decksh

a little language for decks

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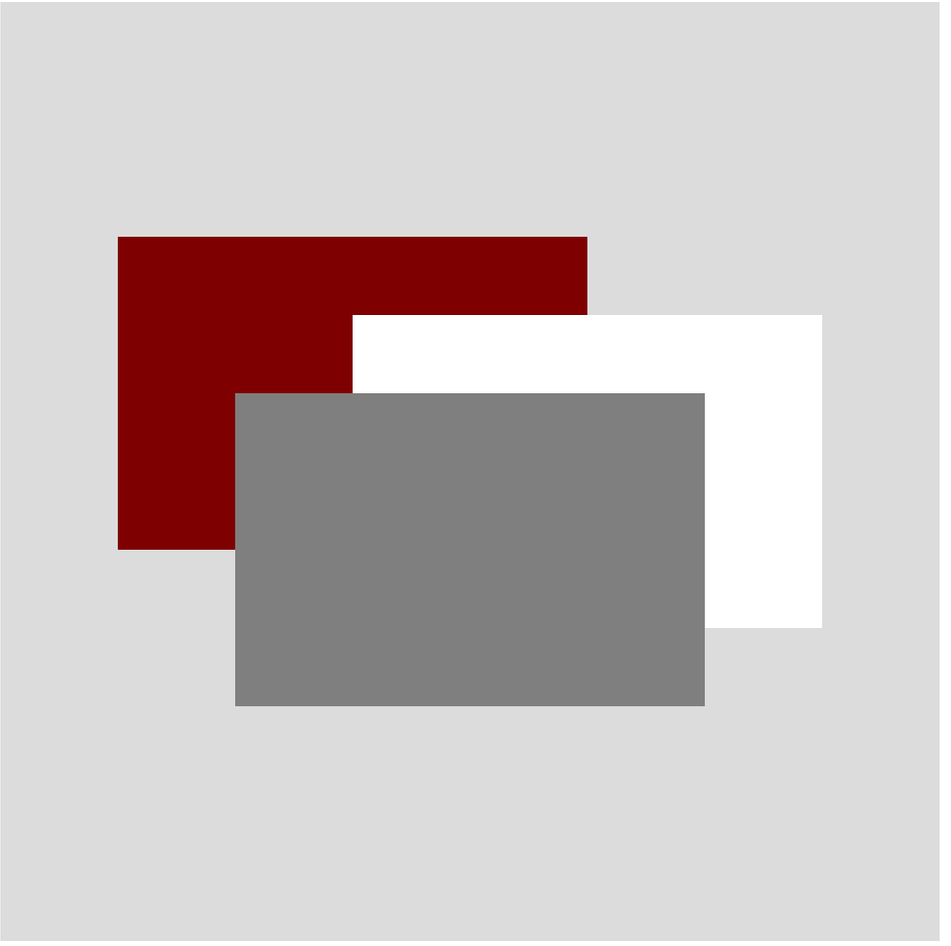
A language is any mechanism to express intent, and the input to many programs can be viewed profitably as statements in a language. This column is about those “little languages.”

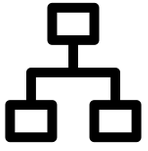
Jon Bentley, Little Languages, Communications of the ACM, August 1986

Deck

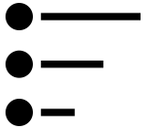


a Go package for presentations

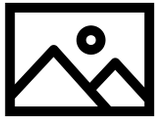
Elements

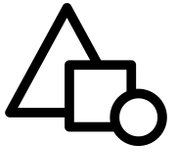
 Structure

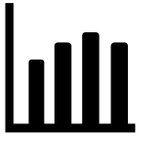
 Text

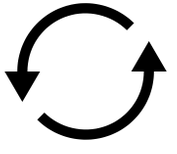
 Lists

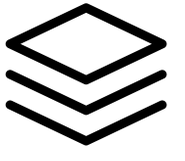
 Arrows

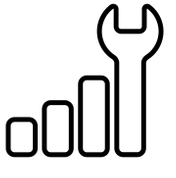
 Images

 Graphics

 Charts

 Loops

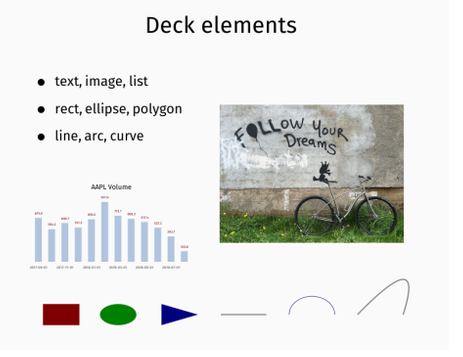
 Data

 Utility

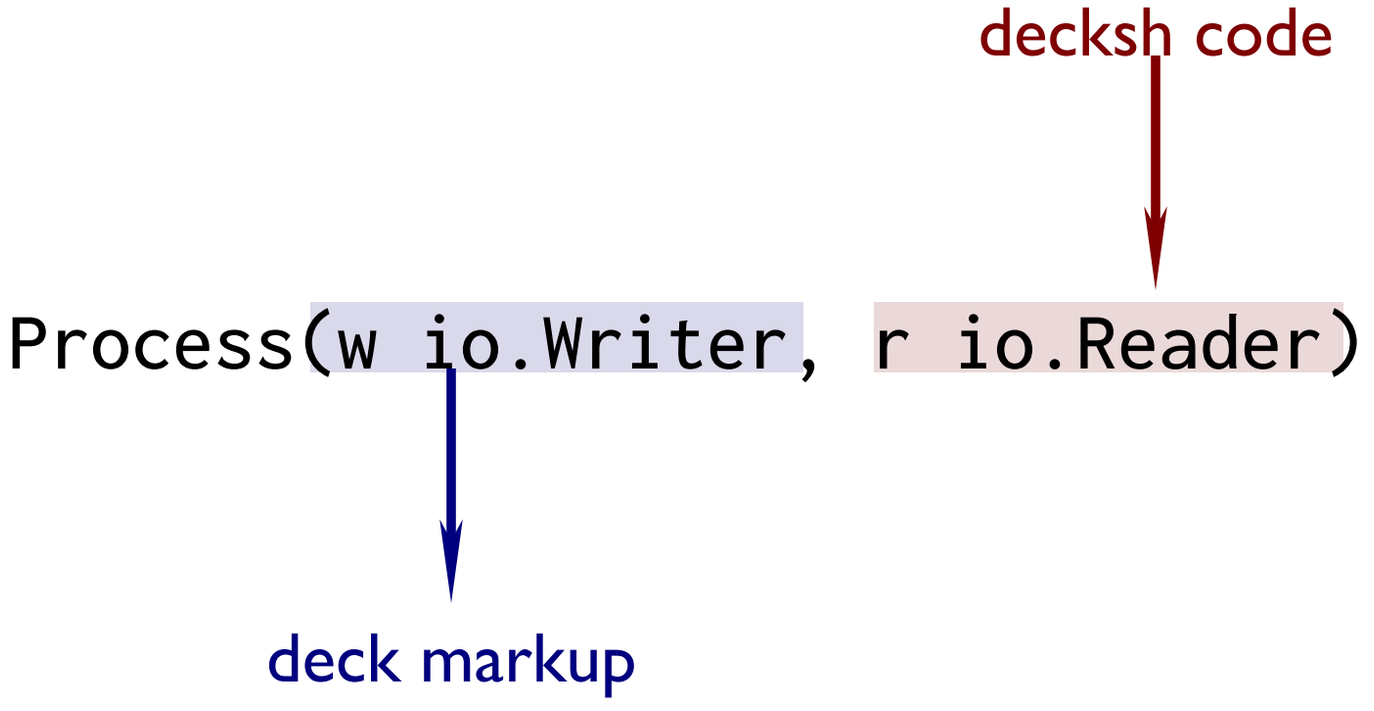
decksh → deck markup → SVG PDF PNG

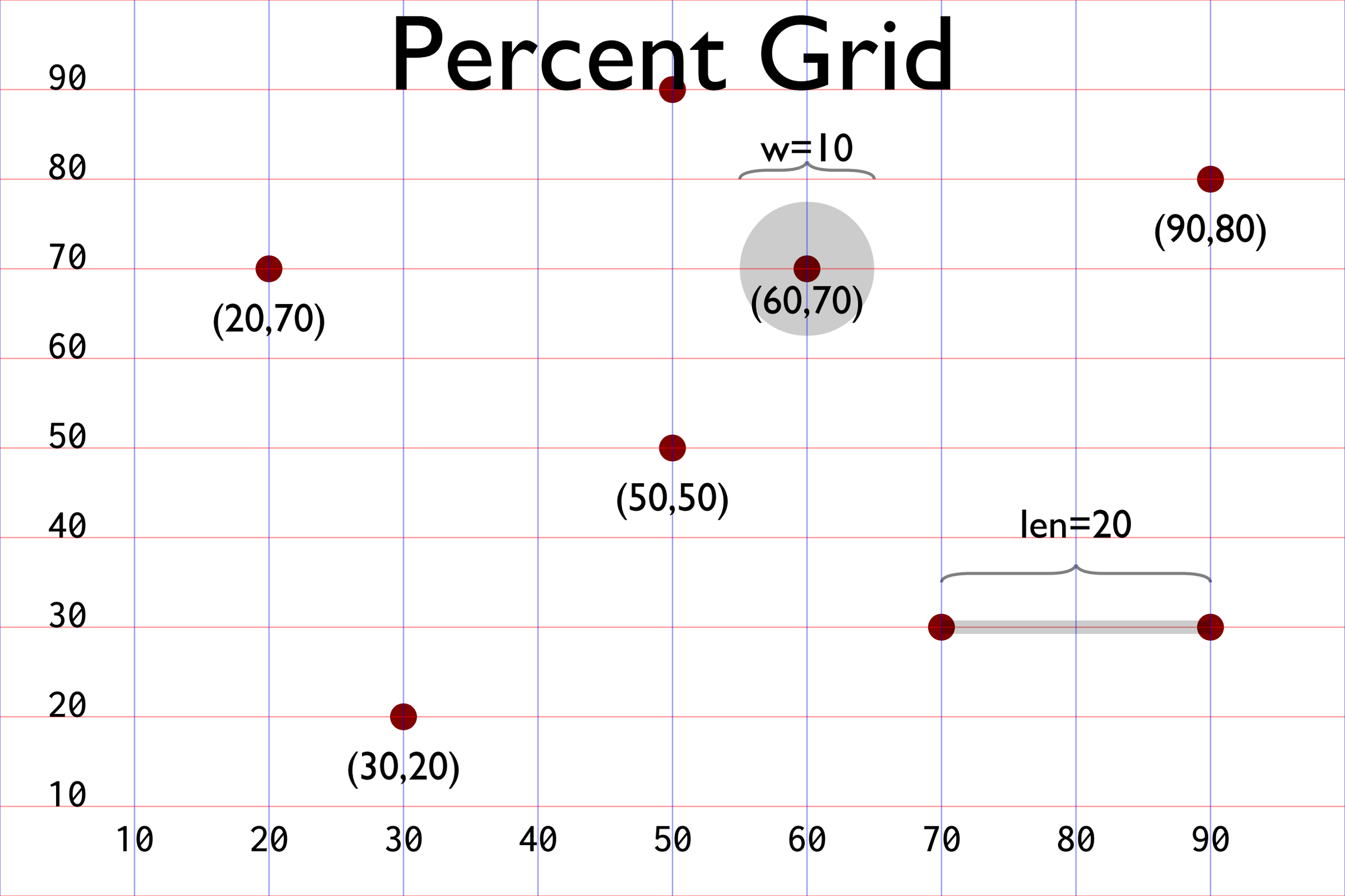
```
deck
    slide "rgb(250,250,250)" "black"
        ctext   "Deck elements" 50 90 5
        image   "follow.jpg"    70 50 640 480 50
        blist   10 75 3
            li "text, image, list"
            li "rect, ellipse, polygon"
            li "line, arc, curve"
        elist

        gy=10
        rect    15 gy 8 6             "rgb(127,0,0)"
        ellipse 27.5 gy 8 6           "rgb(0,127,0)"
        line    50 gy 60 gy
        curve   80 gy 95 30 90 gy
        arc     70 gy 10 8 0 180 0.1  "rgb(0,0,127)"
        polygon "37 37 45" "13 7 10"  "rgb(0,0,127)"

        opts="-fulldeck=f -textsize 1  -xlabel=2  -barwidth 1.5"
        dchart -left 10 -right 42 -top 42 -bottom 25 opts AAPL.d
    eslide
edeck
```

```
<deck>
<slide bg="rgb(250,250,250)" fg="black">
<text align="c" xp="50" yp="90" sp="5">Deck elements</text>
<image name="follow.jpg" xp="70" yp="50" width="640" height="480" scale="50" />
<list type="bullet" xp="10" yp="75" sp="3">
<li>text, image, list</li>
<li>rect, ellipse, polygon</li>
<li>line, arc, curve</li>
</list>
<rect xp="15" yp="10" wp="8" hp="6" color="rgb(127,0,0)" />
<ellipse xp="27.5" yp="10" wp="8" hp="6" color="rgb(0,127,0)" />
<line xp1="50" yp1="10" xp2="60" yp2="10" />
<curve xp1="80" yp1="10" xp2="95" yp2="30" xp3="90" yp3="10" />
<arc xp="70" yp="10" wp="10" hp="8" a1="0" a2="180" sp="0.1" color="rgb(0,0,127)" />
<polygon xc="37 37 45" yc="13 7 10" color="rgb(0,0,127)" />
<text xp="26.00" yp="45.60" sp="1.50" align="center" wp="0.00" font="sans" opacity="100.00"
color="black" type="">AAPL Volume</text>
<line xp1="10.00" yp1="25.00" xp2="10.00" yp2="37.46" sp="1.50" opacity="100.00"
color="lightsteelblue" />
<text xp="10.00" yp="38.46" sp="0.75" align="center" wp="0.00" font="sans" opacity="100.00"
color="rgb(127,0,0)" type="">679.9</text>
<text xp="10.00" yp="23.00" sp="0.80" align="center" wp="0.00" font="sans" opacity="100.00"
color="rgb(75,75,75)" type="">2017-09-01</text>
<line xp1="12.91" yp1="25.00" xp2="12.91" yp2="34.24" sp="1.50" opacity="100.00"
color="lightsteelblue" />
<text xp="12.91" yp="35.24" sp="0.75" align="center" wp="0.00" font="sans" opacity="100.00"
color="rgb(127,0,0)" type="">504.3</text>
...
</slide>
</deck>
```



decksh API




Percent Grid
90
80
70
60
50
40
30
20
10
10
20
30
40
50
60
70
80
90
w=10
(20,70)
(60,70)
(90,80)
(50,50)
len=20
(30,20)

```
// hello world
deck
    slide "black" "white"
        ctext "hello, world" 50 25 10
        circle 50 0 100 "blue"
    eslide
edeck
```

Running decksh

`decksh`	read from stdin, write to stdout
`decksh in.dsh`	read from file, write to stdout
`decksh -o out.xml`	read from stdin, write to file
`decksh -o out.xml in.dsh`	read from file, write to file
`chmod +x in.dsh; ./in.dsh`	executable deck with #!/path/to/decksh

```
decksh example.dsh | pdfdeck ...
```

hw.dsh - Visual Studio Code

File Edit Selection View Go Debug Terminal Help

hw.dsh

```
// hello world
deck
    slide "black" "white"
        ctext "hello, world" 50 25 10
        circle 50 0 100 "blue"
    eslide
edeck
```

PROBLEMS TERMINAL ... 1: bash

```
$ decksh hw.dsh | pdf
$ open f.pdf
$
```

master* 0 0 Ln 8, Col 1 Tab Size: 4 UTF-8 LF Plain Text

f.pdf - 1/1 (87.2941 dpi)

hw.dsh - Visual Studio Code

File Edit Selection View Go Debug Terminal Help

hw.dsh

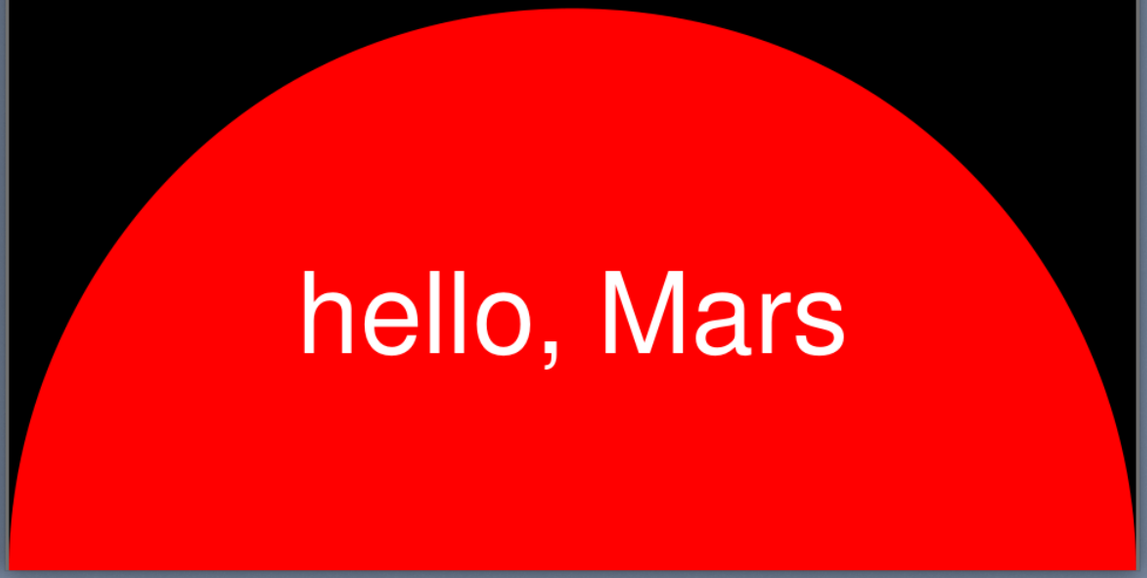
```
// hello world
deck
    slide "black" "white"
        ctext "hello, Mars" 50 25 10
        circle 50 0 100 "red"
    eslide
edeck
```

PROBLEMS TERMINAL ... 1: bash

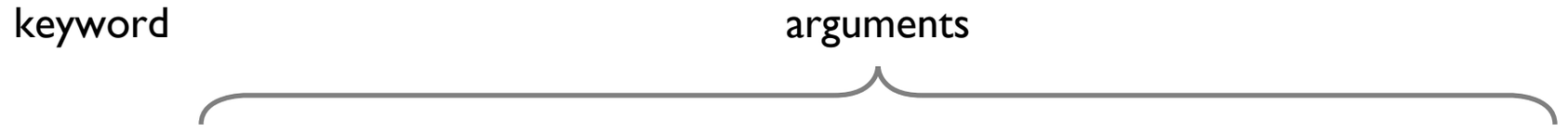
```
$ decksh hw.dsh | pdf
$ open f.pdf
$ decksh hw.dsh | pdf
$
```

master* 0 0 Ln 5, Col 29 Tab Size: 4 UTF-8 LF Plain Text

f.pdf - 1/1 (87.2941 dpi)



Keywords and arguments




```
text "..string...." x  y  n "font" "color" op


text "hello, world" 80 50 2                    hello, world
text "hello, world" 80 40 2 "serif"            hello, world
text "hello, world" 80 30 2 "serif" "red"      hello, world
text "hello, world" 80 20 2 "serif" "red" 50   hello, world
```

Variables and Assignments

```
x=10                                    // number assignment
y=20
factor=2
what="hello world"                      // string assignment

size=x/factor                           // assignment with binop
text what x y size                      // text "hello world" 10 20 5

y-=10                                   // assignment operation
size+=factor                            // assignment op, substitute
text what x y size                      // text "hello world" 10 10 7

for v=0 100 5                           // loop from 0 to 100 by 5
    line 100 v 0 v 0.1 "blue"           // blue horizontal lines
    line v 100 v 0 0.1 "red"            // red vertical lines
efor
```

Keywords

Structure

deck
edeck
slide
eslide
canvas
def
edef
func
grid
import
include

Text

text
btext
ctext
etext
rtext
arctext
textblock
textblockfile
textfile
textcode

Lists

list
blist
nlist
clist
li
elist

Graphics

acircle
arc
circle
curve
ellipse
hline
line
pill
polygon
polyline
rect
rrect
square
star
vline

Braces

lbrace
rbrace
ubrace
dbrace
lbracket
rbracket
dbracket
ubracket

Arrows

arrow
rcarrow
lcarrow
ucarrow
dcarrow

Images

image
cimage

Charts

dchart
legend

Loop

for
efor

Assignments

polar
polarx
polary
random
area
format
substr
vmap

Math

cosine
sine
sqrt
tangent

Data

data
edata
content

Structure


// This is a comment
comment
deck
canvas 1920 1080
canvas size hint (width height)
x=20 // define x
inline comment
variables
y=80
deck
slide
slide 1
text "first" x y 2
eslide
slide "black" "white"
slide 2
include "file.dsh"
eslide
edeck
ctext "hello, world" 50 25 10
circle 50 0 100 "blue"
for x=20 80 10
circle x 75 2
efor

Text

hello world

text

x y size [font] [color] [op] [link]

hello world

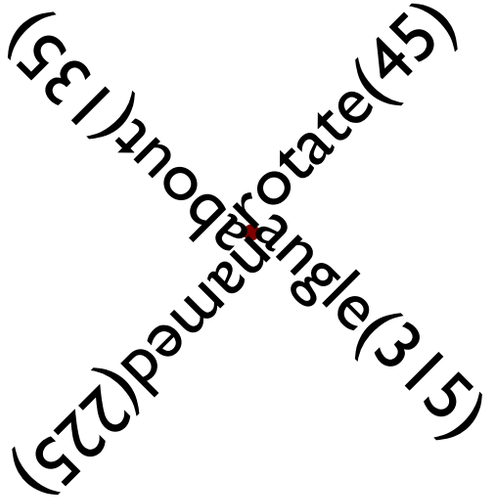
ctext

x y size [font] [color] [op] [link]

hello world

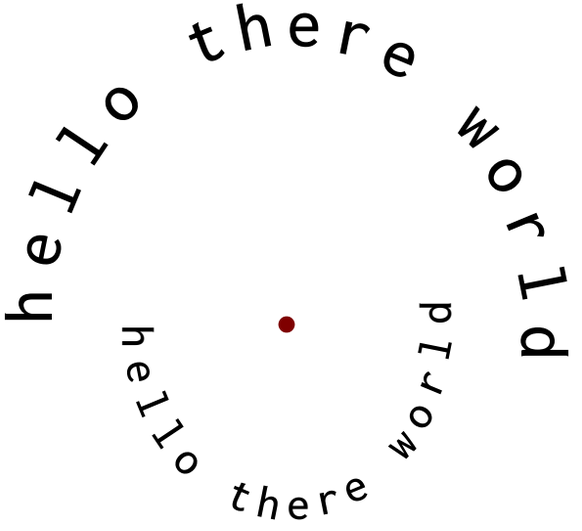
etext

x y size [font] [color] [op] [link]



rtext

x y angle size [font] [color] [op] [link]



arctext

cx cy radius beg-angle end-angle size [font] [color] [op] [link]

Text

`textblock`

The quick brown fox
jump over the lazy
dog

"text" x y width size [font] [color] [op] [link]

`textfile`

This is the contents
of a file. it has lines of text.
Reading is fundamental.

"filename" x y size [font] [color] [op] [sp]

`textcode`

```
import "fmt"
func main() {
  fmt.Println("Go")
}
```

"filename" x y width size [color]

Lists

First thing

Second thing

Third thing

Fourth

- First thing
- Second thing
- Third thing
- Fourth

1. First thing
2. Second thing
3. Third thing
4. Fourth

First thing

Second thing

Third thing

Fourth

```
list
 li "..."
elist
```

```
 blist
 li "..."
elist
```

```
 nlist
 li "..."
elist
```

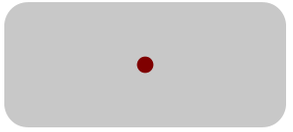
```
 clist
 li "..."
elist
```

x y size [font] [color] [op] [spacing] x y size [font] [color] [op] [spacing] x y size [font] [color] [op] [spacing] x y size [font] [color] [op] [spacing]

Graphics (shapes)

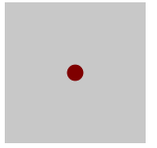
rect

x y w h [color] [op]



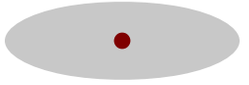
rrect

x y w h r [color]



square

x y w [color] [op]

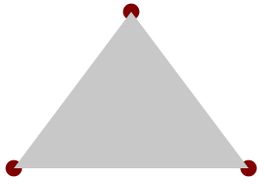


ellipse

x y w h [color] [op]

circle

x y w [color] [op]



polygon

"xc" "yc" [color] [op]

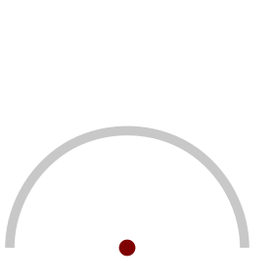
pill

x y w h [color]

star

x y nsides in out [color] [op]

Graphics (lines)

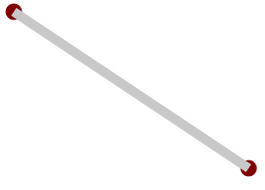


arc

x y w h a1 a2 [lw] [color] [op]

curve

bx by cx cy ex ey [lw] [color] [op]



line

x1 y2 x2 y2 [lw] [color] [op]

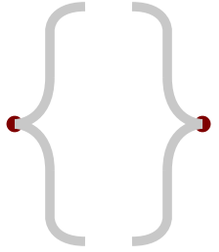
hline

x y len [lw] [color] [op]

vline

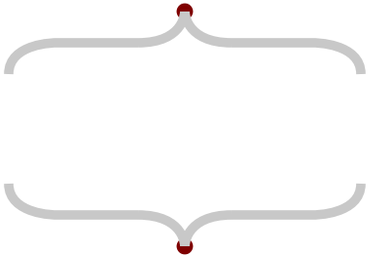
x y len [lw] [color] [op]

Braces and Brackets



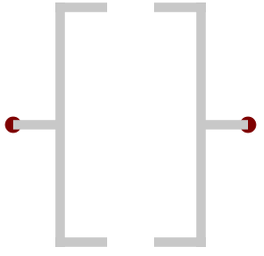
[l-r]brace

x y size aw ah [lw] [color] [op]



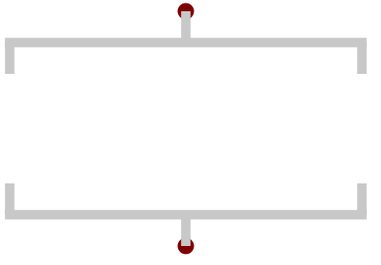
[u-d]brace

x y size aw ah [lw] [color] [op]



[l-r]bracket

x y w h [lw] [color] [op]



[u-d]bracket

x y w h [lw] [color] [op]

Arrows

arrow

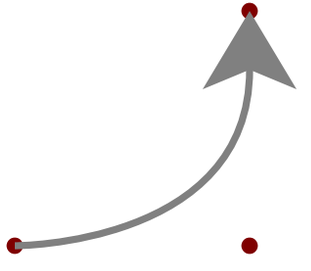
x1 y1 x2 y2 [linewidth] [aw] [ah] [color] [op]

lcarrow

x1 y1 x2 y2 x3 y3 [lw] [aw] [ah] [color] [op]

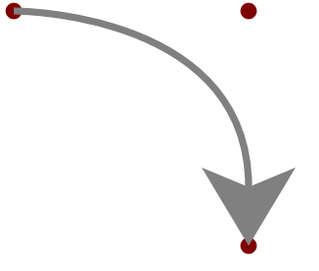
rcarrow

...



ucarrow

...



dcarrow

...

Images

Up in the clouds

`image`

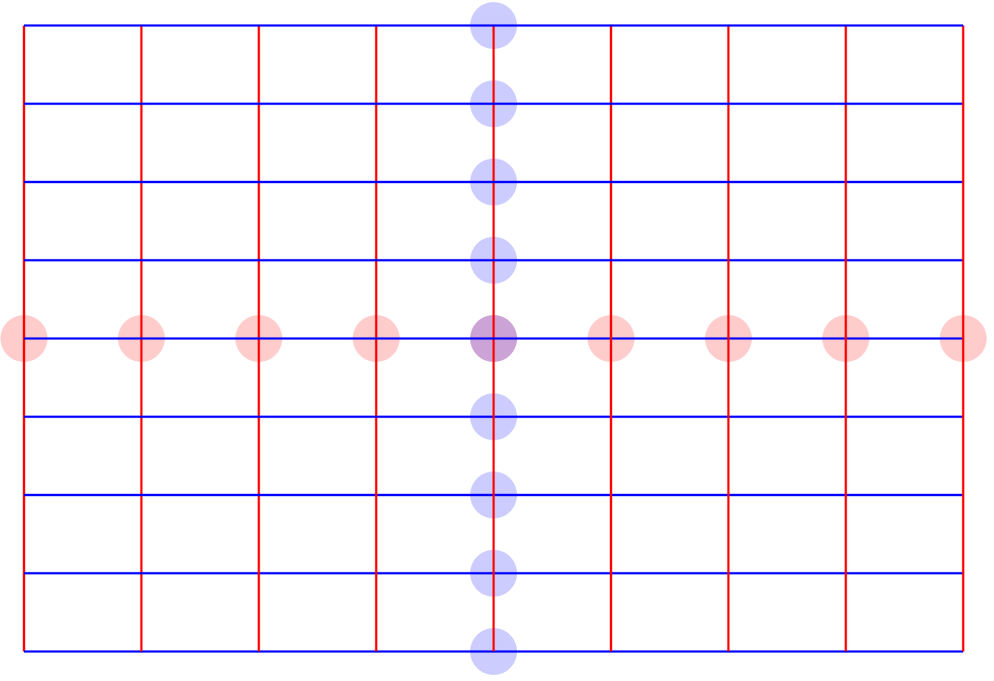
"filename" x y w h [scale] [link]

`cimage`

"filename" "caption" x y w h [scale] [link] [caption-size]

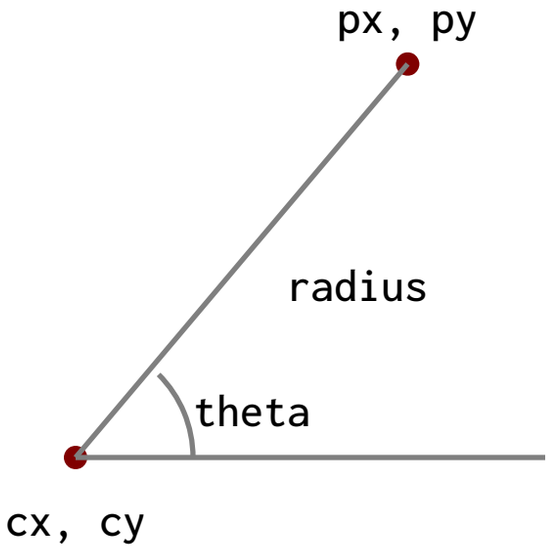
Loops

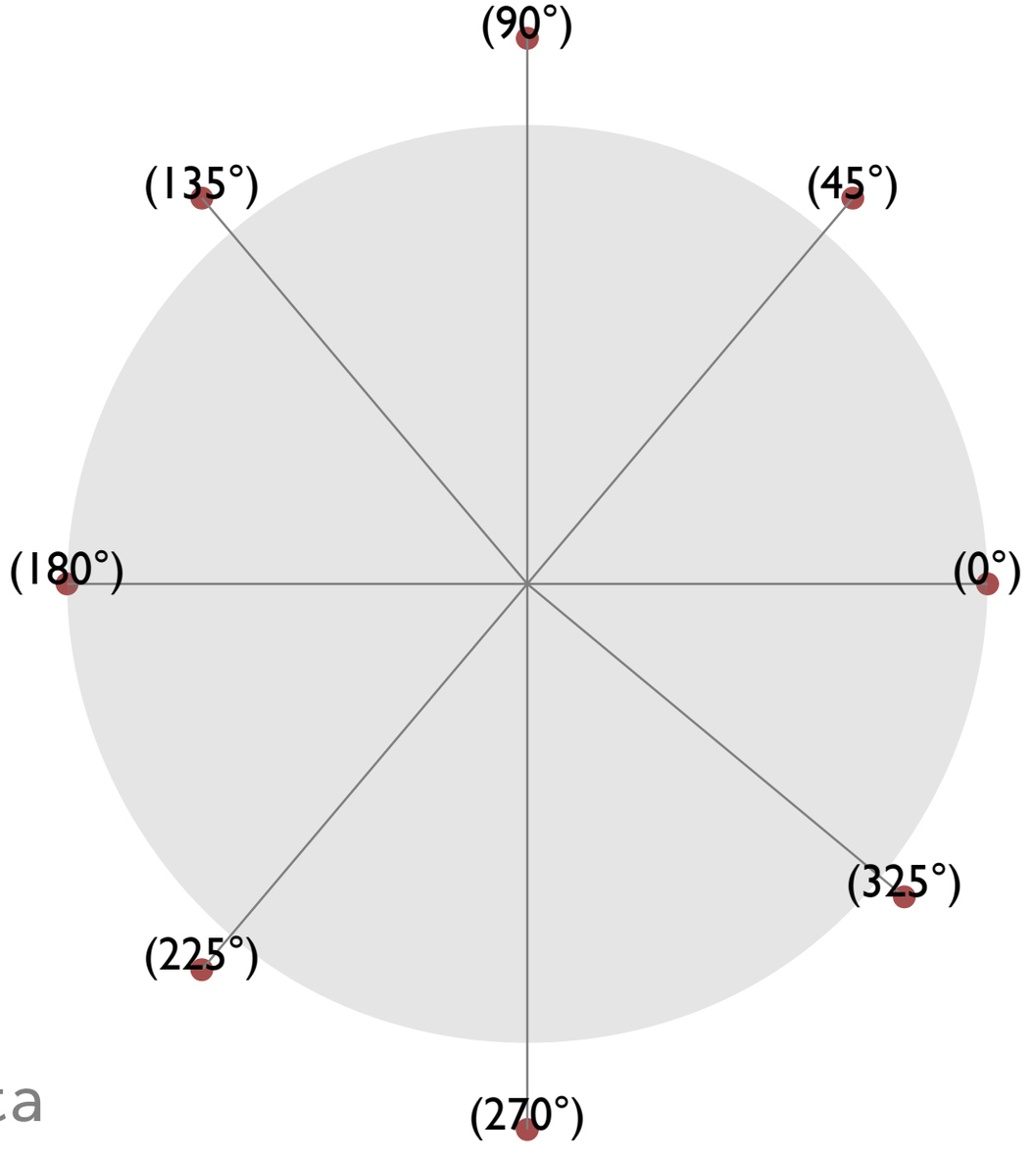
```
for v=50 90 5
    vline v 50 40 0.1 "red"
    hline 50 v 40 0.1 "blue"
    circle v 70 2 "red" 20
    circle 70 v 2 "blue" 20
efor
```



```
for  v=begin end [increment]
    ...v...
efor
```

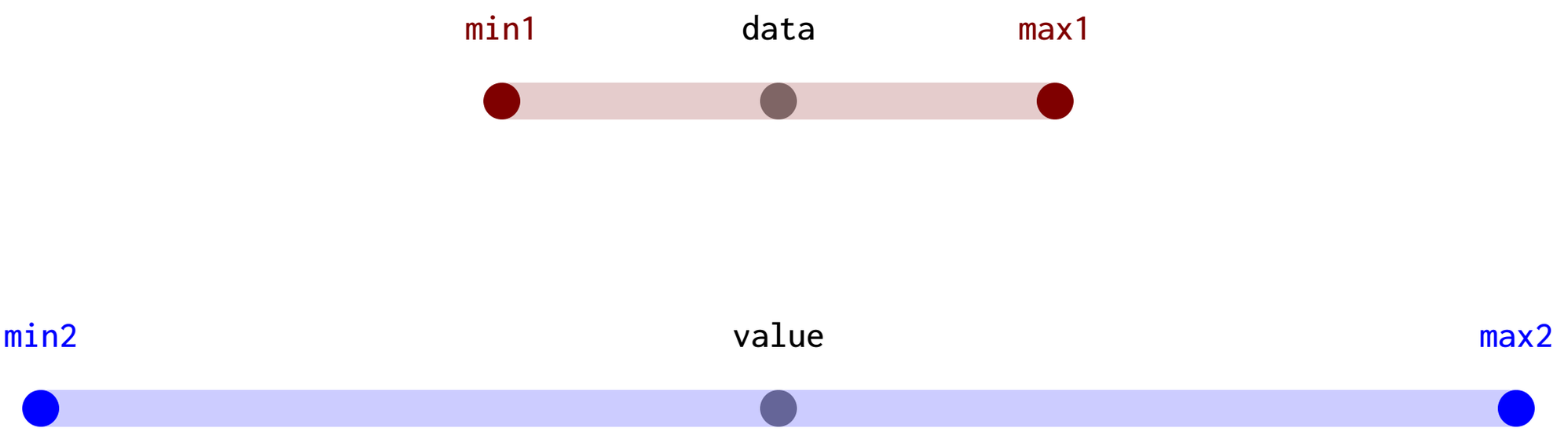
Polar Coordinates






```
px= polarx  cx cy radius theta
py= polary  cx cy radius theta
```

Mapping Ranges




```
value= vmap data min1 max1 min2 max2
```

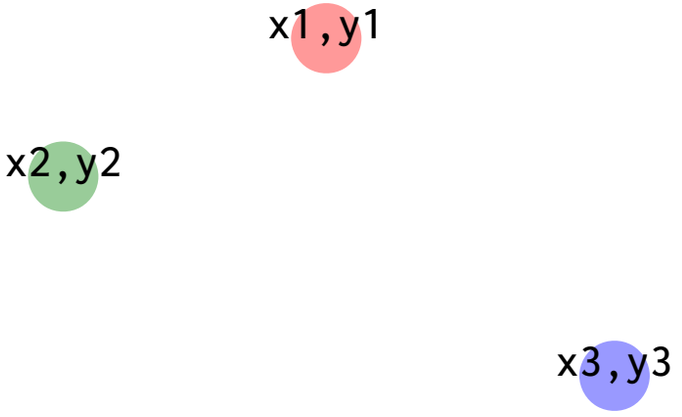
Formatted Strings

```
v1=100.3
v2=200.234
title=format "%.2f Million (USD)" v1
subtitle=format "Total value: %.2f" v1+v2

ctext title    80 70 4 "sans" "maroon"
ctext subtitle 80 60 3 "sans" "gray"
```

value= format fmt expression

Random Numbers

```
x1=random 40 70
y1=random 60 70

x2=random 40 50
y2=random 50 60

x3=random 60 70
y3=random 35 45
```




```
value= random  min max
```

Flexible Grid

```
circle x y 1
circle x y 2
circle x y 4
circle x y 8

circle x y 8
circle x y 4
circle x y 2
circle x y 1

square x y 5 "red"
square x y 5 "green"
square x y 5 "blue"
square x y 5 "orange"

image "images/follow.jpg" x y 640 480 7
image "images/cloudy.jpg" x y 640 480 7
image "images/hearts.jpg" x y 640 480 7
image "images/oldfields.jpg" x y 640 480 7
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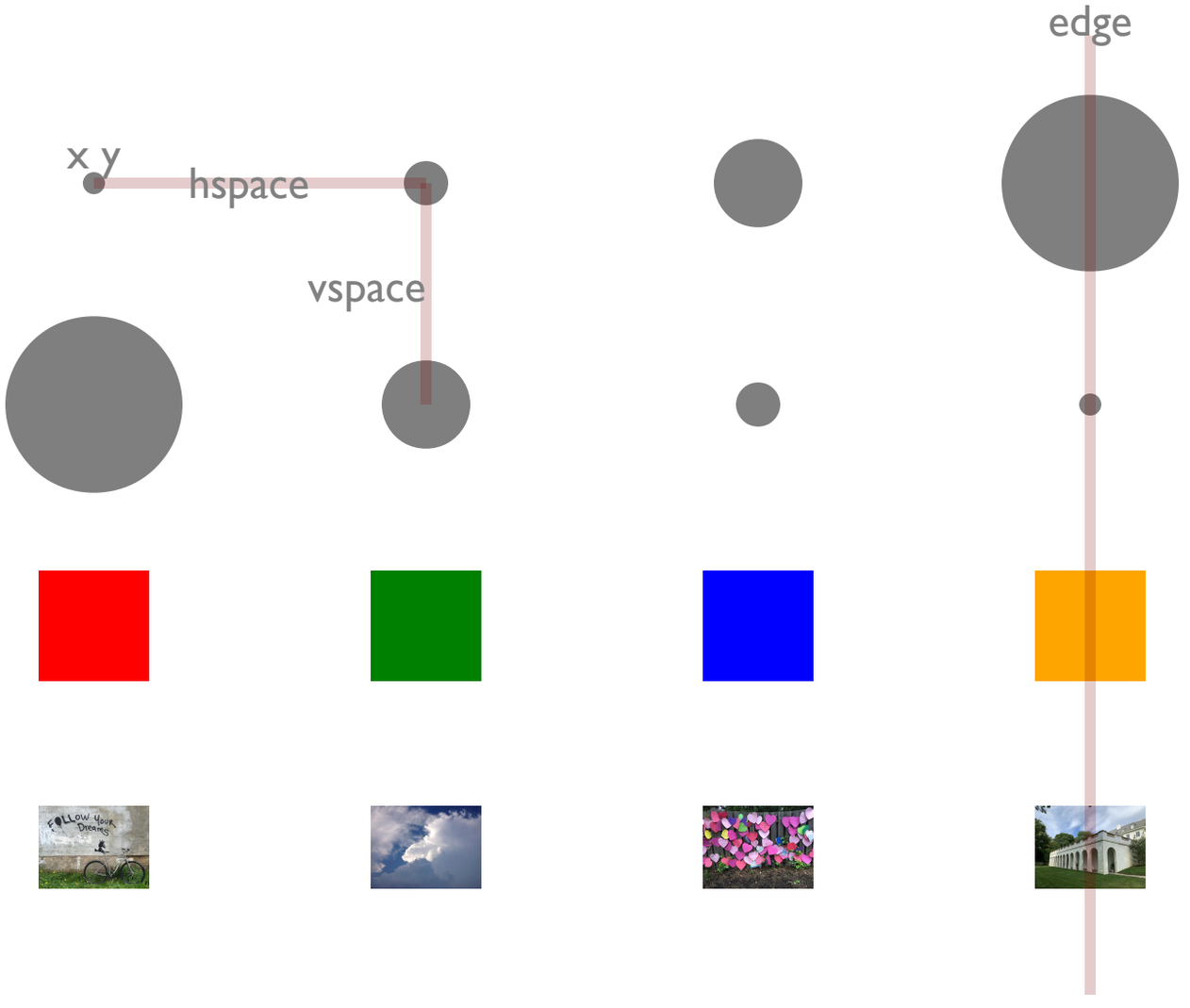


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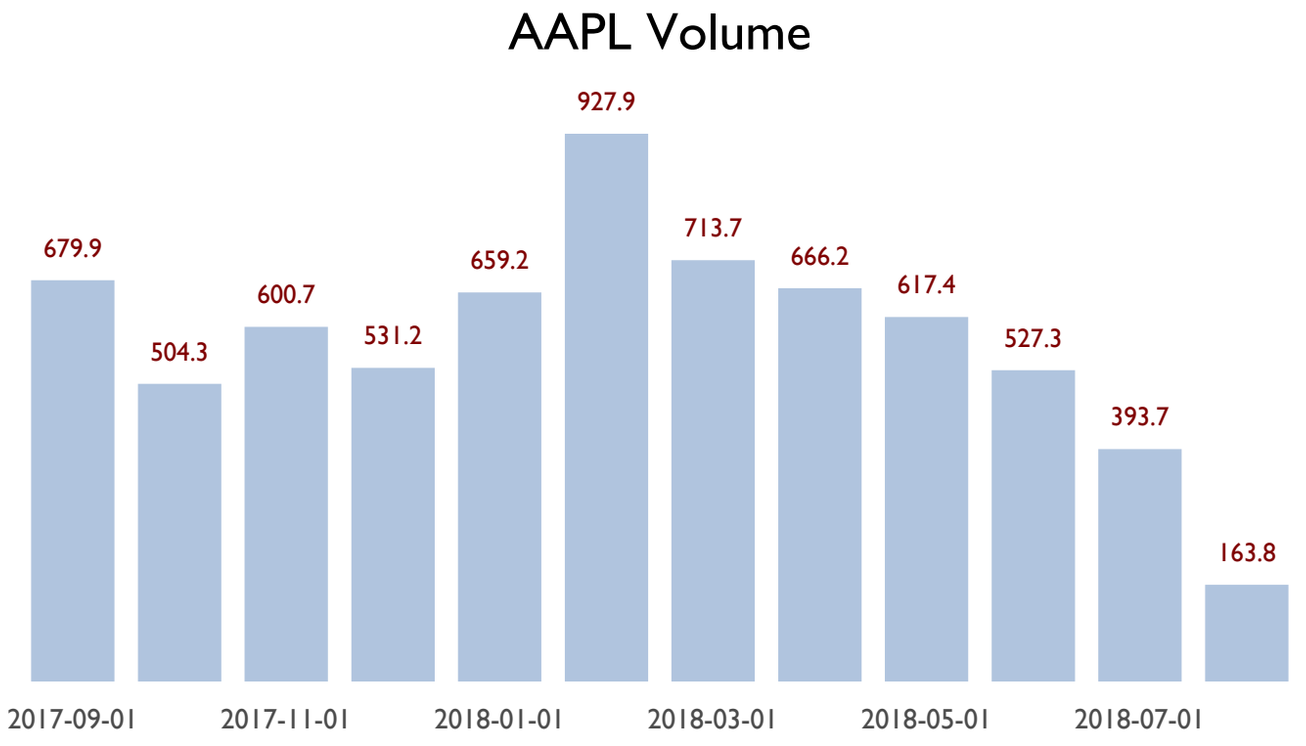
Charts



dchart

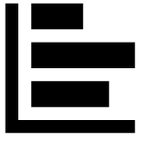
[args]

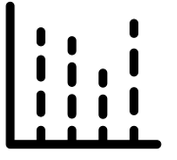
legend

x y size [font] [color]

dchart types

 Column

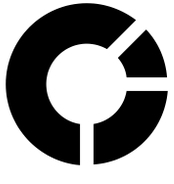
 Bar

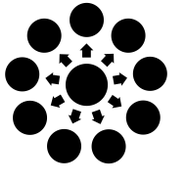
 Dot

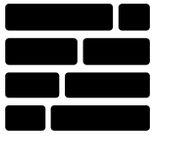
 Line

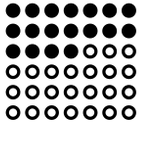
 Scatter

 Area

 Donut/Pie

 Radial

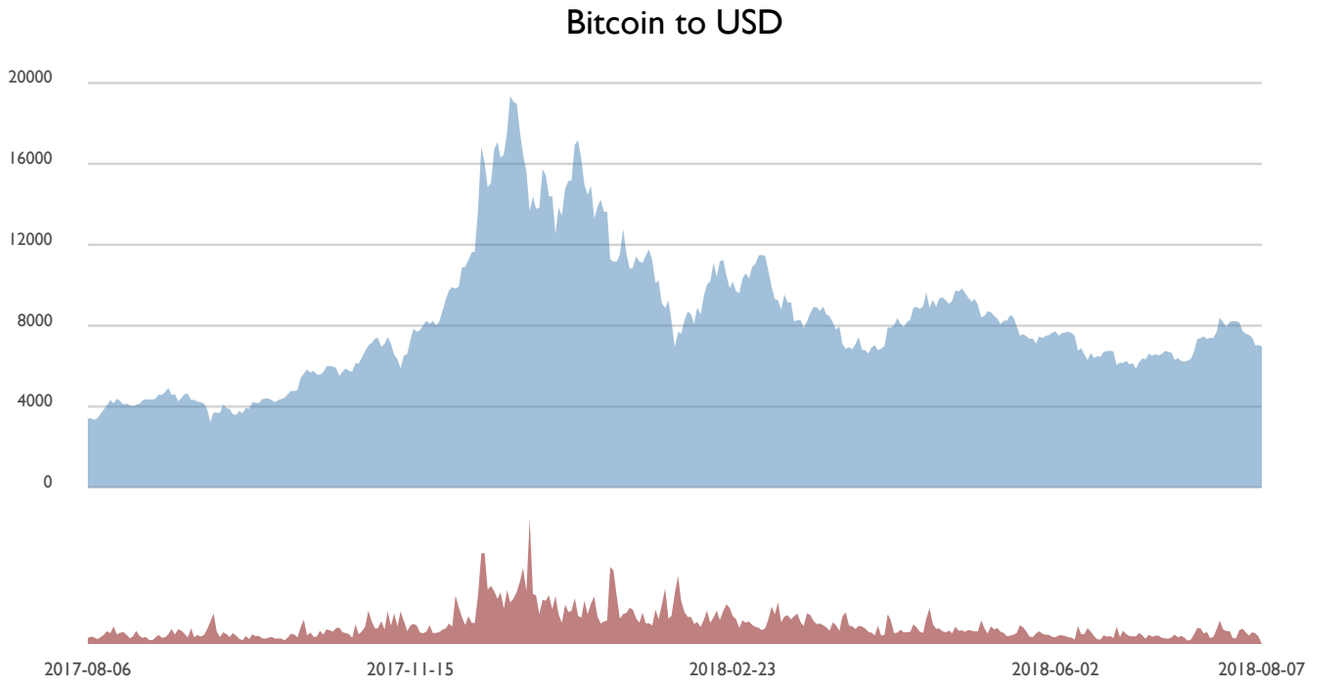
 Pmap

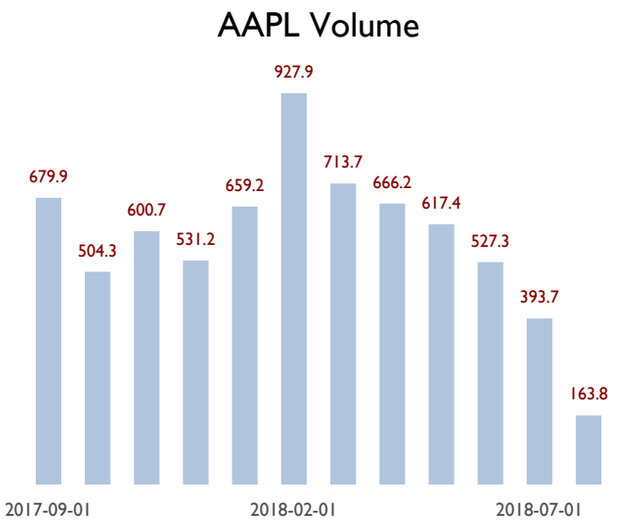
 Waffle/Lego

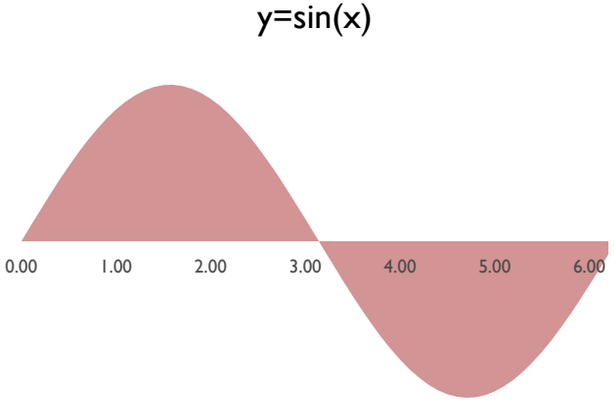
 Fan

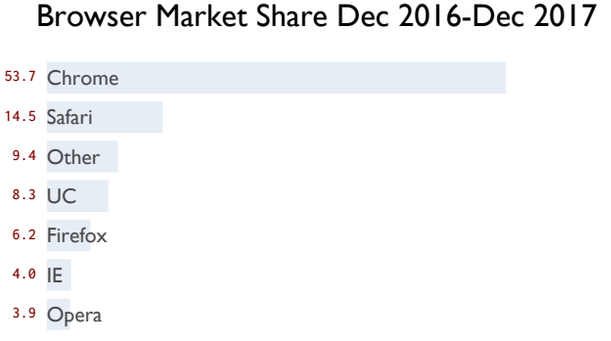
 Bowtie

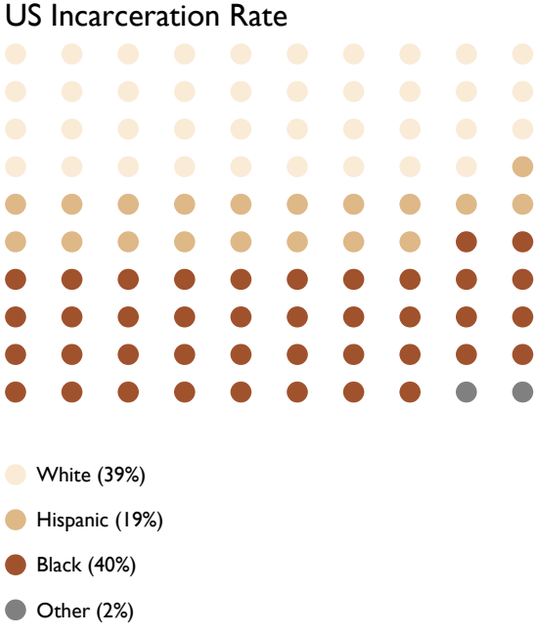
dchart: charts for deck











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            li "text, image, list"
            li "rect, ellipse, polygon"
            li "line, arc, curve"
        elist

        gy=10
        rect    15 gy 8 6             "rgb(127,0,0)"
        ellipse 27.5 gy 8 6           "rgb(0,127,0)"
        line    50 gy 60 gy
        curve   80 gy 95 30 90 gy
        arc     70 gy 10 8 0 180 0.1  "rgb(0,0,127)"
        polygon "37 37 45" "13 7 10"  "rgb(0,0,127)"

        opts="-fulldeck=f -textsize 1  -xlabel=2  -barwidth 1.5"
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edeck
```
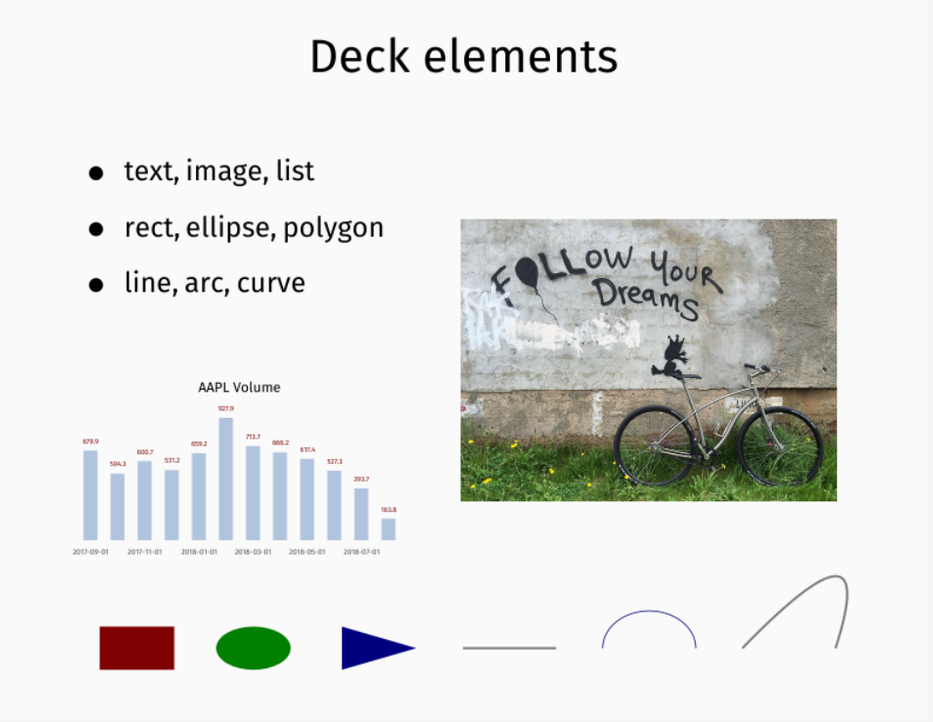
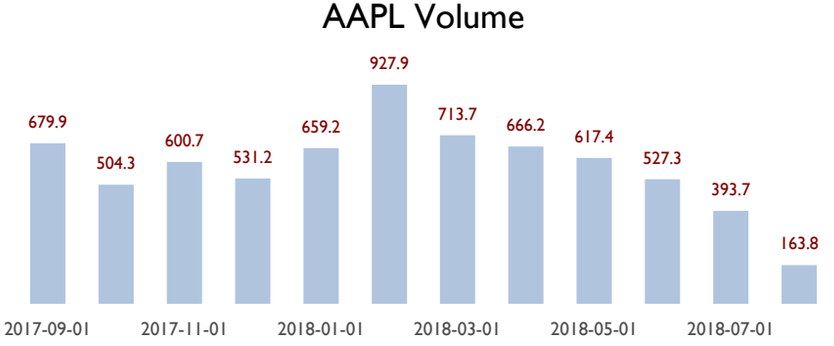



decksh example.dsh | pdf

Deck elements

- text, image, list
- rect, ellipse, polygon
- line, arc, curve



Budnitz #1, Plainfield, NJ, May 10, 2015

text

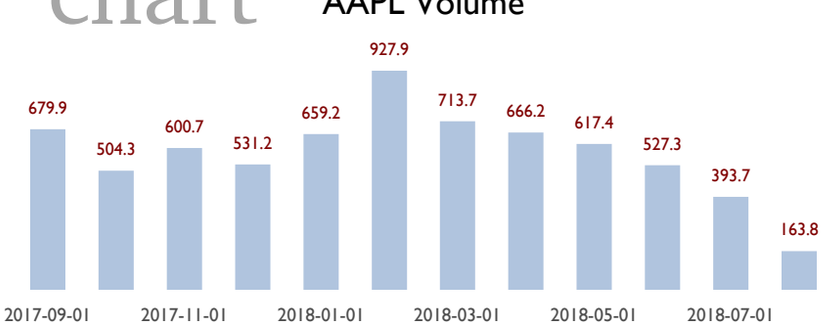
Deck elements

list

image

- text, image, list
- rect, ellipse, polygon
- line, arc, curve

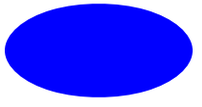
chart



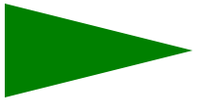
Budnitz #1, Plainfield, NJ, May 10, 2015

rect

ellipse



polygon



line

arc

curve

Examples

Anthony J. Starks

Art + Code


+1 908.548.3403


ajstarks@gmail.com


@ajstarks


github.com/ajstarks


speakerdeck.com/ajstarks

```
deck
    mx=50         // midpoint
    tx=30         // text left
    ix=20         // image left
    ts=10         // base text size
    ss=ts*0.85    // sub-head text size
    cs=ts*0.55    // contact info text size
    ly=58         // line y

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        ctext "Anthony J. Starks"       mx 70 ts "sans" "black"
        ctext "Art + Code"              mx 62 ss "sans" "maroon"
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        image "phone.png"               ix 50 1200 1200 1.2
        image "email.png"               ix 40 1200 1200 1.2
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        image "github.png"              ix 20 120 120 10
        image "sd.png"                  ix 10 512 512 2.5

        text "+1 908.548.3403"          tx 49 cs
        text "ajstarks@gmail.com"       tx 39 cs
        text "@ajstarks"                tx 29 cs
        text "github.com/ajstarks"      tx 19 cs
        text "speakerdeck.com/ajstarks" tx 9  cs
    eslide
edeck
```

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```
deck
    mx=50         // midpoint
    tx=30         // text left
    ix=20         // image left
    ts=10         // base text size
    ss=ts*0.85    // sub-head text size
    cs=ts*0.55    // contact info text size
    ly=58         // line y

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        image "starx.png"               mx 87 512 512 7.5
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        ctext "Art + Code"              mx 62 ss "sans" "maroon"
        line  ix ly 80 ly 0.3 "maroon"

        image "phone.png"               ix 50 1200 1200 1.2
        image "email.png"               ix 40 1200 1200 1.2
        image "twitter.png"             ix 30 1200 1200 1.2
        image "github.png"              ix 20 120 120 10
        image "sd.png"                  ix 10 512 512 2.5

        text "+1 908.548.3403"          tx 49 cs
        text "ajstarks@gmail.com"       tx 39 cs
        text "@ajstarks"                tx 29 cs
        text "github.com/ajstarks"      tx 19 cs
        text "speakerdeck.com/ajstarks" tx 9  cs
    eslide
edeck
```

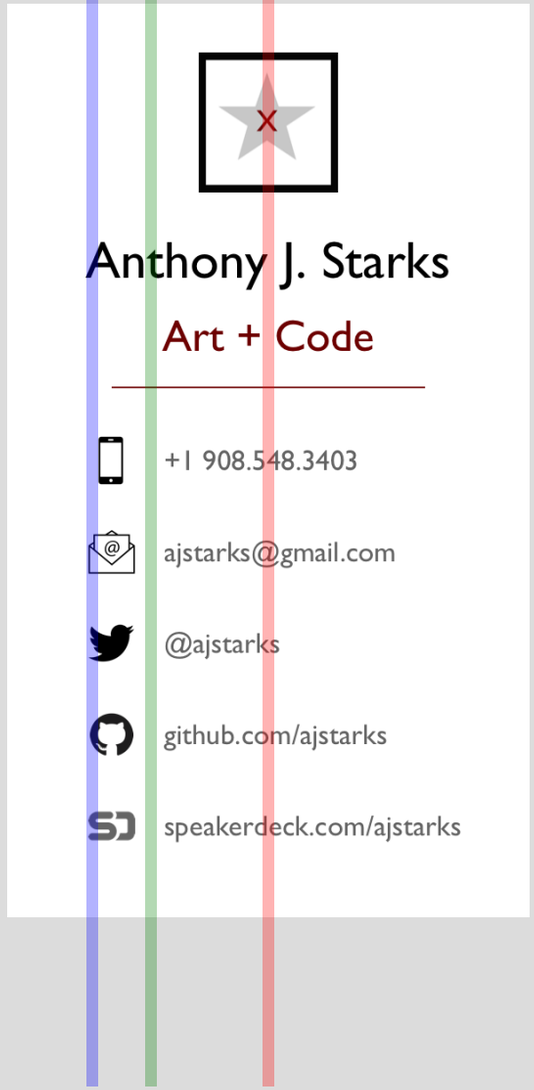

```
deck
    mx=50         // midpoint
    tx=30         // text left
    ix=20         // image left
    ts=10         // base text size
    ss=ts*0.85    // sub-head text size
    cs=ts*0.55    // contact info text size
    ly=58         // line y

    slide "white" "rgb(100,100,100)"
        image "starx.png"               mx 87 512 512 7.5
        ctext "Anthony J. Starks"       mx 70 ts "sans" "black"
        ctext "Art + Code"              mx 62 ss "sans" "maroon"
        line  ix ly 80 ly 0.3 "maroon"

        image "phone.png"               ix 50 1200 1200 1.2
        image "email.png"               ix 40 1200 1200 1.2
        image "twitter.png"             ix 30 1200 1200 1.2
        image "github.png"              ix 20 120 120 10
        image "sd.png"                  ix 10 512 512 2.5

        text "+1 908.548.3403"          tx 49 cs
        text "ajstarks@gmail.com"       tx 39 cs
        text "@ajstarks"                tx 29 cs
        text "github.com/ajstarks"      tx 19 cs
        text "speakerdeck.com/ajstarks" tx 9  cs
    eslide
edeck
```

Anthony J. Starks

Art + Code


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ajstarks@gmail.com


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github.com/ajstarks


speakerdeck.com/ajstarks

```
deck
    mx=25         // midpoint
    tx=62         // text left
    ix=57         // image left
    ts=6          // base text size
    ss=ts*0.85    // sub-head text size
    cs=ts*0.50    // contact info text size
    lx=50         // line x

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        image "email.png"               ix 65 1200 1200 1.2
        image "twitter.png"             ix 50 1200 1200 1.2
        image "github.png"              ix 35 120 120 10
        image "sd.png"                  ix 20 512 512 2.5

        text "+1 908.548.3403"          tx 79 cs
        text "ajstarks@gmail.com"       tx 64 cs
        text "@ajstarks"                tx 49 cs
        text "github.com/ajstarks"      tx 34 cs
        text "speakerdeck.com/ajstarks" tx 19 cs
    eslide
edeck
```
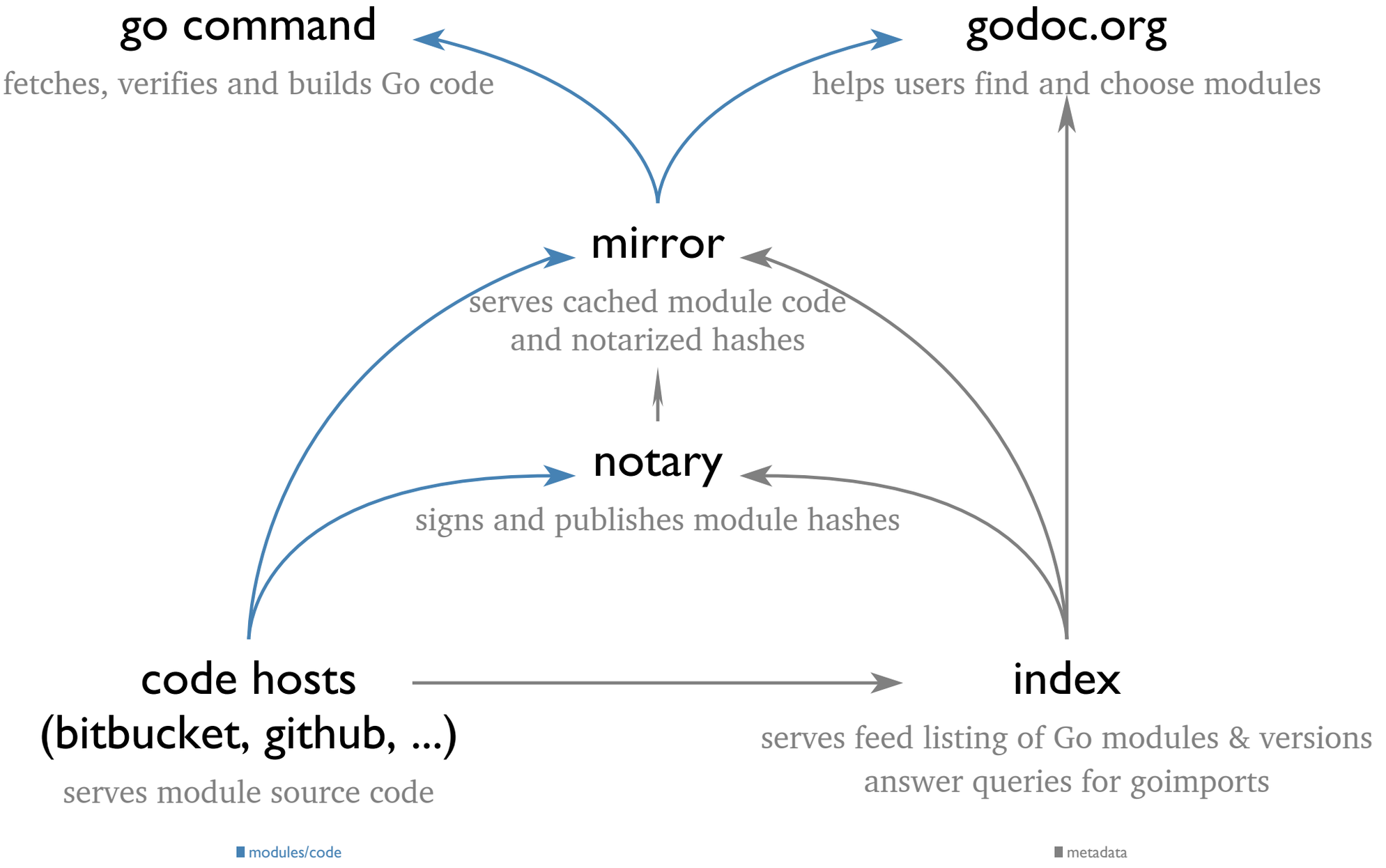

Go Module Information Flows



BOS

SFO

Virgin America 351

Gate B38

8:35am

On Time

JFK

IND

US Airways 1207

Gate C31C

5:35pm

Delayed

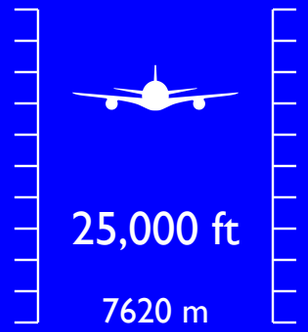
Flight Information

Los Angeles (LAX) → New York/Newark (EWR)

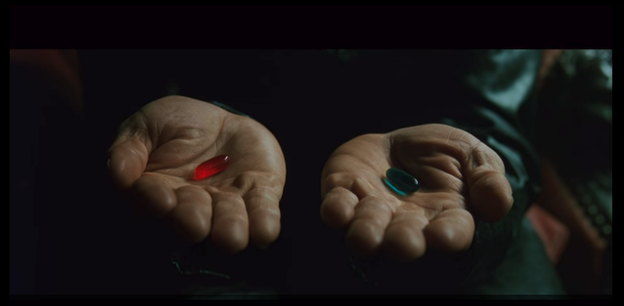
Distance Traveled	Distance to Destination
1,958 mi	596 mi
3,151 km	798 km

Time to Destination	1:20
Estimated time of arrival	12:14 am
Local time of arrival	12:14 am

Ground speed	Headwind	Outside Temperature	Current Altitude
547 mph	50 mph	-30° F	25,000 ft
382 kph	80 kph	-34.4 C	7620 m



Pulp Fiction (1993) 1



The Matrix (1999) 2

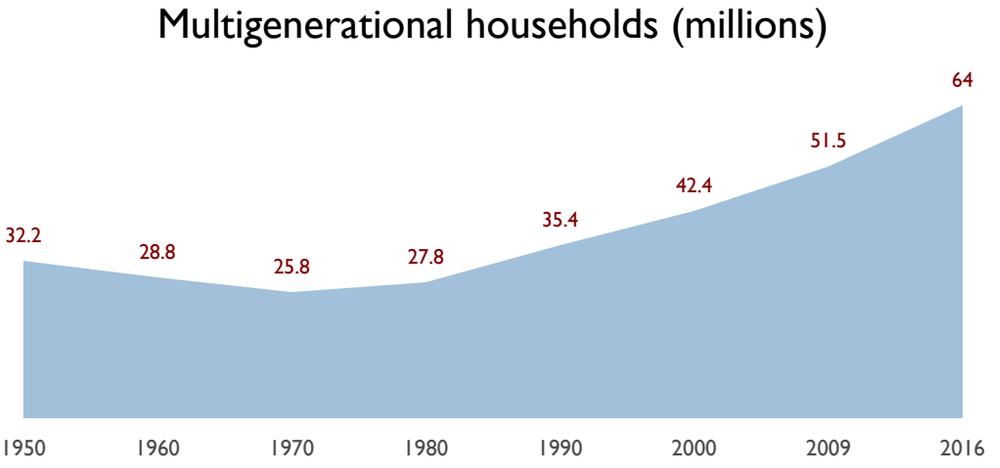
Roma (2018) 4

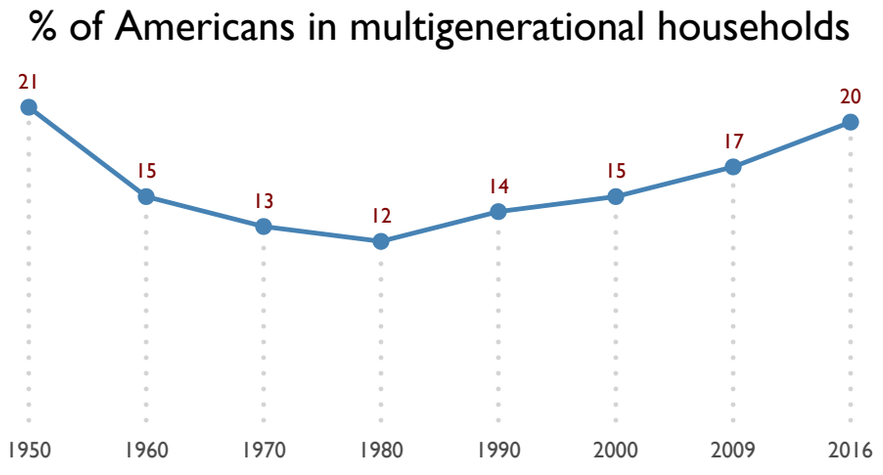
```
pulp04.png,1920,1080,Pulp Fiction (1993)
matrix12.png,1920,1080,The Matrix (1999)
roma04.png,1920,1080,Roma (2018)
```

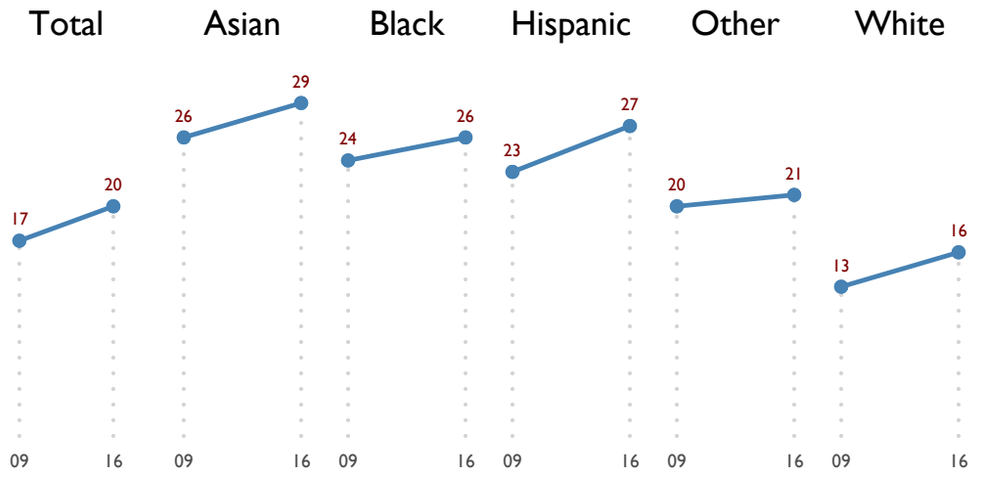
```
caption movies.csv | decksh | pdf ...
```

A record 64 million Americans live in multigenerational households

The number and share of Americans living in multi-generational family households have continued to rise, despite improvements in the U.S. economy since the Great Recession. In 2016, a record 64 million people, or 20% of the U.S.population, lived with multiple generations under one roof, according to a new Pew Research Center analysis of census data.

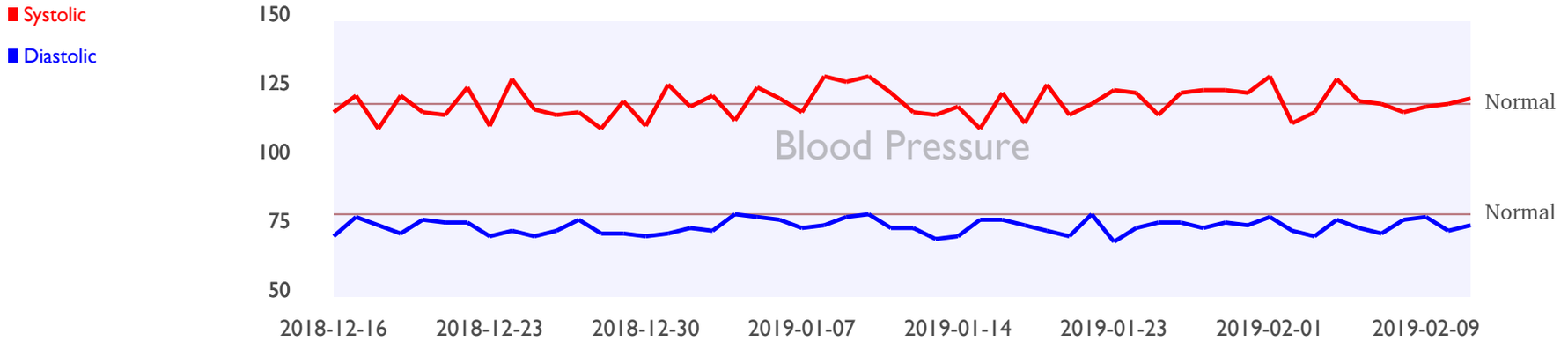


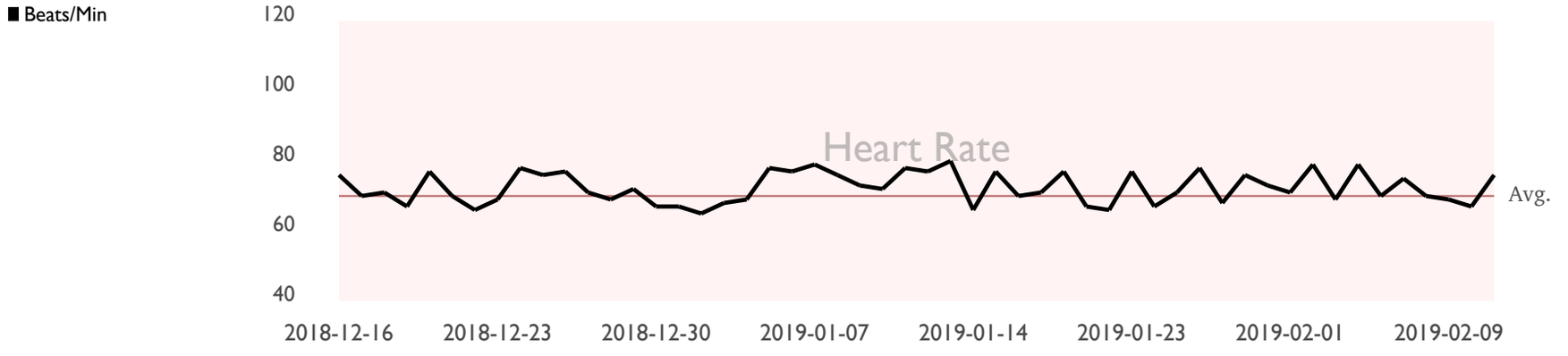




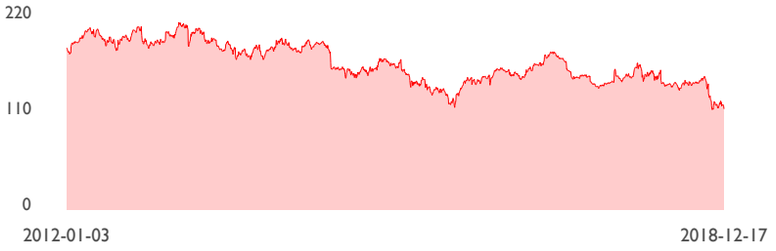
Pew Research Center, April, 2018

Jane Doe


Systolic
Diastolic
150
125
100
75
50
Blood Pressure
Normal
Normal
2018-12-16
2018-12-23
2018-12-30
2019-01-07
2019-01-14
2019-01-23
2019-02-01
2019-02-09


Beats/Min
120
100
80
60
40
Heart Rate
Avg.
2018-12-16
2018-12-23
2018-12-30
2019-01-07
2019-01-14
2019-01-23
2019-02-01
2019-02-09

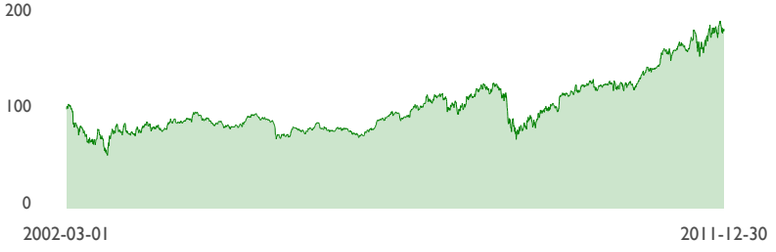
Rometty



-60.47%

The first woman to lead IBM, Rometty shifted IBM away from shrinking businesses such as computers and operating system software, and into higher-growth areas like artificial intelligence. Her tenure has also been met by fierce criticism relating to executive compensation bonuses, layoffs, outsourcing, and presiding over 24 consecutive quarters of revenue decline.

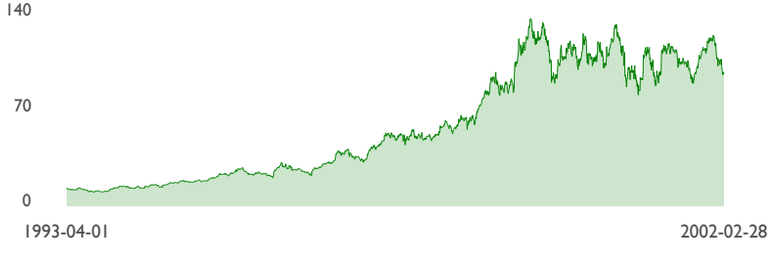
Palmisano



43.97%

Palmisano's mandate was to move into new unique businesses with high profit margins and potential for innovation. This included purchasing PWC Consulting in 2002, so that IBM could go beyond selling computers and software and help customers use technology to solve business challenges in areas such as marketing, procurement and manufacturing.

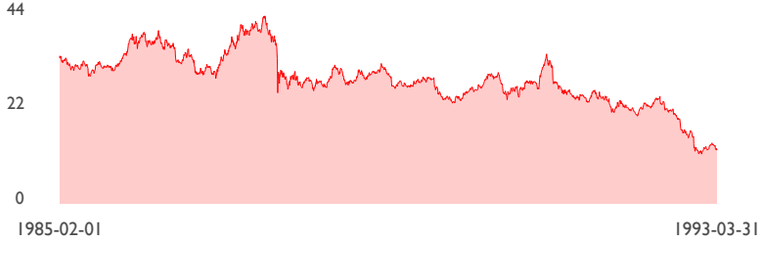
Gerstner



86.78%

Gerstner's choice to keep the company together was the defining decision of his tenure, as these gave IBM the capabilities to deliver complete IT solutions to customers. Services could be sold as an add-on to companies that had already bought IBM computers, while barely profitable pieces of hardware were used to open the door to more profitable deals.

Akers



-166.59%

Akers was credited with simplifying the company's bureaucracy to focus more on profits. In a restructuring intended to reverse three years of disappointing performance, he created five new, autonomous organizations responsible for the company's innovation, design and manufacturing. Akers was forced to resign, after the company posted an unprecedented $5 billion annual loss.

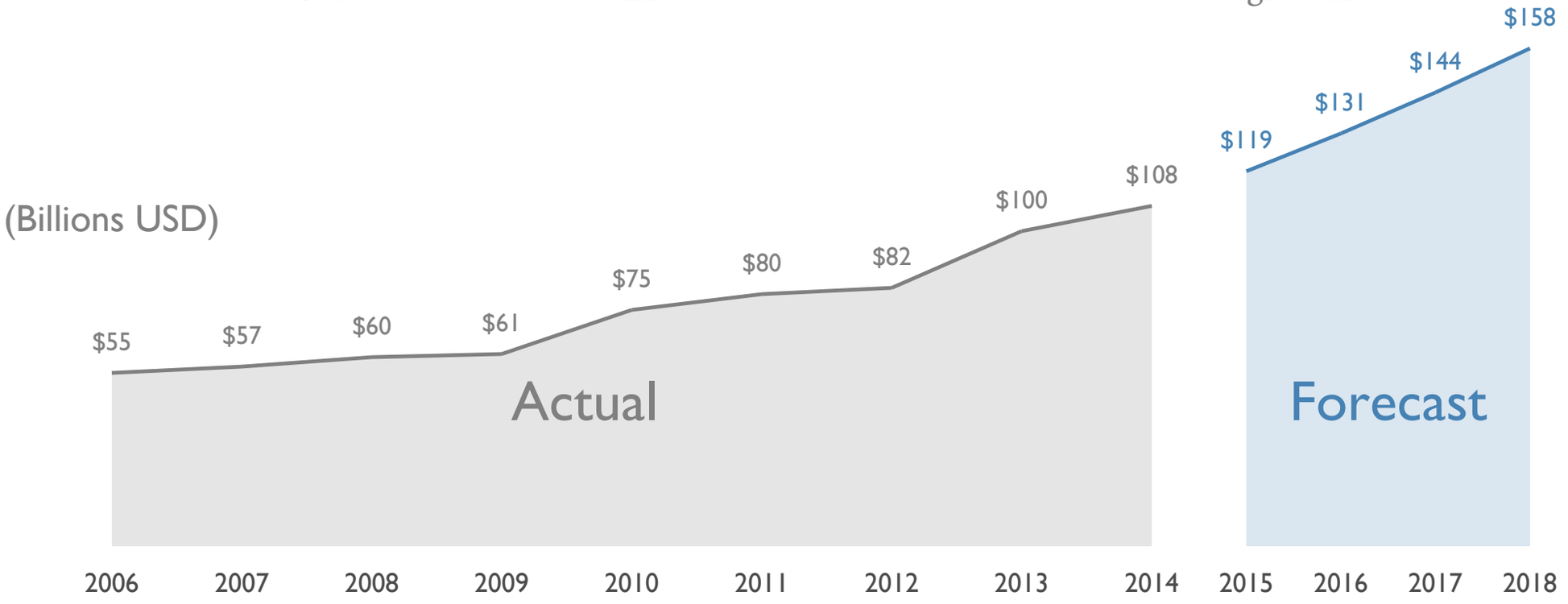
Sales over time

2006-09
annual sales growth 7-8%

2010
marked increase of 22%....

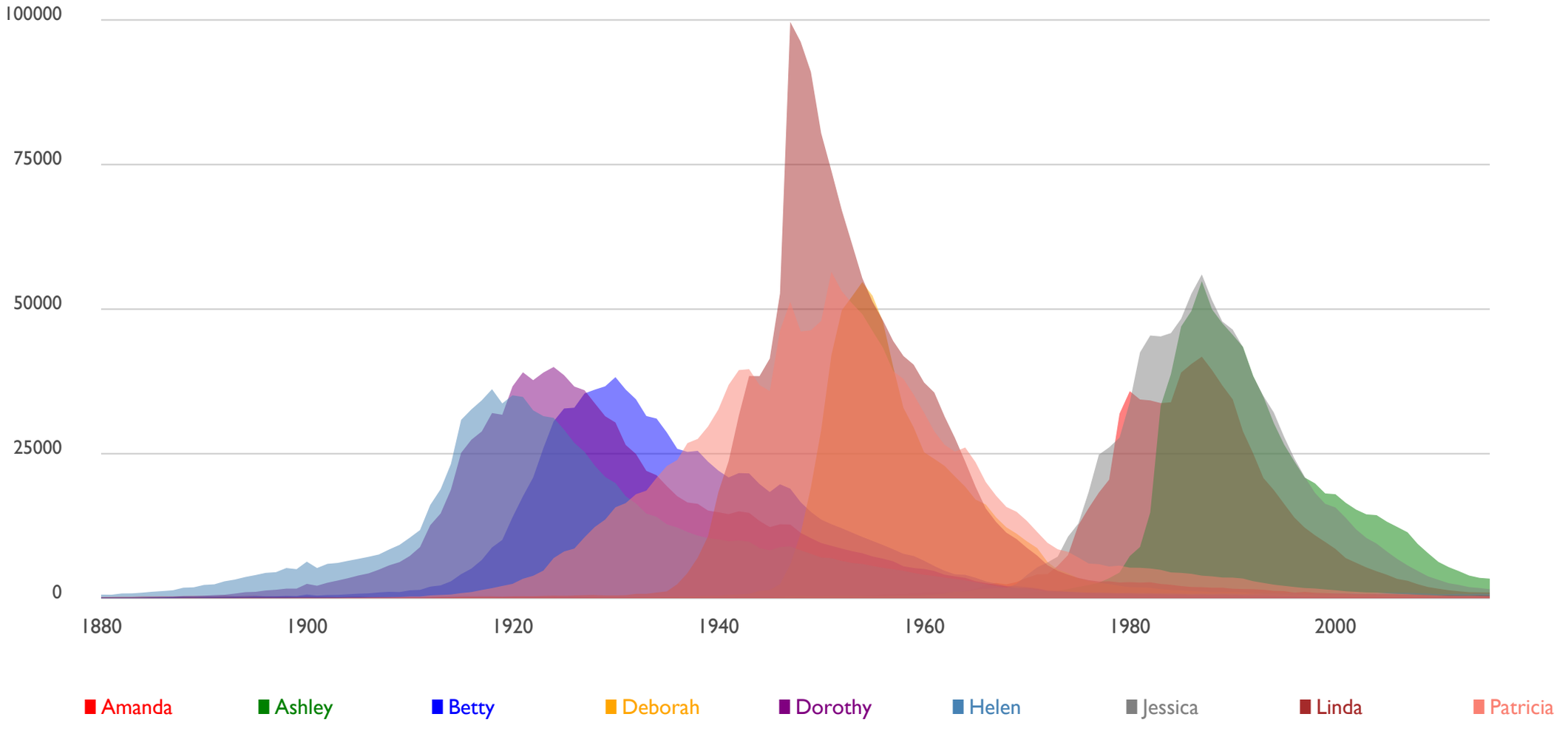
2011-14
steady annual growth: 8-9%

2015 and beyond
assumed 10% year over year growth



Storytelling with data, pg. 154

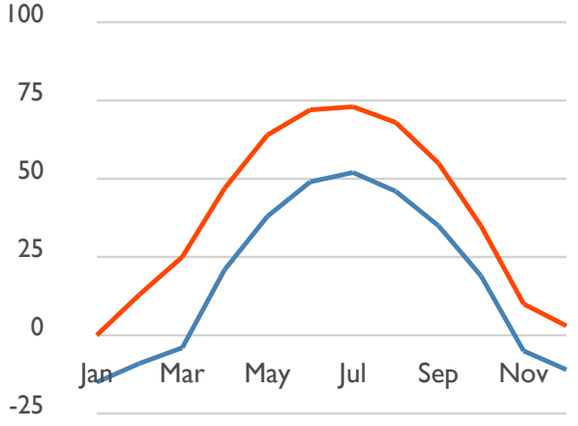
Evolution of Baby Names in the US: 1880-2015



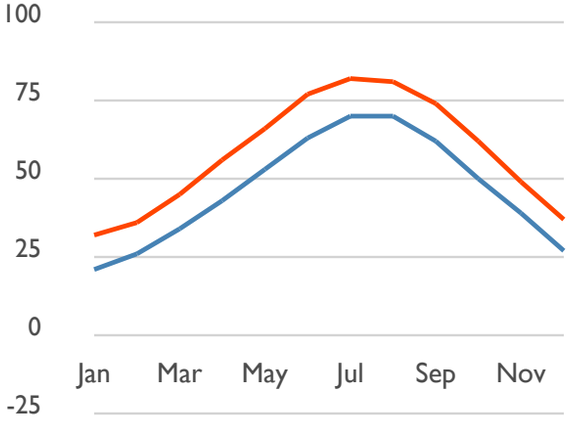
Evolution of Baby Names in the US: 1880-2015

Average High/Low Temperatures (°F)

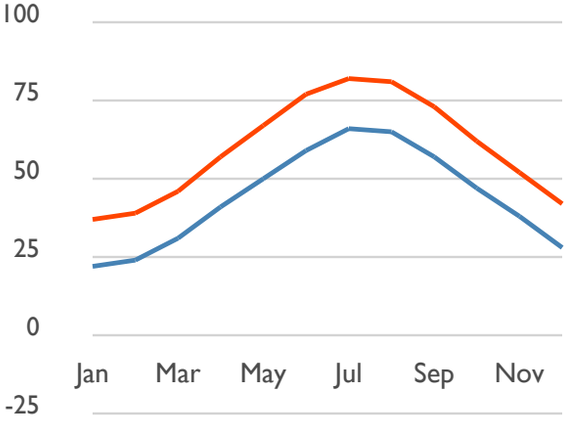
Fairbanks



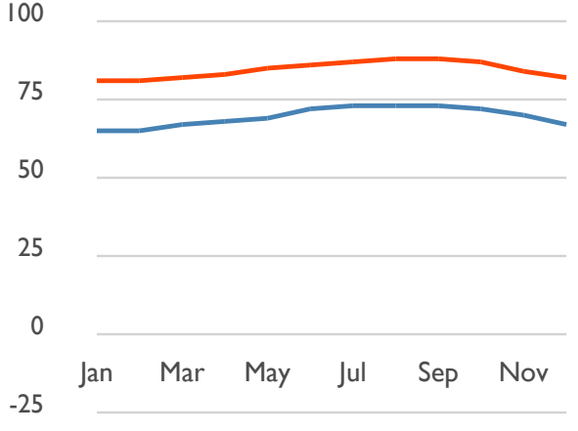
Chicago



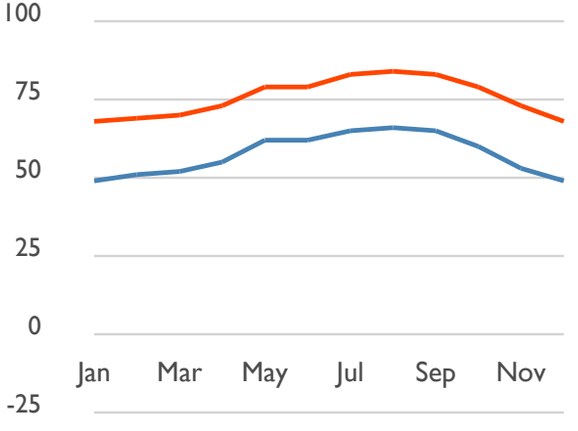
Boston



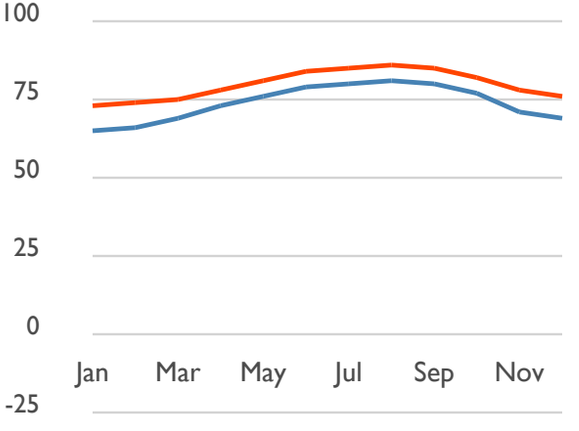
Honolulu



Los Angeles

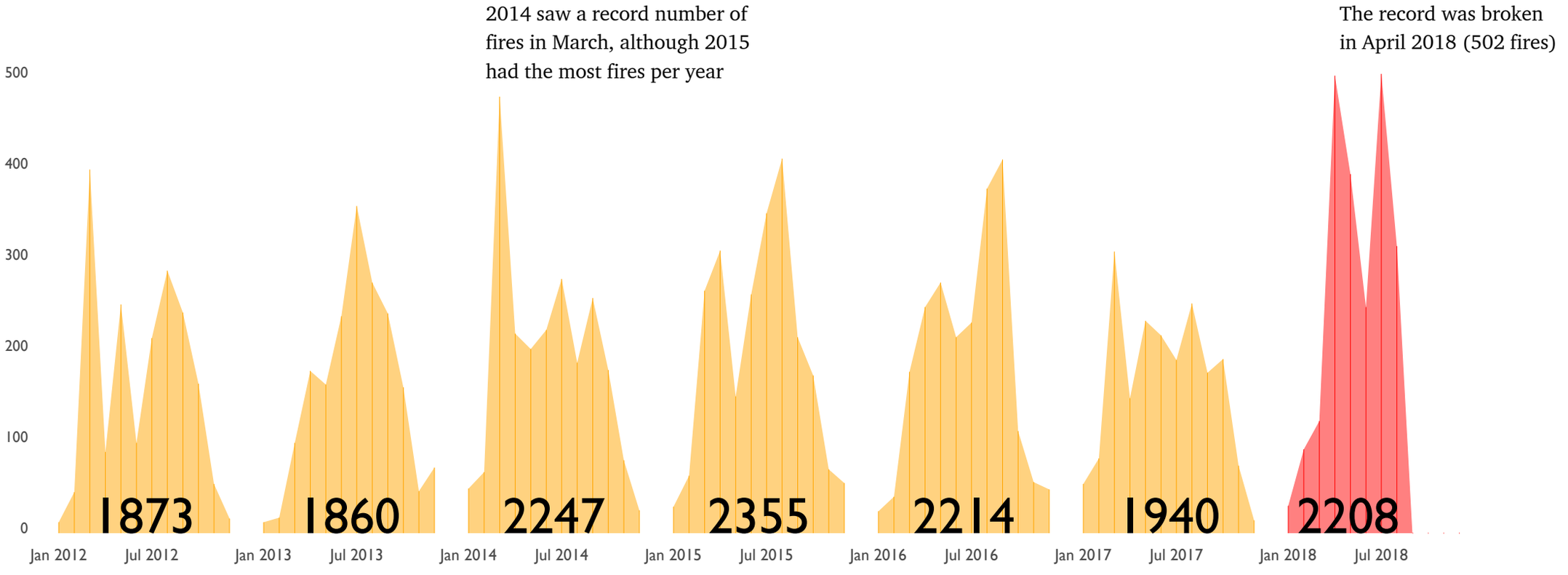


Miami



Avg. High Avg. Low

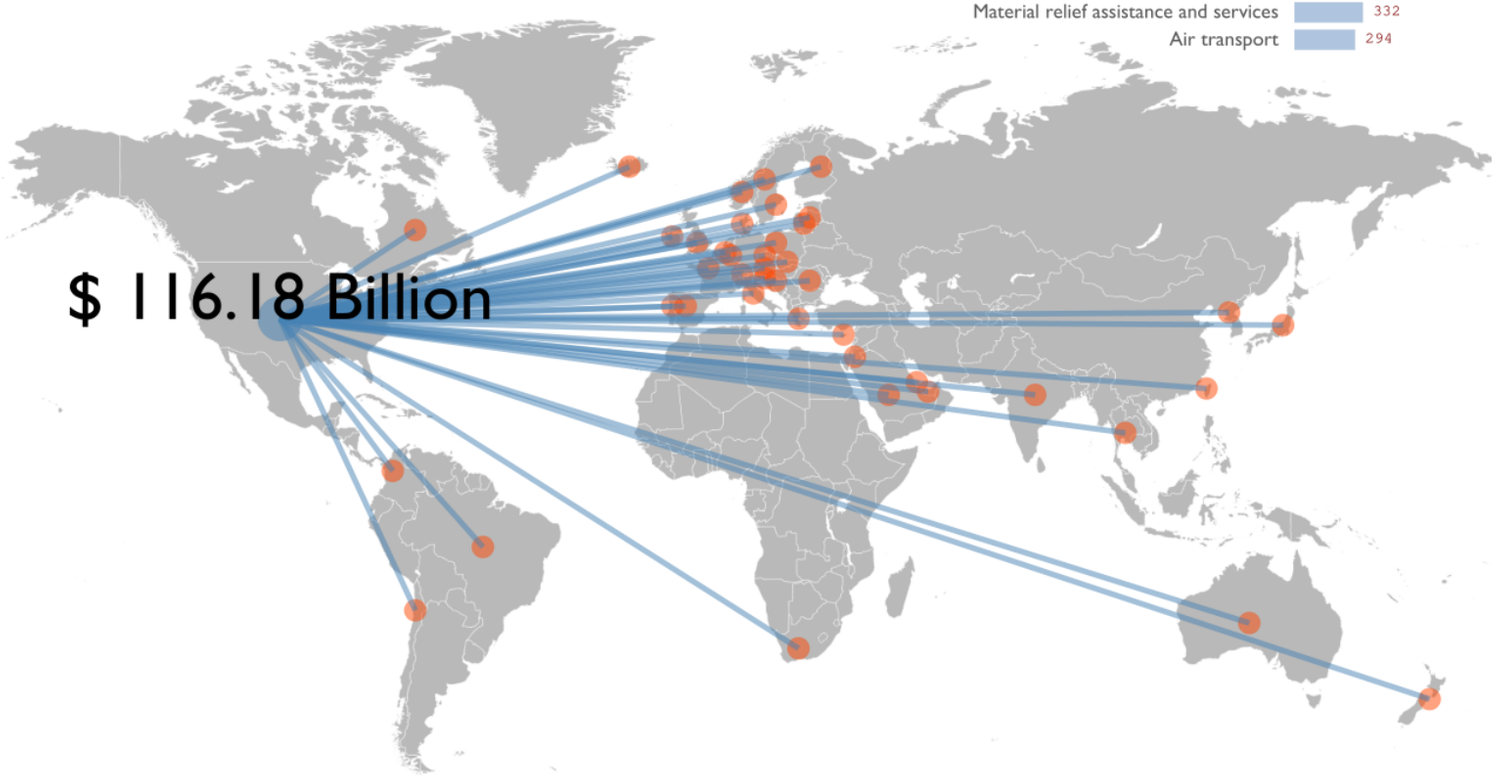
German Wildfires 2012-2018



Chartable blog, Weekly Chart, September 6, 2018

United States

$ 116.18 Billion

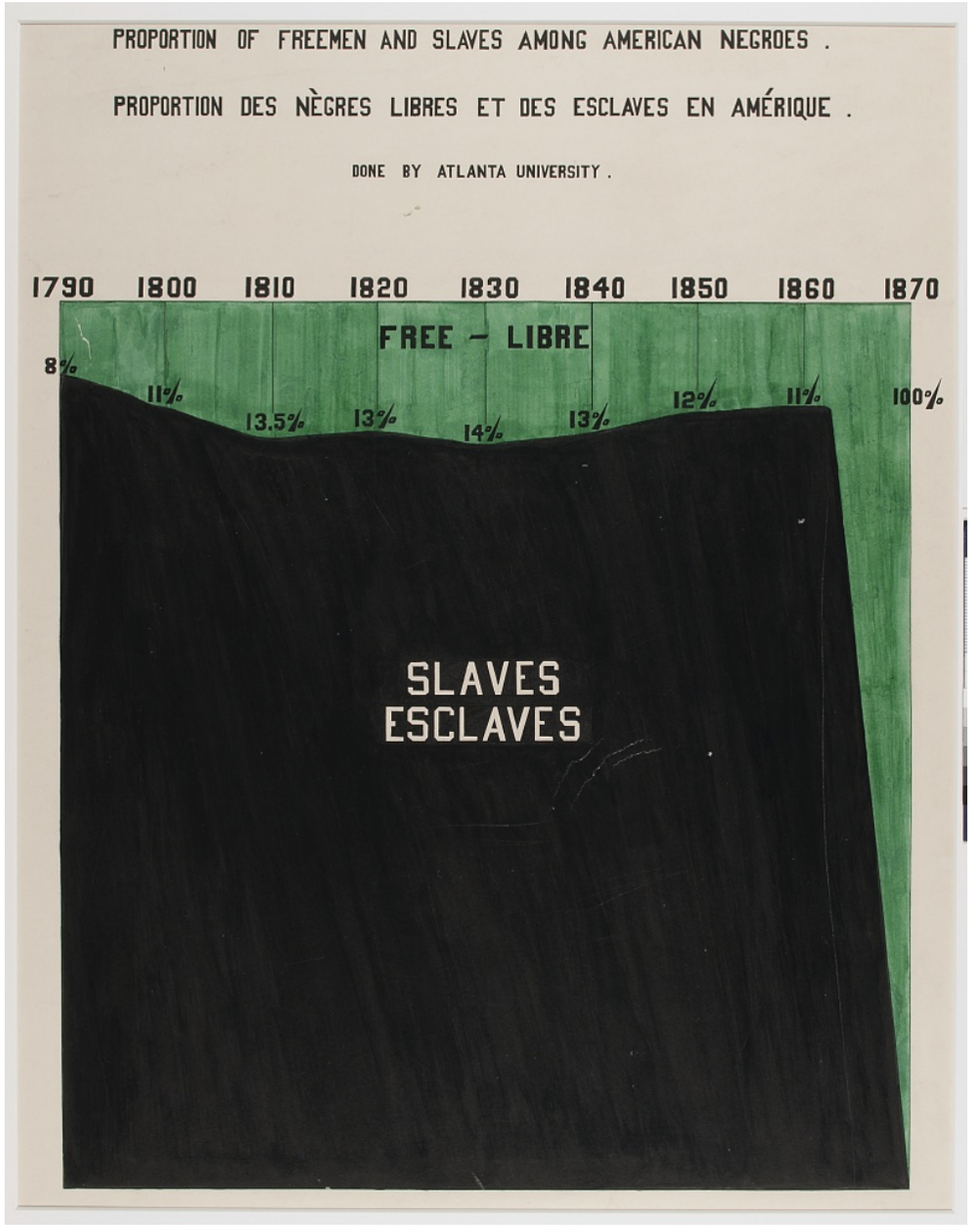


Donation Frequency

Administrative costs	1092
Multisector aid	727
Std control including hiv/aids	562
Bio-diversity	521
Industrial development	425
STD control including HIV/AIDS	372
Strengthening civil society	368
Social/ welfare services	351
Material relief assistance and services	332
Air transport	294

Amount Received

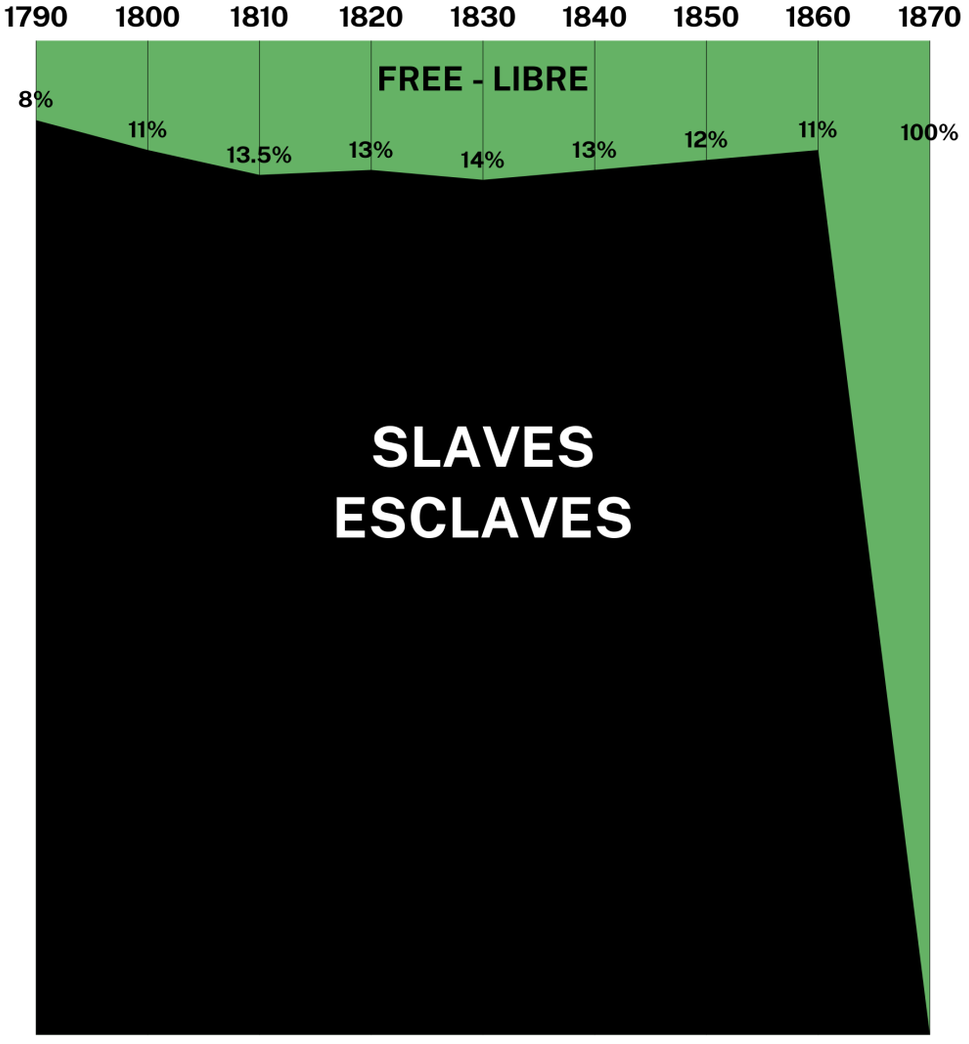
Colombia	$17.10420
India	$16.52980
Brazil	$13.54830
Korea	$11.15440
Kuwait	$7.72742
South Africa	$6.67878
Thailand	$6.49564
Saudi Arabia	$4.44001
Canada	$4.06860
Chile	$3.69068
Taiwan	$2.83103
Australia	$2.57262
Poland	$2.50855
Italy	$2.40003
Japan	$2.08098
Hungary	$1.76530
Romania	$1.68628
Czech Republic	$1.25006
United Kingdom	$0.95734
Ireland	$0.93464
Austria	$0.76991
Qatar	$0.72317
Spain	$0.56171
Luxembourg	$0.55504
Greece	$0.51938
Cyprus	$0.49402
Norway	$0.36800
France	$0.23753
New Zealand	$0.22559
Belgium	$0.18435
Lithuania	$0.18245
Finland	$0.18062
Portugal	$0.17513
Denmark	$0.16631
Latvia	$0.15660
Slovak Republic	$0.09411
Sweden	$0.05976
Estonia	$0.05313
Liechtenstein	$0.01826
Iceland	$0.01806
Slovenia	$0.00692
United Arab Emirates	$0.00154



PROPORTION OF FREEMEN AND SLAVES AMONG AMERICAN NEGROES.

PROPORTION DES NÈGRES LIBRES ET DES ESCLAVES EN AMÉRIQUE.

DONE BY ATLANTA UNIVERSITY.



INCOME AND EXPENDITURE OF 150 NEGRO FAMILIES IN ATLANTA, GA.,U.S.A.

ANNUAL EXPENDITURE FOR

ANNUAL INCOME

RENT

FOOD

DIETARY OF WELL-TO-DO NEGRO FAMILY FROM BULLETIN U.S. DEPARTMENT OF AGRICULTURE NO. 71

CLOTHES

DIRECT TAXES

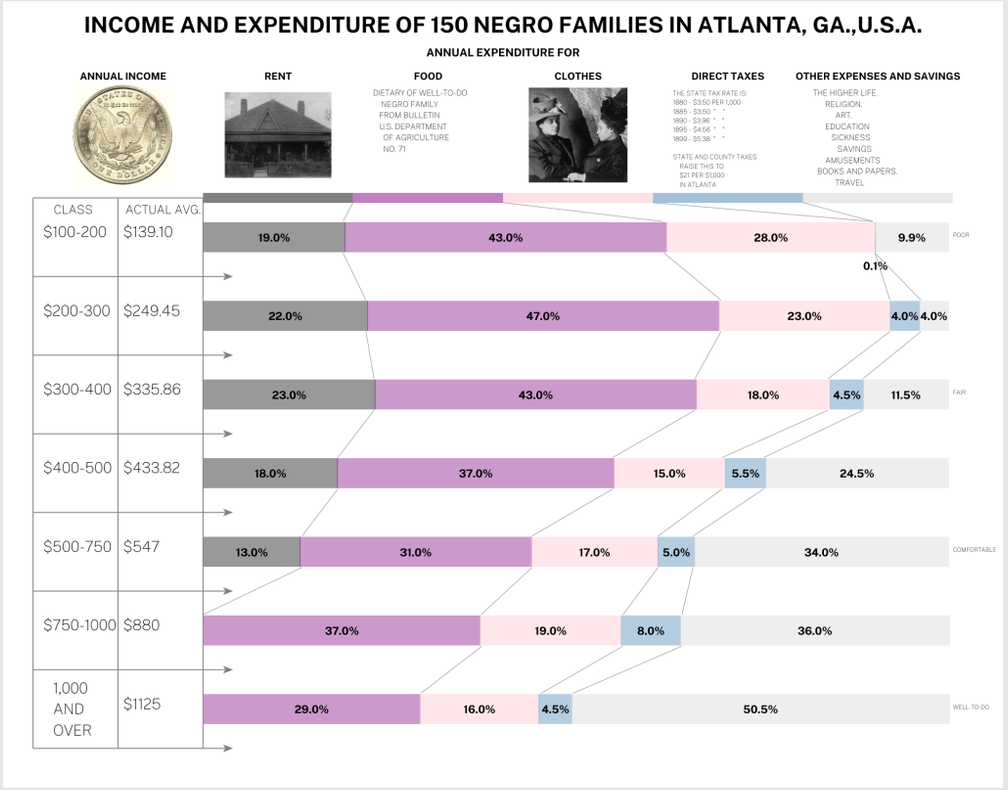
THE STATE TAX RATE IS:
1880 - $3.50 PER 1,000
1885 - $3.50 " "
1890 - $3.96 " "
1895 - $4.56 " "
1899 - $5.38 " "

STATE AND COUNTY TAXES RAISE THIS TO $21 PER $1,000 IN ATLANTA

OTHER EXPENSES AND SAVINGS

THE HIGHER LIFE.
RELIGION.
ART.
EDUCATION
SICKNESS
SAVINGS
AMUSEMENTS
BOOKS AND PAPERS.
TRAVEL

CLASS	ACTUAL AVG.							
$100-200	$139.10	19.0%	43.0%	28.0%			9.9%	POOR
					0.1%			
$200-300	$249.45	22.0%	47.0%	23.0%		4.0%	4.0%	
$300-400	$335.86	23.0%	43.0%	18.0%		4.5%	11.5%	FAIR
$400-500	$433.82	18.0%	37.0%	15.0%		5.5%	24.5%	
$500-750	$547	13.0%	31.0%	17.0%		5.0%	34.0%	COMFORTABLE
$750-1000	$880	37.0%		19.0%		8.0%	36.0%	
1,000 AND OVER	$1125	29.0%		16.0%		4.5%	50.5%	WELL-TO-DO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CLASS
ACTUAL AVG.
$100-200 $139.10 19.0% 43.0% 28.0% 9.9% 0.1% POOR
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$400-500 $433.82 18.0% 37.0% 15.0% 5.5% 24.5%
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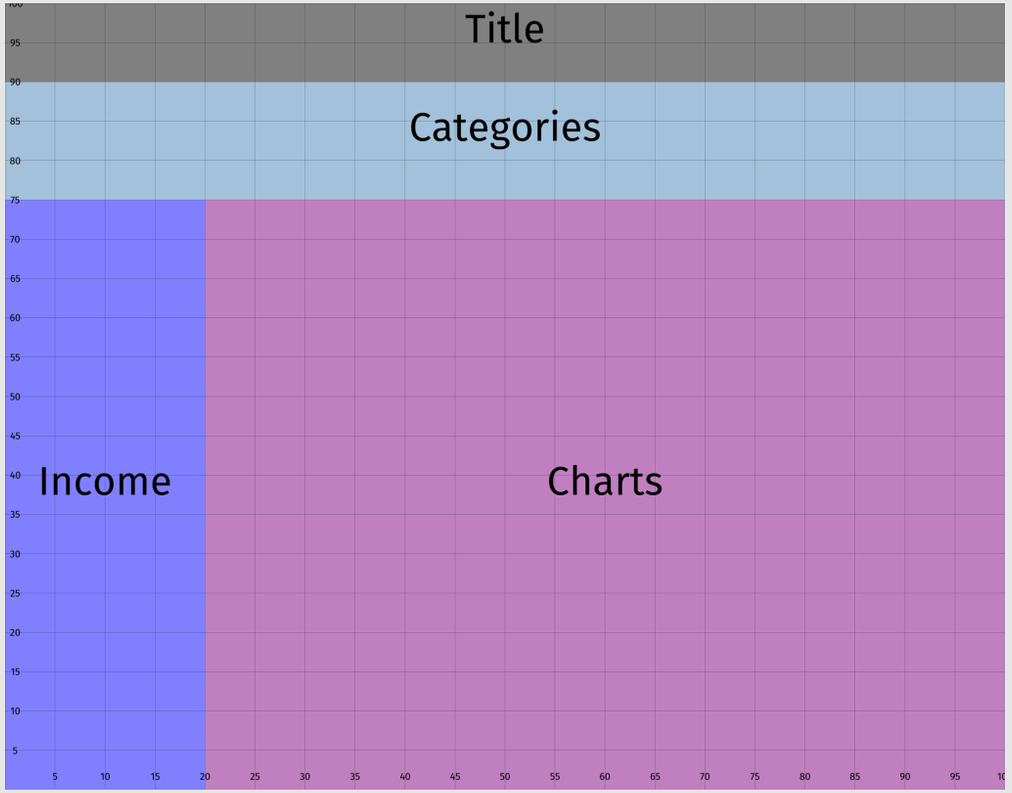
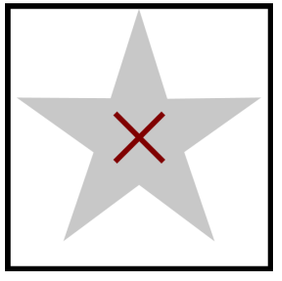
$750-1000 $880 37.0% 19.0% 8.0% 36.0%
1,000 AND OVER $1125 29.0% 16.0% 4.5% 50.5% WELL-TO-DO


Title
Categories
Income
Charts

go get it

decksh	github.com/ajstarks/decksh
dchart	github.com/ajstarks/dchart
pdfdeck	github.com/ajstarks/deck/cmd/pdfdeck
examples	github.com/ajstarks/deckviz
fonts	github.com/ajstarks/deckfonts



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