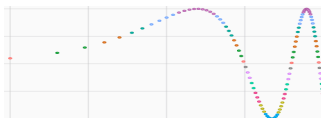


# Gadfly Reference Card v0.9

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## 1 Introduction

Gadfly was developed by Daniel Jones to provide a system for plotting and visualization based on ggplot2 and the book "The Grammar of Graphics". Details and examples can be found in the manual. <http://dcjones.github.io/Gadfly.jl>

Grammar represents an abstraction of objects aiming to shorten the distance from mind to page by mapping data to aesthetic attributes and geometric objects. Think of looking at how y changes with x across levels of z.

Pkg.add("Gadfly") to install  
Load with using Gadfly

## 2 Invoking Plot .

This form is the standard "grammar of graphics" method of plotting. Data is supplied in the form of a dataframe, columns of the data are bound to *aesthetics*, and plot elements including *scales*, *coordinates*, *statistics*, *guides*, and *geometries* are added to the plot.

**Conventional** with dataframes

```
plot(data::AbstractDataFrame, elements::Element...; mapping...)
plot(dfname, x="c1", y="c2")           generates plot of y vs x with points
plot(dfname, x="c1", y="c2", Geom.lines) generates plot of y vs x with lines
plot(df ..., color="c3", ...point)    add colors based on categories in c3
```

**Traditional** with vectors (columns)

```
plot(elements::Element...; mapping...)
plot(x=collect(1:20), y=fn(same length)) using arrays
```

**Functions and Expressions**

```
plot(f::Function, a, b, elements::Element...)
@plot(expr, a, b)
plot([sin, cos], 0, 10pi)               Plot sin and cos of 0 to 10pi radians
```

```
set_default_plot_size(1cm, 8cm)         Set the default plot size
```

## 3 Modifying Aesthetics

```
plot(..., color="c3", ...)              color based on categories in c3
middle, lower_hinge, upper_hinge,       aesthetics for box plots
lower_fence, upper_fence, outliers
x_min, x_max, y_min, y_max               aesthetics for rectbin
x, x_min, x_max, y, y_min, y_max         aesthetics for error bars
```

Themes are covered in section 9

## 4 Geometries do the actual drawing

```
plot(..., Geom.point, ...)              use points (default)
plot(..., Geom.lines, ...)              use lines
plot(..., Geom.histogram(bincount=10))  use histogram
plot(..., Geom.bar, ...)                 bar chart
plot(..., Geom.bar, Geom.errorbar)       if colored, position=:stack or :dodge
plot(..., Geom.rectbin, color="c3")      use colored 2d rectangles
plot(x=1:length(sds), y=ys, ymin=ymins, plot error bars
      ymax=ymaxs, Geom.point, Geom.errorbar)
```

```
plot(...color="c3", Geom.point, Geom.smooth) add loess smoothing of chart points
plot(..., yintercept=[1.0, 2.0],           add horizontal line(s) to chart
      Geom.hline(color="red", size=3mm))
plot(..., xintercept=[1.0, 2.0], Geom.vline) add vertical line(s) to chart
other variations                          see statistics
```

## 4 Statistics transform one or more aesthetics

```
Stat.boxplot                             outputs the middle, and upper and
plot(dfname, x="c1", y="c2", Geom.boxplot) lower hinge, and upper and lower
                                           fence aesthetics
Stat.density                             output line with kernel density
plot(df, x="price", Geom.density)         estimate from data
Geom.rectbin with Stat.histogram2d        heatmap style with density as colour
plot(dfname, x="c1", Geom.histogram2d)
Geom.line with Stat.smooth                smoothing of data; method (loess);
plot(...color="c3", Geom.point, Geom.smooth) smoothing=blahblah
```

## 5 Guides draw graphics to support the visualization such as axis ticks, labels and keys

```
plot(..., Guide.xlabel="Time")           and ylabel; override auto-labelling
plot(..., Guide.colorkey("Key Title"))
```

## 6 Scales transform the data to aid visualization

```
Scale.x_discrete                         categorical - equally spaced coords
Scale.x_continuous( ... )               continuous variables (x and y)
    minvalue, maxvalue,                 aesthetics
    format=:scientific (or :plain or :auto)
Scale.x_log10   Scale.y_log10           apply logarithmic scaling to axis
Scale.x_log2,   Scale.x_log
Scale.x_asinh,   Scale.x_sqrt
```

## 7 Showing Facets and Layers

```
Facets are supported with subplot_grid
set_default_plot_size(20cm, 30cm)       Set plot size for multiple facets
plot(df, xgroup="c4", ygroup="c5", x="c1", Plot grouped subplots
      y="c2", Geom.subplot_grid(Geom.point))
layer(x="c1", y="c2, Geom.point, color="c3") for each of many layers on one chart
```

## 8 Output to other Formats

```
draw(PNG("myplot.svg", 6inch, 3inch), plot(...)) Also PNG, PDF, SVG and PS
draw(D3("myplot.js", 15cm, 20cm), plot(...))
```

## 9 Themes

Many parameters controlling the appearance of plots can be overridden by passing a Theme object to the plot function.

default_point_size	Size of points in the point and boxplot geometry. (Measure)
line_width	Width of lines in the line geometry. (Measure)
panel_fill	Background color used in the main plot panel. (ColorValue or Nothing)
panel_stroke	Border color of the main plot panel. (ColorValue or Nothing)
default_color	When the color aesthetic is not bound, geometry uses this color for drawing. (ColorValue)
grid_color	Color of grid lines. (ColorValue or Nothing)
grid_color_focused	In the D3 backend, mousing over the plot makes the grid lines emphasised by transitioning to this color. (ColorValue or Nothing)
grid_line_width	Width of grid lines. (Measure)
minor_label_font	Font used for minor labels such as guide entries and labels. (String)
minor_label_font_size	Font size used for minor labels. (Measure)
minor_label_color	Color used for minor labels. (ColorValue)
major_label_font	Font used for major labels usch as guide titles and axis labels. (String)
major_label_font_size	Font size used for major labels. (Measure)
major_label_color	Color used for major labels. (ColorValue)
guide_label_position	Justification (default or :left)
bar_spacing	Spacing between bars in Geom.bar. (Measure)
boxplot_spacing	Spacing between boxplots in Geom.boxplot. (Measure)
errorbar_cap_length	Length of caps on error bars. (Measure)
highlight_width	Width of lines drawn around plot geometry like points, and boxplot rectangles. (Measure)
highlight_color	Color used to outline plot geometry. This is a function that alters (e.g. darkens) the fill color of the geometry. (Function)
middle_color	Color altering function used to draw the midline in boxplots. (Function)
middle_width	Width of the middle line in boxplots. (Measure)
colorkey_swatch_shape	Shape of color key (default or :circle)

Example: Theme(guide\_label\_position=:left, default\_point\_size=1mm)