



R Packages: Write R Code



Writing Functions: Review

Writing functions

```
add_one <- function(x) {  
  x <- x + 1  
  x  
}
```

```
add_one(1)  
#> 2
```



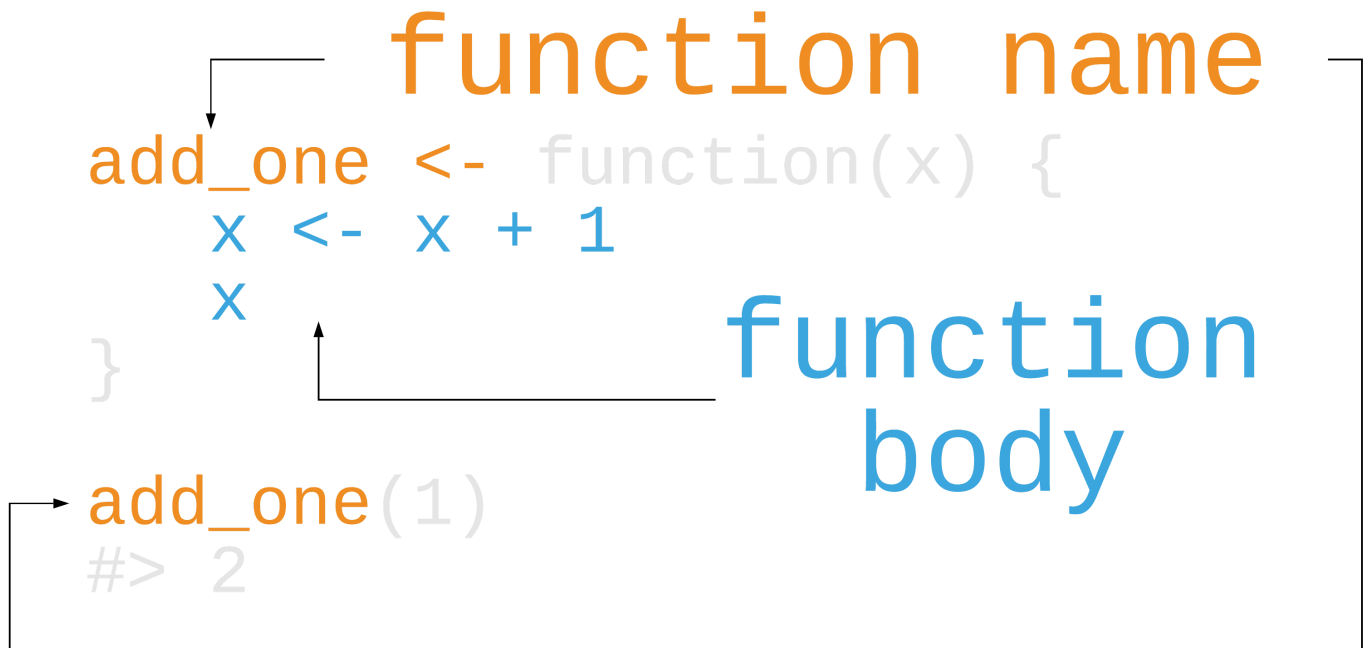
Function arguments

```
add_one <- function(x) {  
  x <- x + 1  
  x  
}
```

```
add_one(1)  
#> 2
```

Create function





```
add_one <- function(x) {  
  x <- x + 1  
  x  
}  
add_one(1)  
#> 2
```

output

input

```
graph LR
    input --> x_param[x]
    x_param --> x_body[x]
    x_body --> output[2]
```



Your Turn 1

Re-write this ggplot2 theme as a function. Call it `theme_avalanche_h()`.

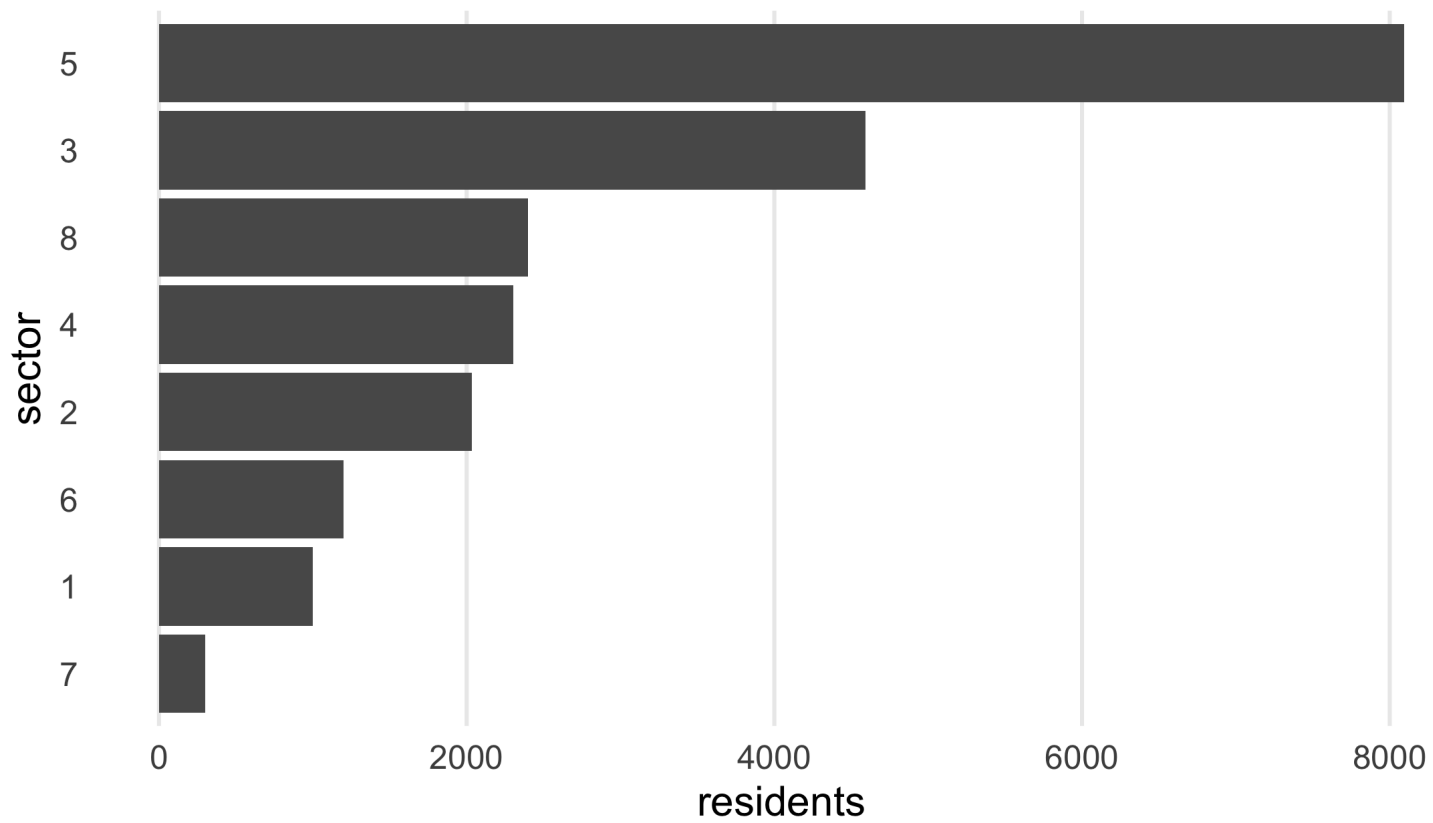
Run this code to test that your function works



Your Turn 1

```
theme_avalanche_h <- function() {  
  theme_minimal(base_size = 14) +  
    theme(panel.grid.minor = element_blank(), panel.grid.major.y = element_blank())  
}  
  
residents_per_sector <-  
  data.frame(  
    sector = as.factor(1:8),  
    residents = c(1000, 2034, 4594, 2304, 8093, 1200, 300, 2398)  
  )  
  
ggplot(residents_per_sector, aes(forcats::fct_reorder(sector, residents), residents)) +  
  geom_col() +  
  coord_flip() +  
  xlab("sector") +  
  theme_avalanche_h()
```







**We're going to start writing
functions to our package,
not the global environment.
This will require a change in
workflow!**

```
use_r("file_name")
```

Write a new file to R/





```
use_r("themes")
```

```
shinRa
├── .Rbuildignore
├── .gitignore
├── DESCRIPTION
├── NAMESPACE
├── R/
│   └── themes.R
└── shinRa.Rproj
```



 workflow alert

 `source()`

 `load_all()`
`build()`



devtools: loading vs. building

`load_all()`: fast, all functions
available

`build()`: builds and installs the
package



Keyboard shortcuts

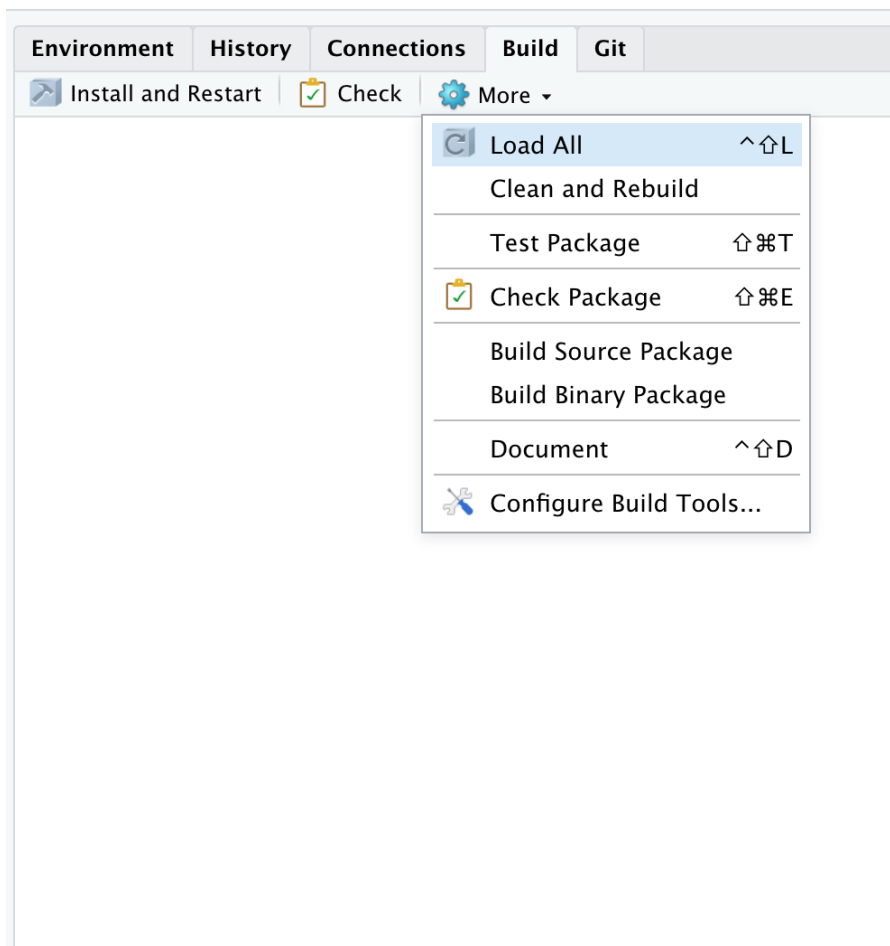
`load_all():`

CMD/CTRL + Shift + L

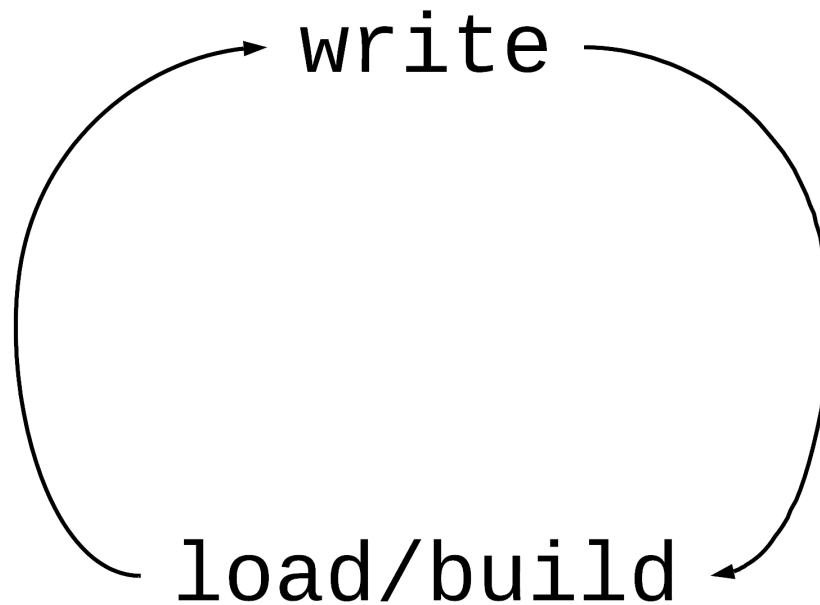
`build():`

CMD/CTRL + Shift + B





Our new workflow



Your Turn 2

Create a new file with `use_r()` called "db_con"

Put this function in the file and save it

Use `load_all()` to load the package function.

Run this code to make sure it works:



Your Turn 2

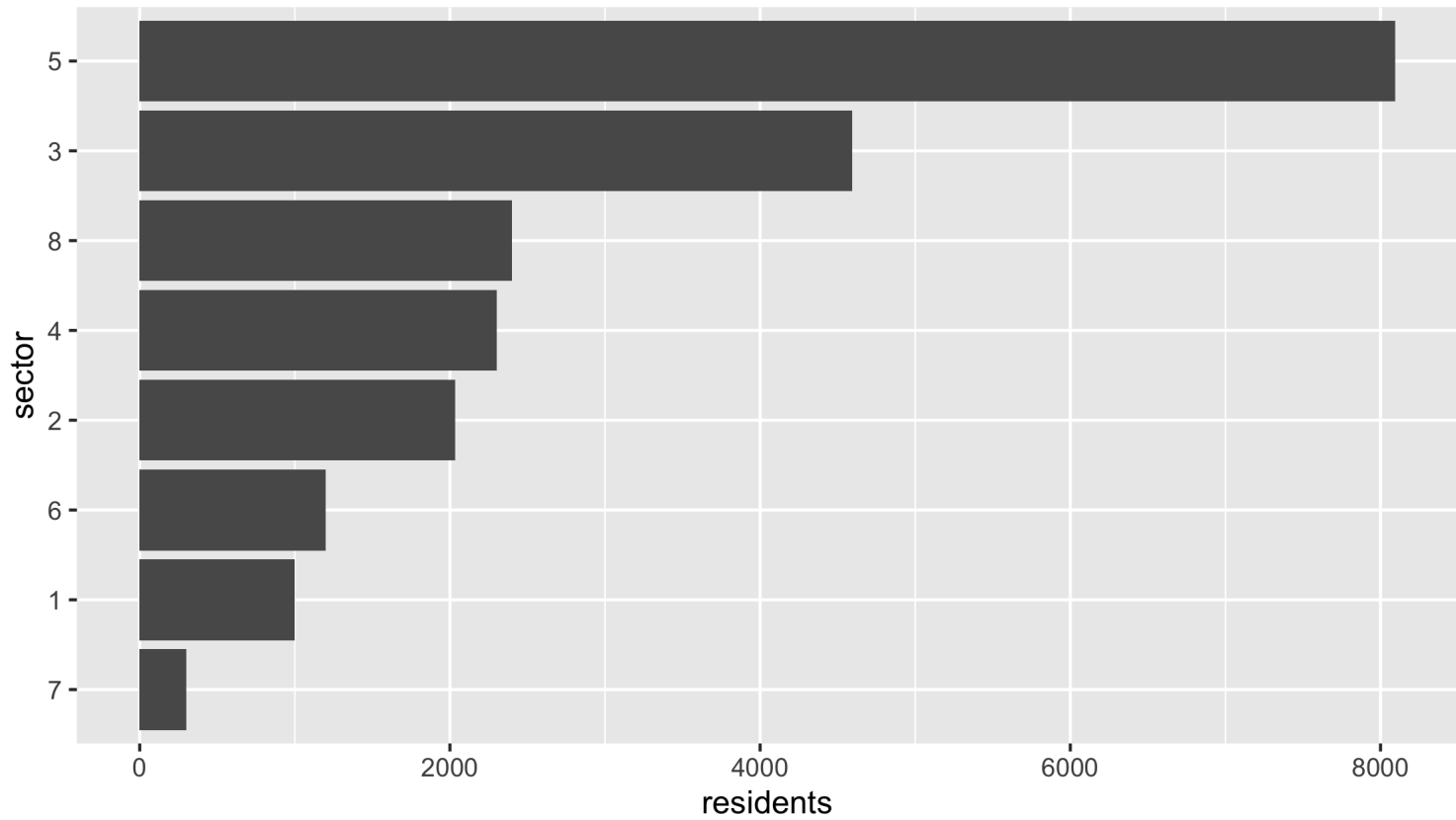
```
use_r("db_con")
```

in R/db_con.R:

```
db_con <- function(dbname = "residents_per_sector") {  
  dbname <- match.arg(dbname)  
  # We'll pretend we've connected to a database  
  # and just return some hard-coded data instead.  
  data.frame(  
    sector = as.factor(1:8),  
    residents = c(1000, 2034, 4594, 2304, 8093, 1200, 300, 2398)  
  )  
}
```



Your Turn 2





Using other packages

1. Import a package with

```
use_package()
```

2. Use the package with `pkg::fun()`

3. **DO NOT** use `library()`. Avoid it completely while developing.



workflow alert



`library()`



`use_package()`
`pkg::fun()`



```
use_package("ggplot2")
```

```
shinRa
├── .Rbuildignore
├── .gitignore
├── DESCRIPTION
├── NAMESPACE
├── R/
│   └── themes.R
└── shinRa.Rproj
```



```
use_package("ggplot2")
Package: shinRa
Title: What the Package Does (One Line, Title
      Case)
Version: 0.0.0.9000
Authors@R:
  person(given = "Malcolm",
          family = "Barrett",
          role = c("aut", "cre"),
          email = "malcolmbarrett@gmail.com")
Description: What the package does (one
            paragraph).
License: MIT + file LICENSE
Encoding: UTF-8
LazyData: true
Roxygen: list(markdown = TRUE)
Imports:
  ggplot2
```




```
use_package("ggplot2", min_version = TRUE)
Package: shinRa
Title: What the Package Does (One Line, Title
      Case)
Version: 0.0.0.9000
Authors@R:
  person(given = "Malcolm",
         family = "Barrett",
         role = c("aut", "cre"),
         email = "malcolmbarrett@gmail.com")
Description: What the package does (one
            paragraph).
License: MIT + file LICENSE
Encoding: UTF-8
LazyData: true
Roxygen: list(markdown = TRUE)
Imports:
  ggplot2 (>= 3.3.0)
```



```
use_dev_package("ggplot2")
Package: shinRa
Title: What the Package Does (One Line, Title
      Case)
Version: 0.0.0.9000
Authors@R:
  person(given = "Malcolm",
         family = "Barrett",
         role = c("aut", "cre"),
         email = "malcolmbarrett@gmail.com")
Description: What the package does (one
            paragraph).
License: MIT + file LICENSE
Encoding: UTF-8
LazyData: true
Roxygen: list(markdown = TRUE)
Imports:
  ggplot2 (>= 3.3.0.9000)
Remotes:
  tidyverse/ggplot2
```



```
use_package("shiny", type = "Suggests")
Package: shinRa
Title: What the Package Does (One Line, Title
      Case)
Version: 0.0.0.9000
Authors@R:
  person(given = "Malcolm",
         family = "Barrett",
         role = c("aut", "cre"),
         email = "malcolmbarrett@gmail.com")
Description: What the package does (one
  paragraph).
License: MIT + file LICENSE
Encoding: UTF-8
LazyData: true
Roxygen: list(markdown = TRUE)
Imports:
  ggplot2
Suggests:
  shiny
```



Testing for suggested packages

```
if (requireNamespace("shiny", quietly = TRUE)) {  
  # ... shiny code  
}
```

or `use_package("rlang")`

```
# offers to install if not already installed  
rlang::check_installed("shiny")  
# ... shiny code
```



```
use_package("R", "Depends", min_version = "3.2.0")
Package: shinRa
Title: What the Package Does (One Line, Title
      Case)
Version: 0.0.0.9000
Authors@R:
  person(given = "Malcolm",
          family = "Barrett",
          role = c("aut", "cre"),
          email = "malcolmbarrett@gmail.com")
Description: What the package does (one
  paragraph).
License: MIT + file LICENSE
Encoding: UTF-8
LazyData: true
Roxygen: list(markdown = TRUE)
Imports:
  ggplot2
Suggests:
  shiny
Depends:
  R (>= 3.2.0)
```



```
use_tidy_description()  
Package: shinRa  
Title: What the Package Does (One Line, Title  
      Case)  
Version: 0.0.0.9000  
Authors@R:  
  person(given = "Malcolm",  
          family = "Barrett",  
          role = c("aut", "cre"),  
          email = "malcolmbarrett@gmail.com")  
Description: What the package does (one  
            paragraph).  
License: MIT + file LICENSE  
Depends:  
  R (>= 3.2.0)  
Imports:  
  ggplot2  
Suggests:  
  shiny  
Encoding: UTF-8  
LazyData: true  
Roxygen: list(markdown = TRUE)
```



Your Turn 3

Fix the code in `R/themes.R` to use `ggplot2::` instead of `library(ggplot2)`

Run `use_package("ggplot")` to add `ggplot2` to Imports

Re-load the package (`Cmd/Ctrl+Shift+L`) and run this code to make sure it works



Your Turn 3

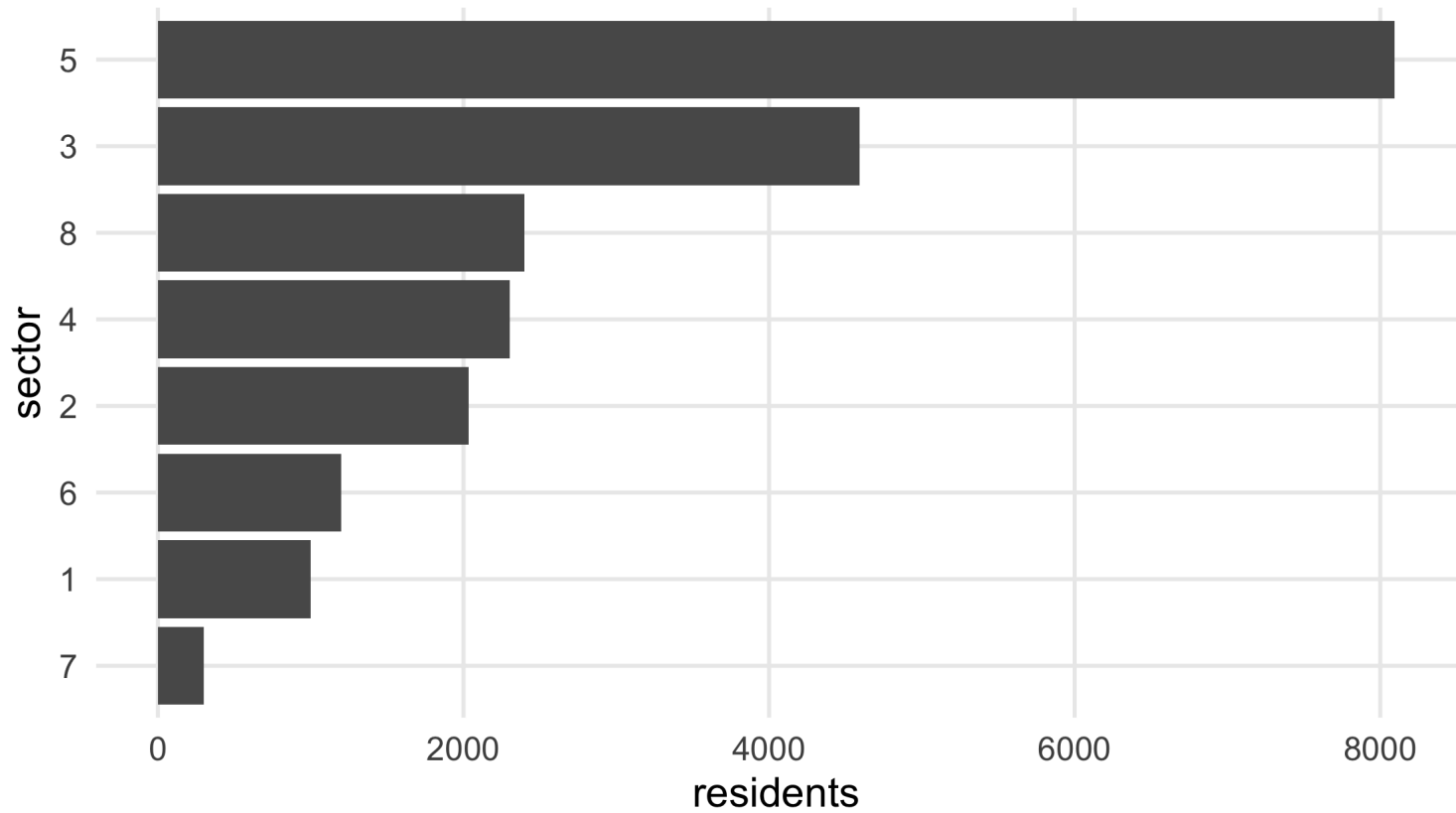
```
use_package("ggplot2")
```

in R/themes.R:

```
theme_avalanche <- function() {  
  ggplot2::theme_minimal(base_size = 14) +  
    ggplot2::theme(panel.grid.minor = ggplot2::element_blank())  
}
```



Your Turn 3



Importing functions directly

```
use_import_from("pkg.name",  
"fun")
```

Adds `@importFrom pkg.name
fun`, **letting you write** `fun()`
instead of `pkg.name::fun()`

Import the whole package with `@import
pkg.name`. *Use this with caution!*



Commonly imported components

`use_tibble()`

`use_data_table()`

`use_pipe()`

`use_rcpp*()`



Your Turn 4

We need roxygen2 for this exercise. We'll learn more about it in the next module. For now, just run `use_roxygen_md()`

Run `use_tibble()` and `use_data_table()`

In `R/get_data.R`, edit the function to be able to return a data table: Add the argument `data_table = FALSE`. If `data_table` is `TRUE`, convert the data frame with `data.table::as.data.table()`

Run this code to make sure it works



Your Turn 4

```
use_roxygen_md()
use_tibble()
use_data_table()
```

```
get_resident_data <- function(data_table = FALSE) {
  residents_per_sector <- db_con("residents_per_sector")

  if (data_table)
    return(data.table::as.data.table(residents_per_sector))

  tibble::as_tibble(residents_per_sector)
}
```



Your Turn 4

```
##      sector residents
## 1:         1      1000
## 2:         2      2034
## 3:         3      4594
## 4:         4      2304
## 5:         5      8093
## 6:         6      1200
## 7:         7       300
## 8:         8      2398
```

```
data.table::is.data.table(res_data)
```

```
## [1] TRUE
```



Your Turn 4: Stretch goal

Run `use_pipe()` to add the magrittr pipe to your package. What changed?



Organizing .R files



Organizing `.R` files

Less than 1:1, more than all:1



Organizing .R files

Less than 1:1, more than all:1

`utils.R`



Organizing .R files

Less than 1:1, more than all:1

`utils.R`

`zzz.R`, `.onLoad`

See [R Packages, ed. 2](#) for more.

