R version 4.5.1 (2025-06-13 ucrt) -- "Great Square Root"

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Platform: x86_64-w64-mingw32/x64

R is free software and comes with ABSOLUTELY NO WARRANTY.

You are welcome to redistribute it under certain conditions.

Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.

Type 'contributors()' for more information and

'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or

'help.start()' for an HTML browser interface to help.

Type 'q()' to quit R.

> Hi Stefan,

Error: unexpected symbol in "Hi Stefan"

>

> I hope you’re doing well. I wanted to follow up regarding the next step with the COO and check if there have been any updates on scheduling. I remain very enthusiastic about the opportunity and appreciate your time.

Error: unexpected symbol in "I hope"

>

> Best regards,

Error: unexpected symbol in "Best regards"

> Christina Albert Danielmainfont: Roboto

Error: unexpected symbol in "Christina Albert"

```
> monofont:
Consolasinstall.packages(c("data.table","readxl","ggplot2","ggmosaic","readr","rmarkdown","tinytex
"))

Error: object 'monofont' not found

> tinytex::install_tinytex()   # enables knitting to PDF (installs a lightweight LaTeX)

Error in loadNamespace(x) : there is no package called ‘tinytex’

> tinytex::install_tinytex()

Error in loadNamespace(x) : there is no package called ‘tinytex’

> tinytex::install_tinytex()

Error in loadNamespace(x) : there is no package called ‘tinytex’

> install.packages(c("data.table","readxl","ggplot2","ggmosaic","readr","rmarkdown","tinytex"))

Warning in install.packages(c("data.table", "readxl", "ggplot2", "ggmosaic",  :

  'lib = "C:/Program Files/R/R-4.5.1/library"' is not writable

--- Please select a CRAN mirror for use in this session ---

Error in contrib.url(repos, "source") :

  trying to use CRAN without setting a mirror

> tinytex::install_tinytex()   # enables knitting to PDF (installs a lightweight LaTeX)

Error in loadNamespace(x) : there is no package called ‘tinytex’

> install.packages("pkgname")

Installing package into ‘C:/Users/christina/AppData/Local/R/win-library/4.5’

(as ‘lib’ is unspecified)

--- Please select a CRAN mirror for use in this session ---

Error in contrib.url(repos, "source") :

  trying to use CRAN without setting a mirror

> install.packages("pkgname")

Installing package into ‘C:/Users/christina/AppData/Local/R/win-library/4.5’

(as ‘lib’ is unspecified)

--- Please select a CRAN mirror for use in this session ---

Warning: unable to access index for repository https://lib.stat.cmu.edu/R/CRAN/src/contrib:

  cannot open URL 'https://lib.stat.cmu.edu/R/CRAN/src/contrib/PACKAGES'

Warning: unable to access index for repository
https://lib.stat.cmu.edu/R/CRAN/bin/windows/contrib/4.5:
```

cannot open URL 'https://lib.stat.cmu.edu/R/CRAN/bin/windows/contrib/4.5/PACKAGES'

Warning message:

package ‘pkgname’ is not available for this version of R

A version of this package for your version of R might be available elsewhere,

see the ideas at

https://cran.r-project.org/doc/manuals/r-patched/R-admin.html#Installing-packages

> install.packages(c("data.table","readxl","ggplot2","ggmosaic","readr","rmarkdown","tinytex"))

Installing packages into ‘C:/Users/christina/AppData/Local/R/win-library/4.5’

(as ‘lib’ is unspecified)

Warning: unable to access index for repository https://lib.stat.cmu.edu/R/CRAN/src/contrib:

cannot open URL 'https://lib.stat.cmu.edu/R/CRAN/src/contrib/PACKAGES'

Warning: unable to access index for repository
https://lib.stat.cmu.edu/R/CRAN/bin/windows/contrib/4.5:

cannot open URL 'https://lib.stat.cmu.edu/R/CRAN/bin/windows/contrib/4.5/PACKAGES'

Warning message:

packages ‘data.table’, ‘readxl’, ‘ggplot2’, ‘ggmosaic’, ‘readr’, ‘rmarkdown’, ‘tinytex’ are not available for this version of R

Versions of these packages for your version of R might be available elsewhere,

see the ideas at

https://cran.r-project.org/doc/manuals/r-patched/R-admin.html#Installing-packages

> options(repos = c(CRAN = "https://cloud.r-project.org"))

> install.packages(c("data.table","readxl","ggplot2","ggmosaic","readr","rmarkdown","tinytex"))

Installing packages into ‘C:/Users/christina/AppData/Local/R/win-library/4.5’

(as ‘lib’ is unspecified)

also installing the dependencies ‘sys’, ‘askpass’, ‘utf8’, ‘curl’, ‘openssl’, ‘later’, ‘stringi’, ‘bit’, ‘fs’, ‘rappdirs’, ‘rematch’, ‘magrittr’, ‘pillar’, ‘pkgconfig’, ‘prettyunits’, ‘farver’, ‘labeling’, ‘RColorBrewer’, ‘viridisLite’, ‘plyr’, ‘generics’, ‘tidyselect’, ‘httr’, ‘digest’, ‘base64enc’, ‘htmlwidgets’, ‘lazyeval’, ‘crosstalk’, ‘promises’, ‘stringr’, ‘Rcpp’, ‘bit64’, ‘cachem’, ‘fastmap’, ‘memoise’, ‘mime’, ‘sass’, ‘highr’, ‘cellranger’, ‘tibble’, ‘cpp11’, ‘progress’, ‘cli’, ‘glue’, ‘gtable’, ‘isoband’, ‘lifecycle’, ‘rlang’, ‘scales’, ‘vctrs’, ‘withr’, ‘productplots’, ‘dplyr’, ‘plotly’, ‘purrr’, ‘tidyr’, ‘ggrepel’, ‘clipr’, ‘crayon’, ‘hms’, ‘R6’, ‘vroom’, ‘tzdb’, ‘bslib’, ‘evaluate’, ‘fontawesome’, ‘htmltools’, ‘jquerylib’, ‘jsonlite’, ‘knitr’, ‘xfun’, ‘yaml’

There is a binary version available but the source version is later:

binary source needs_compilation

xfun 0.52 0.53 TRUE

Binaries will be installed

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/sys_3.4.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/askpass_1.2.1.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/utf8_1.2.6.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/curl_7.0.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/openssl_2.3.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/later_1.4.4.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/stringi_1.8.7.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/bit_4.6.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/fs_1.6.6.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/rappdirs_0.3.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/rematch_2.0.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/magrittr_2.0.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/pillar_1.11.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/pkgconfig_2.0.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/prettyunits_1.2.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/farver_2.1.2.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/labeling_0.4.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/RColorBrewer_1.1-3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/viridisLite_0.4.2.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/plyr_1.8.9.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/generics_0.1.4.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/tidyselect_1.2.1.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/httr_1.4.7.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/digest_0.6.37.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/base64enc_0.1-3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/htmlwidgets_1.6.4.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/lazyeval_0.2.2.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/crosstalk_1.2.2.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/promises_1.3.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/stringr_1.5.1.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/Rcpp_1.1.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/bit64_4.6.0-1.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/cachem_1.1.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/fastmap_1.2.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/memoise_2.0.1.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/mime_0.13.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/sass_0.4.10.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/highr_0.11.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/cellranger_1.1.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/tibble_3.3.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/cpp11_0.5.2.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/progress_1.2.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/cli_3.6.5.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/glue_1.8.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/gtable_0.3.6.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/isoband_0.2.7.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/lifecycle_1.0.4.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/rlang_1.1.6.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/scales_1.4.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/vctrs_0.6.5.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/withr_3.0.2.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/productplots_0.1.1.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/dplyr_1.1.4.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/plotly_4.11.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/purrr_1.1.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/tidyr_1.3.1.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/ggrepel_0.9.6.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/clipr_0.8.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/crayon_1.5.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/hms_1.1.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/R6_2.6.1.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/vroom_1.6.5.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/tzdb_0.5.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/bslib_0.9.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/evaluate_1.0.5.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/fontawesome_0.5.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/htmltools_0.5.8.1.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/jquerylib_0.1.4.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/jsonlite_2.0.0.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/knitr_1.50.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/xfun_0.52.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/yaml_2.3.10.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/data.table_1.17.8.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/readxl_1.4.5.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/ggplot2_3.5.2.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/ggmosaic_0.3.3.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/readr_2.1.5.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/rmarkdown_2.29.zip'

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.5/tinytex_0.57.zip'

package ‘sys’ successfully unpacked and MD5 sums checked

package ‘askpass’ successfully unpacked and MD5 sums checked

package ‘utf8’ successfully unpacked and MD5 sums checked

package ‘curl’ successfully unpacked and MD5 sums checked

package ‘openssl’ successfully unpacked and MD5 sums checked

package ‘later’ successfully unpacked and MD5 sums checked

package ‘stringi’ successfully unpacked and MD5 sums checked

package ‘bit’ successfully unpacked and MD5 sums checked

package ‘fs’ successfully unpacked and MD5 sums checked

package ‘rappdirs’ successfully unpacked and MD5 sums checked

package ‘rematch’ successfully unpacked and MD5 sums checked

package ‘magrittr’ successfully unpacked and MD5 sums checked

package ‘pillar’ successfully unpacked and MD5 sums checked

package ‘pkgconfig’ successfully unpacked and MD5 sums checked

package ‘prettyunits’ successfully unpacked and MD5 sums checked

package ‘farver’ successfully unpacked and MD5 sums checked

package ‘labeling’ successfully unpacked and MD5 sums checked

package ‘RColorBrewer’ successfully unpacked and MD5 sums checked

package ‘viridisLite’ successfully unpacked and MD5 sums checked

package ‘plyr’ successfully unpacked and MD5 sums checked

package ‘generics’ successfully unpacked and MD5 sums checked

package ‘tidyselect’ successfully unpacked and MD5 sums checked

package ‘httr’ successfully unpacked and MD5 sums checked

package ‘digest’ successfully unpacked and MD5 sums checked

package ‘base64enc’ successfully unpacked and MD5 sums checked

package ‘htmlwidgets’ successfully unpacked and MD5 sums checked

package ‘lazyeval’ successfully unpacked and MD5 sums checked

package ‘crosstalk’ successfully unpacked and MD5 sums checked

package ‘promises’ successfully unpacked and MD5 sums checked

package ‘stringr’ successfully unpacked and MD5 sums checked

package ‘Rcpp’ successfully unpacked and MD5 sums checked

package ‘bit64’ successfully unpacked and MD5 sums checked

package ‘cachem’ successfully unpacked and MD5 sums checked

package ‘fastmap’ successfully unpacked and MD5 sums checked

package ‘memoise’ successfully unpacked and MD5 sums checked

package ‘mime’ successfully unpacked and MD5 sums checked

package ‘sass’ successfully unpacked and MD5 sums checked

package ‘highr’ successfully unpacked and MD5 sums checked

package ‘cellranger’ successfully unpacked and MD5 sums checked

package ‘tibble’ successfully unpacked and MD5 sums checked

package ‘cpp11’ successfully unpacked and MD5 sums checked

package ‘progress’ successfully unpacked and MD5 sums checked

package ‘cli’ successfully unpacked and MD5 sums checked

package ‘glue’ successfully unpacked and MD5 sums checked

package ‘gtable’ successfully unpacked and MD5 sums checked

package ‘isoband’ successfully unpacked and MD5 sums checked

package ‘lifecycle’ successfully unpacked and MD5 sums checked

package ‘rlang’ successfully unpacked and MD5 sums checked

package ‘scales’ successfully unpacked and MD5 sums checked

package ‘vctrs’ successfully unpacked and MD5 sums checked

package ‘withr’ successfully unpacked and MD5 sums checked

package ‘productplots’ successfully unpacked and MD5 sums checked

package ‘dplyr’ successfully unpacked and MD5 sums checked

package ‘plotly’ successfully unpacked and MD5 sums checked

package ‘purrr’ successfully unpacked and MD5 sums checked

package ‘tidyr’ successfully unpacked and MD5 sums checked

package ‘ggrepel’ successfully unpacked and MD5 sums checked

package ‘clipr’ successfully unpacked and MD5 sums checked

package ‘crayon’ successfully unpacked and MD5 sums checked

package ‘hms’ successfully unpacked and MD5 sums checked

package ‘R6’ successfully unpacked and MD5 sums checked

package ‘vroom’ successfully unpacked and MD5 sums checked

package ‘tzdb’ successfully unpacked and MD5 sums checked

package ‘bslib’ successfully unpacked and MD5 sums checked

package ‘evaluate’ successfully unpacked and MD5 sums checked

package ‘fontawesome’ successfully unpacked and MD5 sums checked

package ‘htmltools’ successfully unpacked and MD5 sums checked

package ‘jquerylib’ successfully unpacked and MD5 sums checked

package ‘jsonlite’ successfully unpacked and MD5 sums checked

package ‘knitr’ successfully unpacked and MD5 sums checked

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package ‘xfun’ successfully unpacked and MD5 sums checked
package ‘yaml’ successfully unpacked and MD5 sums checked
package ‘data.table’ successfully unpacked and MD5 sums checked
package ‘readxl’ successfully unpacked and MD5 sums checked
package ‘ggplot2’ successfully unpacked and MD5 sums checked
package ‘ggmosaic’ successfully unpacked and MD5 sums checked
package ‘readr’ successfully unpacked and MD5 sums checked
package ‘rmarkdown’ successfully unpacked and MD5 sums checked
package ‘tinytex’ successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\christina\AppData\Local\Temp\RtmpYfZlZd\downloaded_packages
> library(data.table)
data.table 1.17.8 using 6 threads (see ?getDTthreads).  Latest news: r-datatable.com
> library(readxl)
> library(ggplot2)
> library(ggmosaic)
> library(readr)
>
> # set working directory (edit this path to where your Excel files are)
> setwd("C:/Users/christina/Documents/quantium")
Error in setwd("C:/Users/christina/Documents/quantium") :
  cannot change working directory
>
> # read in Excel files
> transactionData <- as.data.table(read_excel("QVI_transaction_data.xlsx", sheet = 1))
Error: `path` does not exist: ‘QVI_transaction_data.xlsx’
> customerData    <- as.data.table(read_excel("QVI_purchase_behaviour.xlsx", sheet = 1))
Error: `path` does not exist: ‘QVI_purchase_behaviour.xlsx’
>
> # check structure
```

```
> str(transactionData)
Error: object 'transactionData' not found
> str(customerData)
Error: object 'customerData' not found
> library(data.table)
> library(readxl)
> library(ggplot2)
> library(ggmosaic)
> library(readr)
>
> # set working directory (edit this path to where your Excel files are)
> setwd("C:\Users\christina\OneDrive\Desktop\RPROJECT")
Error: '\U' used without hex digits in character string (<input>:1:11)
>
> # read in Excel files
> transactionData <- as.data.table(read_excel("QVI_transaction_data.xlsx", sheet = 1))
Error: `path` does not exist: 'QVI_transaction_data.xlsx'
> customerData    <- as.data.table(read_excel("QVI_purchase_behaviour.xlsx", sheet = 1))
Error: `path` does not exist: 'QVI_purchase_behaviour.xlsx'
>
> # check structure
> str(transactionData)
Error: object 'transactionData' not found
> str(customerData)
Error: object 'customerData' not found
> library(data.table)
> library(readxl)
> library(ggplot2)
> library(ggmosaic)
> library(readr)
>
```

```
> # set working directory (edit this path to where your Excel files are)
> setwd("setwd("C:\\Users\\christina\\OneDrive\\Desktop\\RPROJECT")")
Error: unexpected symbol in "setwd("setwd("C"
>
> # read in Excel files
> transactionData <- as.data.table(read_excel("QVI_transaction_data.xlsx", sheet = 1))
Error: `path` does not exist: ‘QVI_transaction_data.xlsx’
> customerData    <- as.data.table(read_excel("QVI_purchase_behaviour.xlsx", sheet = 1))
Error: `path` does not exist: ‘QVI_purchase_behaviour.xlsx’
>
> # check structure
> str(transactionData)
Error: object 'transactionData' not found
> str(customerData)
Error: object 'customerData' not found
> library(data.table)
> library(readxl)
> library(ggplot2)
> library(ggmosaic)
> library(readr)
>
> # set working directory (edit this path to where your Excel files are)
> setwd("setwd("C:\Users\christina\OneDrive\Desktop\RPROJECT")")
Error: unexpected symbol in "setwd("setwd("C"
>
> # read in Excel files
> transactionData <- as.data.table(read_excel("QVI_transaction_data.xlsx", sheet = 1))
Error: `path` does not exist: ‘QVI_transaction_data.xlsx’
> customerData    <- as.data.table(read_excel("QVI_purchase_behaviour.xlsx", sheet = 1))
Error: `path` does not exist: ‘QVI_purchase_behaviour.xlsx’
>
```

```
> # check structure
> str(transactionData)
Error: object 'transactionData' not found
> str(customerData)
Error: object 'customerData' not found
> library(data.table)
> library(readxl)
> library(ggplot2)
> library(ggmosaic)
> library(readr)
>
> # set working directory (edit this path to where your Excel files are)
> setwd("C:\Users\christina\OneDrive\Desktop\RPROJECT")
Error: '\U' used without hex digits in character string (<input>:1:11)
>
> # read in Excel files
> transactionData <- as.data.table(read_excel("QVI_transaction_data.xlsx", sheet = 1))
Error: `path` does not exist: 'QVI_transaction_data.xlsx'
> customerData    <- as.data.table(read_excel("QVI_purchase_behaviour.xlsx", sheet = 1))
Error: `path` does not exist: 'QVI_purchase_behaviour.xlsx'
>
> # check structure
> str(transactionData)
Error: object 'transactionData' not found
> str(customerData)
Error: object 'customerData' not found
> library(data.table)
> library(readxl)
> library(ggplot2)
> library(ggmosaic)
> library(readr)
```

```
>
> # set working directory (edit this path to where your Excel files are)
> setwd("C:\\Users\\christina\\OneDrive\\Desktop\\RPROJECT")
>
> # read in Excel files
> transactionData <- as.data.table(read_excel("QVI_transaction_data.xlsx", sheet = 1))


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> customerData    <- as.data.table(read_excel("QVI_purchase_behaviour.xlsx", sheet = 1))
```

```
Error: `path` does not exist: 'QVI_purchase_behaviour.xlsx'
>
> # check structure
> str(transactionData)
Classes 'data.table' and 'data.frame':  264836 obs. of  8 variables:
 $ DATE         : num  43390 43599 43605 43329 43330 ...
 $ STORE_NBR    : num  1 1 1 2 2 4 4 4 5 7 ...
 $ LYLTY_CARD_NBR: num  1000 1307 1343 2373 2426 ...
 $ TXN_ID       : num  1 348 383 974 1038 ...
 $ PROD_NBR     : num  5 66 61 69 108 57 16 24 42 52 ...
 $ PROD_NAME    : chr  "Natural Chip        Compny SeaSalt175g" "CCs Nacho Cheese    175g" "Smiths Crinkle Cut  Chips Chicken 170g" "Smiths Chip Thinly  S/Cream&Onion 175g" ...
 $ PROD_QTY     : num  2 3 2 5 3 1 1 1 1 2 ...
 $ TOT_SALES    : num  6 6.3 2.9 15 13.8 5.1 5.7 3.6 3.9 7.2 ...
 - attr(*, ".internal.selfref")=<externalptr>
> str(customerData)transactionData[, DATE := as.Date(DATE, origin = "1899-12-30")]
Error: unexpected symbol in "str(customerData)transactionData"
> transactionData[, PACK_SIZE := as.numeric(gsub("\\D", "", PROD_NAME))]
> transactionData[, DATE := as.Date(DATE, origin = "1899-12-30")]
>
> transactionData[, PACK_SIZE := as.numeric(gsub("\\D", "", PROD_NAME))]
> transactionData <- transactionData[!grepl("Salsa", PROD_NAME, ignore.case = TRUE)]
> summary(transactionData)
      DATE             STORE_NBR     LYLTY_CARD_NBR       TXN_ID
 Min.   :2018-07-01   Min.   :  1.0   Min.   :   1000   Min.   :     1
 1st Qu.:2018-09-30   1st Qu.: 70.0   1st Qu.:  70015   1st Qu.:  67569
 Median :2018-12-30   Median :130.0   Median : 130367   Median : 135183
 Mean   :2018-12-30   Mean   :135.1   Mean   : 135531   Mean   : 135131
 3rd Qu.:2019-03-31   3rd Qu.:203.0   3rd Qu.: 203084   3rd Qu.: 202654
 Max.   :2019-06-30   Max.   :272.0   Max.   :2373711   Max.   :2415841
    PROD_NBR       PROD_NAME           PROD_QTY        TOT_SALES
```

```
 Min.   :  1.00   Length:246742      Min.   :  1.000   Min.   :  1.700
 1st Qu.: 26.00   Class :character   1st Qu.:  2.000   1st Qu.:  5.800
 Median : 53.00   Mode  :character   Median :  2.000   Median :  7.400
 Mean   : 56.35                      Mean   :  1.908   Mean   :  7.321
 3rd Qu.: 87.00                      3rd Qu.:  2.000   3rd Qu.:  8.800
 Max.   :114.00                      Max.   :200.000   Max.   :650.000
   PACK_SIZE
 Min.   : 70.0
 1st Qu.:150.0
 Median :170.0
 Mean   :175.6
 3rd Qu.:175.0
 Max.   :380.0
> head(transactionData)data_merged <- merge(transactionData, customerData,
Error: unexpected symbol in "head(transactionData)data_merged"
>                   by = "LYLTY_CARD_NBR",
Error: unexpected ',' in "                  by = "LYLTY_CARD_NBR","
>                   all.x = TRUE)
Error: unexpected ')' in "                  all.x = TRUE)"
>
> # check result
> str(data_merged)
Error: object 'data_merged' not found
> head(data_merged)
Error: object 'data_merged' not found
> # 1) peek at the transaction data
> head(transactionData)
        DATE STORE_NBR LYLTY_CARD_NBR TXN_ID PROD_NBR
      <Date>    <num>          <num>  <num>    <num>
1: 2018-10-17        1           1000      1        5
2: 2019-05-14        1           1307    348       66
```

```
3: 2019-05-20       1         1343    383      61
4: 2018-08-17       2         2373    974      69
5: 2018-08-18       2         2426   1038     108
6: 2019-05-16       4         4149   3333      16
                        PROD_NAME PROD_QTY TOT_SALES PACK_SIZE
                          <char>    <num>     <num>     <num>
1:   Natural Chip       Compny SeaSalt175g       2       6.0       175
2:              CCs Nacho Cheese    175g       3       6.3       175
3:   Smiths Crinkle Cut  Chips Chicken 170g       2       2.9       170
4:   Smiths Chip Thinly  S/Cream&Onion 175g       5      15.0       175
5: Kettle Tortilla ChpsHny&Jlpno Chili 150g       3      13.8       150
6: Smiths Crinkle Chips Salt & Vinegar 330g       1       5.7       330
>
> # 2) merge with customer data
> data_merged <- merge(transactionData, customerData,
+                  by = "LYLTY_CARD_NBR",
+                  all.x = TRUE)
Error: object 'customerData' not found
>
> # 3) check result
> str(data_merged)
Error: object 'data_merged' not found
> head(data_merged)
Error: object 'data_merged' not found
> library(data.table)
> library(readxl)
>
> # set working directory (change if needed)
> setwd("C:/Users/christina/OneDrive/Desktop/RPROJECT")
>
> # load the transaction and customer files
```

```
> transactionData <- as.data.table(read_excel("QVI_transaction_data.xlsx", sheet = 1))


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> customerData    <- as.data.table(read_excel("QVI_purchase_behaviour.xlsx", sheet = 1))
Error: `path` does not exist: 'QVI_purchase_behaviour.xlsx'
>
> # confirm they loaded
> head(transactionData)
   DATE STORE_NBR LYLTY_CARD_NBR TXN_ID PROD_NBR
```

```
  <num>    <num>       <num>  <num>    <num>
1: 43390       1        1000      1       5
2: 43599       1        1307    348      66
3: 43605       1        1343    383      61
4: 43329       2        2373    974      69
5: 43330       2        2426   1038     108
6: 43604       4        4074   2982      57
                        PROD_NAME PROD_QTY TOT_SALES
                          <char>    <num>    <num>
1:   Natural Chip       Compny SeaSalt175g       2       6.0
2:             CCs Nacho Cheese    175g       3       6.3
3:   Smiths Crinkle Cut  Chips Chicken 170g       2       2.9
4:   Smiths Chip Thinly  S/Cream&Onion 175g       5      15.0
5: Kettle Tortilla ChpsHny&Jlpno Chili 150g       3      13.8
6: Old El Paso Salsa   Dip Tomato Mild 300g       1       5.1
> head(customerData)
Error: object 'customerData' not found
> data_merged <- merge(transactionData, customerData,
+                  by = "LYLTY_CARD_NBR",
+                  all.x = TRUE)
Error: object 'customerData' not found
>
> # check result
> str(data_merged)
Error: object 'data_merged' not found
> head(data_merged)
Error: object 'data_merged' not found
> # Load necessary libraries
> library(data.table)
> library(readxl)
>
```

```
> # Set your working directory (adjust the path if needed)
> setwd("C:/Users/christina/OneDrive/Desktop/RPROJECT")
>
> # Load transaction data
> transactionData <- as.data.table(read_excel("QVI_transaction_data.xlsx", sheet = 1))


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```
>
> # Load customer data
> customerData <- as.data.table(read_excel("QVI_purchase_behaviour.xlsx", sheet = 1))
Error: `path` does not exist: 'QVI_purchase_behaviour.xlsx'
>
> # Quick check
> head(transactionData)
    DATE STORE_NBR LYLTY_CARD_NBR TXN_ID PROD_NBR
   <num>    <num>        <num>  <num>    <num>
1: 43390        1         1000      1       5
2: 43599        1         1307    348      66
3: 43605        1         1343    383      61
4: 43329        2         2373    974      69
5: 43330        2         2426   1038     108
6: 43604        4         4074   2982      57
                          PROD_NAME PROD_QTY TOT_SALES
                             <char>    <num>     <num>
1:   Natural Chip       Compny SeaSalt175g        2       6.0
2:             CCs Nacho Cheese    175g        3       6.3
3:   Smiths Crinkle Cut  Chips Chicken 170g        2       2.9
4:   Smiths Chip Thinly  S/Cream&Onion 175g        5      15.0
5: Kettle Tortilla ChpsHny&Jlpno Chili 150g        3      13.8
6: Old El Paso Salsa   Dip Tomato Mild 300g        1       5.1
> head(customerData)
Error: object 'customerData' not found
>
> # Merge datasets
> data_merged <- merge(transactionData, customerData,
+                  by = "LYLTY_CARD_NBR",
+                  all.x = TRUE)
Error: object 'customerData' not found
```

```
>

> # Check merged result

> str(data_merged)

Error: object 'data_merged' not found

> head(data_merged)

Error: object 'data_merged' not found

> setwd("C:/Users/christina/OneDrive/Desktop/RPROJECT")

> list.files()

[1] "QVI_purchase_behaviour.csv" "QVI_transaction_data.xlsx"

> library(data.table)

> library(readxl)

>

> transactionData <-
as.data.table(read_excel("C:/Users/christina/OneDrive/Desktop/RPROJECT/QVI_transaction_data.xls
x"))


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```
> head(transactionData)
   DATE STORE_NBR LYLTY_CARD_NBR TXN_ID PROD_NBR
  <num>    <num>        <num>  <num>    <num>
1: 43390        1         1000      1       5
2: 43599        1         1307    348      66
3: 43605        1         1343    383      61
4: 43329        2         2373    974      69
5: 43330        2         2426   1038     108
6: 43604        4         4074   2982      57
                        PROD_NAME PROD_QTY TOT_SALES
                           <char>    <num>     <num>
1:   Natural Chip       Compny SeaSalt175g        2       6.0
2:             CCs Nacho Cheese    175g        3       6.3
3:   Smiths Crinkle Cut  Chips Chicken 170g        2       2.9
4:   Smiths Chip Thinly  S/Cream&Onion 175g        5      15.0
5: Kettle Tortilla ChpsHny&Jlpno Chili 150g        3      13.8
6: Old El Paso Salsa   Dip Tomato Mild 300g        1       5.1
>
> customerData <-
fread("C:/Users/christina/OneDrive/Desktop/RPROJECT/QVI_purchase_behaviour.csv")
> head(customerData)
  LYLTY_CARD_NBR            LIFESTAGE PREMIUM_CUSTOMER
          <int>               <char>          <char>
```

```
1:          1000  YOUNG SINGLES/COUPLES         Premium
2:          1002  YOUNG SINGLES/COUPLES       Mainstream
3:          1003        YOUNG FAMILIES          Budget
4:          1004  OLDER SINGLES/COUPLES       Mainstream
5:          1005 MIDAGE SINGLES/COUPLES       Mainstream
6:          1007  YOUNG SINGLES/COUPLES         Budget
> data_merged <- merge(transactionData, customerData,
+                  by = "LYLTY_CARD_NBR",
+                  all.x = TRUE)
>
> str(data_merged)
Classes ‘data.table’ and 'data.frame':  264836 obs. of  10 variables:
 $ LYLTY_CARD_NBR  : int  1000 1002 1003 1003 1004 1005 1007 1007 1009 1010 ...
 $ DATE            : num  43390 43359 43531 43532 43406 ...
 $ STORE_NBR       : num  1 1 1 1 1 1 1 1 1 1 ...
 $ TXN_ID          : num  1 2 3 4 5 6 7 8 9 10 ...
 $ PROD_NBR        : num  5 58 52 106 96 86 49 10 20 51 ...
 $ PROD_NAME       : chr  "Natural Chip        Compny SeaSalt175g" "Red Rock Deli Chikn&Garlic Aioli
150g" "Grain Waves Sour    Cream&Chives 210G" "Natural ChipCo      Hony Soy Chckn175g" ...
 $ PROD_QTY        : num  2 1 1 1 1 1 1 1 2 ...
 $ TOT_SALES       : num  6 2.7 3.6 3 1.9 2.8 3.8 2.7 5.7 8.8 ...
 $ LIFESTAGE       : chr  "YOUNG SINGLES/COUPLES" "YOUNG SINGLES/COUPLES" "YOUNG FAMILIES"
"YOUNG FAMILIES" ...
 $ PREMIUM_CUSTOMER: chr  "Premium" "Mainstream" "Budget" "Budget" ...
 - attr(*, ".internal.selfref")=<externalptr>
 - attr(*, "sorted")= chr "LYLTY_CARD_NBR"
> head(data_merged)
Key: <LYLTY_CARD_NBR>
   LYLTY_CARD_NBR  DATE STORE_NBR TXN_ID PROD_NBR
            <int> <num>     <num>  <num>    <num>
1:          1000 43390         1      1        5
2:          1002 43359         1      2       58
```

```
3:         1003 43531       1     3      52
4:         1003 43532       1     4     106
5:         1004 43406       1     5      96
6:         1005 43462       1     6      86
                        PROD_NAME PROD_QTY TOT_SALES
                          <char>   <num>    <num>
1: Natural Chip       Compny SeaSalt175g       2      6.0
2:  Red Rock Deli Chikn&Garlic Aioli 150g       1      2.7
3:  Grain Waves Sour    Cream&Chives 210G       1      3.6
4: Natural ChipCo      Hony Soy Chckn175g       1      3.0
5:        WW Original Stacked Chips 160g       1      1.9
6:                 Cheetos Puffs 165g       1      2.8
             LIFESTAGE PREMIUM_CUSTOMER
               <char>         <char>
1:  YOUNG SINGLES/COUPLES        Premium
2:  YOUNG SINGLES/COUPLES      Mainstream
3:        YOUNG FAMILIES         Budget
4:        YOUNG FAMILIES         Budget
5:  OLDER SINGLES/COUPLES      Mainstream
6: MIDAGE SINGLES/COUPLES      Mainstream
> # Check summary statistics
> summary(data_merged)
 LYLTY_CARD_NBR        DATE        STORE_NBR        TXN_ID
 Min.   :   1000   Min.   :43282   Min.   :  1.0   Min.   :     1
 1st Qu.:  70021   1st Qu.:43373   1st Qu.: 70.0   1st Qu.:  67602
 Median : 130358   Median :43464   Median :130.0   Median : 135138
 Mean   : 135549   Mean   :43464   Mean   :135.1   Mean   : 135158
 3rd Qu.: 203094   3rd Qu.:43555   3rd Qu.:203.0   3rd Qu.: 202701
 Max.   :2373711   Max.   :43646   Max.   :272.0   Max.   :2415841
   PROD_NBR      PROD_NAME          PROD_QTY        TOT_SALES
 Min.   :  1.00   Length:264836      Min.   :  1.000   Min.   :  1.500
```

```
1st Qu.: 28.00   Class :character   1st Qu.:  2.000   1st Qu.:  5.400
Median : 56.00   Mode  :character   Median :  2.000   Median :  7.400
Mean   : 56.58                      Mean   :  1.907   Mean   :  7.304
3rd Qu.: 85.00                      3rd Qu.:  2.000   3rd Qu.:  9.200
Max.   :114.00                      Max.   :200.000   Max.   :650.000
 LIFESTAGE         PREMIUM_CUSTOMER
Length:264836      Length:264836
Class :character   Class :character
Mode  :character   Mode  :character



>
> # Quick peek at first few rows
> head(data_merged)
Key: <LYLTY_CARD_NBR>
   LYLTY_CARD_NBR  DATE STORE_NBR TXN_ID PROD_NBR
           <int> <num>     <num>  <num>    <num>
1:           1000 43390         1      1        5
2:           1002 43359         1      2       58
3:           1003 43531         1      3       52
4:           1003 43532         1      4      106
5:           1004 43406         1      5       96
6:           1005 43462         1      6       86
                        PROD_NAME PROD_QTY TOT_SALES
                           <char>    <num>     <num>
1: Natural Chip        Compny SeaSalt175g        2       6.0
2:  Red Rock Deli Chikn&Garlic Aioli 150g        1       2.7
3:  Grain Waves Sour    Cream&Chives 210G        1       3.6
4: Natural ChipCo      Hony Soy Chckn175g        1       3.0
5:         WW Original Stacked Chips 160g        1       1.9
```

```
6:                 Cheetos Puffs 165g       1      2.8
            LIFESTAGE PREMIUM_CUSTOMER
              <char>         <char>
1:  YOUNG SINGLES/COUPLES         Premium
2:  YOUNG SINGLES/COUPLES      Mainstream
3:        YOUNG FAMILIES         Budget
4:        YOUNG FAMILIES         Budget
5:  OLDER SINGLES/COUPLES      Mainstream
6: MIDAGE SINGLES/COUPLES      Mainstream
>
> # Check for missing values
> colSums(is.na(data_merged))
 LYLTY_CARD_NBR           DATE      STORE_NBR         TXN_ID
              0              0              0              0
      PROD_NBR      PROD_NAME       PROD_QTY      TOT_SALES
              0              0              0              0
     LIFESTAGE PREMIUM_CUSTOMER
              0              0
> data_merged <- data_merged[!grepl("salsa", PROD_NAME, ignore.case = TRUE)]
> if(is.numeric(data_merged$DATE)) {
+   data_merged[, DATE := as.Date(DATE, origin = "1899-12-30")]
+ }
> library(readr)  # for parse_number if needed
> data_merged[, PACK_SIZE := parse_number(PROD_NAME)]
> data_merged[, BRAND := tstrsplit(PROD_NAME, " ")[[1]]]
>
> # Optional: clean brand names if needed
> data_merged[BRAND == "RED", BRAND := "RRD"]
> library(ggplot2)
> ggplot(data_merged, aes(x = DATE)) +
+   geom_histogram(binwidth = 7, fill = "steelblue", color = "white") +
```

```
+   labs(title = "Transactions over Time", x = "Date", y = "Number of Transactions")
> ggplot(data_merged, aes(x = reorder(BRAND, BRAND, length))) +
+   geom_bar(fill = "orange") +
+   coord_flip() +
+   labs(title = "Transactions by Brand", x = "Brand", y = "Count")
> library(dplyr)

Attaching package: ‘dplyr’

The following objects are masked from ‘package:data.table’:

    between, first, last

The following objects are masked from ‘package:stats’:

    filter, lag

The following objects are masked from ‘package:base’:

    intersect, setdiff, setequal, union

>
> avg_spend <- data_merged %>%
+   group_by(LIFESTAGE, PREMIUM_CUSTOMER) %>%
+   summarise(Average_Spend = mean(TOT_SALES, na.rm = TRUE))
`summarise()` has grouped output by 'LIFESTAGE'. You can override using the
`.groups` argument.
>
> print(avg_spend)
# A tibble: 21 × 3
# Groups:   LIFESTAGE [7]
```

```
  LIFESTAGE            PREMIUM_CUSTOMER Average_Spend
  <chr>                <chr>                <dbl>
 1 MIDAGE SINGLES/COUPLES Budget                7.11
 2 MIDAGE SINGLES/COUPLES Mainstream            7.64
 3 MIDAGE SINGLES/COUPLES Premium               7.15
 4 NEW FAMILIES           Budget                7.30
 5 NEW FAMILIES           Mainstream            7.31
 6 NEW FAMILIES           Premium               7.23
 7 OLDER FAMILIES         Budget                7.29
 8 OLDER FAMILIES         Mainstream            7.28
 9 OLDER FAMILIES         Premium               7.36
10 OLDER SINGLES/COUPLES  Budget                7.44
# ℹ 11 more rows
# ℹ Use `print(n = ...)` to see more rows
> total_sales <- data_merged %>%
+   group_by(LIFESTAGE, PREMIUM_CUSTOMER) %>%
+   summarise(Total_Sales = sum(TOT_SALES, na.rm = TRUE))
`summarise()` has grouped output by 'LIFESTAGE'. You can override using the
`.groups` argument.
>
> # Plot total sales by segment
> ggplot(total_sales, aes(x = LIFESTAGE, y = Total_Sales, fill = PREMIUM_CUSTOMER)) +
+   geom_bar(stat = "identity", position = "dodge") +
+   labs(title = "Total Chip Sales by Customer Segment", x = "Lifestage", y = "Total Sales") +
+   theme(axis.text.x = element_text(angle = 45, hjust = 1))
> units_per_customer <- data_merged %>%
+   group_by(LIFESTAGE, PREMIUM_CUSTOMER, LYLTY_CARD_NBR) %>%
+   summarise(Total_Units = sum(PROD_QTY, na.rm = TRUE)) %>%
+   group_by(LIFESTAGE, PREMIUM_CUSTOMER) %>%
+   summarise(Avg_Units_Per_Customer = mean(Total_Units))
`summarise()` has grouped output by 'LIFESTAGE', 'PREMIUM_CUSTOMER'. You can
```

```
override using the `.groups` argument.
`summarise()` has grouped output by 'LIFESTAGE'. You can override using the
`.groups` argument.
>
> # Plot
> ggplot(units_per_customer, aes(x = LIFESTAGE, y = Avg_Units_Per_Customer, fill =
PREMIUM_CUSTOMER)) +
+   geom_bar(stat = "identity", position = "dodge") +
+   labs(title = "Average Units per Customer by Segment", x = "Lifestage", y = "Avg Units") +
+   theme(axis.text.x = element_text(angle = 45, hjust = 1))
> price_per_unit <- data_merged %>%
+   group_by(LIFESTAGE, PREMIUM_CUSTOMER, LYLTY_CARD_NBR) %>%
+   summarise(Avg_Price = sum(TOT_SALES, na.rm = TRUE)/sum(PROD_QTY, na.rm = TRUE)) %>%
+   group_by(LIFESTAGE, PREMIUM_CUSTOMER) %>%
+   summarise(Avg_Price_Per_Unit = mean(Avg_Price))
`summarise()` has grouped output by 'LIFESTAGE', 'PREMIUM_CUSTOMER'. You can
override using the `.groups` argument.
`summarise()` has grouped output by 'LIFESTAGE'. You can override using the
`.groups` argument.
>
> # Plot
> ggplot(price_per_unit, aes(x = LIFESTAGE, y = Avg_Price_Per_Unit, fill = PREMIUM_CUSTOMER)) +
+   geom_bar(stat = "identity", position = "dodge") +
+   labs(title = "Average Price per Unit by Segment", x = "Lifestage", y = "Avg Price per Unit") +
+   theme(axis.text.x = element_text(angle = 45, hjust = 1))
> segment_data <- data_merged[LIFESTAGE == "YOUNG SINGLES/COUPLES" &
PREMIUM_CUSTOMER == "Mainstream"]
>
> # Preferred brands
> brand_pref <- segment_data %>%
+   group_by(BRAND) %>%
+   summarise(Count = n()) %>%
```

```
+   arrange(desc(Count))
>
> ggplot(brand_pref[1:10,], aes(x = reorder(BRAND, Count), y = Count)) +
+   geom_bar(stat = "identity", fill = "purple") +
+   coord_flip() +
+   labs(title = "Top Brands for Mainstream Young Singles/Couples", x = "Brand", y = "Transactions")
>
> # Preferred pack sizes
> pack_pref <- segment_data %>%
+   group_by(PACK_SIZE) %>%
+   summarise(Count = n()) %>%
+   arrange(desc(Count))
>
> ggplot(pack_pref, aes(x = factor(PACK_SIZE), y = Count)) +
+   geom_bar(stat = "identity", fill = "green") +
+   labs(title = "Preferred Pack Sizes for Mainstream Young Singles/Couples", x = "Pack Size (g)", y =
"Count")
> save.image("C:\\Users\\christina\\OneDrive\\Desktop\\RPROJECT\\Data preparation and customer
analytics")
>
```