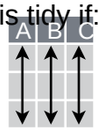
Data tidying with tidyr CHEATSHEET

Tidy data is a way to organize tabular data in a consistent data structure across packages.

A table is tidy if:

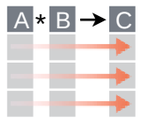


&

Each **variable** is in its own **column**

Each **observation**, or **case**, is in its own row

Access **variables** as **vectors**



Preserve **cases** in vectorized operations

Tibbles

AN ENHANCED DATA FRAME

Tibbles are a table format provided by the **tibble** package. They inherit the data frame class, but have improved behaviors:

- **Subset** a new tibble with], a vector with [[and $.
- **No partial matching** when subsetting columns.
- **Display** concise views of the data on one screen.

options(tibble.print_max = n, tibble.print_min = m,
tibble.width = Inf**)** Control default display settings.

View() or **glimpse()** View the entire data set.

CONSTRUCT A TIBBLE

tibble(…**)** Construct by columns.
tibble(x = 1:3, y = c("a", "b", "c"))

tribble(…**)** Construct by rows.
tribble(~x, ~y,
1, "a", A tibble: 3 × 2 x y
2, "b", <int> <chr> 1 1 a
3, "c")2 2 b
3 3 c

as_tibble(x, …**)** Convert a data frame to a tibble.

enframe(x, name = "name", value = "value"**)** Convert a named vector to a tibble. Also **deframe()**. **is_tibble(**x**)** Test whether x is a tibble.

Reshape Data

- Pivot data to reorganize values into a new layout.

table4a

country	1999	2000
A	0.7K	2K
B	37K	80K
C	212K	213K

country	year	cases
A	1999	0.7K
B	1999	37K
C	1999	212K
A	2000	2K
B	2000	80K
C	2000	213K

pivot_longer(data, cols, names_to = "name", values_to = "value", values_drop_na = FALSE**)**

"Lengthen" data by collapsing several columns into two. Column names move to a new names_to column and values to a new values_to column.

pivot_longer(table4a, cols = 2:3, names_to ="year", values_to = "cases")

table2

country	year	type	count
A	1999	cases	0.7K
A	1999	pop	19M
A	2000	cases	2K
A	2000	pop	20M
B	1999	cases	37K
B	1999	pop	172M
B	2000	cases	80K
B	2000	pop	174M
C	1999	cases	212K
C	1999	pop	1T
C	2000	cases	213K
C	2000	pop	1T

country	year	cases	pop
A	1999	0.7K	19M
A	2000	2K	20M
B	1999	37K	172M
B	2000	80K	174M
C	1999	212K	1T
C	2000	213K	1T

pivot_wider(data, names_from = "name", values_from = "value"**)**

The inverse of pivot_longer(). "Widen" data by expanding two columns into several. One column provides the new column names, the other the values.

pivot_wider(table2, names_from = type, values_from = count)

Split Cells

- Use these functions to split or combine cells into individual, isolated values.

table5

country	century	year
A	19	99
A	20	00
B	19	99
B	20	00

country	year
A	1999
A	2000
B	1999
B	2000

unite(data, col, …, sep = "_", remove = TRUE, na.rm = FALSE**)** Collapse cells across several columns into a single column.

unite(table5, century, year, col = "year", sep = "")

table3

country	year	rate
A	1999	0.7K/19M
A	2000	2K/20M
B	1999	37K/172M
B	2000	80K/174M

country	year	cases	pop
A	1999	0.7K	19M
A	2000	2K	20M
B	1999	37K	172M
B	2000	80K	174M

separate_wider_delim(data, cols, delim, ..., names = NULL, names_sep = NULL, names_repair = "check_unique", too_few, too_many, cols_remove = TRUE**)** Separate each cell in a column into several columns. Also **separate_wider_regex()** and **separate_wider_position().**

separate(table3, rate, sep = "/", into = c("cases", "pop"))

table3

country	year	rate
A	1999	0.7K/19M
A	2000	2K/20M
B	1999	37K/172M
B	2000	80K/174M

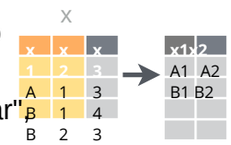
country	year	rate
A	1999	0.7K
A	1999	19M
A	2000	2K
A	2000	20M
B	1999	37K
B	1999	172M
B	2000	80K
B	2000	174M

separate_longer_delim(data, cols, delim, .., width, keep_eampty**)** Separate each cell in a column into several rows.

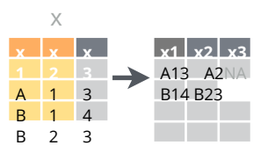
separate_longer_delim(table3, rate, sep = "/")

Expand Tables

Create new combinations of variables or identify implicit missing values (combinations of variables not present in the data).



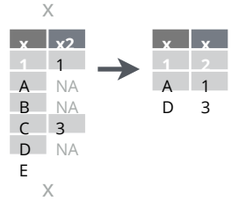
expand(data, …**)** Create a new tibble with all possible combinations of the values of the variables listed in … Drop other variables.
expand(mtcars, cyl, gear, carb)



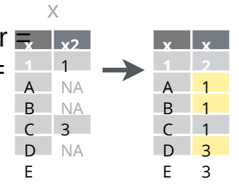
complete(data, …, fill = list()**)** Add missing possible combinations of values of variables listed in … Fill remaining variables with NA.
complete(mtcars, cyl, gear, carb)

Handle Missing Values

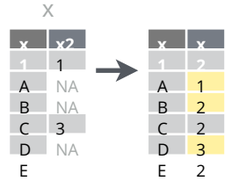
Drop or replace explicit missing values (NA).



s(data, …**)** Drop rows containing NA's in … columns.
drop_na(x, x2)



fill(data, …, .direction = "down"**)** Fill in NA's in … columns using the next or previous value.
fill(x, x2)



replace_na(data, replace**)** Specify a value to replace NA in selected columns.
replace_na(x, list(x2 = 2))

Nested Data

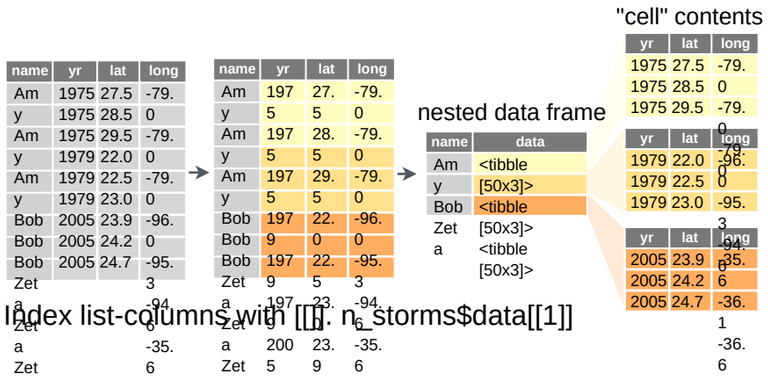
A **nested data frame** stores individual tables as a list-column of data frames within a larger organizing data frame. List-columns can also be lists of vectors or lists of varying data types.
Use a nested data frame to:
•Preserve relationships between observations and subsets of data. Preserve the type of the variables being nested (factors and datetimes aren't coerced to character).
•Manipulate many sub-tables at once with **purrr** functions like map(), map2(), or pmap() or with **dplyr** rowwise() grouping.

CREATE NESTED DATARESHAPE NESTED DATATRANSFORM NESTED DATA

nest(data, …**)** Moves groups of cells into a list-column of a data **unnest(**data, cols, ..., keep_empty = FALSE**)** Flatten nested columns A vectorized function takes a vector, transforms each element in frame. Use alone or with dplyr::**group_by()**: back to regular columns. The inverse of nest(). parallel, and returns a vector of the same length. By themselves

1.Group the data frame with **group_by()** and use **nest()** to move n_storms |> unnest(data) vectorized functions cannot work with lists, such as list-columns.
the groups into a list-column. **unnest_longer(**data, col, values_to = NULL, indices_to = NULL**)** dplyr::**rowwise(**.data, …**)** Group data so that each row is one
n_storms <- storms |> Turn each element of a list-column into a row.group, and within the groups, elements of list-columns appear
group_by(name) |> directly (accessed with [[ ), not as lists of length one. **When you**
nest() starwars |> **use rowwise(), dplyr functions will seem to apply functions to**

2.Use **nest(new_col = c(x, y))** to specify the columns to group select(name, films) |> **list-columns in a vectorized fashion.**
using dplyr::**select()** syntax. unnest_longer(films)
n_storms <- storms |>
nest(data = c(year:long))



CREATE TIBBLES WITH LIST-COLUMNS

tibble::**tribble(**…**)** Makes list-columns when needed.
tribble(~max, ~seq,
3, 1:3,
4, 1:4, 4<int [4]>
5, 1:5) 5<int [5]>

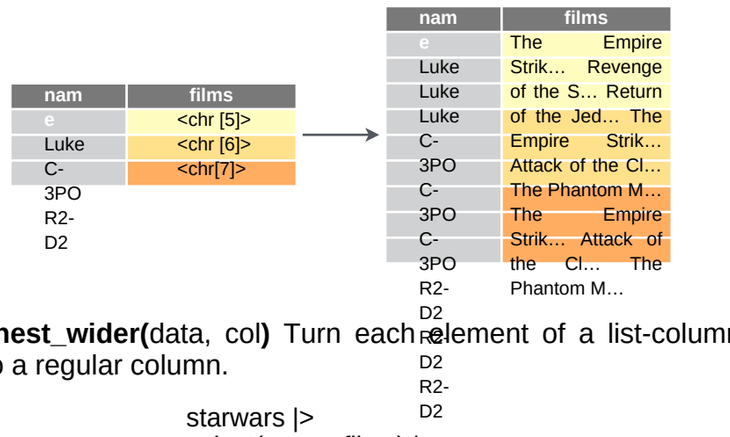
tibble::**tibble(**…**)** Saves list input as list-columns.
tibble(max = c(3, 4, 5), seq = list(1:3, 1:4, 1:5))

tibble::**enframe(**x, name="name", value="value"**)**

Converts multi-level list to a tibble with list-cols.
enframe(list('3'=1:3, '4'=4:4, '5'=1:5), 'max', 'seq')

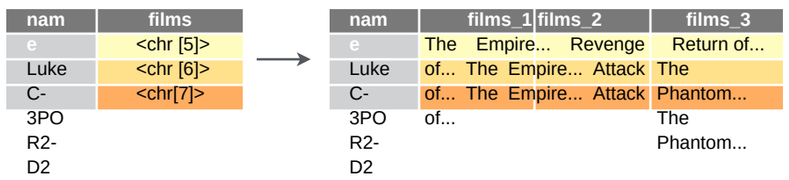
OUTPUT LIST-COLUMNS FROM OTHER FUNCTIONS

dplyr::**mutate()**, **transmute()**, and **summarise()** will output list-columns if they return a list.
mtcars |>
group_by(cyl) |>
summarise(q = list(quantile(mpg)))



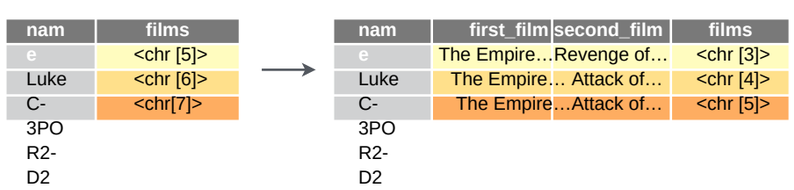
unnest_wider(data, col**)** Turn each element of a list-column into a regular column.

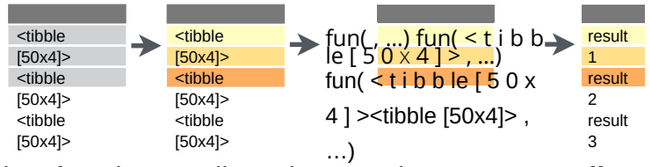
starwars |>
select(name, films) |>
unnest_wider(films, names_sep = "_")



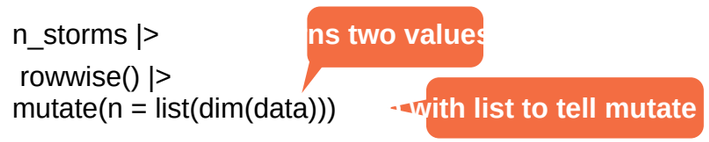
hoist(.data, .col, ..., .remove = TRUE) Selectively pull list components out into their own top-level columns. Uses purrr::pluck() syntax for selecting from lists.

starwars |>
select(name, films) |>
hoist(films, first_film = 1, second_film = 2)





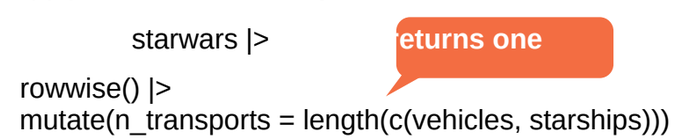
Apply a function to a list-column and **create a new list-column.**



Apply a function to a list-column and **create a regular column.**

Collapse **multiple list-columns** into a single list-column**.**

Apply a function to **multiple list-columns.**



See **purrr** package for more list functions.

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