

# Package ‘lemon’

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**Type** Package

**Title** Freshing Up your 'ggplot2' Plots

**URL** <https://github.com/stefanedwards/lemon>

**BugReports** <https://github.com/stefanedwards/lemon/issues>

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**Description** Functions for working with legends and axis lines of 'ggplot2', facets that repeat axis lines on all panels, and some 'knitr' extensions.

**Depends** R (>= 3.1.0)

**Imports** ggplot2 (>= 3.3.0), plyr, grid, gridExtra, gtable, knitr (>= 1.12), lattice, scales, rlang

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'coord-flex.r' 'coord-capped.r' 'dot.r' 'facet-rep-lab.r'  
'facet-wrap.r' 'geom-pointline.r' 'lemon\_print.r'  
'geom-siderange.r' 'grob\_utils.r' 'gtable\_show-.r' 'legends.r'  
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**VignetteBuilder** knitr

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**Author** Stefan McKinnon Edwards [aut, ctb, cre]

(<<https://orcid.org/0000-0002-4628-8148>>),

Baptiste Auguie [ctb] (For `g_legend` and `grid_arrange_shared_legend`),

Shaun Jackman [ctb] (For `grid_arrange_shared_legend`),

Hadley Wickham [ctb] (ggplot2 functions),

Winston Chang [ctb] (ggplot2 functions)

**Maintainer** Stefan McKinnon Edwards <sme@iysik.com>

**Repository** CRAN

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---

.dot	<i>Create paths that are safe from changing working directory.</i>
------	--

---

### Description

The .dot functions creates functions that allows relative-like specification of paths, but are safe from changing working directory.

### Usage

```
.dot(x, root = getwd(), mustExist = FALSE, relative = FALSE, create = TRUE)
.dot2(names, quiet = FALSE, ...)
```

**Arguments**

x	File path that is appended to BASEDIR.
root	Root of your working directory, from which x is relative too.
mustExist	Logical value; if TRUE and the resulting path does not exist, it raises an error.
relative	For .dot, sets default for the returned function. For the returned function, when TRUE, the function returns a path relative to root.
create	Logical values, creates the target directory when TRUE (default).
names	Character vector of names
quiet	Logical value, suppresses output to stdout() when TRUE.
...	Arguments passed on to .dot.

**Value**

A function that returns file paths constructed from root, x, and ...

*Side effect:* It creates the directory.

**Examples**

```
## Not run:

.data <- .dot('data')
.data('input.txt')
.data(c('a.txt', 'b.txt'))

.dot2(c('rawdata', 'results'))
.rawdata('rawfile.csv')
.results('myresults.txt')

## End(Not run)
```

---

 annotate\_y\_axis

*Annotations in the axis*


---

**Description**

Annotations in the axis

**Usage**

```
annotate_y_axis(
  label,
  y,
  side = waiver(),
  print_label = TRUE,
  print_value = TRUE,
```

```

    print_both = TRUE,
    parsed = FALSE,
    ...
  )

  annotate_x_axis(
    label,
    x,
    side = waiver(),
    print_label = TRUE,
    print_value = TRUE,
    print_both = TRUE,
    parsed = FALSE,
    ...
  )

```

### Arguments

label	Text to print
y, x	Position of the annotation.
side	left or right, or top or bottom side to print annotation
print_label, print_value, print_both	Logical; what to show on annotation. Label and/or value. print_both is shortcut for setting both print_label and print_value. When both is TRUE, uses argument sep to separate the label and value.
parsed	Logical (default FALSE), when TRUE, uses mathplot for outputting expressions. See section "Showing values".
...	Style settings for label and tick: colour, hjust, vjust, size, fontface, family, rot. When waiver() (default), the relevant theme element is used.

Showing values: See [plotmath](#) for using mathematical expressions. The function uses a simple replacement strategy where the literal strings `.(y)` and `.(val)` are replaced by the value after round of to a number of digits, as given by argument `digits`.

### Examples

```

library(ggplot2)

p <- ggplot(mtcars, aes(mpg, hp, colour=disp)) + geom_point()

l <- p + annotate_y_axis('mark at', y=200, tick=TRUE)
l

(l + annotate_x_axis('| good economy ->', x=25, print_value=FALSE, hjust=0, tick=TRUE))

l + annotate_y_axis("x^2 == .(y)", y=180, parsed=FALSE, tick=FALSE) +
  annotate_y_axis("x^2 + bar(x) == .(y)", y=mean(mtcars$hp), parsed=TRUE, tick=TRUE)

l + annotate_y_axis("bar(x) == .(y)", y = mean(mtcars$hp), parsed=TRUE, tick=FALSE)

```

```
# use double equal signs, or the output becomes '=(...)' for some reason.

l + annotate_y_axis('this is midway', y=sum(range(mtcars$hp))/2, print_value = FALSE, side='left')

# work around if an axis only contains parsed expressions
p + annotate_y_axis("some long string", y=100, tick=FALSE, print_value=FALSE, colour=NA) +
  annotate_y_axis("bar(x) == .(y)", y = mean(mtcars$hp), parsed=TRUE, tick=FALSE)

# Works together with other functions
p <- p + theme_light() + theme(panel.border=element_blank(),
                               axis.line = element_line(),
                               axis.ticks = element_line(colour='black'))
p + coord_capped_cart(bottom='right') +
  annotate_y_axis('More than I\ncan afford', y=125,
                 print_value=FALSE, tick=TRUE)
```

---

brackets\_horizontal    *Axis brackets instead of axis ticks and lines*

---

## Description

To be used with [coord\\_flex\\_cart](#), [coord\\_capped\\_cart](#), etc. for displaying brackets instead of the axis ticks and lines.

## Usage

```
brackets_horizontal(
  direction = c("up", "down"),
  length = unit(0.05, "npc"),
  tick.length = waiver()
)

brackets_vertical(
  direction = c("left", "right"),
  length = unit(0.05, "npc"),
  tick.length = waiver()
)
```

## Arguments

direction	Which way should the opening side of the brackets point? up, down, left, or right?
length	Length of the unit, parallel with axis line.
tick.length	Height (width) of x-axis (y-axis) bracket. If <code>waiver()</code> (default), use <code>axis.ticks.length</code> from <a href="#">theme</a> .

**Details**

The looks of the brackets are taken from `theme(axis.ticks)`, or `theme(axis.ticks.x)` and `theme(axis.ticks.y)`, respectively.

It does not re-calculate tick marks, but lets `scale_x_*` and `scale_y_*` calculate and draw ticks and labels, and then modifies the ticks with brackets.

Both `length` and `tick.length` accepts a numeric scalar instead of a `unit` object that is interpreted as an "npc" unit.

**See Also**

[unit](#)

**Examples**

```
library(ggplot2)
p <- ggplot(mpg, aes(as.factor(cyl), hwy, colour=class)) +
  geom_point(position=position_jitter(width=0.3)) +
  theme_bw() +
  theme(panel.border = element_blank(), axis.line = element_line())
p

p <- p + coord_flex_cart(bottom=brackets_horizontal(length=unit(0.08, 'npc')))
p
# However getting the correct width is a matter of tweaking either length or
# position_jitter...

# A further adjustment,
p + theme(panel.grid.major.x = element_blank())
```

---

coord\_capped\_cart      *Cartesian coordinates with capped axis lines.*

---

**Description**

Caps the axis lines to the outer ticks to e.g. indicate range of values. Methods correspond to [coord\\_cartesian](#) and [coord\\_flip](#)

**Usage**

```
coord_capped_cart(
  xlim = NULL,
  ylim = NULL,
  expand = TRUE,
  top = waiver(),
  left = waiver(),
  bottom = waiver(),
  right = waiver(),
```

```

    gap = 0.01
  )

  coord_capped_flip(
    xlim = NULL,
    ylim = NULL,
    expand = TRUE,
    top = waiver(),
    left = waiver(),
    bottom = waiver(),
    right = waiver(),
    gap = 0.01
  )

  capped_horizontal(capped = c("both", "left", "right", "none"), gap = 0.01)

  capped_vertical(capped = c("top", "bottom", "both", "none"), gap = 0.01)

```

### Arguments

xlim, ylim	Limits for the x and y axes.
expand	If TRUE, the default, adds a small expansion factor to the limits to ensure that data and axes don't overlap. If FALSE, limits are taken exactly from the data or xlim/ylim.
top, left, bottom, right	Either a function returned from <a href="#">capped_horizontal</a> or <a href="#">brackets_horizontal</a> . If string, it is assumed to be shorthand for <code>capped_horizontal(capped)</code> or similar for vertical.
gap	Both ends are <i>always</i> capped by this proportion. Usually a value between 0 and 1.
capped	Which end to cap the line. Can be one of (where relevant): both, none, left, right, top, bottom.

### Details

This function is a simple override of [coord\\_flex\\_cart](#) and [coord\\_flex\\_flip](#), which allows shorthand specification of what to cap.

NB! A panel-border is typically drawn on top such that it covers tick marks, grid lines, and axis lines. Many themes also do not draw axis lines. To ensure the modified axis lines are visible, use `theme(panel.border=element_blank(), axis.lines=element_line())`.

### Examples

```

library(ggplot2)
# Notice how the axis lines of the following plot meet in the lower-left corner.
p <- ggplot(mtcars, aes(x = mpg)) + geom_dotplot() +
  theme_bw() +
  theme(panel.border=element_blank(), axis.line=element_line())

```

```

p

# We can introduce a gap by capping the ends:
p + coord_capped_cart(bottom='none', left='none')

# The lower limit on the y-axis is 0. We can cap the line to this value.
# Notice how the x-axis line extends through the plot when we no long
# define its capping.
p + coord_capped_cart(left='both')

# It it also works on the flipped.
p + coord_capped_flip(bottom='both')

# And on secondary axis, in conjunction with brackets:
p +
  scale_y_continuous(sec.axis = sec_axis(~.*100)) +
  scale_x_continuous(sec.axis = sec_axis(~1/., name='Madness scale')) +
  coord_capped_cart(bottom='none', left='none', right='both', top=brackets_horizontal())
# Although we cannot recommend the above madness.

```

---

 coord\_flex\_cart

*Cartesian coordinates with flexible options for drawing axes*


---

## Description

Allows user to inject a function for drawing axes, such as [capped\\_horizontal](#) or [brackets\\_horizontal](#).

## Usage

```

coord_flex_cart(
  xlim = NULL,
  ylim = NULL,
  expand = TRUE,
  top = waiver(),
  left = waiver(),
  bottom = waiver(),
  right = waiver()
)

coord_flex_flip(
  xlim = NULL,
  ylim = NULL,
  expand = TRUE,
  top = waiver(),
  left = waiver(),
  bottom = waiver(),
  right = waiver()
)

```



```

coord_flex_fixed(
  ratio = 1,
  xlim = NULL,
  ylim = NULL,
  expand = TRUE,
  top = waiver(),
  left = waiver(),
  bottom = waiver(),
  right = waiver()
)

```

### Arguments

xlim, ylim	Limits for the x and y axes.
expand	If TRUE, the default, adds a small expansion factor to the limits to ensure that data and axes don't overlap. If FALSE, limits are taken exactly from the data or xlim/ylim.
top, left, bottom, right	Function for drawing axis lines, ticks, and labels, use e.g. <a href="#">capped_horizontal</a> or <a href="#">brackets_horizontal</a> .
ratio	aspect ratio, expressed as y / x.

### Details

NB! A panel-border is typically drawn on top such that it covers tick marks, grid lines, and axis lines. Many themes also do not draw axis lines. To ensure the modified axis lines are visible, use `theme(panel.border=element_blank(), axis.line=element_line())`.

### User defined functions

The provided function in top, right, bottom, and left defaults to `panel_guides_grob` which is defined in 'gR/coord-cartesian.r'.

The provided function is with the arguments `scale_details`, `axis`, `scale`, `position`, and `theme`, and the function should return an `absoluteGrob` object.

For examples of modifying the drawn object, see e.g. [capped\\_horizontal](#) or [brackets\\_horizontal](#).

### Examples

```

library(ggplot2)
# A standard plot
p <- ggplot(mtcars, aes(displ, wt)) +
  geom_point() +
  geom_smooth() + theme(panel.border=element_blank(), axis.line=element_line())

# We desire that left axis does not extend beyond '6'
# and the x-axis is unaffected
p + coord_capped_cart(left='top')

```

```

# Specifying 'bottom' caps the axis with at most the length of 'gap'
p + coord_capped_cart(left='top', bottom='none')

# We can specify a ridiculous large 'gap', but the lines will always
# protrude to the outer most ticks.
p + coord_capped_cart(left='top', bottom='none', gap=2)

# We can use 'capped_horizontal' and 'capped_vertical' to specify for
# each axis individually.
p + coord_capped_cart(left='top', bottom=capped_horizontal('none', gap=2))

# At this point we might as well drop using the short-hand and go full on:
p + coord_flex_cart(left=brackets_vertical(), bottom=capped_horizontal('left'))

# Also works with secondary axes:
p + scale_y_continuous(sec.axis=sec_axis(~5*., name='wt times 5')) +
  coord_flex_cart(left=brackets_vertical(), bottom=capped_horizontal('right'),
  right=capped_vertical('both', gap=0.02))

# Supports the usual 'coord_fixed':
p + coord_flex_fixed(ratio=1.2, bottom=capped_horizontal('right'))

# and coord_flip:
p + coord_flex_flip(ylim=c(2,5), bottom=capped_horizontal('right'))

```

---

element\_render

*Render a ggplot2 grob or retrieve its gpar object.*


---

## Description

Helps add the ggplot2-theme's look-and-feel to grid's grob objects. `render_gpar` returns a [gpar](#)-object, `element_render` returns a [grid.grob](#)-object.

## Usage

```
element_render(theme, element, ..., name = NULL)
```

```
render_gpar(theme, element, ...)
```

## Arguments

theme	A ggplot2 <a href="#">theme</a>
element	The name of an element in the theme, e.g. "axis.text".
...	Additional arguments sent to grobs (e.g. x or y).
name	Returned grob's name..

**Value**

A `grid.grob` or `gpar` object.

**Author(s)**

`element_render` is from `ggplot2` source.

**See Also**

[theme](#)

---

<code>facet_rep_grid</code>	<i>Repeat axis lines and labels across all facet panels</i>
-----------------------------	---

---

**Description**

[facet\\_grid](#) and [facet\\_wrap](#), but with axis lines and labels preserved on all panels.

**Usage**

```
facet_rep_grid(..., repeat.tick.labels = FALSE)
```

```
facet_rep_wrap(..., scales = "fixed", repeat.tick.labels = FALSE)
```

**Arguments**

`...` Arguments used for [facet\\_grid](#) or [facet\\_wrap](#).

`repeat.tick.labels`

When FALSE (default), axes on inner panels have their tick labels (i.e. the numbers) removed. Set this to TRUE to keep all labels, or any combination of top, bottom, left, right to keep only those specified. Also accepts 'x' and 'y'.

`scales`

As for [facet\\_grid](#), but alters behaviour of `repeat.tick.labels`.

**Details**

These two functions are extensions to [facet\\_grid](#) and [facet\\_wrap](#) that keeps axis lines, ticks, and optionally tick labels across all panels.

Examples are given in the vignette "[Repeat axis lines on facet panels](#)" vignette.

---

geom_pointpath	<i>Connected points</i>
----------------	-------------------------

---

### Description

geom\_pointpath combines [geom\\_point](#) and [geom\\_path](#), such that a) when jittering is used, both lines and points stay connected, and b) provides a visual effect by adding a small gap between the point and the end of line. geom\_pointline combines [geom\\_point](#) and [geom\\_path](#).

### Usage

```
geom_pointpath(  
  mapping = NULL,  
  data = NULL,  
  stat = "identity",  
  position = "identity",  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  distance = unit(3, "pt"),  
  shorten = 0.5,  
  threshold = 0.1,  
  lineend = "butt",  
  linejoin = "round",  
  linemitre = 1,  
  linesize = 0.5,  
  linecolour = waiver(),  
  linecolor = waiver(),  
  arrow = NULL,  
  ...  
)
```

```
geom_pointline(  
  mapping = NULL,  
  data = NULL,  
  stat = "identity",  
  position = "identity",  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  distance = unit(3, "pt"),  
  shorten = 0.5,  
  threshold = 0.1,  
  lineend = "butt",  
  linejoin = "round",  
  linemitre = 1,  
  linesize = 0.5,
```

```

    linecolour = waiver(),
    linecolor = waiver(),
    arrow = NULL,
    ...
)

geom_pointrangeline(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE,
  distance = unit(3, "pt"),
  lineend = "butt",
  linejoin = "round",
  linemitre = 1,
  linesize = 0.5,
  linecolour = waiver(),
  linecolor = waiver(),
  arrow = NULL,
  ...
)

```

### Arguments

mapping	Set of aesthetic mappings created by <code>aes</code> or <code>aes_</code> .
data	The data to be displayed in this layer.
stat	The statistical transformation to use on the data for this layer, as a string.
position	Position adjustment, either as a string, or the result of a call to a position adjustment function (e.g. <code>position_jitter</code> ). Both lines and points gets the same adjustment ( <i>this</i> is where the function excels over <code>geom_point()</code> + <code>geom_line()</code> ).
na.rm	If FALSE (default), missing values are removed with a warning. If TRUE, missing values are silently removed.
show.legend	Logical. Should this layer be included in the legends? NA (default), includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes.
inherit.aes	If FALSE, overrides the default aesthetic, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification.
distance	Gap size between point and end of lines; use <code>unit</code> . Is converted to 'pt' if given as simple numeric. When NULL or NA, gapping and shorten/treshold is disabled. To keep the latter, set to 0.
shorten, threshold	When points are closer than threshold, shorten the line by the proportion in shorten instead of adding a gap by distance.

lineend	Line end style (round, butt, square).
linejoin	Line join style (round, mitre, bevel).
linemitre	Line mitre limit (number greater than 1).
linesize	Width of of line.
linecolour, linecolor	When not waiver(), the line is drawn with this colour instead of that set by aesthetic colour.
arrow	Arrow specification, as created by <a href="#">arrow</a> .
...	other arguments passed on to <a href="#">layer</a> .

### Details

geom\_pointpath connects the observations in the same order in which they appear in the data. geom\_pointline connects them in order of the variable on the x-axis.

Both geom\_pointpath and geom\_pointline will only connect observations within the same group! However, if linecolour is *not* waiver(), connections will be made between groups, but possible in an incorrect order.

### Aesthetics

geom\_pointline and geom\_pointpath understands the following aesthetics (required aesthetics are in bold):

- **x**
- **y**
- alpha
- colour – sets colour of point. Only affects line if linecolour=waiver().
- stroke
- shape
- stroke
- group
- linetype
- size – only affects point size. Width of line is set with linesize and cannot be linked to an aesthetic.

### Examples

```
# geom_point examples
library(ggplot2)

p <- ggplot(mtcars, aes(wt, mpg))
p + geom_point() + geom_line()
p + geom_pointline()

p + geom_pointline(linecolour='brown')
```

```

p + geom_pointpath()

# Add aesthetic mappings
p + geom_pointline(aes(colour = factor(cyl)))
# Using linecolour preserved groups.
p + geom_pointline(aes(colour = factor(cyl)), linecolour='brown')

## If you want to combine the pretty lines of pointline that do *not* respect
## grouping (or order), combine several layers with geom_point on top:
p + geom_pointline() + geom_point(aes(colour=factor(cyl)))

# Change scales
p + geom_pointline(aes(colour = cyl)) + scale_colour_gradient(low = "blue")
p + geom_pointline(aes(colour = cyl), linecolour='black') + scale_colour_gradient(low = "blue")
p + geom_pointline(aes(shape = factor(cyl))) + scale_shape(solid = FALSE)

# For shapes that have a border (like 21), you can colour the inside and
# outside separately. Use the stroke aesthetic to modify the width of the
# border
ggplot(mtcars, aes(wt, mpg)) +
  geom_pointline(shape = 21, colour = "black", fill = "white",
                size = 5, stroke = 5, distance = unit(10, 'pt'))

## Another example
df <- data.frame(x=rep(c('orange','apple','pear'), each=3),
                 b=rep(c('red','green','purple'), times=3), y=runif(9))
ggplot(df, aes(x=x, y=y, colour=b, group=b)) +
  geom_pointline(linesize=1, size=2, distance=6) + theme_bw()

# geom_pointline() is suitable for time series
ggplot(economics, aes(date, unemploy)) + geom_pointline()
ggplot(economics_long, aes(date, value01, colour = variable)) +
  geom_pointline()

```

---

geom\_siderange

*Display range of data in side of plot*


---

## Description

Projects data onto horizontal or vertical edge of panels.

## Usage

```

geom_siderange(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...,
  distance = 3,

```

```

  arrow = NULL,
  lineend = "butt",
  sides = "bl",
  start = NA,
  end = NA,
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE
)

```

### Arguments

mapping	Set of aesthetic mappings created by <a href="#">aes</a> or <a href="#">aes_</a> .
data	The data to be displayed in this layer.
stat	The statistical transformation to use on the data for this layer, as a string.
position	Position adjustment, either as a string, or the result of a call to a position adjustment function (e.g. <a href="#">position_jitter</a> ). Both lines and points gets the same adjustment ( <i>this</i> is where the function excels over <code>geom_point()</code> + <code>geom_line()</code> ).
...	other arguments passed on to <a href="#">layer</a> .
distance	Distance between edge of panel and lines, and distance between lines, in multiples of line widths, see description.
arrow	Arrow specification, as created by <a href="#">arrow</a> .
lineend	Line end style (round, butt, square).
sides	Character including <b>top</b> , <b>right</b> , <b>bottom</b> , and/or <b>left</b> , indicating which side to project data onto.
start, end	Adds a symbol to either end of the siderange. <code>start</code> corresponds to minimal value, <code>end</code> to maximal value.
na.rm	If FALSE (default), missing values are removed with a warning. If TRUE, missing values are silently removed.
show.legend	Logical. Should this layer be included in the legends? NA (default), includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes.
inherit.aes	If FALSE, overrides the default aesthetic, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification.

### Details

The `geom_siderange` projects the data displayed in the panel onto the sides, using the same aesthetics. It has the added capability of putting a symbol at either end of the line, and lines are offset from the edge and each other.

To display a symbol, specify an integer for either `start` or `end`. See the list for `pch` in [points](#) for values to use. The arguments `start` and `end` also accepts a list object with named entries `pch`, `alpha`, `stroke`, and `fill`, which correspond to the usual aesthetics, as well as a special named entry, `sizer` (note the extra `'r'`). This last entry is a multiplier for enlarging the symbol relative to the linewidth, as the aesthetic `size` affects both linewidth and symbol size.



The distance between the panel's edge and sideranges are specified by the argument `distance`. If a symbol is specified, the linewidth is further expanded to cover the width of the symbol (including `sizer`).

### Aesthetics

The geom understands the following aesthetics (required are in bold):

- **x**
- **y**
- alpha
- colour
- fill (if a symbol is applied with `start` or `end`)
- group
- linetype
- size
- stroke

### See Also

[geom\\_rug](#)

### Examples

```
library(ggplot2)

x <- rnorm(25)
df <- data.frame(x=x, y=x+rnorm(25, sd=0.2),
                 a=sample(c('horse','goat'), 25, replace=TRUE),
                 stringsAsFactors = FALSE)
df$y <- with(df, ifelse(y > 1 & a=='horse', 1, y))
(p <- ggplot(df, aes(x=x, y=y, colour=a)) + geom_point(shape=1))

p + geom_siderange(start=19)

# Capping the sideranges with different symbols:
p + geom_siderange(start=19, end=22, fill='black', sides='b') + geom_siderange(sides='tl')

# It also works with facets

p <- ggplot(mpg, aes(displ, hwy, colour=fl)) +
  geom_point() +
  facet_wrap(~class, nrow = 4)

p + geom_siderange()
```

---

get_panel_range	<i>Version safe(r) method to get the y- and x-range from trained scales.</i>
-----------------	--

---

**Description**

The names of the internal layout objects from `ggplot_build` changed slightly.

**Usage**

```
get_panel_y_range(layout, index = 1)
```

```
get_panel_x_range(layout, index = 1)
```

```
get_panel_params(layout, index = 1)
```

**Arguments**

layout	layout part from <code>ggplot_build</code>
index	Could be panel number?

---

grid_arrange_shared_legend	<i>Share a legend between multiple plots</i>
----------------------------	--

---

**Description**

Extract legend, combines plots using `arrangeGrob` / `grid.arrange`, and places legend in a margin.

**Usage**

```
grid_arrange_shared_legend(
  ...,
  ncol = length(list(...)),
  nrow = 1,
  position = c("bottom", "right", "top", "left"),
  plot = TRUE
)
```

**Arguments**

...	Objects to plot. First argument should be a <code>ggplot2</code> object, as the legend is extracted from this. Other arguments are passed on to <code>arrangeGrob</code> , including named arguments that are not defined for <code>grid_arrange_shared_legend</code> . <code>ggplot2</code> objects have their legends hidden.
ncol	Integer, number of columns to arrange plots in.

nrow	Integer, number of rows to arrange plots in.
position	'bottom' or 'right' for positioning legend.
plot	Logical, when TRUE (default), draws combined plot on a new page.

**Value**

gtable of combined plot, invisibly. Draw gtable object using `grid.draw`.

**Author(s)**

Originally brought to you by [Baptiste Augu  ](https://github.com/tidyverse/ggplot2/wiki/Share-a-legend-between-two-ggplot2-graphs) (<https://github.com/tidyverse/ggplot2/wiki/Share-a-legend-between-two-ggplot2-graphs>) and [Shaun Jackman](#) ([original](#)). Stefan McKinnon Edwards added left and top margins.

**See Also**

[g\\_legend](#), [reposition\\_legend](#)

**Examples**

```
library(ggplot2)
dsamp <- diamonds[sample(nrow(diamonds), 300), ]
p1 <- qplot(carat, price, data = dsamp, colour = clarity)
p2 <- qplot(cut, price, data = dsamp, colour = clarity)
p3 <- qplot(color, price, data = dsamp, colour = clarity)
p4 <- qplot(depth, price, data = dsamp, colour = clarity)
grid_arrange_shared_legend(p1, p2, p3, p4, ncol = 4, nrow = 1)
grid_arrange_shared_legend(p1, p2, p3, p4, ncol = 2, nrow = 2)

# Passing on plots in a grob are not touched
grid_arrange_shared_legend(p1, gridExtra::arrangeGrob(p2, p3, p4, ncol=3), ncol=1, nrow=2)

# We can also pass on named arguments to arrangeGrob:
title <- grid::textGrob('This is grob', gp=grid::gpar(fontsize=14, fontface='bold'))
nt <- theme(legend.position='none')
grid_arrange_shared_legend(p1,
  gridExtra::arrangeGrob(p2+nt, p3+nt, p4+nt, ncol=3), ncol=1, nrow=2,
  top=title)
```

---

`gtable_show_grill`      *Visualise underlying gtable layout.*

---

**Description**

Visualises the table structure or the names of the gtable's components.

## Usage

```
gtable_show_grill(x, plot = TRUE)

gtable_show_names(
  x,
  plot = TRUE,
  rect.gp = grid::gpar(col = "black", fill = "white", alpha = 1/4)
)
```

## Arguments

x	A gtable object. If given a ggplot object, it is converted to a gtable object with <a href="#">ggplotGrob</a> .
plot	Logical. When TRUE (default), draws resulting gtable object on a new page.#'
rect.gp	Graphical parameters ( <a href="#">gpar</a> ) for background drop.

## Details

These functions are highly similar to [gtable\\_show\\_layout](#). `gtable_show_grill` draws the grid of the underlying table, and places row and column indices in the margin. `gtable_show_names` replaces the grobs with a semi-transparent rectangle and the component's name.

## Value

Modified gtable object, invisibly.

## Examples

```
library(ggplot2)
library(gtable)
library(grid)

p <- ggplot(mtcars, aes(wt, mpg)) + geom_point()

gtable_show_grill(p)
library(ggplot2)
library(gtable)
library(grid)

p <- ggplot(mtcars, aes(wt, mpg)) + geom_point()

gtable_show_names(p)
```

---

guidebox_as_column	<i>Guidebox as a column</i>
--------------------	-----------------------------

---

### Description

Takes a plot or legend and returns a single guide-box in a single column, for embedding in e.g. tables.

### Usage

```
guidebox_as_column(legend, which.legend = 1, add.title = FALSE)
```

### Arguments

legend	A ggplot2 plot or the legend extracted with <a href="#">g_legend</a> . <i>Do not</i> provide a <a href="#">ggplotGrob</a> as it is indistinguishable from a legend.
which.legend	Integer, a legend can contain multiple guide-boxes (or vice versa?). Use this argument to select which to use.
add.title	Does nothing yet.

### Value

A [gtable](#) with keys and labels reordered into a single column and each pair of keys and labels in the same cell.

### See Also

[g\\_legend](#)

### Examples

```
library(ggplot2)
library(dplyr)

p <- ggplot(diamonds, aes(x=x, y=y, colour=cut)) + geom_point()
guidebox_as_column(p)
p <- p + guides(colour=guide_legend(ncol=2, byrow=TRUE))
guidebox_as_column(p)
```

---

`g_legend`*Extract ggplot legends*

---

**Description**

Extracts the legend ('guide-box') from a ggplot2 object.

**Usage**

```
g_legend(a.gplot)
```

**Arguments**

`a.gplot` ggplot2 or gtable object.

**Details**

The extraction is applied *after* the plot is trained and themes are applied. Modifying the legend is easiest by applying themes etc. to the ggplot2 object, before calling `g_legend`.

An alternative method for extracting the legend is using `gtable::gtable_filter`:

```
gtable_filter(ggplotGrob(a.ggplot.obj), 'guide-box')
```

This method however returns a `gtable` object which encapsulates the entire legend. The legend itself may be a collection of `gtable`. We have only noticed a problem with this extra layer when using the returned legend with `arrangeGrob` (see examples).

**Value**

`gtable` (grob) object. Draw with `grid.draw`.

**Author(s)**

Baptiste Augu  

**See Also**

[grid\\_arrange\\_shared\\_legend](#), [reposition\\_legend](#), [gtable\\_filter](#)

**Examples**

```
library(ggplot2)
library(gtable)
library(grid)
library(gridExtra)
library(gtable)
dsamp <- diamonds[sample(nrow(diamonds), 1000), ]
(d <- ggplot(dsamp, aes(carat, price)) +
```

```

geom_point(aes(colour = clarity)) +
  theme(legend.position='bottom'))

legend <- g_legend(d)
grid.newpage()
grid.draw(legend)

(d2 <- ggplot(dsamp, aes(x=carat, fill=clarity)) +
  geom_histogram(binwidth=0.1) +
  theme(legend.position='bottom'))

grid.arrange(d + theme(legend.position='hidden'),
             d2 + theme(legend.position='hidden'),
             bottom=legend$grobs[[1]])
# Above fails with more than one guide

legend2 <- gtable_filter(ggplotGrob(d), 'guide-box')
grid.arrange(d + theme(legend.position='hidden'),
             d2 + theme(legend.position='hidden'),
             bottom=legend2$grobs[[1]]$grobs[[1]])
# Above fails with more than one guide

```

---

is.small

*Is a given unit 'small'?*


---

### Description

Uses a holistic approach to determine whether a unit is 'small', i.e. less than 1 cm, 1 line, 10 pt, or 0.4 in.

### Usage

```
is.small(x)
```

### Arguments

x                    A unit.

### Details

Based on arbitrarily chosen definitions of 'small', this function can return TRUE or FALSE if a unit is 'small'.

So far, less than 1 cm, 1 line, 10 pt, or 0.4 inches is defined as being 'small'. Unresolved sizes, such as 'grobheight', 'grobwidth', or 'null' are not small. Units based on arithmetic, such as sum of multiple units, are also *not* small. NAs are returned for undecided sizes.

**Value**

Logical or NA.

---

lemon

*Freshing up your ggplots*

---

**Description**

Collection of misc. functions for changing subtle aspects of ggplots. Works mostly on gtables produced prior to printing.

**Functions for axis**

See [coord\\_capped\\_cart](#) and [coord\\_flex\\_cart](#). The latter is a shorthand version of the former. It automatically uses [capped\\_horizontal](#) and [capped\\_vertical](#), but both accepts these as well as [brackets\\_horizontal](#) and [brackets\\_vertical](#).

**Legends**

**Extract legend** [g\\_legend](#)

**Many plots, one legend** [grid\\_arrange\\_shared\\_legend](#)

**Place legend exactly on plot** [reposition\\_legend](#)

**Facets**

[facet\\_rep\\_grid](#) and [facet\\_rep\\_wrap](#) are extensions to the wellknown [facet\\_grid](#) and [facet\\_wrap](#) where axis lines and labels are drawn on all panels.

**Extending knitr**

We automatically load knitr's [knit\\_print](#) for data frames and dplyr tables to provide automatic pretty printing of data frame using [kable](#).

See [lemon\\_print](#) or `vignette('lemon_print', 'lemon')`.

Relative paths safe from hanging directory: `.dot`.

**Author(s)**

Stefan McKinnon Edwards <sme@iysik.com>

Contributions from [Baptiste Augu  ](#) on [g\\_legend](#) and [grid\\_arrange\\_shared\\_legend](#).

Contributions from [Shaun Jackman](#) on [grid\\_arrange\\_shared\\_legend](#).

**Source**

<https://github.com/stefanedwards/lemon>



**See Also**

Useful links:

- <https://github.com/stefanedwards/lemon>
- Report bugs at <https://github.com/stefanedwards/lemon/issues>

---

lemon\_print

*knitr extension: Always use 'kable' for data frames.*

---

**Description**

Convenience function for working with R Notebooks that ensures data frames (and dplyr tables) are printed with [kable](#) while allowing RStudio to render the data frame dynamically for inline display.

**Usage**

```
lemon_print(x, options, ...)

## S3 method for class 'data.frame'
lemon_print(x, options, ...)

## S3 method for class 'table'
lemon_print(x, options, ...)
```

**Arguments**

x	an data frame or dplyr table object to be printed
options	Current chunk options are passed through this argument.
...	Ignored for now.

**Details**

These functions divert data frame and summary output to [kable](#) for nicely printing the output.

For *options to kable*, they can be given directly as chunk-options (see arguments to [kable](#)), or though as a list to a special chunk-option `kable.opts`.

For more examples, see `vignette('lemon_print', package='lemon')`.

**Knitr usage**

To use for a single chunk, do

```
```{r render=lemon_print,caption='My data frame'}
data.frame
```
```

**Note:** We are *not* calling the function, but instead referring to it.

An alternate route for specifying `kable` arguments is as:

```
```{r render=lemon_print,kable.opts=list(align='l')}
data.frame
```
```

The option `kable.opts` takes precedence over arguments given directly as chunk-options.

To enable as default printing method for *all chunks*, include

```
knit_print.data.frame <- lemon_print
knit_print.table <- lemon_print
knit_print.grouped_df <- lemon_print # enables dplyr results
knit_print.tibble <- lemon_print
knit_print.tbl <- lemon_print
```

**Note:** We are *not* calling the function, but instead assigning the `knit_print` functions for some classes.

To disable, temporarily, specify chunk option:

```
```{r render=normal_print}`
data.frame
```
```

## See Also

[knit\\_print](#), [kable](#)

---

`remove_labels_from_axis`

*Removes labels from axis grobs.*

---

## Description

Called from `FacetGridRepeatLabels`.

## Usage

```
remove_labels_from_axis(axisgrob)
```

## Arguments

`axisgrob`      Grob with an axis.

---

reposition_legend	<i>Reposition a legend onto a panel</i>
-------------------	---

---

### Description

Repositions a legend onto a panel, by either taking it from the same ggplot, or by using another. Works on both ggplot2 and gtable objects, and can accept any grob as legend.

### Usage

```
reposition_legend(
  aplot,
  position = NULL,
  legend = NULL,
  panel = "panel",
  x = NULL,
  y = NULL,
  just = NULL,
  name = "guide-box",
  clip = "on",
  offset = c(0, 0),
  z = Inf,
  plot = TRUE
)
```

### Arguments

aplot	a ggplot2 or gtable object.
position	Where to place the legend in the panel. Overrides just argument.
legend	The legend to place, if NULL (default), it is extracted from aplot if this is a ggplot2 object.
panel	Name of panel in gtable. See description.
x	horizontal coordinate of legend, with 0 at left.
y	vertical coordinate of legend, with 0 at bottom.
just	'Anchor point' of legend; it is this point of the legend that is placed at the x and y coordinates.
name, clip	Parameters forwarded to <a href="#">gtable_add_grob</a> .
offset	Numeric vector, sets distance from edge of panel. First element for horizontal distance, second for vertical. Not used by arguments x and y.
z	Z-level of legend. When Inf (default), legend is placed just <i>under</i> the axis-lines. If you want it on top of everything, use a sufficient large number, but not Inf.
plot	Logical, when TRUE (default), draws plot with legend repositioned on a new page.

**Details**

To modify the look of the legend, use themes and the natural ggplot functions found in [guide\\_legend](#).

*Positioning* is done by argument `position` which places the panel relative in panel (see below). `position` resolves to three variables, `x`, `y`, and `just`. `x` and `y` is the coordinate in panel, where the anchorpoint of the legend (set via `just`) is placed. In other words, `just='bottom right'` places the bottom right corner of the legend at coordinates  $(x, y)$ .

The positioning can be set by argument `position` alone, which can be further nudged by setting `position`, `x`, and `y`. Alternatively, manually positioning can be obtained by setting arguments `x`, `y`, and `just`.

*Panel* name is by default `panel`, but when using facets it typically takes the form `panel-{col}-{row}`, but not for wrapped facets. Either print result from `ggplotGrob` or use `gtable_show_names` to display all the names of the `gtable` object.

`panel` takes multiple names, and will then use these components' extremes for placing the legend.

If `panel` is an integer vector of length 2 or 4, these elements are used directly for top-left and bottom-right coordinates.

**Value**

`gtable` object, invisibly, with legend repositioned. Can be drawn with `grid.draw`.

**Author(s)**

Stefan McKinnon Edwards <[sme@iysik.com](mailto:sme@iysik.com)>

**See Also**

[g\\_legend](#), [grid\\_arrange\\_shared\\_legend](#)

**Examples**

```
library(ggplot2)
dsamp <- diamonds[sample(nrow(diamonds), 1000), ]
(d <- ggplot(dsamp, aes(carat, price)) +
  geom_point(aes(colour = clarity)))

reposition_legend(d + theme(legend.position='bottom'), 'bottom right')

# To change the orientation of the legend, use theme's descriptors.
reposition_legend(d + theme(legend.position='bottom'), 'top left')

# Use odd specifications, here offset the legend with half its height from the bottom.
reposition_legend(d + theme(legend.position='bottom'), x=0.3, y=0, just=c(0, -0.5))

# For using with facets, use gtable_show_names to find the panel's name:

gtable_show_names(d + facet_grid(.~cut))
panel_name <- ifelse(packageVersion("ggplot2") >=
  package_version("3.3.1"), 'panel-1-5', 'panel-3-1')
reposition_legend(d + facet_grid(.~cut), 'top left', panel = panel_name)
```

---

scale_x_symmetric	<i>Symmetrix position scale for continuous x and y</i>
-------------------	--

---

### Description

scale\_x\_symmetric and scale\_y\_symmetric are like the default scales for continuous x and y, but ensures that the resulting scale is centered around mid. Does not work when setting limits on the scale.

### Usage

```
scale_x_symmetric(mid = 0, ...)
```

```
scale_y_symmetric(mid = 0, ...)
```

### Arguments

mid	Value to center the scale around.
...	Values passed on to <a href="#">scale_continuous</a> .

### Examples

```
library(ggplot2)
df <- expand.grid(a=c(-1,0,1), b=c(-1,0,1))
rnorm2 <- function(x,y,n,sdx,sdy) {
  if (missing(sdy))
    sdy <- sdx
  data.frame(a=x,b=y,x=rnorm(n,x,sdx), y=rnorm(n,y,sdy))
}
df <- mapply(rnorm2,df$a, df$b, MoreArgs=list(n=30,sdx=1),SIMPLIFY=FALSE)
df <- do.call(rbind, df)
(p <- ggplot(df, aes(x=x,y=y)) + geom_point() +
  facet_grid(a~b, scales='free_x')
)
p + scale_x_symmetric(mid=0)
```

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