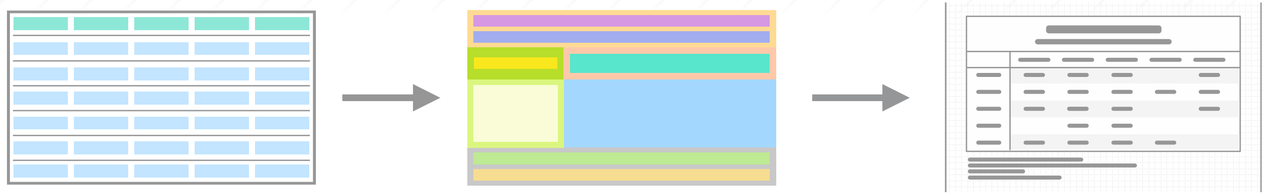
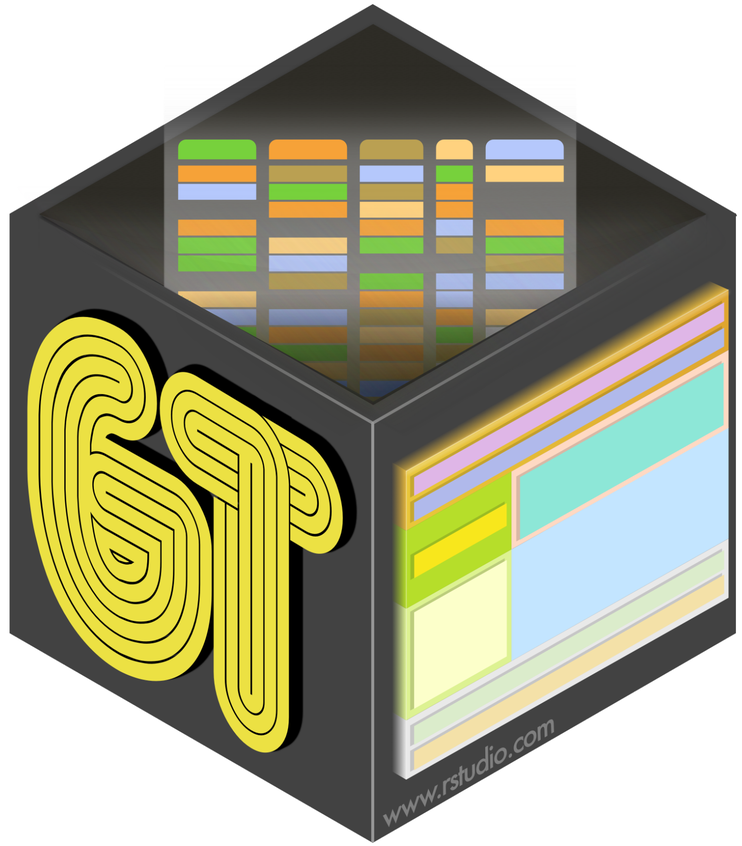
An Overview of the **gt** Package





rich-iannone

@riannone

rich@rstudio.com

*The Typical Workflow for Making Tables with **gt***

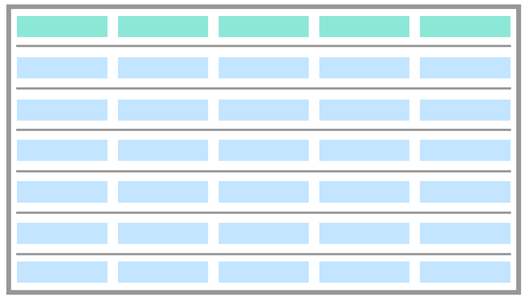
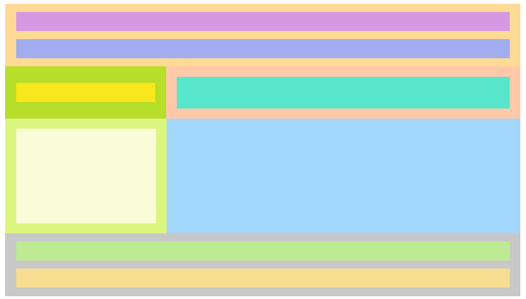
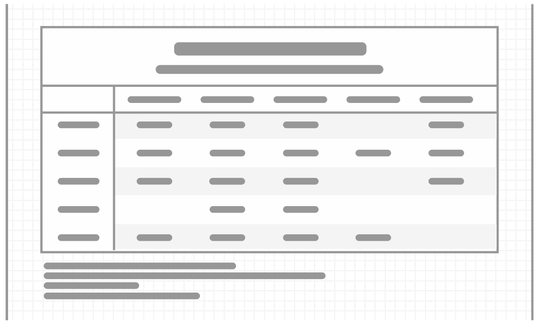


table data



gt object



gt table

Put your data to a form that's reasonably close to the expected form of the display table.

Add table components, group rows together, add spanner labels, footnotes, format cells, add styles…

Output the table to HTML, save an image. *Soon*: **RTF** and **LaTeX** output will be better supported.

Use **dplyr** and **tidyr** and other great Tidyverse 📦s.

Use **gt**'s functions to build. Preview in **RStudio**.

Use tables in reports, Shiny apps, packages, etc.

Categorizing the Useful Features of a Table

table header
with a title
and a subtitle

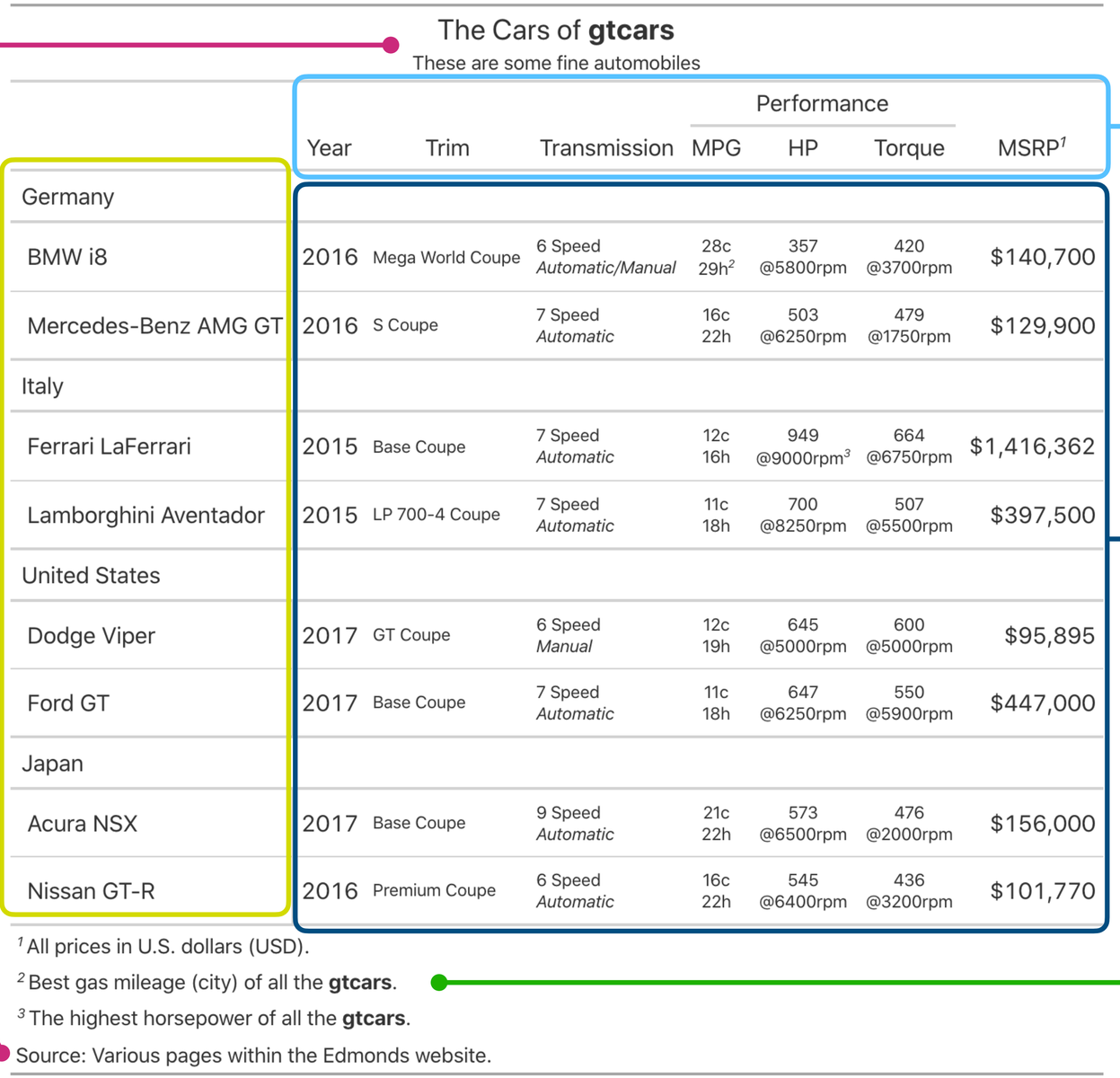
column labels
along with
column grouping

row labels
along with
row grouping

data formatting
need to transform raw
data for presentation

a source note

footnotes
are in the right order



The Cars of **gtcars**

These are some fine automobiles

	Year	Trim	Transmission	Performance			MSRP[1]
				MPG	HP	Torque	
Germany							
BMW i8	2016	Mega World Coupe	6 Speed *Automatic/Manual*	28c 29h[2]	357 @5800rpm	420 @3700rpm	$140,700
Mercedes-Benz AMG GT	2016	S Coupe	7 Speed *Automatic*	16c 22h	503 @6250rpm	479 @1750rpm	$129,900
Italy							
Ferrari LaFerrari	2015	Base Coupe	7 Speed *Automatic*	12c 16h	949 @9000rpm[3]	664 @6750rpm	$1,416,362
Lamborghini Aventador	2015	LP 700-4 Coupe	7 Speed *Automatic*	11c 18h	700 @8250rpm	507 @5500rpm	$397,500
United States							
Dodge Viper	2017	GT Coupe	6 Speed *Manual*	12c 19h	645 @5000rpm	600 @5000rpm	$95,895
Ford GT	2017	Base Coupe	7 Speed *Automatic*	11c 18h	647 @6250rpm	550 @5900rpm	$447,000
Japan							
Acura NSX	2017	Base Coupe	9 Speed *Automatic*	21c 22h	573 @6500rpm	476 @2000rpm	$156,000
Nissan GT-R	2016	Premium Coupe	6 Speed *Automatic*	16c 22h	545 @6400rpm	436 @3200rpm	$101,770

[1] All prices in U.S. dollars (USD).

[2] Best gas mileage (city) of all the **gtcars**.

[3] The highest horsepower of all the **gtcars**.

Source: Various pages within the Edmonds website.

Categorizing the Useful Features of a Table

The ordering of footnotes must always be correct.

And it's **no fun** doing this manually.

The Cars of gtcars

These are some fine automobiles

				Performance			
	Year	Trim	Transmission	MPG	HP	Torque	MSRP[1]
Germany							
BMW i8	2016	Mega World Coupe	6 Speed *Automatic/Manual*	28c 29h[2]	357 @5800rpm	420 @3700rpm	$140,700
Mercedes-Benz AMG GT	2016	S Coupe	7 Speed *Automatic*	16c 22h	503 @6250rpm	479 @1750rpm	$129,900
Italy							
Ferrari LaFerrari	2015	Base Coupe	7 Speed *Automatic*	12c 16h	949 @9000rpm[3]	664 @6750rpm	$1,416,362
Lamborghini Aventador	2015	LP 700-4 Coupe	7 Speed *Automatic*	11c 18h	700 @8250rpm	507 @5500rpm	$397,500
United States							
Dodge Viper	2017	GT Coupe	6 Speed *Manual*	12c 19h	645 @5000rpm	600 @5000rpm	$95,895
Ford GT	2017	Base Coupe	7 Speed *Automatic*	11c 18h	647 @6250rpm	550 @5900rpm	$447,000
Japan							
Acura NSX	2017	Base Coupe	9 Speed *Automatic*	21c 22h	573 @6500rpm	476 @2000rpm	$156,000
Nissan GT-R	2016	Premium Coupe	6 Speed *Automatic*	16c 22h	545 @6400rpm	436 @3200rpm	$101,770

[1] All prices in U.S. dollars (USD).

[2] Best gas mileage (city) of all the **gtcars**.

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Source: Various pages within the Edmonds website.

footnotes
are in the right order

Categorizing the Useful Features of a Table

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The Cars of gtcars

These are some fine automobiles

	Year	Trim	Transmission	Performance MPG	Performance HP	Performance Torque	MSRP[1]
Germany							
BMW i8	2016	Mega World Coupe	6 Speed *Automatic/Manual*	28c 29h[2]	357 @5800rpm	420 @3700rpm	$140,700
Mercedes-Benz AMG GT	2016	S Coupe	7 Speed *Automatic*	16c 22h	503 @6250rpm	479 @1750rpm	$129,900
Italy							
Ferrari LaFerrari	2015	Base Coupe	7 Speed *Automatic*	12c 16h	949 @9000rpm[3]	664 @6750rpm	$1,416,362
Lamborghini Aventador	2015	LP 700-4 Coupe	7 Speed *Automatic*	11c 18h	700 @8250rpm	507 @5500rpm	$397,500
United States							
Dodge Viper	2017	GT Coupe	6 Speed *Manual*	12c 19h	645 @5000rpm	600 @5000rpm	$95,895
Ford GT	2017	Base Coupe	7 Speed *Automatic*	11c 18h	647 @6250rpm	550 @5900rpm	$447,000
Japan							
Acura NSX	2017	Base Coupe	9 Speed *Automatic*	21c 22h	573 @6500rpm	476 @2000rpm	$156,000
Nissan GT-R	2016	Premium Coupe	6 Speed *Automatic*	16c 22h	545 @6400rpm	436 @3200rpm	$101,770

[1] All prices in U.S. dollars (USD).

[2] Best gas mileage (city) of all the **gtcars**.

[3] The highest horsepower of all the **gtcars**.

Source: Various pages within the Edmonds website.

1
2
3

1
2
3

footnotes
are in the right order

Categorizing the Useful Features of a Table

To do this right, a system needs to index the locations *left-to-right*, *top-to-bottom.*

This system also must be smart about the formatting of the footnote marks.

The Cars of gtcars [1]

These are some fine automobiles [2]

[3]	Year [5]	Trim [6]	Transmission [7]	Performance [4] MPG [8]	HP [9]	Torque [10]	MSRP [1][11]
Germany [13]							
BMW i8 [14]	2016 [15]	Mega World Coupe [16]	6 Speed *Automatic/Manual* [17]	28c [18] 29h [2]	357 [19] @5800rpm	420 [20] @3700rpm	$140,700 [21]
Mercedes-Benz AMG GT [22]	2016 [23]	S Coupe [24]	7 Speed *Automatic* [25]	16c [26] 22h	503 [27] @6250rpm	479 [28] @1750rpm	$129,900 [29]
Italy [30]							
Ferrari LaFerrari [31]	2015 [32]	Base Coupe [33]	7 Speed *Automatic* [34]	12c [35] 16h	949 [36] @9000rpm [3]	664 [37] @6750rpm	$1,416,362 [38]
Lamborghini Aventador [39]	2015 [40]	LP 700-4 Coupe [41]	7 Speed *Automatic* [42]	11c [43] 18h	700 [44] @8250rpm	507 [45] @5500rpm	$397,500 [46]
United States [47]							
Dodge Viper [48]	2017 [49]	GT Coupe [50]	6 Speed *Manual* [51]	12c [52] 19h	645 [53] @5000rpm	600 [54] @5000rpm	$95,895 [55]
Ford GT [56]	2017 [57]	Base Coupe [58]	7 Speed *Automatic* [59]	11c [60] 18h	647 [61] @6250rpm	550 [62] @5900rpm	$447,000 [63]
Japan [64]							
Acura NSX [65]	2017 [66]	Base Coupe [67]	9 Speed *Automatic* [68]	21c [69] 22h	573 [70] @6500rpm	476 [71] @2000rpm	$156,000 [72]
Nissan GT-R [73]	2016 [74]	Premium Coupe [75]	6 Speed *Automatic* [76]	16c [77] 22h	545 [78] @6400rpm	436 [79] @3200rpm	$101,770 [80]

[1] All prices in U.S. dollars (USD).

[2] Best gas mileage (city) of all the **gtcars**.

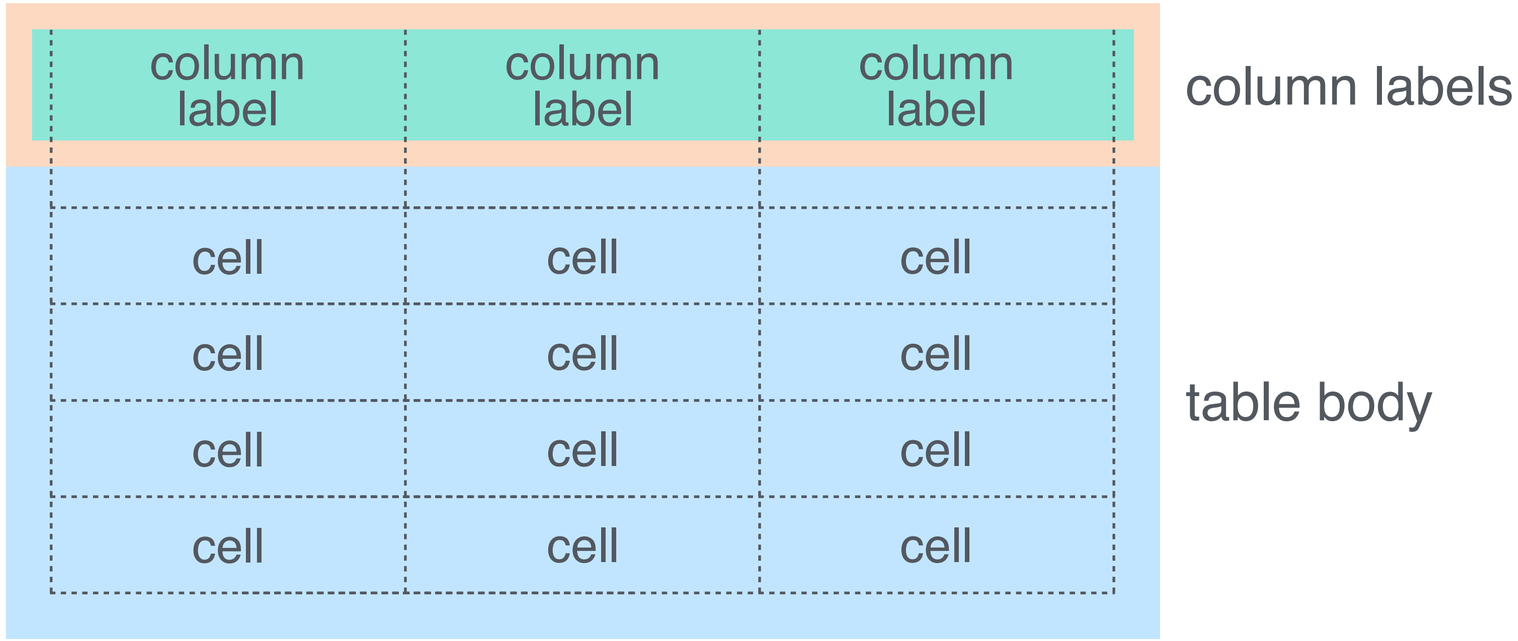
[3] The highest horsepower of all the **gtcars**.

Source: Various pages within the Edmonds website.

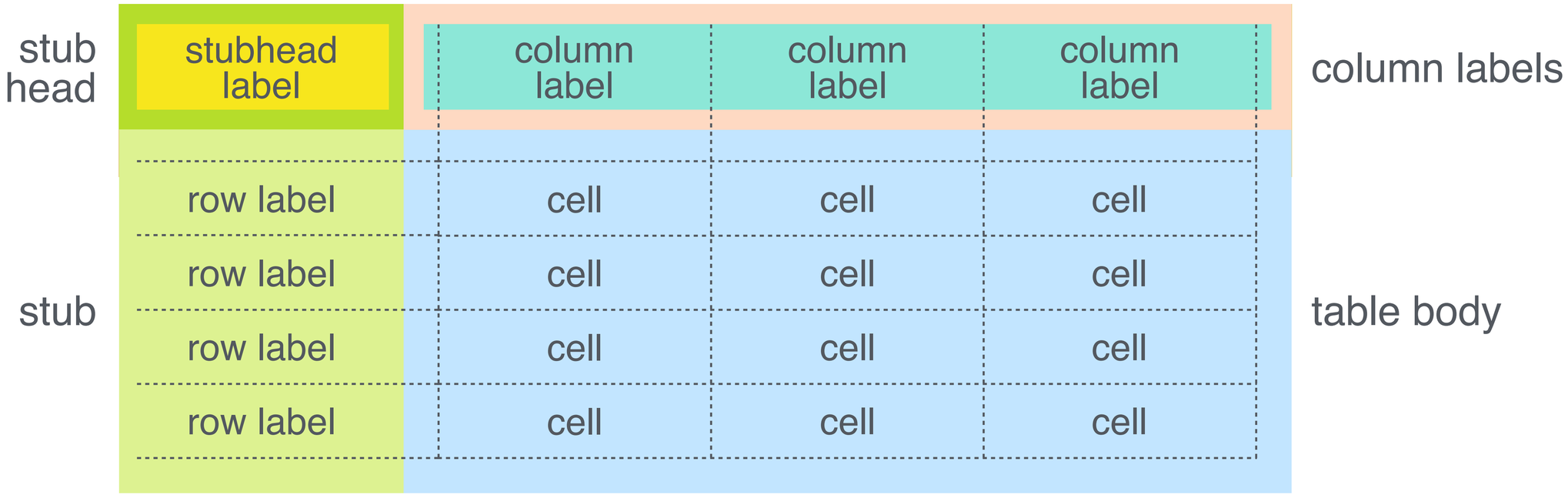
*The **gt** Package Formalizes the Parts of a Table*

The Structural Parts of a Table

This is the most basic form of a **gt** table:

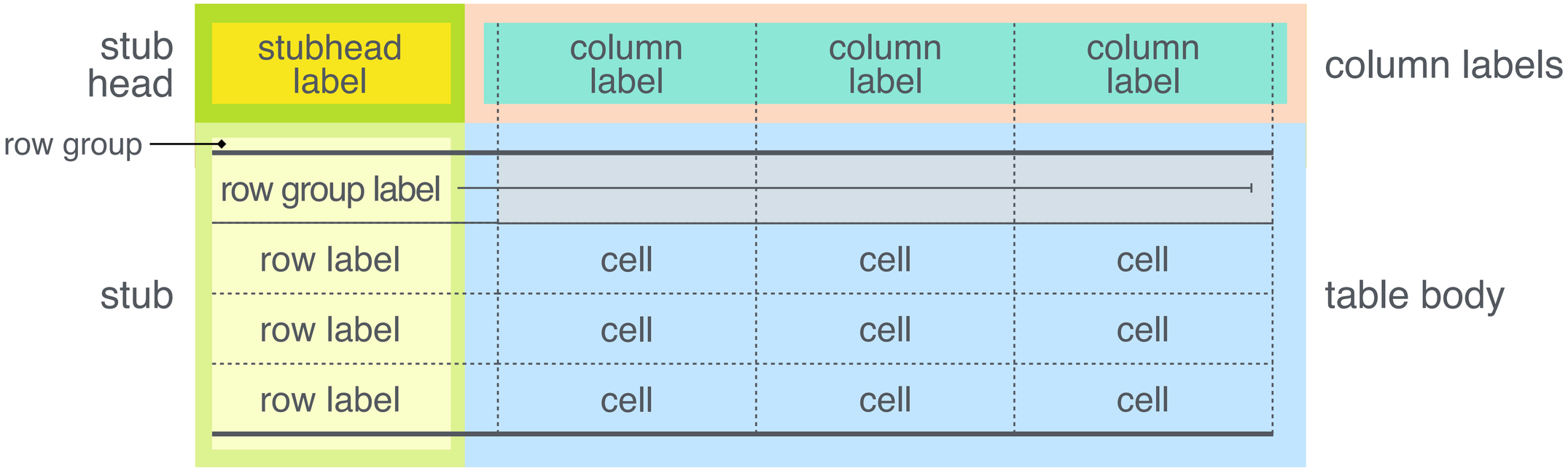


The Structural Parts of a Table



A table stub is not always needed but it can be useful.

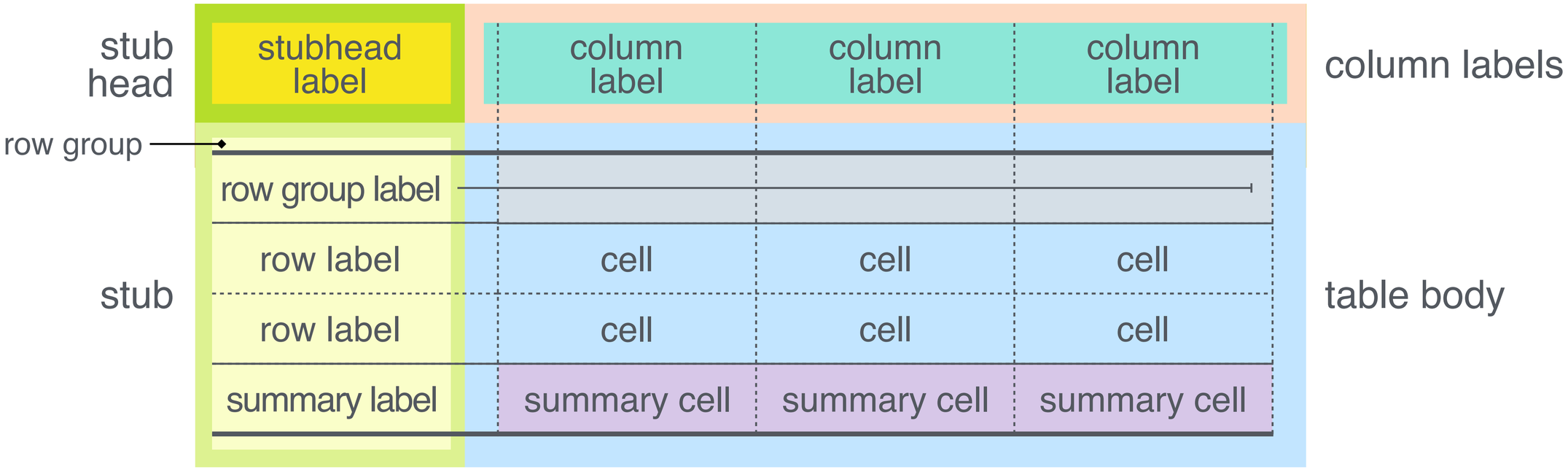
The Structural Parts of a Table



A table stub is not always needed but it can be useful.

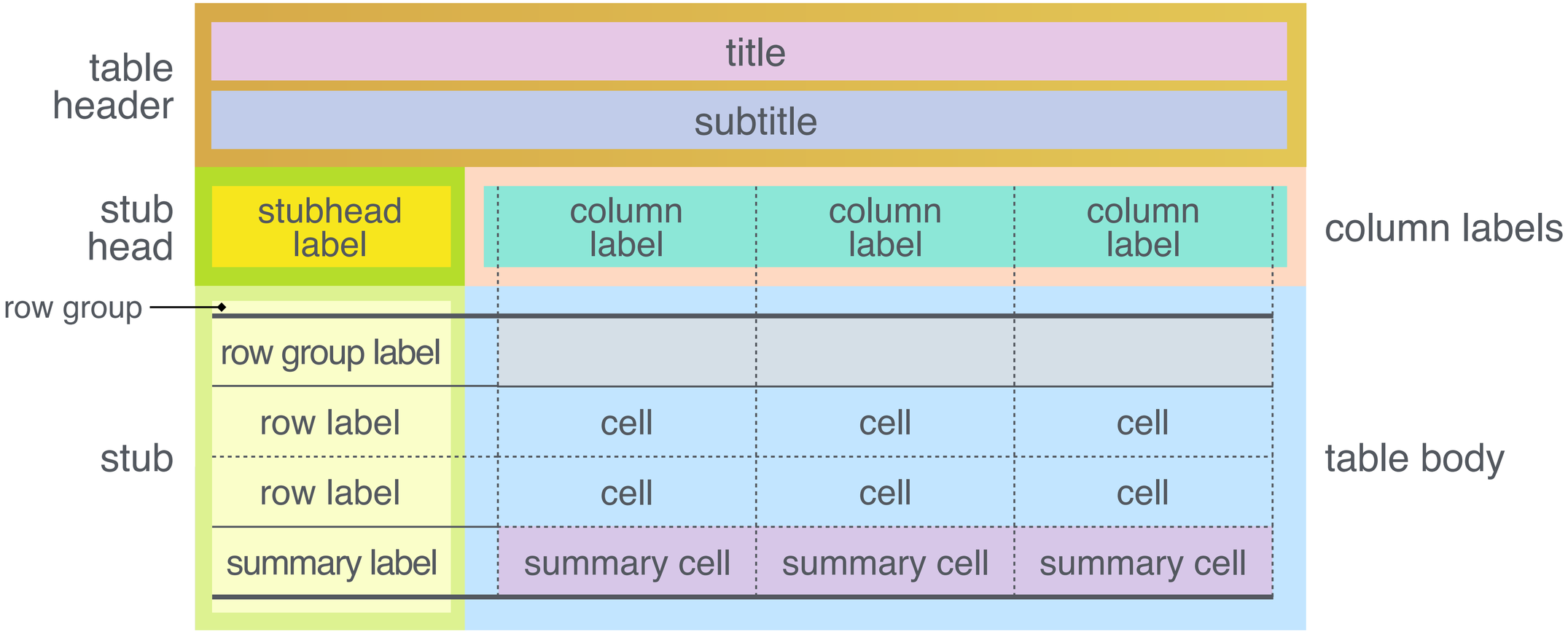
Rows can be grouped, and they can have labels.

The Structural Parts of a Table



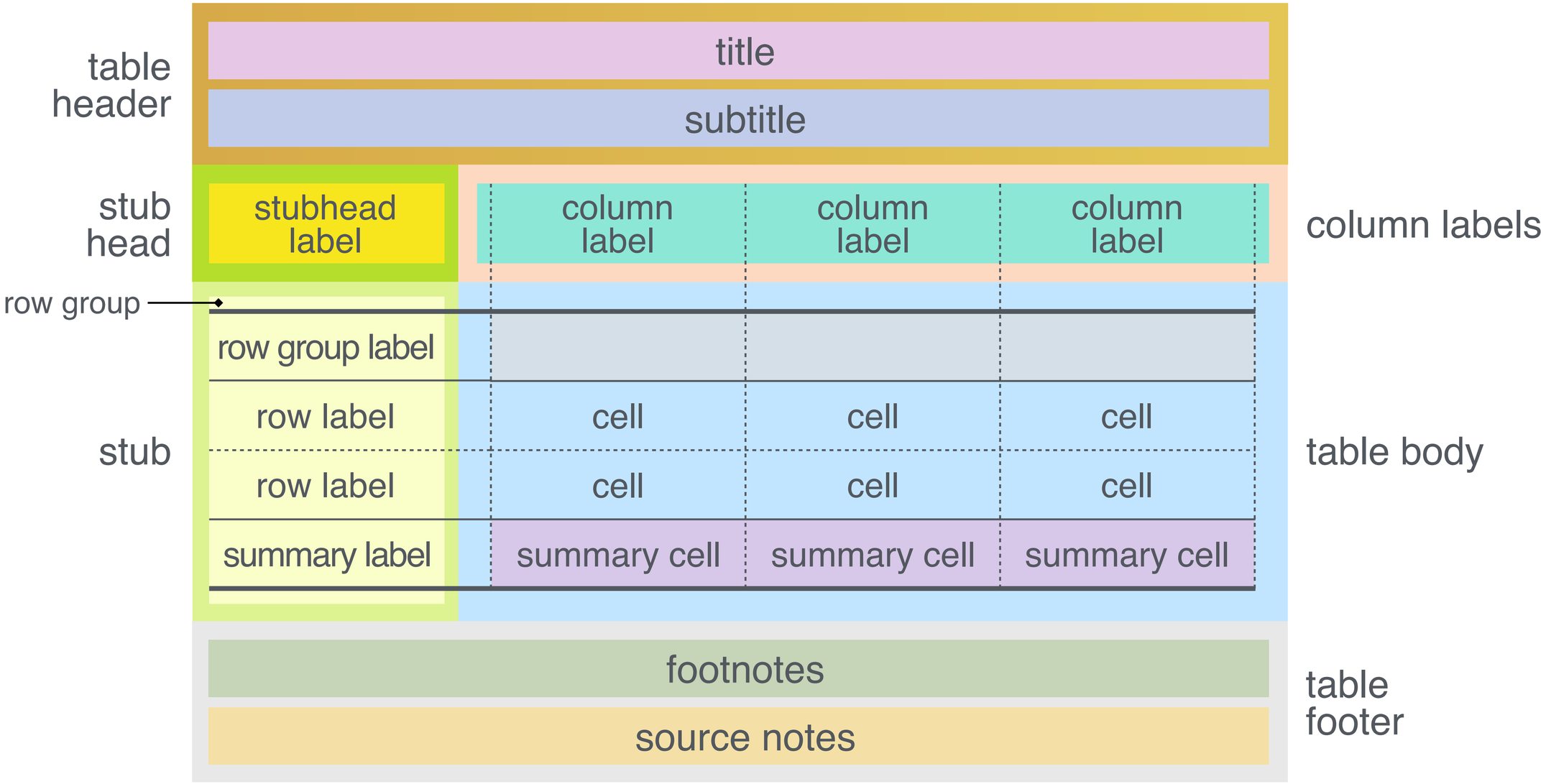
A table stub is not always needed but it can be useful.
Rows can be grouped, and they can have labels.
Summary rows can be added to groups (or, we can have a *grand summary*).

The Structural Parts of a Table



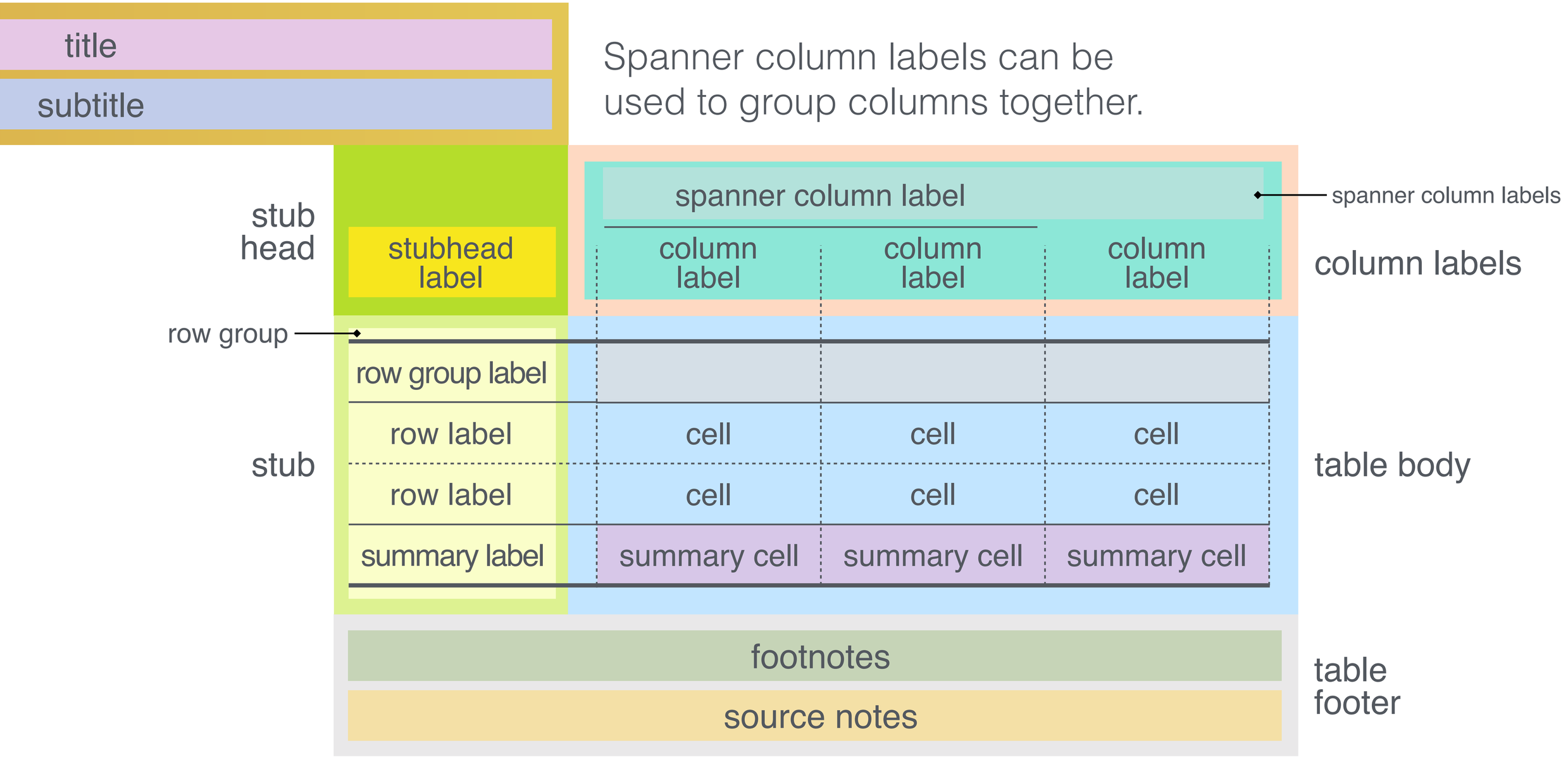
A table header is a great place to add a title and a subtitle.

The Structural Parts of a Table

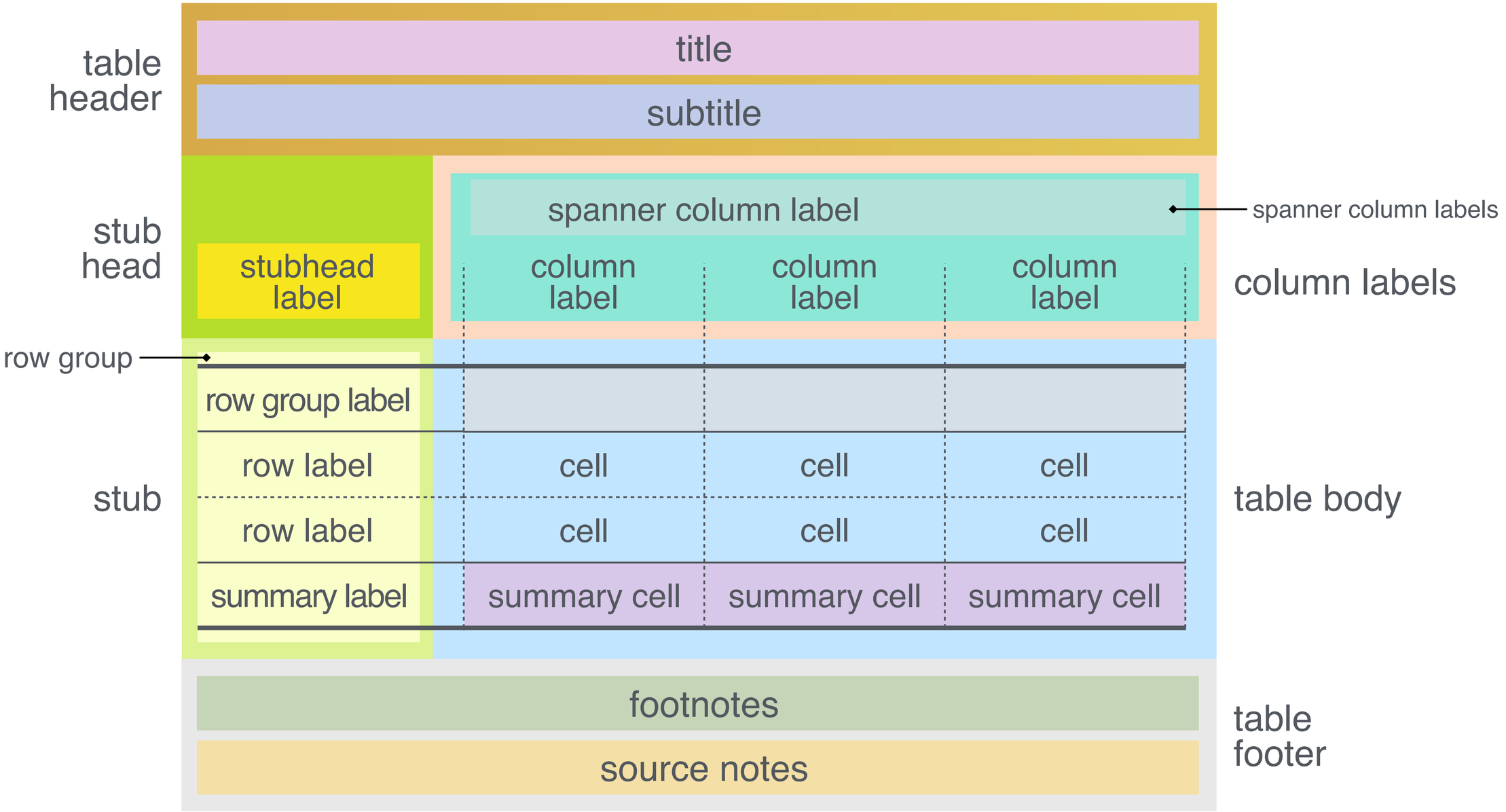


Ordered footnotes and source notes are useful annotations.

The Structural Parts of a Table



The Structural Parts of a Table



Let's Learn How to Use ***gt***

Datasets in ***gt***

countrypops
12,470 × 5

sza
816 × 4

gtcars
47 × 15

sp500
16,607 × 7

pizzaplace
49,574 × 7

exibble
8 × 9

The **gt** package comes with *six* example datasets.

They are of various sizes and subject matter. There are some nice examples available at:

`gt.rstudio.com/articles/gt-datasets`

*Datasets in **gt***

`exibble`
8 × 9

The **gt** package comes with *six* example datasets.

They are of various sizes and subject matter. There are some nice examples available at:

`gt.rstudio.com/articles/gt-datasets`

Let's take a look at some examples with `exibble`: a dataset that's great for small examples.

The First Function You Need to Know

Create Table

`gt()`

CODE

```
exibble %>% gt()
```

TABLE

num	char	fctr	date	time	datetime	currency	row	group
1.111e-01	apricot	one	2015-01-15	13:35	2018-01-01 02:22	49.950	row_1	grp_a
2.222e+00	banana	two	2015-02-15	14:40	2018-02-02 14:33	17.950	row_2	grp_a
3.333e+01	coconut	three	2015-03-15	15:45	2018-03-03 03:44	1.390	row_3	grp_a
4.444e+02	durian	four	2015-04-15	16:50	2018-04-04 15:55	65100.000	row_4	grp_a
5.550e+03	NA	five	2015-05-15	17:55	2018-05-05 04:00	1325.810	row_5	grp_b
NA	fig	six	2015-06-15	NA	2018-06-06 16:11	13.255	row_6	grp_b
7.770e+05	grapefruit	seven	NA	19:10	2018-07-07 05:22	NA	row_7	grp_b
8.880e+06	honeydew	eight	2015-08-15	20:20	NA	0.440	row_8	grp_b

Work with Table Components, Add Style

Create or Modify Parts

`tab_header()` `tab_spanner()` `tab_spanner_delim()` `tab_row_g`

CODE

```
exibble %>% gt() %>% tab_header(md("**gt** is cool"))
```

TABLE

gt is cool

num	char	fctr	date	time	datetime	currency	row	group
1.111e-01	apricot	one	2015-01-15	13:35	2018-01-01 02:22	49.950	row_1	grp_a
2.222e+00	banana	two	2015-02-15	14:40	2018-02-02 14:33	17.950	row_2	grp_a
3.333e+01	coconut	three	2015-03-15	15:45	2018-03-03 03:44	1.390	row_3	grp_a
4.444e+02	durian	four	2015-04-15	16:50	2018-04-04 15:55	65100.000	row_4	grp_a
5.550e+03	NA	five	2015-05-15	17:55	2018-05-05 04:00	1325.810	row_5	grp_b
NA	fig	six	2015-06-15	NA	2018-06-06 16:11	13.255	row_6	grp_b
7.770e+05	grapefruit	seven	NA	19:10	2018-07-07 05:22	NA	row_7	grp_b
8.880e+06	honeydew	eight	2015-08-15	20:20	NA	0.440	row_8	grp_b

Work with Table Components, Add Style

Create or Modify Parts

`tab_source_note()` `tab_style()` `tab_options()`

CODE

```
exibble %>% gt() %>% tab_header(md("**gt** is cool")) %>%
tab_source_note("From gt.")
```

TABLE

gt is cool

num	char	fctr	date	time	datetime	currency	row	group
1.111e-01	apricot	one	2015-01-15	13:35	2018-01-01 02:22	49.950	row_1	grp_a
2.222e+00	banana	two	2015-02-15	14:40	2018-02-02 14:33	17.950	row_2	grp_a
3.333e+01	coconut	three	2015-03-15	15:45	2018-03-03 03:44	1.390	row_3	grp_a
4.444e+02	durian	four	2015-04-15	16:50	2018-04-04 15:55	65100.000	row_4	grp_a
5.550e+03	NA	five	2015-05-15	17:55	2018-05-05 04:00	1325.810	row_5	grp_b
NA	fig	six	2015-06-15	NA	2018-06-06 16:11	13.255	row_6	grp_b
7.770e+05	grapefruit	seven	NA	19:10	2018-07-07 05:22	NA	row_7	grp_b
8.880e+06	honeydew	eight	2015-08-15	20:20	NA	0.440	row_8	grp_b

From gt.

The Formatting Functions

Format Data

`fmt_number()` `fmt_scientific()` `fmt_percent()` `fmt_currency(`

CODE

```
exibble %>% gt() %>% fmt_number(vars(num), decimals = 2)
```

TABLE

num	char	fctr	date	time	datetime	currency	row	group
0.11	apricot	one	2015-01-15	13:35	2018-01-01 02:22	49.950	row_1	grp_a
2.22	banana	two	2015-02-15	14:40	2018-02-02 14:33	17.950	row_2	grp_a
33.33	coconut	three	2015-03-15	15:45	2018-03-03 03:44	1.390	row_3	grp_a
444.40	durian	four	2015-04-15	16:50	2018-04-04 15:55	65100.000	row_4	grp_a
5,550.00	NA	five	2015-05-15	17:55	2018-05-05 04:00	1325.810	row_5	grp_b
NA	fig	six	2015-06-15	NA	2018-06-06 16:11	13.255	row_6	grp_b
777,000.00	grapefruit	seven	NA	19:10	2018-07-07 05:22	NA	row_7	grp_b
8,880,000.00	honeydew	eight	2015-08-15	20:20	NA	0.440	row_8	grp_b

The Formatting Functions

Format Data

`fmt_scientific()` `fmt_percent()` `fmt_currency()` `fmt_date()`

CODE

```
exibble %>% gt() %>%
  fmt_scientific(vars(num))
```

TABLE

num	char	fctr	date	time	datetime	currency	row	group
1.11×10^{-1}	apricot	one	2015-01-15	13:35	2018-01-01 02:22	49.950	row_1	grp_a
2.22	banana	two	2015-02-15	14:40	2018-02-02 14:33	17.950	row_2	grp_a
3.33×10^{1}	coconut	three	2015-03-15	15:45	2018-03-03 03:44	1.390	row_3	grp_a
4.44×10^{2}	durian	four	2015-04-15	16:50	2018-04-04 15:55	65100.000	row_4	grp_a
5.55×10^{3}	NA	five	2015-05-15	17:55	2018-05-05 04:00	1325.810	row_5	grp_b
NA	fig	six	2015-06-15	NA	2018-06-06 16:11	13.255	row_6	grp_b
7.77×10^{5}	grapefruit	seven	NA	19:10	2018-07-07 05:22	NA	row_7	grp_b
8.88×10^{6}	honeydew	eight	2015-08-15	20:20	NA	0.440	row_8	grp_b

The Formatting Functions

Format Data

`fmt_scientific()` `fmt_percent()` `fmt_currency()` `fmt_date()`

CODE

```
exibble %>% gt() %>%
  fmt_scientific(vars(num), rows = num >= 10^3 )
```

TABLE

num	char	fctr	date	time	datetime	currency	row	group
0.1111	apricot	one	2015-01-15	13:35	2018-01-01 02:22	49.950	row_1	grp_a
2.2220	banana	two	2015-02-15	14:40	2018-02-02 14:33	17.950	row_2	grp_a
33.3300	coconut	three	2015-03-15	15:45	2018-03-03 03:44	1.390	row_3	grp_a
444.4000	durian	four	2015-04-15	16:50	2018-04-04 15:55	65100.000	row_4	grp_a
5.55×10^{3}	NA	five	2015-05-15	17:55	2018-05-05 04:00	1325.810	row_5	grp_b
NA	fig	six	2015-06-15	NA	2018-06-06 16:11	13.255	row_6	grp_b
7.77×10^{5}	grapefruit	seven	NA	19:10	2018-07-07 05:22	NA	row_7	grp_b
8.88×10^{6}	honeydew	eight	2015-08-15	20:20	NA	0.440	row_8	grp_b

The Formatting Functions

Format Data

`fmt_currency()` `fmt_date()` `fmt_time()` `fmt_datetime()` `fmt`

CODE

```
exibble %>% gt() %>%
  fmt_currency(vars(currency), currency = "EUR")
```

try `info_currencies()`

TABLE

num	char	fctr	date	time	datetime	currency	row	group
1.111e-01	apricot	one	2015-01-15	13:35	2018-01-01 02:22	€49.95	row_1	grp_a
2.222e+00	banana	two	2015-02-15	14:40	2018-02-02 14:33	€17.95	row_2	grp_a
3.333e+01	coconut	three	2015-03-15	15:45	2018-03-03 03:44	€1.39	row_3	grp_a
4.444e+02	durian	four	2015-04-15	16:50	2018-04-04 15:55	€65,100.00	row_4	grp_a
5.550e+03	NA	five	2015-05-15	17:55	2018-05-05 04:00	€1,325.81	row_5	grp_b
NA	fig	six	2015-06-15	NA	2018-06-06 16:11	€13.26	row_6	grp_b
7.770e+05	grapefruit	seven	NA	19:10	2018-07-07 05:22	NA	row_7	grp_b
8.880e+06	honeydew	eight	2015-08-15	20:20	NA	€0.44	row_8	grp_b

The Formatting Functions

Format Data

`fmt_date()` `fmt_time()` `fmt_datetime()` `fmt_markdown()` `fmt`

CODE

```
exibble %>% gt() %>%
  fmt_date(vars(date), date_style = 2)
```

try `info_date_style()`

TABLE

num	char	fctr	date	time	datetime	currency	row	group
1.111e-01	apricot	one	Thursday, January 15, 2015	13:35	2018-01-01 02:22	49.950	row_1	grp_a
2.222e+00	banana	two	Sunday, February 15, 2015	14:40	2018-02-02 14:33	17.950	row_2	grp_a
3.333e+01	coconut	three	Sunday, March 15, 2015	15:45	2018-03-03 03:44	1.390	row_3	grp_a
4.444e+02	durian	four	Wednesday, April 15, 2015	16:50	2018-04-04 15:55	65100.000	row_4	grp_a
5.550e+03	NA	five	Friday, May 15, 2015	17:55	2018-05-05 04:00	1325.810	row_5	grp_b
NA	fig	six	Monday, June 15, 2015	NA	2018-06-06 16:11	13.255	row_6	grp_b
7.770e+05	grapefruit	seven	NA	19:10	2018-07-07 05:22	NA	row_7	grp_b
8.880e+06	honeydew	eight	Saturday, August 15, 2015	20:20	NA	0.440	row_8	grp_b

The Formatting Functions

Format Data

`fmt_missing()` `fmt()` `text_transform()` `data_color()`

CODE

```
exibble %>% gt() %>% fmt_missing(columns = everything())
```

TABLE

num	char	fctr	date	time	datetime	currency	row	group
1.111e-01	apricot	one	2015-01-15	13:35	2018-01-01 02:22	49.950	row_1	grp_a
2.222e+00	banana	two	2015-02-15	14:40	2018-02-02 14:33	17.950	row_2	grp_a
3.333e+01	coconut	three	2015-03-15	15:45	2018-03-03 03:44	1.390	row_3	grp_a
4.444e+02	durian	four	2015-04-15	16:50	2018-04-04 15:55	65100.000	row_4	grp_a
5.550e+03	—	five	2015-05-15	17:55	2018-05-05 04:00	1325.810	row_5	grp_b
—	fig	six	2015-06-15	—	2018-06-06 16:11	13.255	row_6	grp_b
7.770e+05	grapefruit	seven	—	19:10	2018-07-07 05:22	—	row_7	grp_b
8.880e+06	honeydew	eight	2015-08-15	20:20	—	0.440	row_8	grp_b

How to Do Modifications on Entire Columns

Modify Columns

`cols_align()` `cols_width()` `cols_label()` `cols_move_to_start`

CODE

```
exibble %>% gt() %>%
  cols_align(vars(char, fctr), align = "right")
```

TABLE

num	char	fctr	date	time	datetime	currency	row	group
1.111e-01	apricot	one	2015-01-15	13:35	2018-01-01 02:22	49.950	row_1	grp_a
2.222e+00	banana	two	2015-02-15	14:40	2018-02-02 14:33	17.950	row_2	grp_a
3.333e+01	coconut	three	2015-03-15	15:45	2018-03-03 03:44	1.390	row_3	grp_a
4.444e+02	durian	four	2015-04-15	16:50	2018-04-04 15:55	65100.000	row_4	grp_a
5.550e+03	NA	five	2015-05-15	17:55	2018-05-05 04:00	1325.810	row_5	grp_b
NA	fig	six	2015-06-15	NA	2018-06-06 16:11	13.255	row_6	grp_b
7.770e+05	grapefruit	seven	NA	19:10	2018-07-07 05:22	NA	row_7	grp_b
8.880e+06	honeydew	eight	2015-08-15	20:20	NA	0.440	row_8	grp_b

How to Do Modifications on Entire Columns

Modify Columns

`cols_hide()` `cols_merge_range()` `cols_merge_uncert()` `cols_m`

CODE

```
exibble %>% gt() %>% cols_hide(matches("date|time"))
```

TABLE

num	char	fctr	currency	row	group
1.111e-01	apricot	one	49.950	row_1	grp_a
2.222e+00	banana	two	17.950	row_2	grp_a
3.333e+01	coconut	three	1.390	row_3	grp_a
4.444e+02	durian	four	65100.000	row_4	grp_a
5.550e+03	NA	five	1325.810	row_5	grp_b
NA	fig	six	13.255	row_6	grp_b
7.770e+05	grapefruit	seven	NA	row_7	grp_b
8.880e+06	honeydew	eight	0.440	row_8	grp_b

How to Do Modifications on Entire Columns

Modify Columns

`cols_merge()`

CODE

```
exibble %>% gt() %>%
  cols_merge(columns = vars(char, fctr), pattern = "{1} ({2})")
```

TABLE

num	char	date	time	datetime	currency	row	group
1.111e-01	apricot (one)	2015-01-15	13:35	2018-01-01 02:22	49.950	row_1	grp_a
2.222e+00	banana (two)	2015-02-15	14:40	2018-02-02 14:33	17.950	row_2	grp_a
3.333e+01	coconut (three)	2015-03-15	15:45	2018-03-03 03:44	1.390	row_3	grp_a
4.444e+02	durian (four)	2015-04-15	16:50	2018-04-04 15:55	65100.000	row_4	grp_a
5.550e+03	NA (five)	2015-05-15	17:55	2018-05-05 04:00	1325.810	row_5	grp_b
NA	fig (six)	2015-06-15	NA	2018-06-06 16:11	13.255	row_6	grp_b
7.770e+05	grapefruit (seven)	NA	19:10	2018-07-07 05:22	NA	row_7	grp_b
8.880e+06	honeydew (eight)	2015-08-15	20:20	NA	0.440	row_8	grp_b

More Functions

- **Create Table**
- **Create or Modify Parts**
- **Format Data**
- **Modify Columns**
- **Modify Rows**
- **Add Rows**
- **Helper Functions**
- **Image Addition Functions**
- **Table Option Functions**
- **Information Functions**
- **Datasets**
- **Shiny Functions**
- **Export Functions**

There is *a lot* of useful information about each function in **gt**'s *Function Reference* section

`gt.rstudio.com/reference`

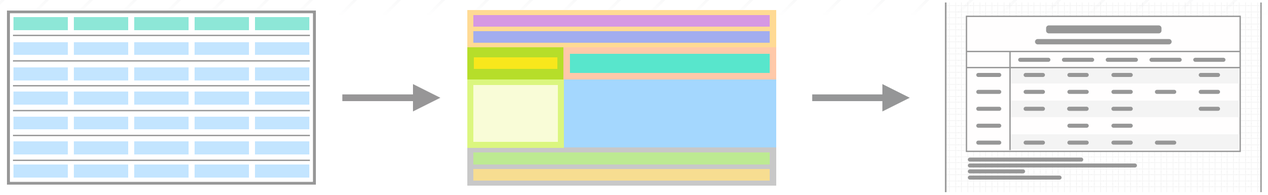
You can try out dozens of examples in RStudio Cloud

The link is available in the package README

`github.com/rstudio/gt`

Demo

An Overview of the **gt** Package



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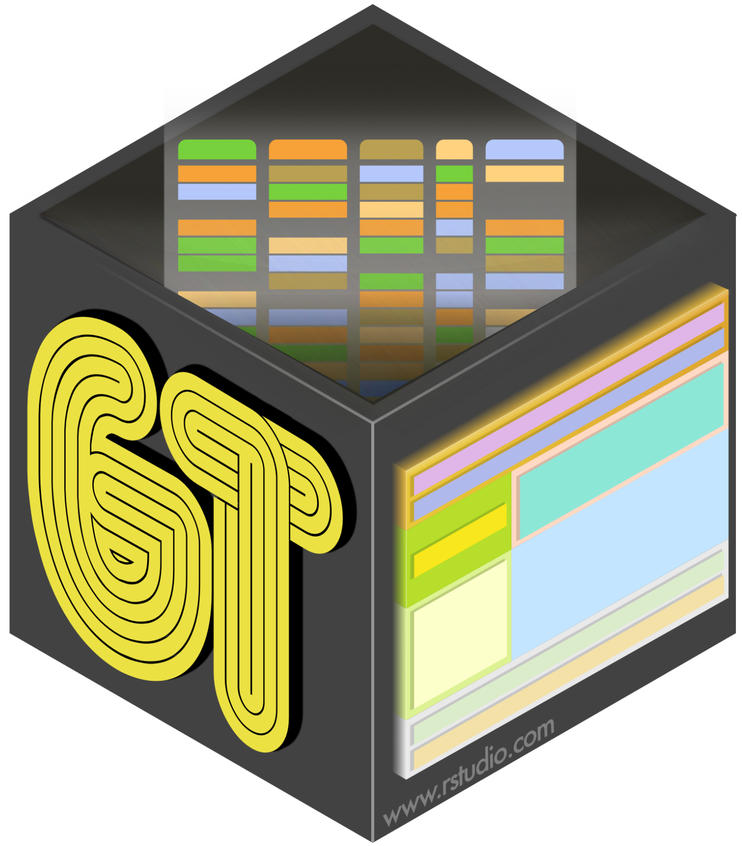

github.com/rstudio/gt