D3 Cheatsheet by Blair Labatt III, page 1 of 2

D3 is rigorously declarative, but not purely functional. Most of the work is done in stateful "function objects", of which \exists 4 main types:

• Factory_F: implement prescribed APIs

- Generator_G: Generate concrete visualization code (SVG, Canvas) from passed data
- Layout_L: Transform passed dataset to include additional visual layout information
- Component_C: Manipulate the DOM Subscripts are used herein to categorize D3 functions according to the above taxonomy.

1 Data Joining & Selections

Selecting [d3

Create a selection with one of the following toplevel calls, generally passing a W3C selector string: selection select selectAll selector selectorAll matcher window style

Create derivative selections (subsets, unions, nestings) by invoking one of the following methods of an already-existing selection:

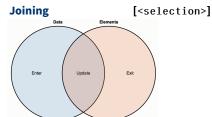
merge

select selectAll filter

Modifying [<selection>]

Change properties of DOM elements in bulk:

attr classed property
text html append
insert remove clone
sort order raise



The "General Update Pattern" involves a "data join", followed by references to the resulting subset of elements & data, and looks something like this: svg.selectAll("circle")

.data(data)

.enter().append("circle")
 .attr("cx", function(d) { return d.x; })
 .attr("cy", function(d) { return d.y; })

.attr("r", 2.5);

data join enter exit datum

Events [d3]

Add/remove an event-handler with <selection>.on(), or immediately dispatch an event with <selection>.dispatch(). The following toplevel functions return information about an active event: event customEvent mouse touch touches clientPoint

Control [<selection>]

The following yield information about selections, except for each and call, which afford arbitrary code execution for selections while maintaining the ability to chain subsequent methods.

each call empty nodes node size

Local Variables [<selection>]

Afford the storage/retrieval of state that is independent of a selection's data.

set get remove toString

Namespaces [d3]

For use in construction XML namespaces. namespace namespaces

2 Munging & Formatting

Data importation process can be complex. Here is a somewhat general pattern:



Delimiter-Separated [<dsv>]

[De-]Serialize raw files. (Can alternatively use concomitant command-line tool.)

parse parseRows format formatRow formatValue parseRows formatRow formatRow

d3.dsvFormat("|").parse("foo|bar\n1|2");
For CSV, TSV, \(\frac{1}{2}\) top-level shorthands for the above:

d3.csvParse("foo,bar\n1,2");
d3.tsvParse("foo\tbar\n1\t2");

d3.csvFormat([{foo: "1", bar: "2"}]);

d3.tsvFormat([{foo: "1", bar: "2"}]);

Arrays [d3]

Extending the already-extensive set of native javascript array functions, these top-level methods take an array and yield transformations or statistical meta-information.

min	max	extent
sum	mean	median
variance	deviation	cumsum
bisect	bisectLeft	fsum
bisector	quickselect	scan
quantile	ascending	bisectRight
cross	merge	descending
permute	shuffle	pairs
tickIncrement	tickStep	ticks
transpose	least	range
least index[es]	group	groups
. ,	rollup[s]	žip ¹

Can also sub-divide array data into bins using d3.histogram() and its methods.

Hierarchies [<node>]

Format data into nested, tree-like structure. Create with top-level call d3.hierarchy(), which returns parent node.

ancestors descendents leaves
path links sum
count sort each
eachAfter eachBefore copy
d3.stratify transforms data from "link format"
into a proper hierarchy.

Number Formats

Pass a specifier string to a formatter, eg:

d3.format(".0%")(0.123); % 12% d3.format("(\$.2f")(-3.5); % (£3.50) d3.format(".2s")(42e6); % 42M d3.format("#x")(48879); % 0xbeef d3.format(",.2r")(4223); % 4,200

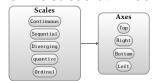
...where specifier takes the form:

[[fill]align][sign][symbol][0] [width][,][.precision][~][type]

Serialize specifiers with d3.formatSpecifier. Create formatter for non-default "locale" with d3.formatLocale. Add SI Unit prefixes with <locale>.formatPrefix: d3.formatPrefix(",0", 1e-6)(.00042); % 420µ

Time Formatting & Calc [d3.time-]

3 Scales & Axes



See also here for a lovely visual explanation.

Continuous

[<scale>]

Sub-types: power^p, log^l, time^t:

Sequential

[d3.scaleSquential-]

Log Sqrt Symlog Quantile Pow

Diverging [d3.scaleDiverging]

Log Pow Sqrt Symlog

Ouantize [<scale>]

Sub-types: quantile¹, quantize², threshold^t: invertExtent domain range nice² tickFormat² copy quantiles¹

Ordinal [<scale>]

Sub-types: ordinal^o, band^b, point^p:

 $\begin{array}{lll} \text{domain} & \text{rangeRound}^{b,p} & \text{padding} \\ \text{range} & \text{round}^{b,p} & \text{align}^{b,p} \\ \text{copy} & \text{paddingInner}^{b} & \text{bandwidth}^{b,p} \\ \text{nknown}^{o} & \text{paddingOuter}^{b} & \text{step}^{b,p} \end{array}$

Axes [<axis>]

Unlike scales, axes are side-effect-having, DOM-manipulating "layouts". As such, d3-level calls must differentiate by location on page: d3.axisTopL, d3.axisRightL, d3.axisBottomL,, and d3.axisLeftL. Axis methods are:

tickValues tickFormat tickSize tickSizeInner tickSizeOuter tickPadding

4 Shapes

Each of the following contain one eponymous toplevel function that produces a "generator" which is a late-binding function that creates the indicated shape when called. Input to each generator is a data array. Output shapes are coded as "path calls," which are either svg or html canvas commands (see here) depending on the passed <shape>.context().

Paths [<path>_G]

Generates: a serialized set of accumulated SVG or HTML Canvas-like path instructions.

moveTo closePath lineTo quadraticCurveTo arc arcTo bezierCurveTo rect toString

Arcs [<arc>₆]

Generates: circular or annular sectors for use in pie or donut charts, respectively. Here, input data must provide start and end angles.

centroid innerRadius outerRadius cornerRadius startAngle endAngle padRadius context

Lines [<line>_G]

Generates: a spline (smoothed curve) or polyline (piecewise-connected line) for use in a line or edge-bundling chart. There are two top-level calls: d3.line¹, and d3.line-radial^r.

 $\begin{array}{ccc} x_l & defined & angle_r \\ y_l & curve & radius_r \end{array}$

Areas [<area>₆]

Generates an area, for use in area or difference charts. There are two top-level calls: d3.area^a and d3.areaRadial^r.

xa	context	radius ^r
x0 ^a	lineX0 ^a	innerRadius ^r
x1 ^a	lineY0 ^a	outerRadius ^r
y ^a	lineX1 ^a	lineStartAngle ^r
y0 ^a	lineY1 ^a	lineInnerRadius ^r
v1 ^a	angle ^r	lineEndAngle ^r
defined	startAngle ^r	lineOuterRadius ^r
curve	endAngle ^r	

Curves [d3.curve-F]

These are <u>not</u> shapes, but passed to lines & areas under their <shape>.curve() call. curves are algorithms that, given input data arrays ("control points") yield smooth splines.

Basis CatmullRomOpen
BasisClosed Linear
BasisOpen LinearClosed

BasisClosed Linear
BasisOpen LinearClosed
Bundle MonotoneX
Cardinal MonotoneY
CardinalClosed Natural
CardinalOpen Step
CatmullRom StepAfter
CatmullRomClosed StepBefore

One can also create custom curves.

Links [<link>_G]

Generate a smooth line segment between passed source and target points for use in tree diagrams. \exists vertical^l, horizontal^l, and radial^r links.

source x^l context target y^l angle radius r

Generate a symbol:

Circle Star Diamond Cross Square Triangle Wye

Symbol generators provide the following methods: item size context

Polygons [d3.polygon-_G]

d3.polygonHullbuilds a polygon that covers an array of input points. Other top level functions access properties of the resulting polygon:

Area Centroid Contains Length

5 Colors

Color Creation [d3]

Create a color from a <color_spec>:
rgb lab lch
hsl hcl cubehelix

...where <color_spec> is a string that can be the name of the color or a type-specific constructor:

rgb(255, 255, 255) % RGB hsl(120, 50%, 20%) % HSL #ffeeaa % hex

Color Properties [<color>]

Get color properties, or yield an externally-usable <color_spec> string:

formatHsl formatRgb

Derivative Colors [<color>]

Return a new, derivative color: brighter darker

Color Schemes [d3]

Categorical schemes, prefixed with scheme-Category10 Dark2 Pastel1 Accent Paired Pastel2 Set1 Set2 Set3 Tableau

Diverging schemes, prefixed with interpolate- (for continuous) or scheme- (for discrete):

BrBG PRGn RdBu RdYlBu PiYG PuOr RdGy RdYlGn Spectral

Sequential, single-hue schemes, prefixed with interpolate (continuous) or scheme- (discrete):

Blues Greens Greys Oranges Purples Reds

Sequential, multi-hue schemes, prefixed with interpolate- or scheme-:

BuGn BuPu GnBu OrRd PuBu PuBuGn PuRd RdPu YlGn YlGnBu YlOrBr YlOrRd

Sequential, multi-hue schemes, available only in continuous form, prefixed with interpolate-:
Cividis Cool CubehelixDefault
Inferno Magma Plasma

Warm

Cyclical schemes, prefixed with interpolate-:
Rainbow Sinebow

Viridis

6 Interactions

Dragging [<drag>]
Brushing [<brush>]
Zooms [<zoom>]

7 Transitions & Animation

General Pattern Easings

Turbo

Visually "ease" the rate (acceleration) at which objects change their velocity. Preface the following with ease, and optionally suffix with one of: In, Out, or InOut:

Linear Quad Cubic Sin Exp Circle Elastic Back Bounce

Interpolators [d3]

An interpolator is a function that takes a number $i \in [0,1]$ and yields intermediary values in the domain-space of the specific interpolator. The following functions take two parameters that bookend the interpolation range (except for -Discrete, -Basis, and -BasisClosed, which take a single array), and yield interpolators (for color interpolators, see "color" section):

interpolate -Round -String
-Date -Array -Numb. Array
-Object -TransformCss -Svg
-Discrete -Basis

The last two are "splines", which produce nonlinear interpolators roughly following the given array. In addition, d3.piecewise generates a piecewise interpolation visiting the n points of its input array, and d3.quantize generates n samples of a passed interpolator.

Timers

8 Layouts

Chord Layout [<chord>]
Force Layout [<simulation>]
Voronoi Layout [<delaunay>]
Pies [<pie>|

Lays out a set of arc angles (wedges) for use as input to arcs, in creating a pie chart.

Sankey Layout_L [d3]
Pack Layout_L [d3]
Partition Layout_L [d3]
Cluster Layout_L [d3]

Used to create a dendogram diagram.

Treemap Layout_L [d3] Stacks_L [<stack>]

Generates stacking positions (in a multidimensional array $m \times n$ for m series, n points), which are used as input to areas in creating steamgraphs, or directly in positioning stacked bars.

keys value offset order

Top-level algs to pass to order, offset methods:

order
Order
Order
Order
Order
Obscending
Obscending
InsideOut
None
Owiggle
Order
Offset
Order

9 **Geography**

Paths Projections Spherical Math Spherical Shapes Streams Transforms

10 Miscellaneous

Quadtrees Random Numbers