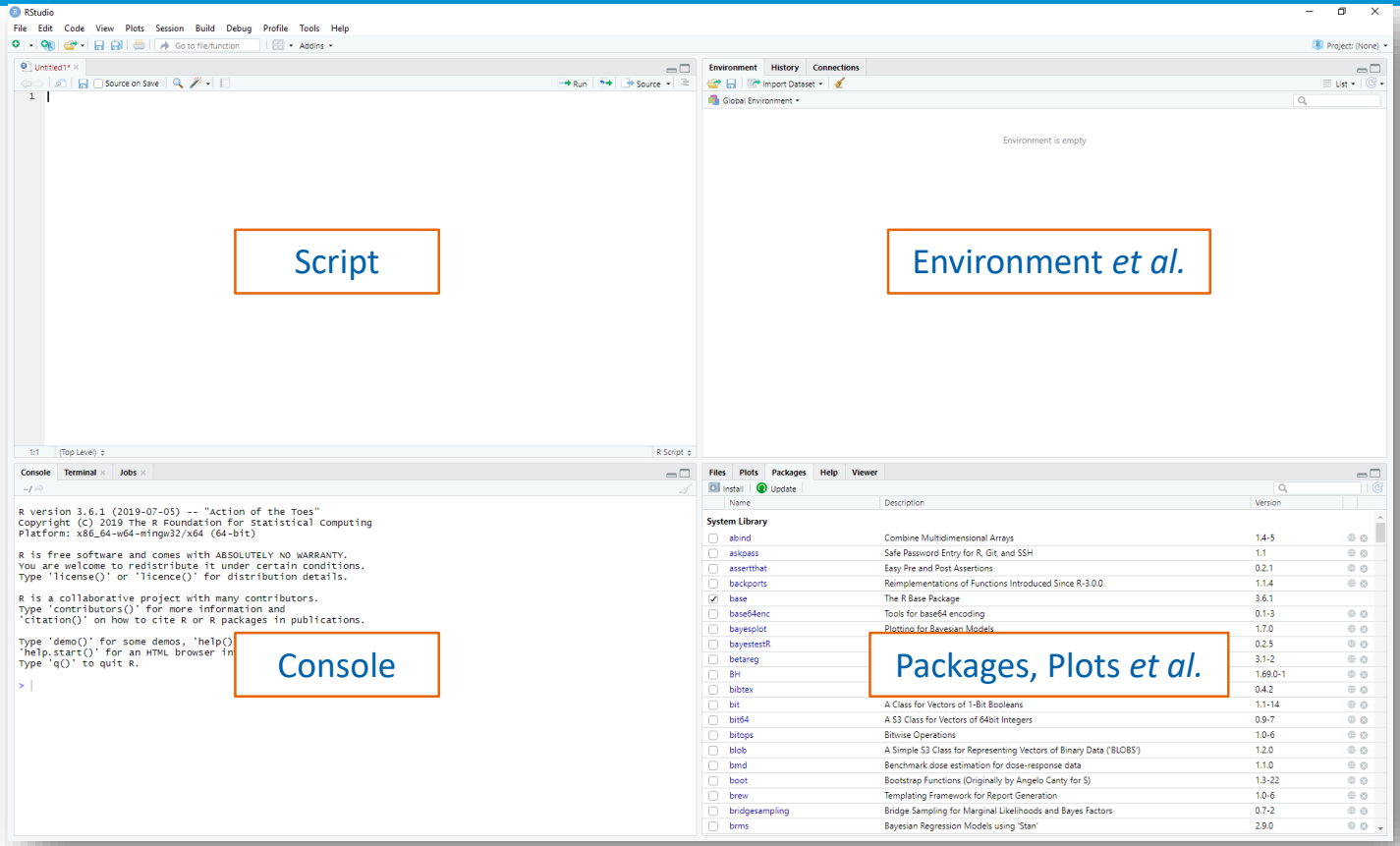
R at NIVA – What do we *use*?

Rtools

R at NIVA – Recommendations

- Use RStudio

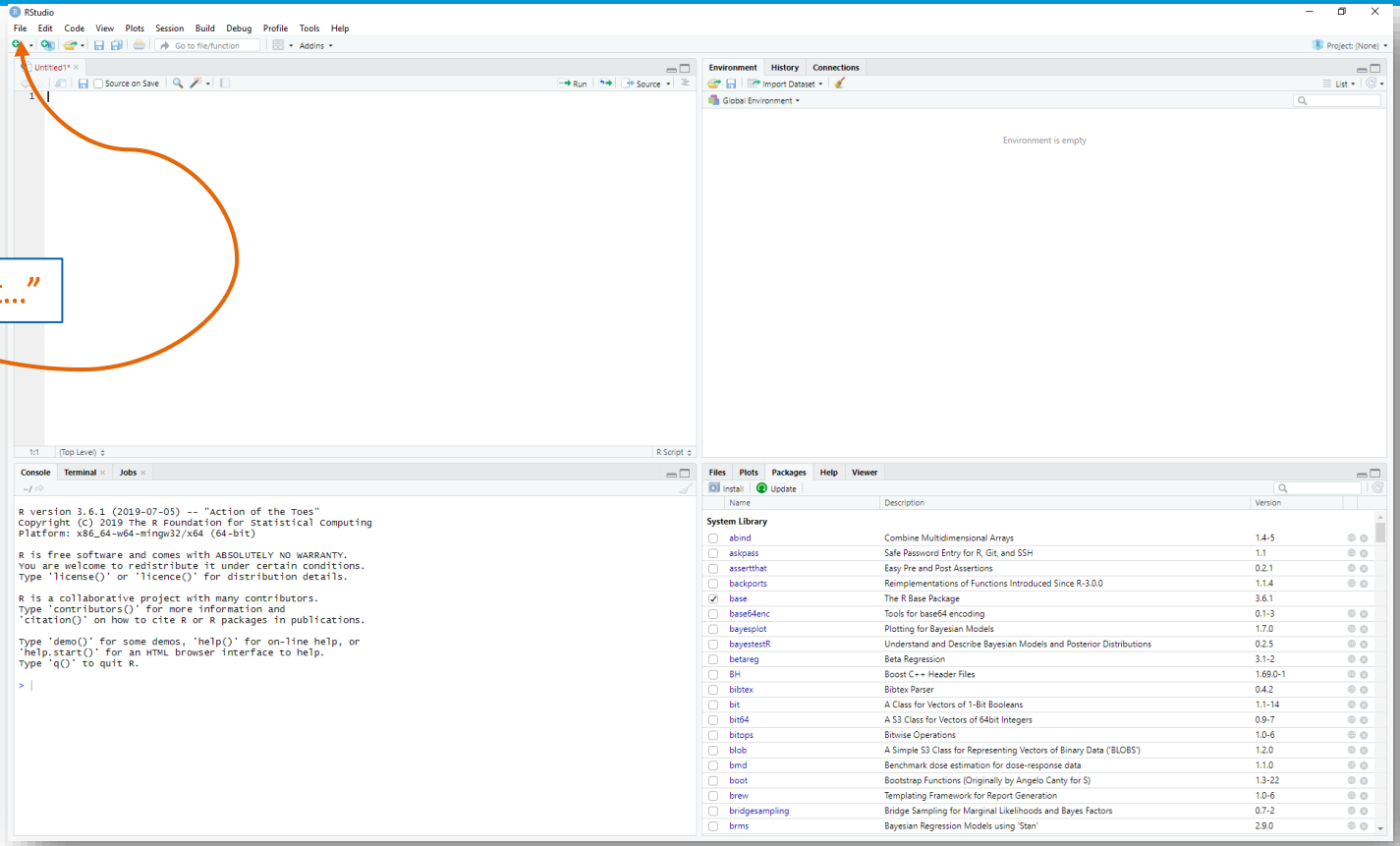
R at NIVA – Recommendations



R at NIVA – Recommendations

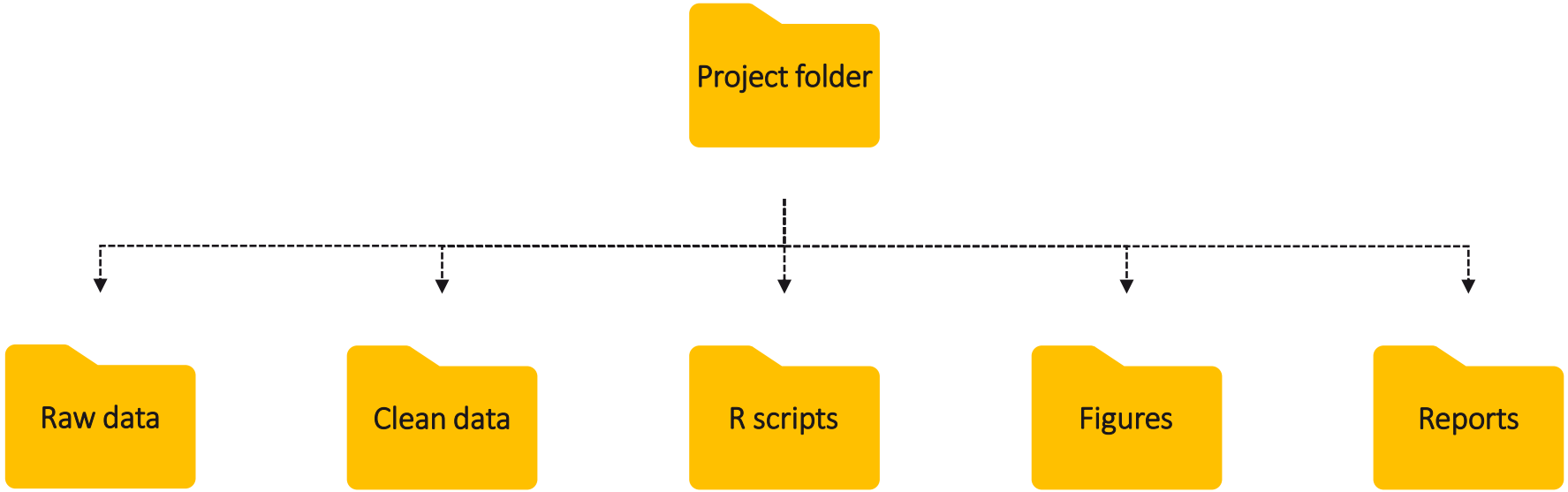
- Use RStudio
- Use RStudio projects (no more `setwd()`!)

R at NIVA – Recommendations



"New Project..."

R at NIVA – Recommendations



R at NIVA – Recommendations

- Use RStudio
- Use RStudio projects (no more `setwd()`!)
- Annotate your code!

R at NIVA – Recommendations

Bad script

```
rtnorm <- function(n, mean = 0, sd = 1, lower = -Inf, upper = Inf, inclusive = TRUE, ...) {

  pre_result <- rnorm(n = n, mean = mean, sd = sd)

  if (inclusive) {
    result <- pre_result[which(pre_result >= lower & pre_result <= upper)]
    while (length(result) < n) {
      result <- c(result, rnorm(n = n - length(result), mean = mean, sd = sd))
      result <- result[which(result >= lower & result <= upper)]
    }
  }

  if (!inclusive) {
    result <- pre_result[which(pre_result > lower & pre_result < upper)]
    while (length(result) < n) {
      result <- c(result, rnorm(n = n - length(result), mean = mean, sd = sd))
      result <- result[which(result > lower & result < upper)]
    }
  }

  result

}
```

R at NIVA – Recommendations

Okay script

```
## Load packages
library(DBI)
library(odbc)
library(keyring)
library(tidyverse)
library(dbplyr)

## Connect to database
RADBDEV <- dbConnect(odbc(),
                     dsn = "RADBDEV",
                     UID = key_get(service = "RADBDEV username", username = Sys.getenv("USERNAME")),
                     PWD = key_get(service = "RADBDEV password", username = Sys.getenv("USERNAME")))

## Get relevant Kaldvellfjord case study
exposure_data <- tbl(RADBDEV, in_schema("RA_EL", "RA_ENVIRONMENTAL_CON")) %>%
  filter(CAMPAIGN == "Kaldvellfjorden",
         SAMPLE_MATRIX == "Salt water",
         FRACTION == "LMM",
         STRESSOR_TYPE == "Pollutant",
         is.na(MEASURED_FLAG),
         DWH_VALID == 1) %>%
  select(SITE_CODE, SAMPLE_DATE, CHEMICAL_ID, CHEMICAL_NAME, MEASURED_VALUE, MEASURED_UNIT) %>%
  collect() %>%
  mutate(SAMPLE_DATE = as.Date(SAMPLE_DATE),
         CHEMICAL_ID = as.integer(CHEMICAL_ID),
         CHEMICAL_NAME = str_to_title(CHEMICAL_NAME))

## Extract Chemical IDs
chids <- exposure_data %>%
  select(CHEMICAL_ID, CHEMICAL_NAME) %>%
  distinct()
```

R at NIVA – Recommendations

Good report

Walk Through Of A Case Study

The following is a walkthrough of cumulative risk assessment procuders *without* using the `nctpr` package for convenience, but it follows all steps manually. Please not that as of 2019-06-27 the user effect data and parent compounds are *not* included in this walkthrough.

Install and load necessary packages

This walkthrough largely depends on data wrangling functionalities of packages contained inside the `tidyverse` package collection, like `dbplyr`, `dplyr`, `stringr` and `tidyr`. The packages `DBI` and `odbc` provide a database interface and driver information, respectively. Finally, the `keyring` package is used to access credentials (username and password) for NIVA's Risk Assessment database (RAdb)

```
install.packages(c("tidyverse", "DBI", "odbc", "keyring"))
```

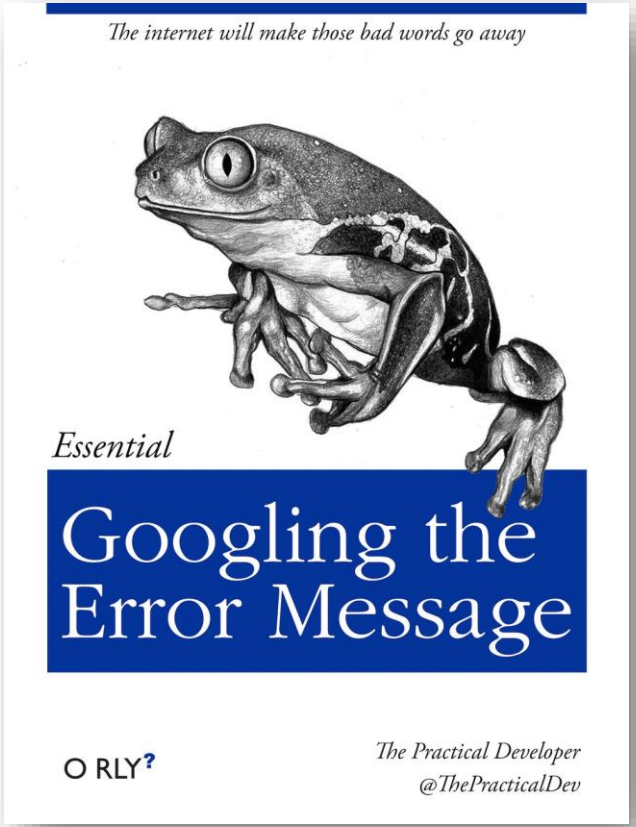
Loading the `tidyverse` package collection automatically loads most of the relevant packages for data wrangling. Only the database-specific `dbplyr` package needs to be loaded explicitly in addition.

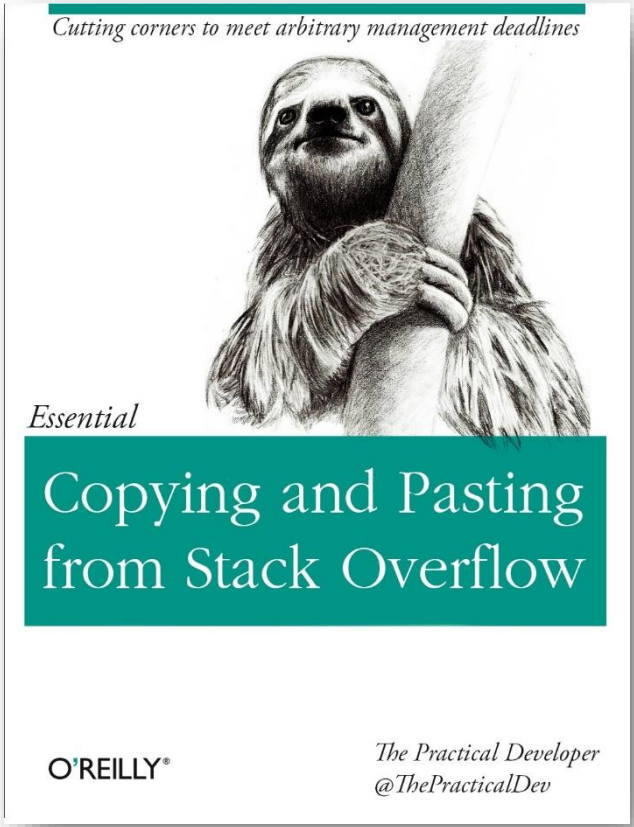
```
library(DBI)
library(odbc)
library(keyring)
library(tidyverse)
library(dbplyr)
```

R at NIVA – Recommendations

- Use RStudio
- Use RStudio projects (no more `setwd()`!)
- Annotate your code!
- Use Google and Stack Overflow!

R at NIVA – Recommendations





R at NIVA – What do *YOU* want?

- Markdown reports?
- Git/GitHub integration?
- Database access?
- Data crunching?
- Visualizations?
- Statistics?