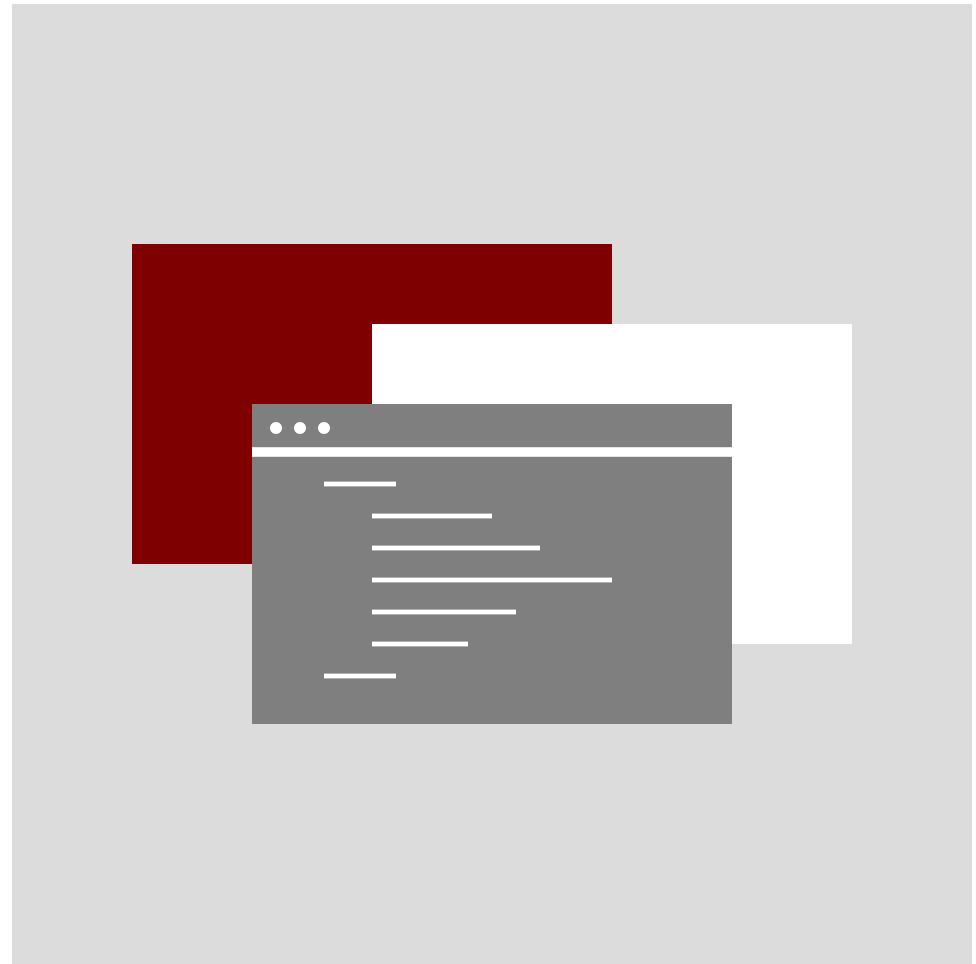


# decksh

a little language for decks



Anthony Starks  
@ajstarks

*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.”*

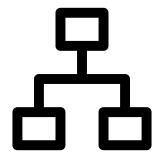
Jon Bentley, Little Languages, Communications of the ACM, August 1986

# Deck



a Go package for presentations

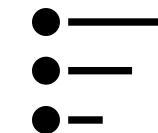
# *Elements*



Structure



Text



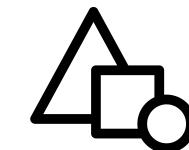
Lists



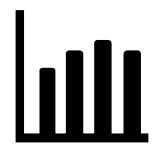
Arrows



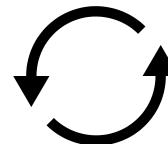
Images



Graphics



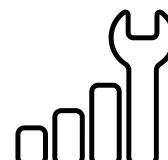
Charts



Loops



Data



Utility

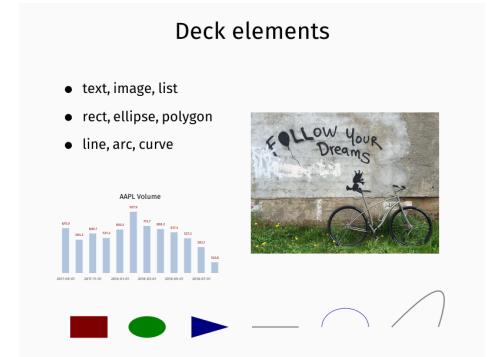
decksh → deck markup → PDF  
SVG  
PNG

```
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

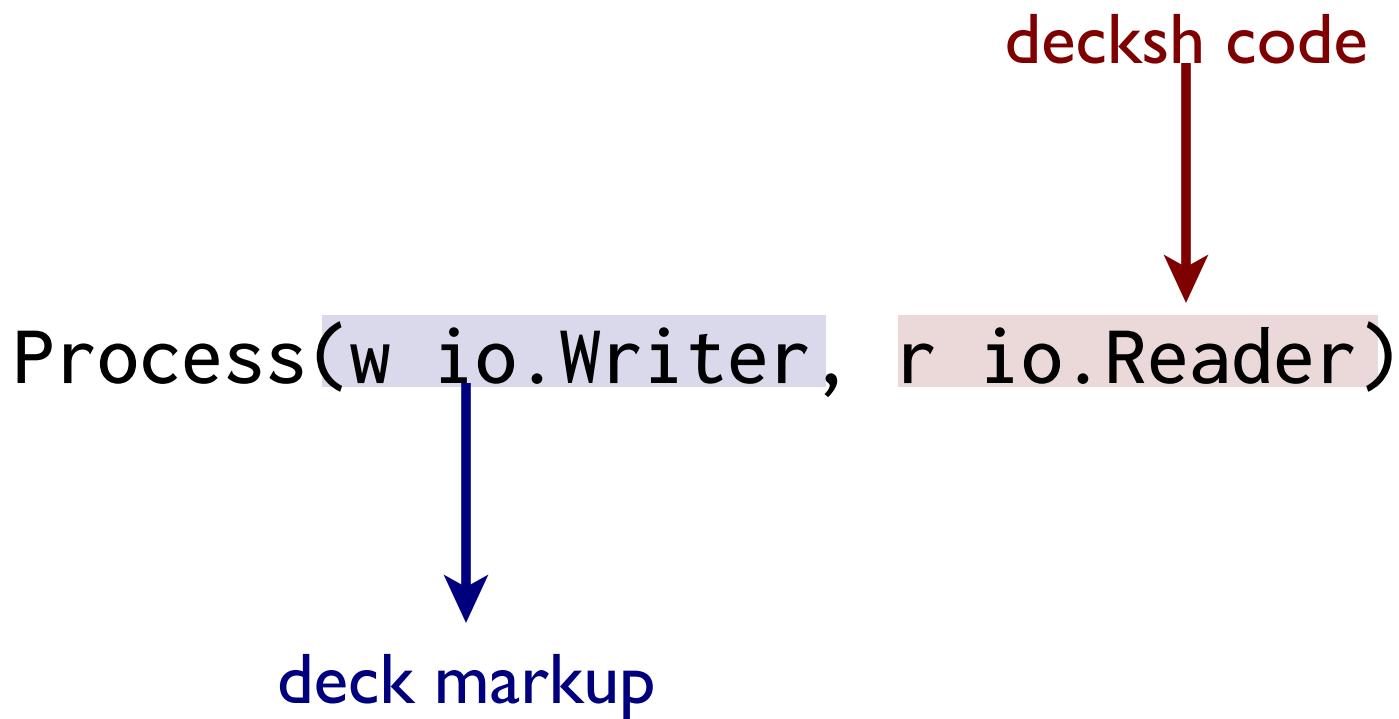
  gy=10
  rect 15 gy 8 6      "rgb(127,0,0)"
  ellipse 27.5 gy 8 6   "rgb(0,127,0)"
  line 50 gy 60 gy
  curve 80 gy 95 30 90 gy
  arc 70 gy 10 8 0 180 0.1 "rgb(0,0,127)"
  polygon "37 37 45" "13 7 10" "rgb(0,0,127)"

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

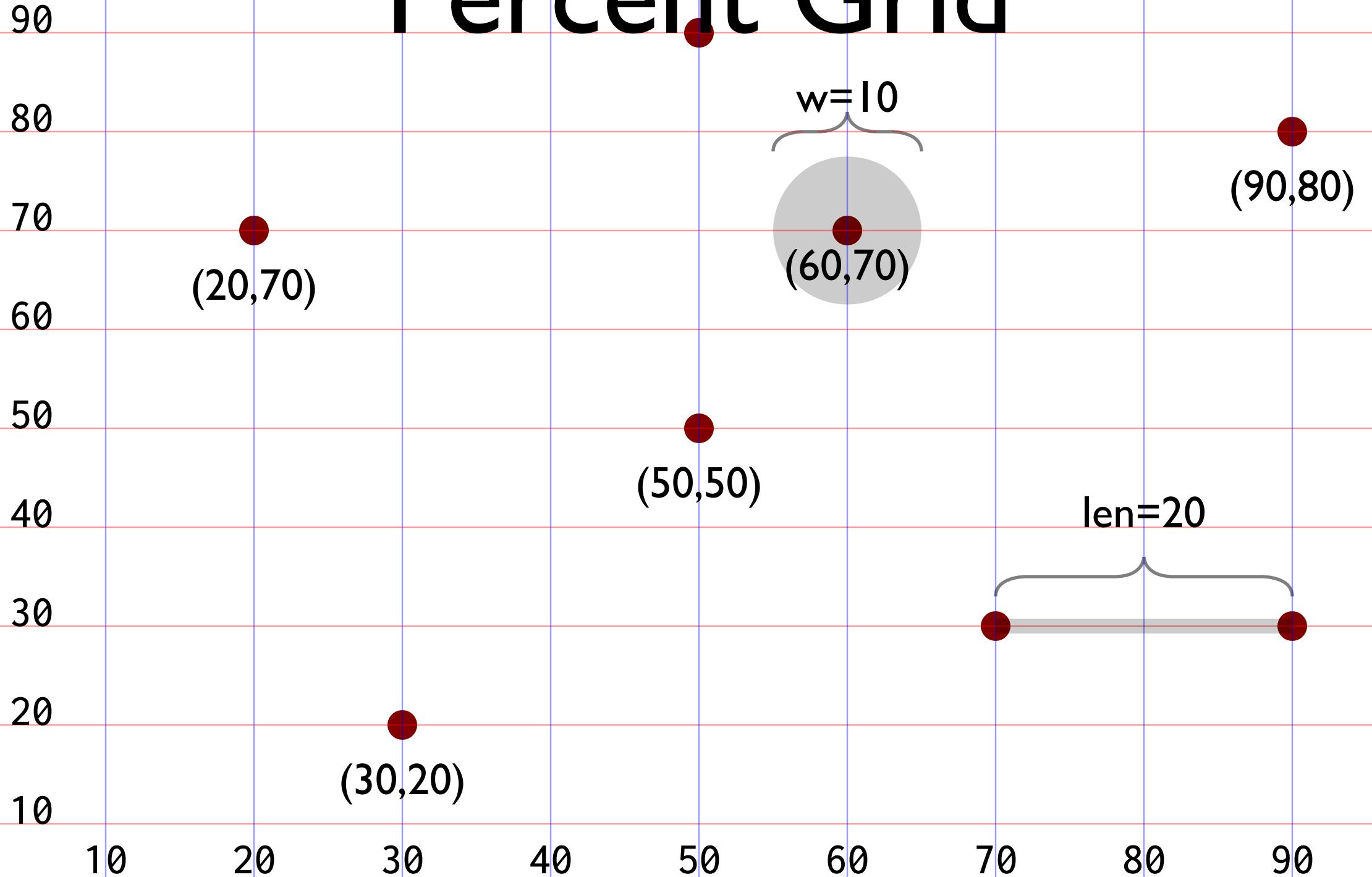
```
<deck>
<slide bg="rgb(250,250,250)" fg="black">
<text align="c" xp="50" yp="90" sp="5">Deck elements</text>
<image name="follow.jpg" xp="70" yp="50" width="640" height="480" scale="50" />
<list type="bullet" xp="10" yp="75" sp="3">
<li>text, image, list</li>
<li>rect, ellipse, polygon</li>
<li>line, 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



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

# hello, world

# *Running decksh*

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

`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
edock
```

PROBLEMS TERMINAL ...

1: bash

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

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

master\* 0 0 0 0



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 ☺ 🔔



# *Keywords and arguments*

keyword

arguments

mandatory

optional

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 Text

deck  
edeck  
slide  
eslide  
canvas  
def  
edef  
func  
grid  
include

## Lists

list  
blist  
nlist  
clist  
li  
elist

## Graphics

acircle  
arc  
circle  
curve  
ellipse  
hline  
line

## Braces Arrows

lbrace  
rbrace  
ubrace  
dbrace  
arrow  
rcarrow  
lcarrow  
ucarrow  
dcarrow

## Images

image  
cimage

## Charts

dchart  
legend

## Loop

for  
efor

## Assignments

polarx  
polary  
area  
format  
random  
sqrt  
vmap

## Data

data  
edata

# *Structure*

```
// This is a comment ← comment

deck

    canvas 1920 1080 ← canvas size hint (width height)

    variables { x=20      // define x ← inline comment
                 y=80

    slide { slide I
            text "first" x y 2
            eslides

            slide "black" "white"
            include "file.dsh" { ctext "hello, world" 50 25 10
                                   circle 50 0 100 "blue"
                                   for x=20 80 10
                                       circle x 75 2
                                   efor

            eslides

        edeck
```

Text

hello world

hello world

hello world.

text

# ctext

etext

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

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

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

angle(315) named(25) rotate(45) about((35))

# rtext

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

A circular arrangement of words and symbols on a light blue background. The words are written in a black, cursive-style font. Starting from the top and moving clockwise, the words are: 'there', 'wor1d', 'piwo', 'there', 'hello', 'there', and 'oTTeH'. A single red dot is positioned in the center of the circle.

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]*

## textfield

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("hello, world")  
}
```

"filename" *x y width size [color]*

# *Lists*

First thing

- First thing

Second thing

- Second thing

Third thing

- Third thing

Fourth

- Fourth

I. 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

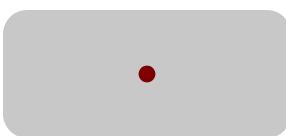
*x y size [font] [color] [op] [spacing]*   *x y size [font] [color] [op] [spacing]*   *x y size [font] [color] [op] [spacing]*   *x y size [font] [color] [op] [spacing]*

# *Graphics (shapes)*



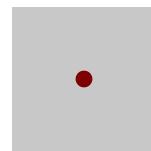
rect

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



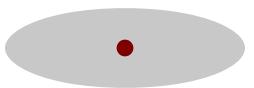
rrect

*x y w h r [color]*



square

*x y w [color] [op]*



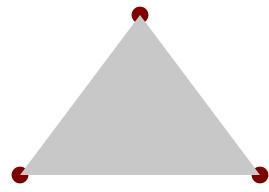
ellipse

*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 inner outer [color] [op]*

# *Graphics (lines)*



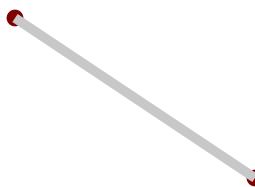
**arc**

*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**

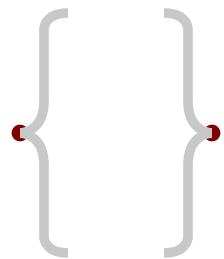
*x y len [lw] [color] [op]*



**vline**

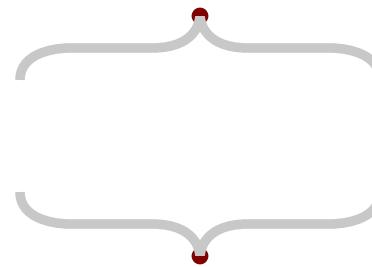
*x y len [lw] [color] [op]*

# *Braces*



[r-l]brace

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



[u-d]brace

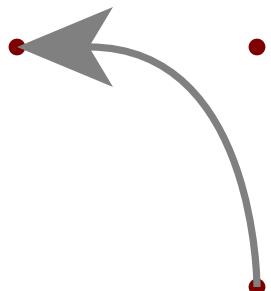
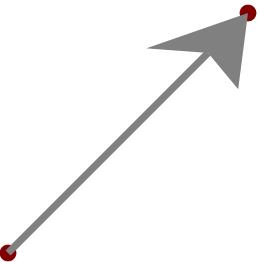
*x y size aw ah [lw] [color] [op]*

# Arrows



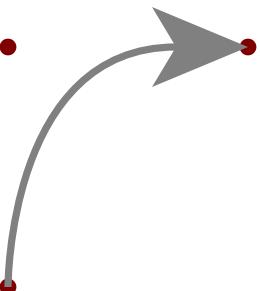
arrow

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



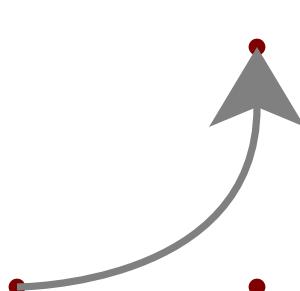
larrow

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



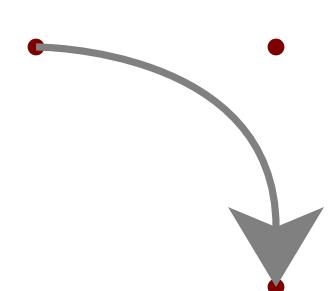
rcarrow

...



ucarrow

...



darrow

...

# *Images*



Up in the clouds

image

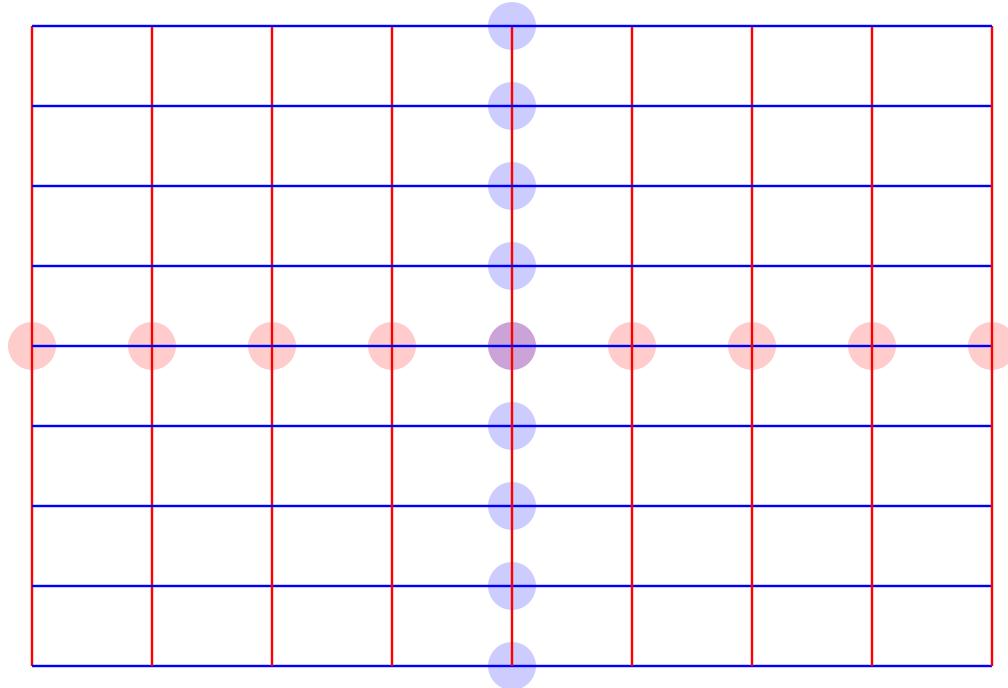
"filename" x y w h [scale] [link]

cimage

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

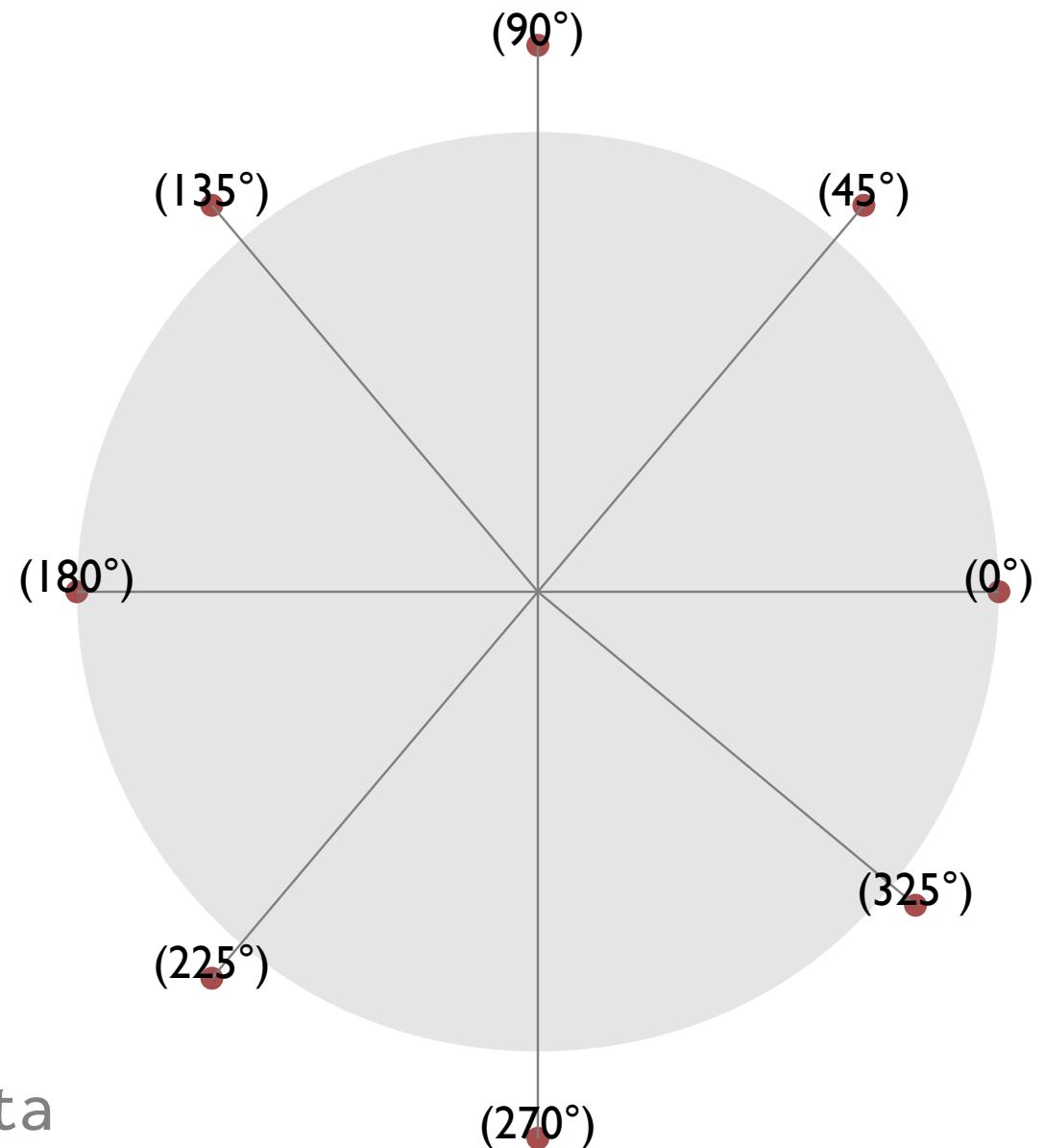
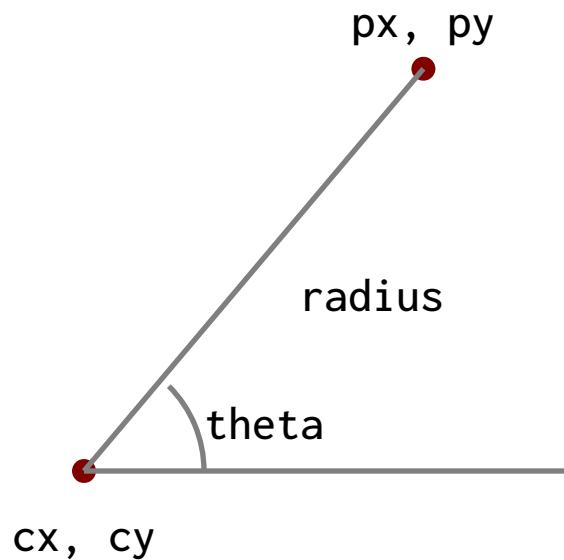
# *Loops*

```
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
```

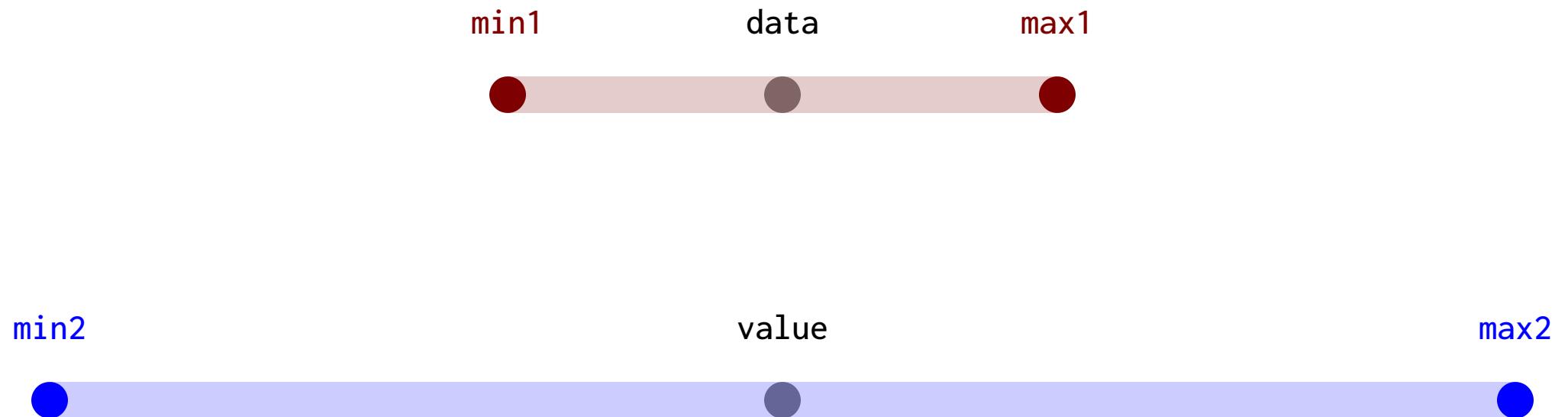
# Polar Coordinates



`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"
```

100.30 Million (USD)

Total value: 300.53

**value= `format` fmt expression**

# *Random Numbers*

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

x1,y1

```
x2=random 40 50  
y2=random 50 60
```

x2,y2

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

x3,y3

value= **random** min max

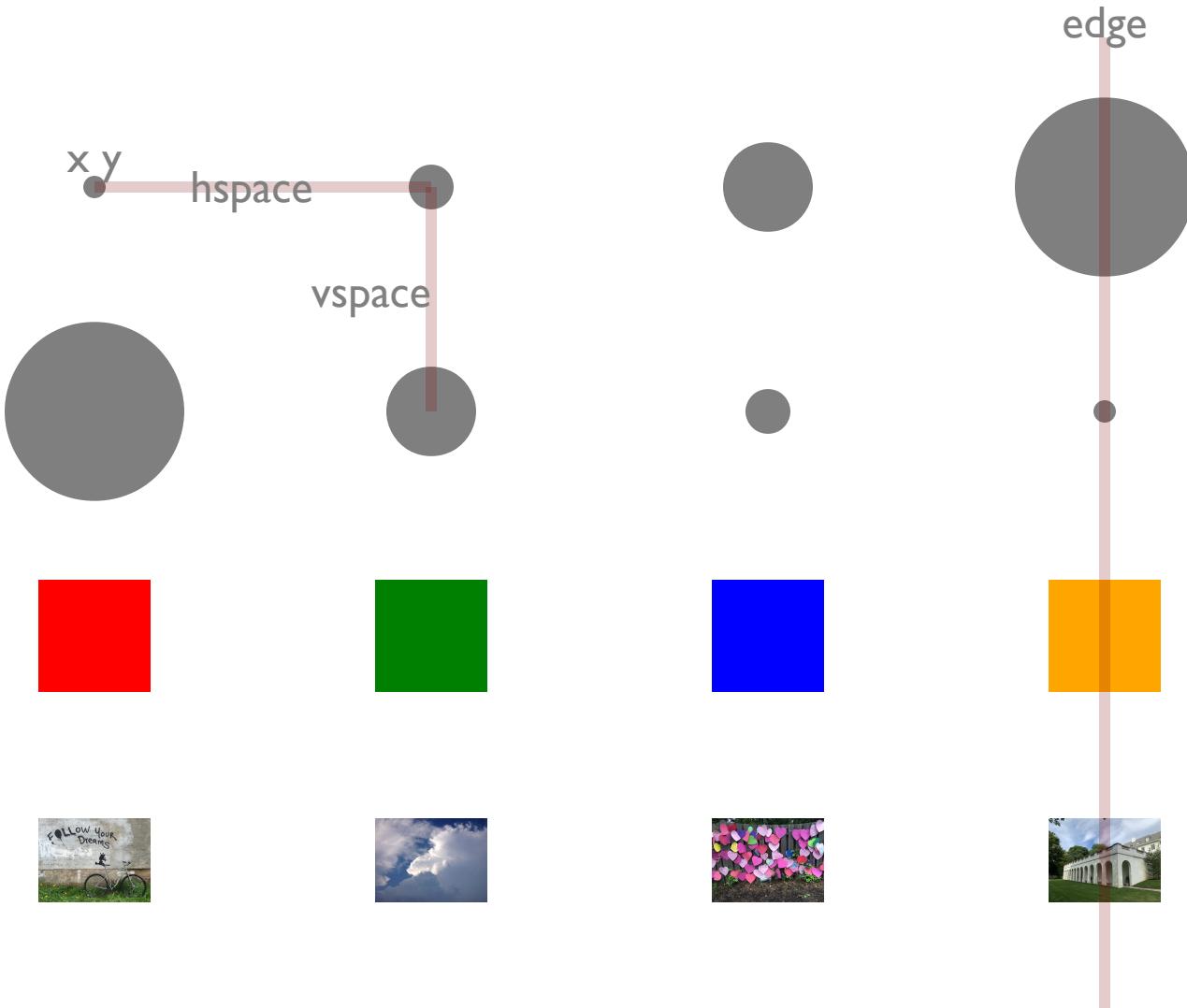
# Flexible Grid

```
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
```

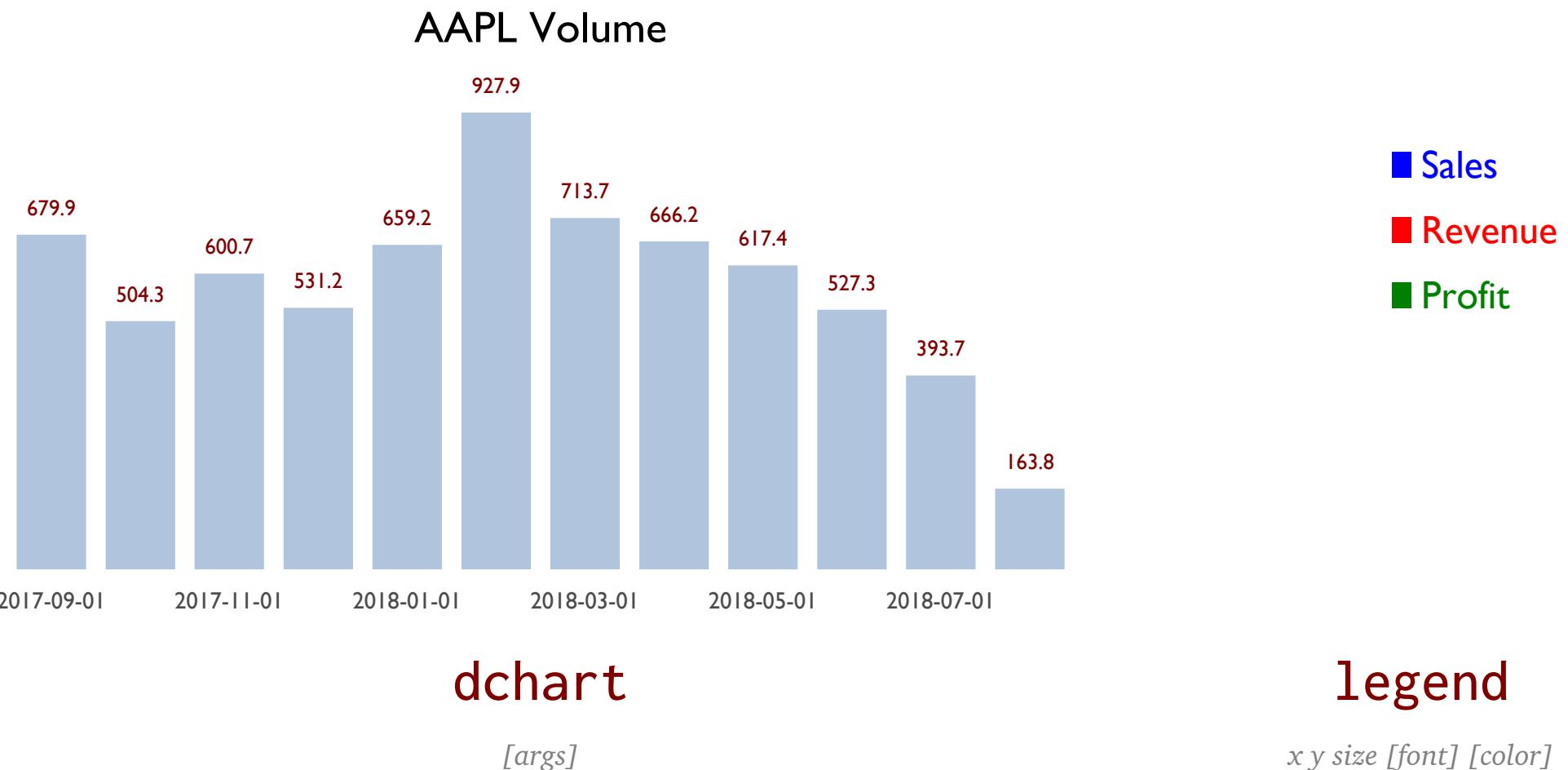
```
square x y 5 "red"  
square x y 5 "green"  
square x y 5 "blue"  
square x y 5 "orange"
```

```
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
```

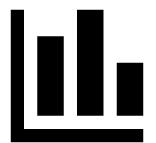


**grid "foo.dsh" x y hspace vspace edge**

# Charts



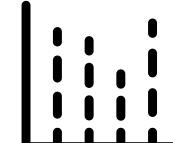
# *dchart types*



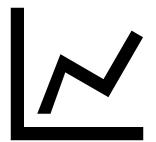
Column



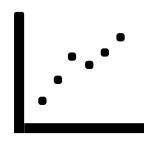
Bar



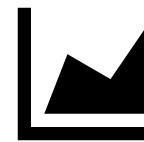
Dot



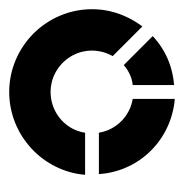
Line



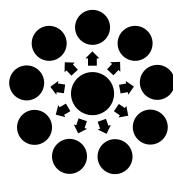
Scatter



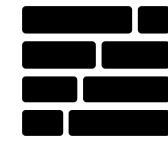
Area



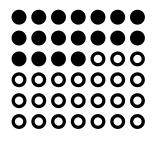
Donut/Pie



Radial



Pmap



Waffle/Lego

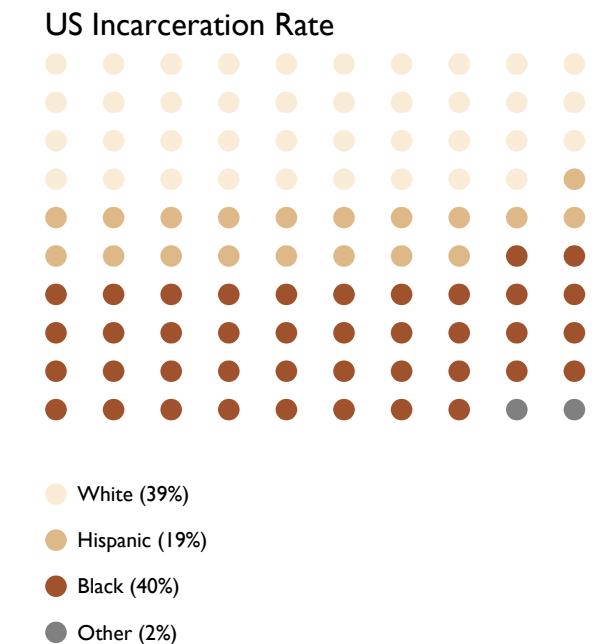
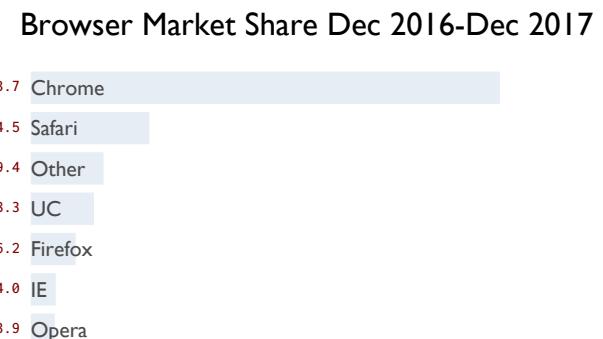
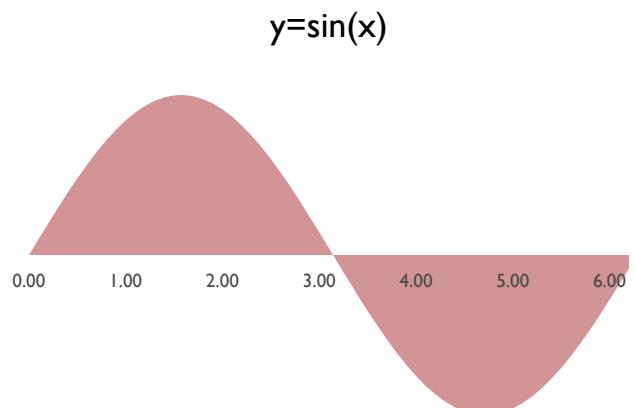
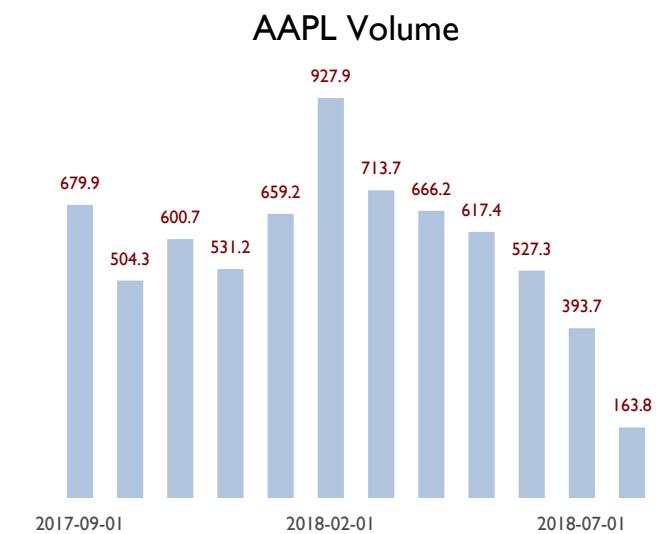
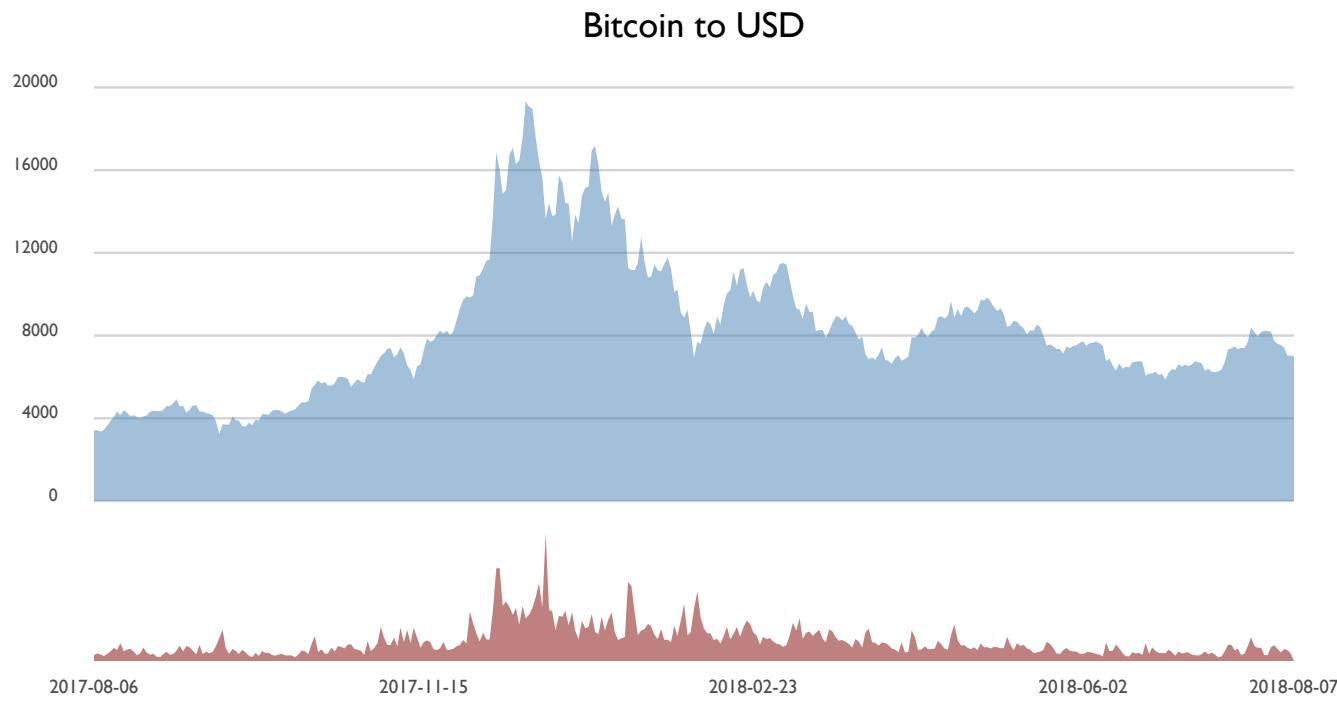


Fan



Bowtie

# *dchart: charts for deck*



```
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
  eslides
edeck
```

## Deck elements

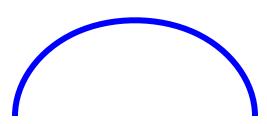
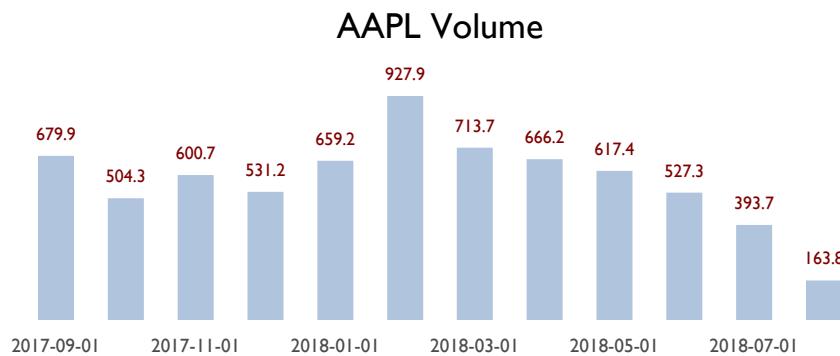
- text, image, list
- rect, ellipse, polygon
- line, arc, curve



decksh example.dsh | pdf

# Deck elements

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



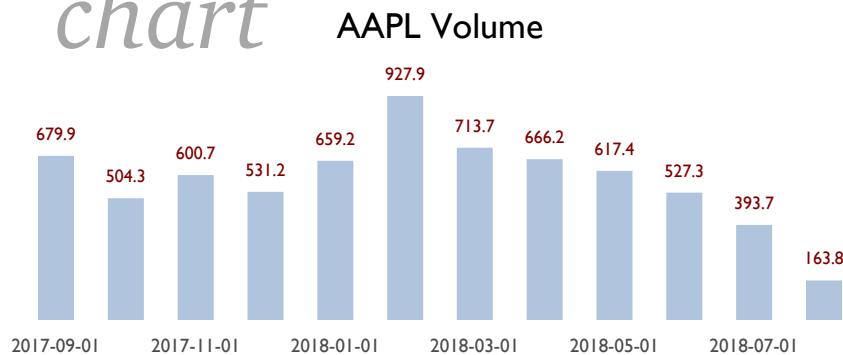
# *text*

# Deck elements

*list*

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

*chart*



*image*



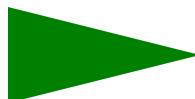
*rect*



*ellipse*



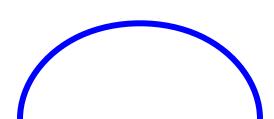
*polygon*



*line*



*arc*



*curve*



# Examples



# Anthony J. Starks

## Art + Code

---

 +1 908.548.3403

 ajstarks@gmail.com

 @ajstarks

 [github.com/ajstarks](https://github.com/ajstarks)

 [speakerdeck.com/ajstarks](https://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

  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
edock

```



## Anthony J. Starks

### Art + Code

---

 +1 908.548.3403

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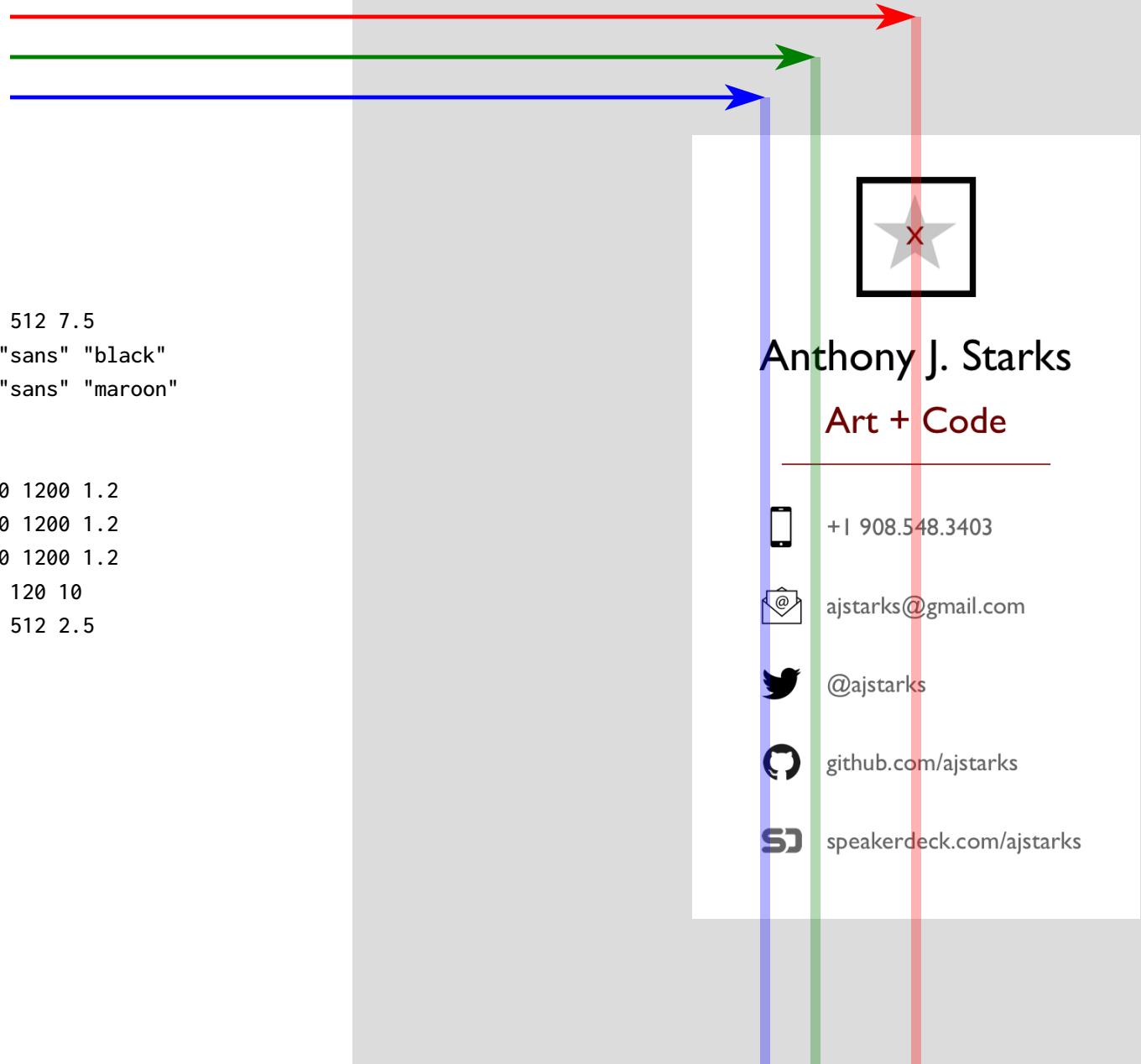
 speakerdeck.com/ajstarks

```
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

  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
```



```

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
edock

```



## Anthony J. Starks

### Art + Code

---

 +1 908.548.3403

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 @ajstarks

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 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

  slide "white" "rgb(100,100,100)"
    image "starx.png"           mx 75 512 512 7.5
    ctext "Anthony J. Starks"   mx 35 ts "sans" "black"
    ctext "Art + Code"         mx 22 ss "sans" "maroon"
    line lx 90 lx 10 0.3 "maroon"

    image "phone.png"          ix 80 1200 1200 1.2
    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
edock
```

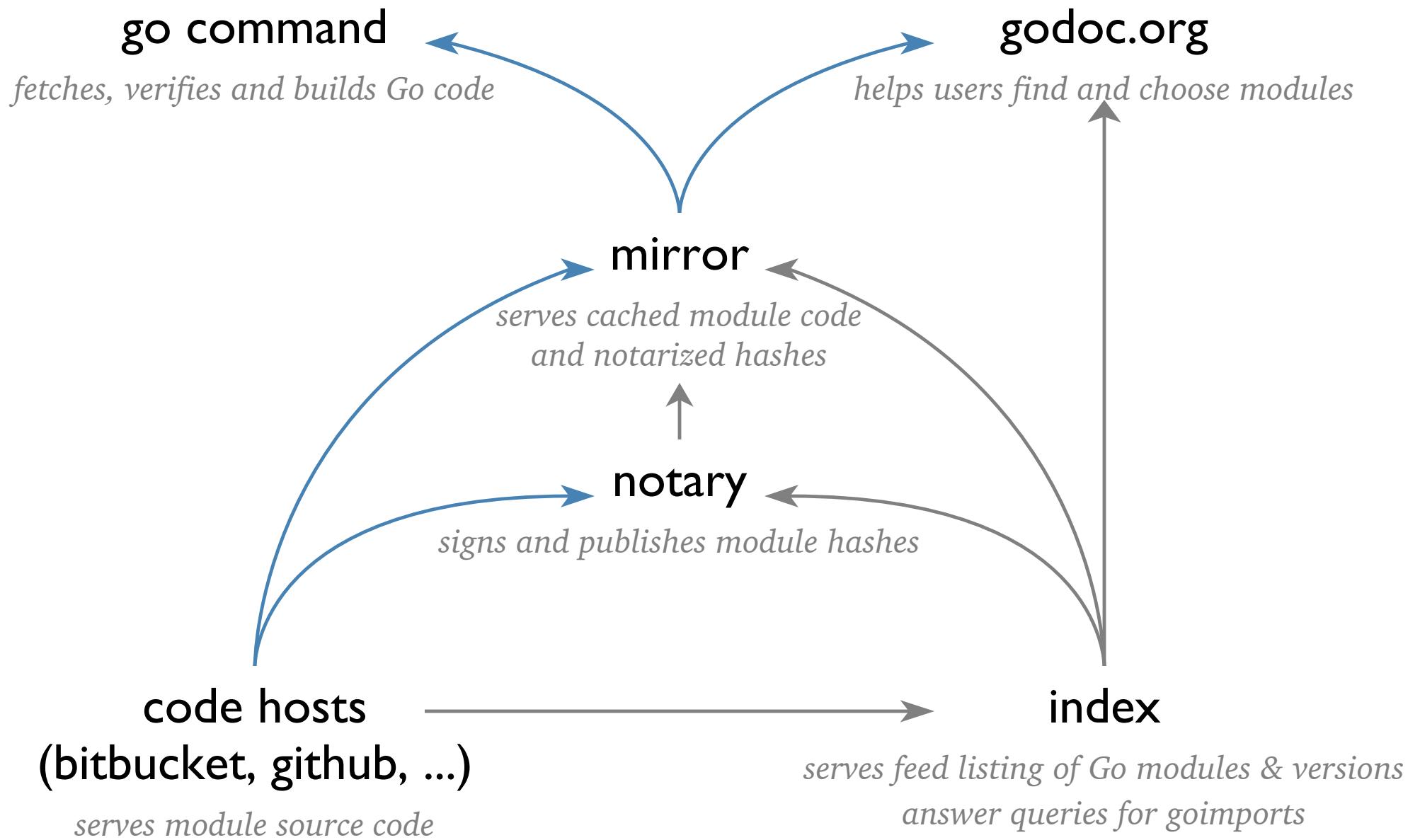


**Anthony J. Starks**  
**Art + Code**

---

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-  @ajstarks
-  github.com/ajstarks
-  speakerdeck.com/ajstarks

# 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

1,958 mi

3,151 km

Distance to Destination

596 mi

798 km



Time to Destination

1:20

Estimated time of arrival

12:14 am

Local time of arrival

12:14 am

Ground speed



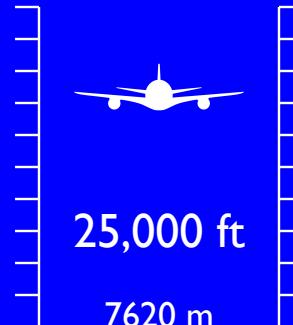
Headwind



Outside Temperature



Current Altitude





Pulp Fiction (1993)



The Matrix (1999)



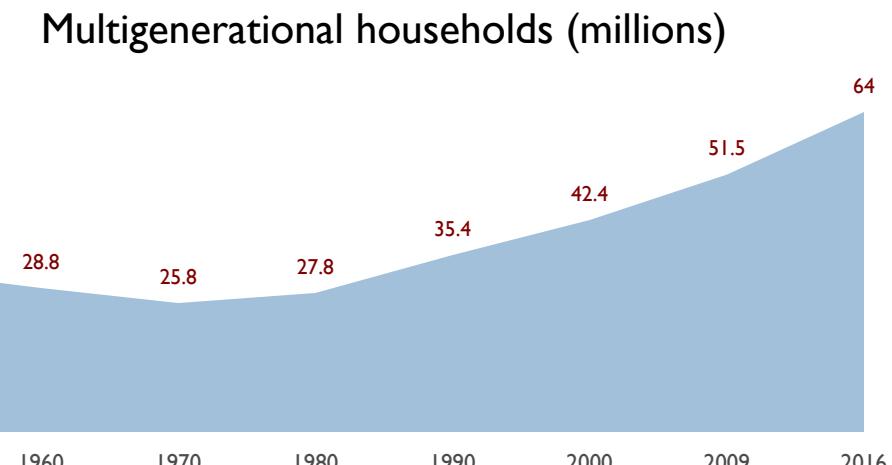
Roma (2018)

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

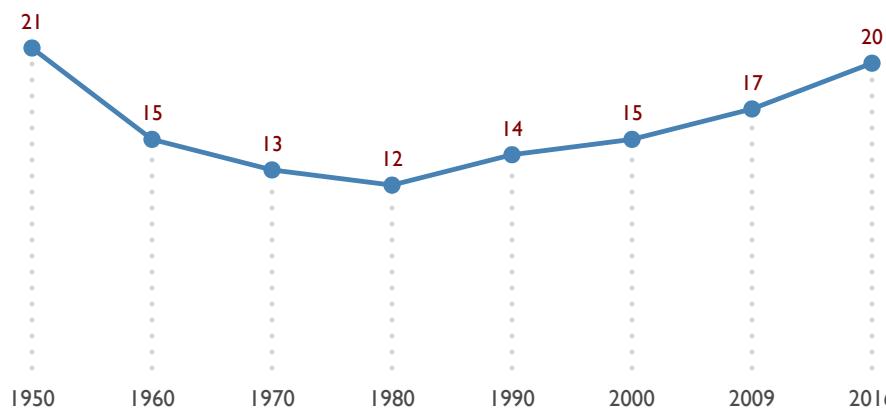
caption movies.csv | decksh | pdf ...

# A record 64 million Americans live in multigenerational households

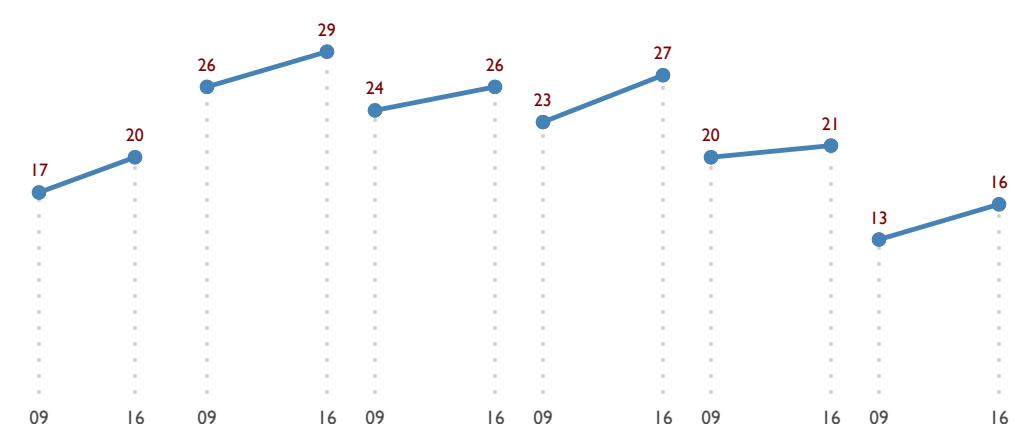
*The number and share of Americans living in multi- generational family households have continued to rise, despite improvements in the U.S. economy since the Great Recession. In 2016, a record 64 million people, or 20% of the U.S. population, lived with multiple generations under one roof, according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



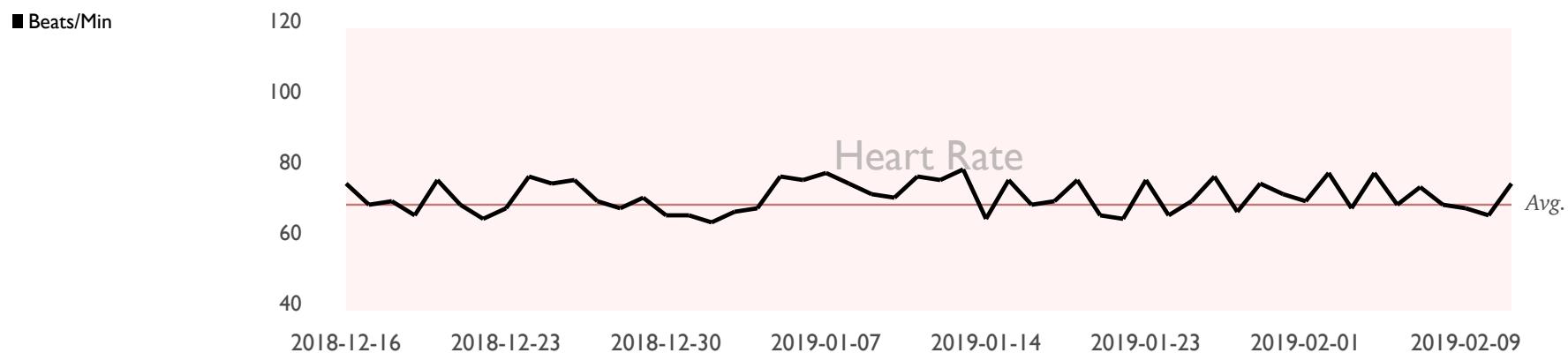
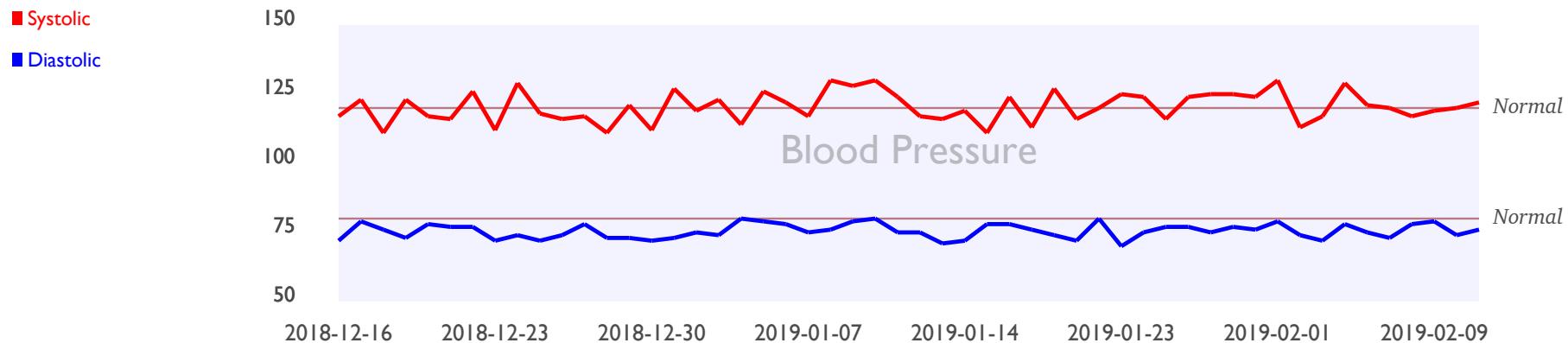
% of Americans in multigenerational households



Total      Asian      Black      Hispanic      Other      White

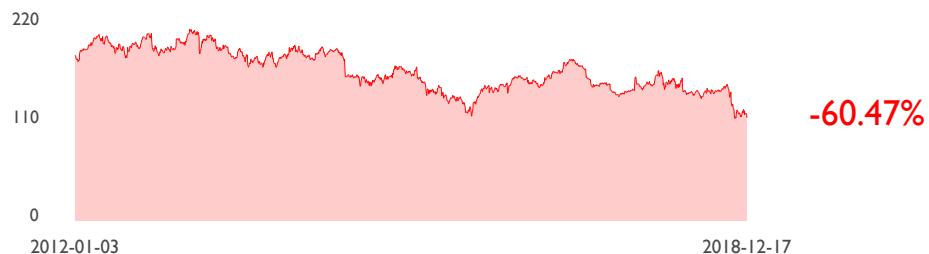


# Jane Doe





Rometty



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



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.



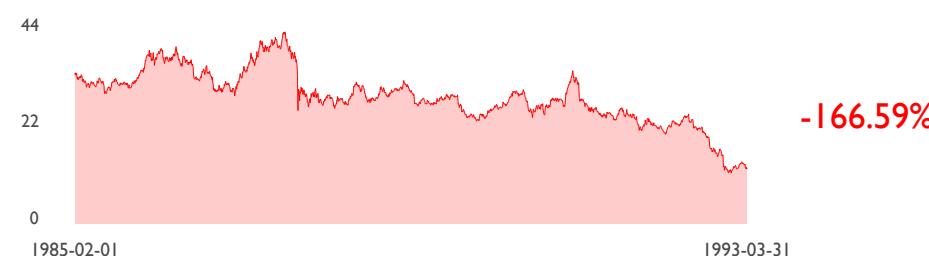
Gerstner



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.

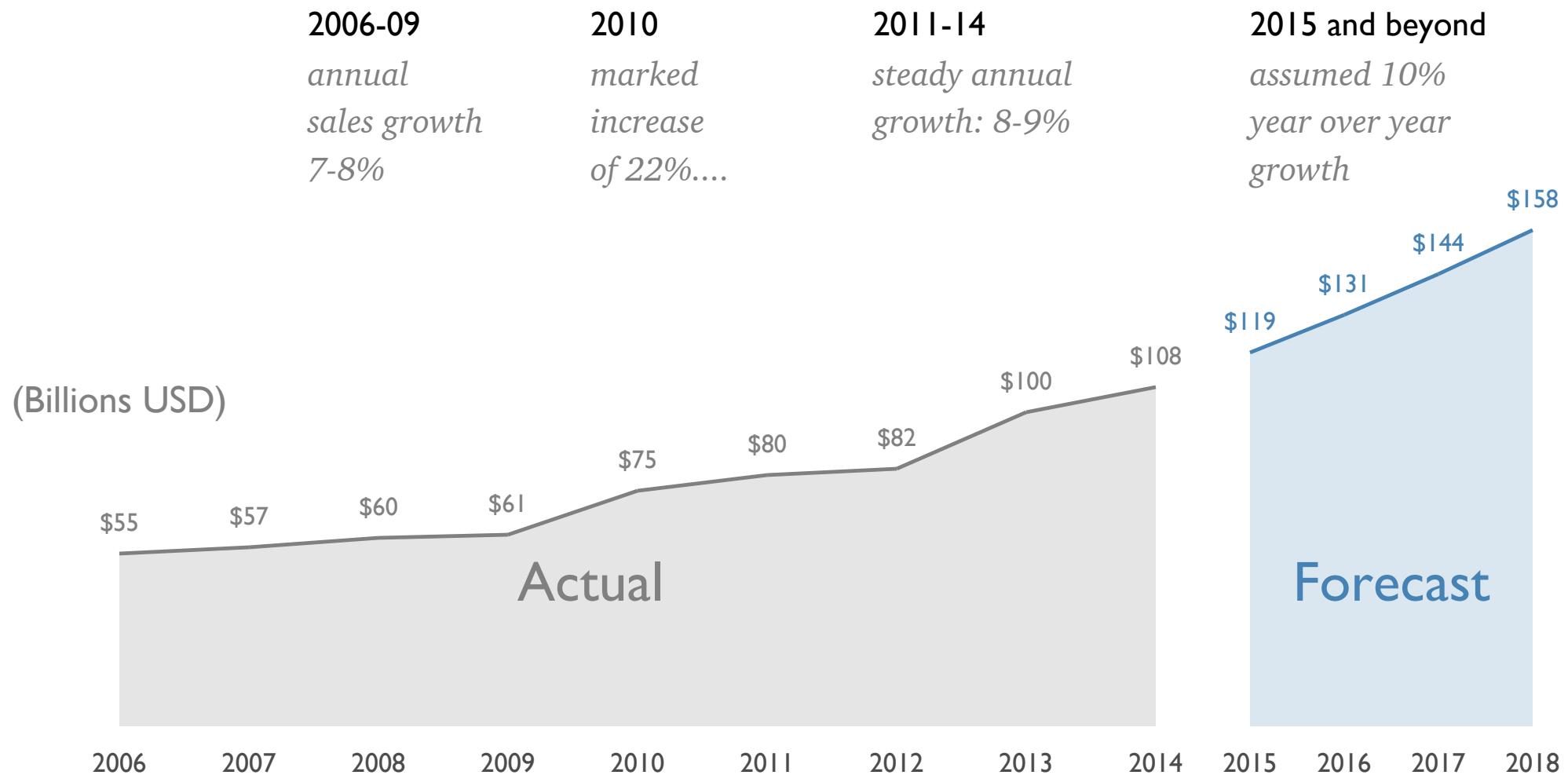


Akers

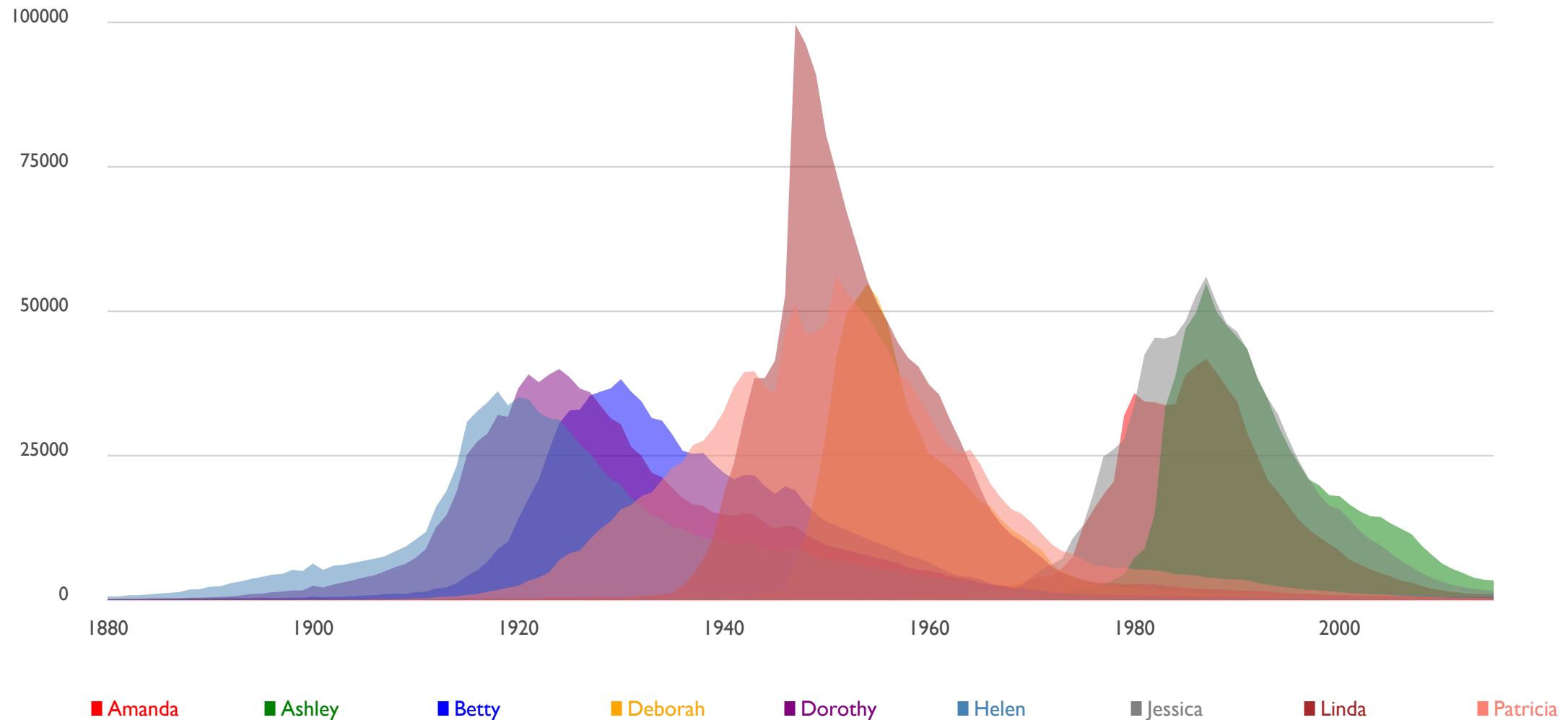


Akers was credited with simplifying the company's bureaucracy to focus more on profits. In a restructuring intended to reverse three years of disappointing performance, he created five new, autonomous organizations responsible for the company's innovation, design and manufacturing. Akers was forced to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

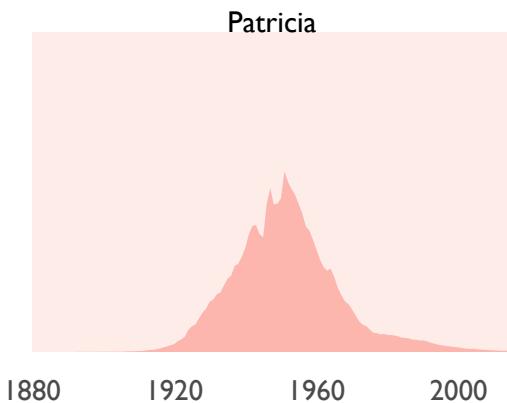
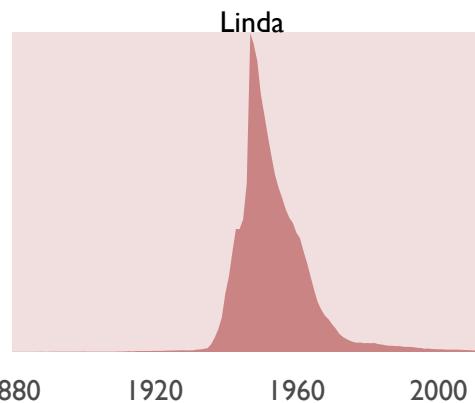
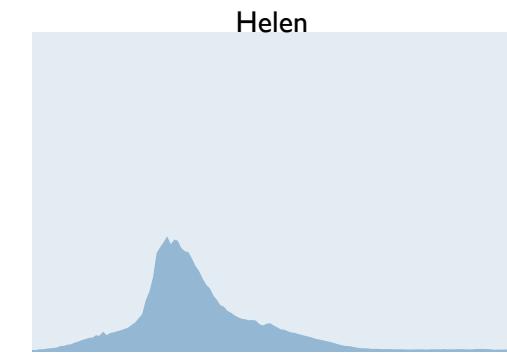
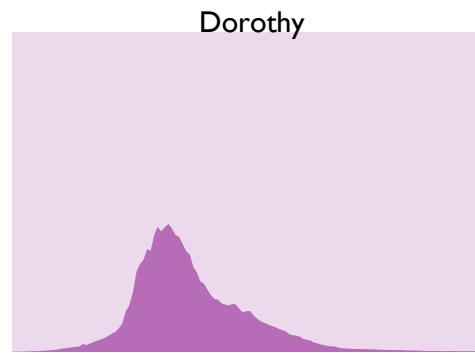
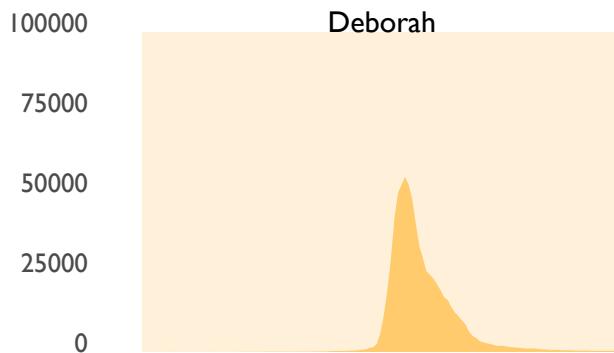
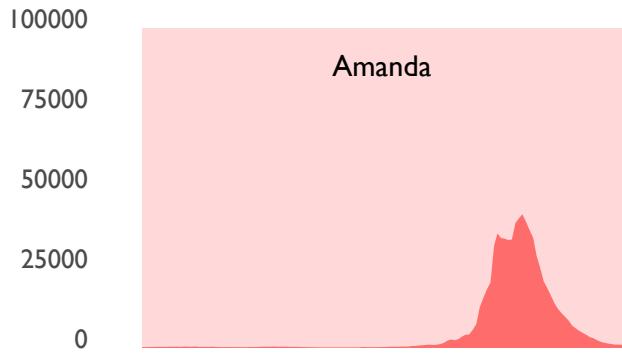
# Sales over time



# Evolution of Baby Names in the US: 1880-2015

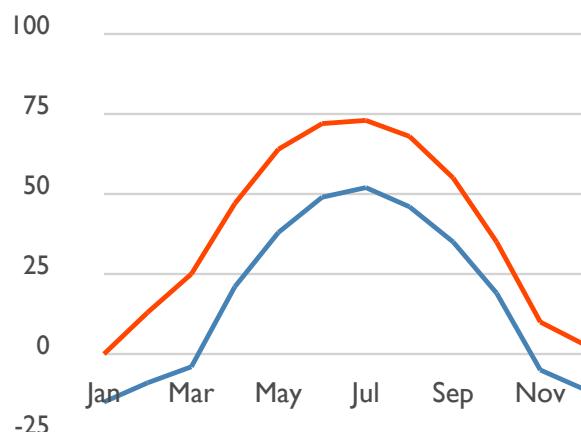


# Evolution of Baby Names in the US: 1880-2015

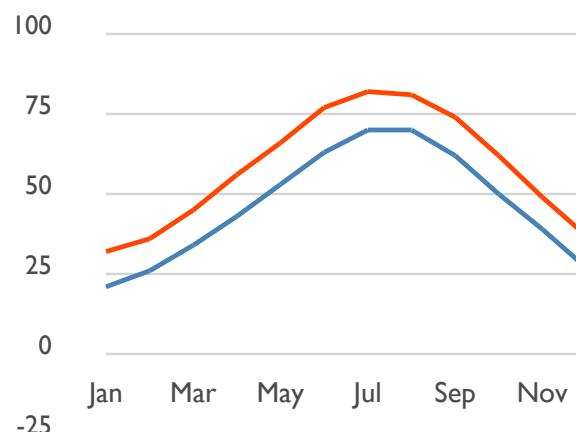


# Average High/Low Temperatures (°F)

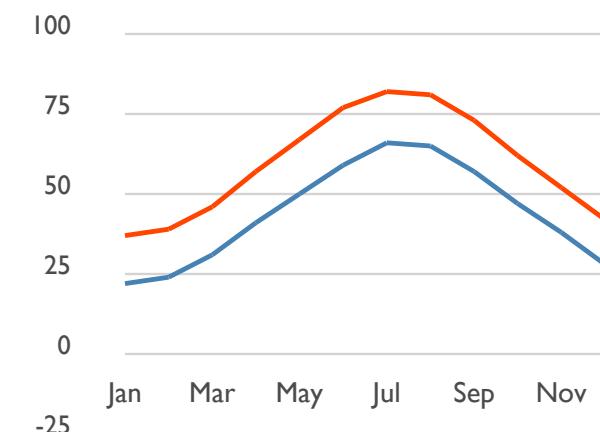
## Fairbanks



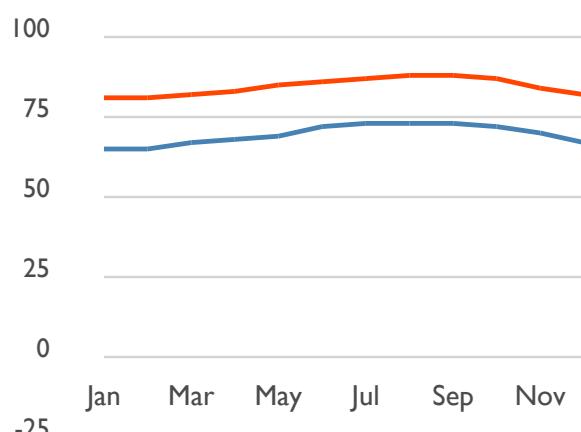
## Chicago



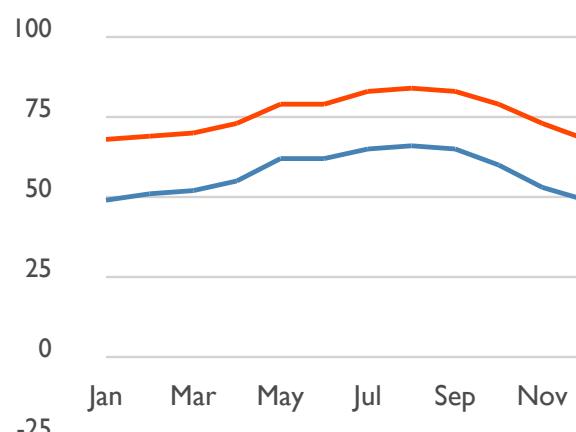
## Boston



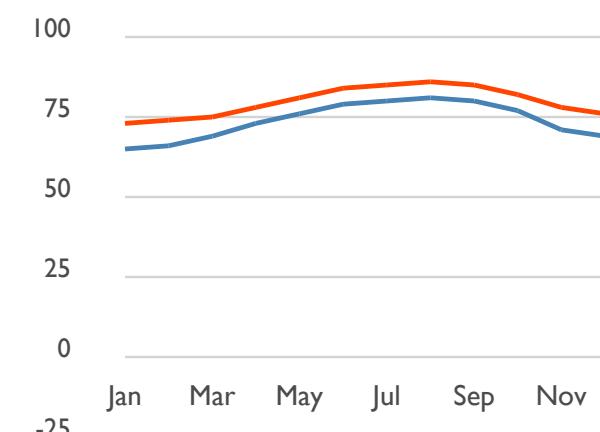
## Honolulu



## Los Angeles



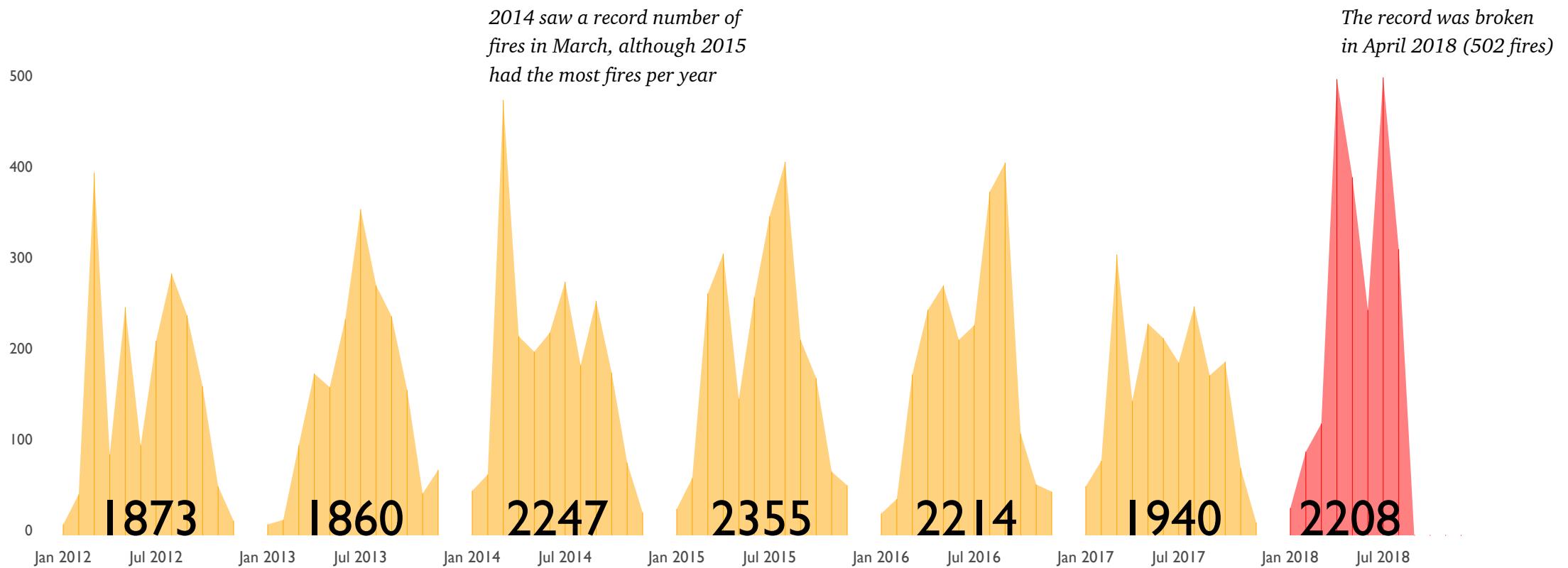
## Miami



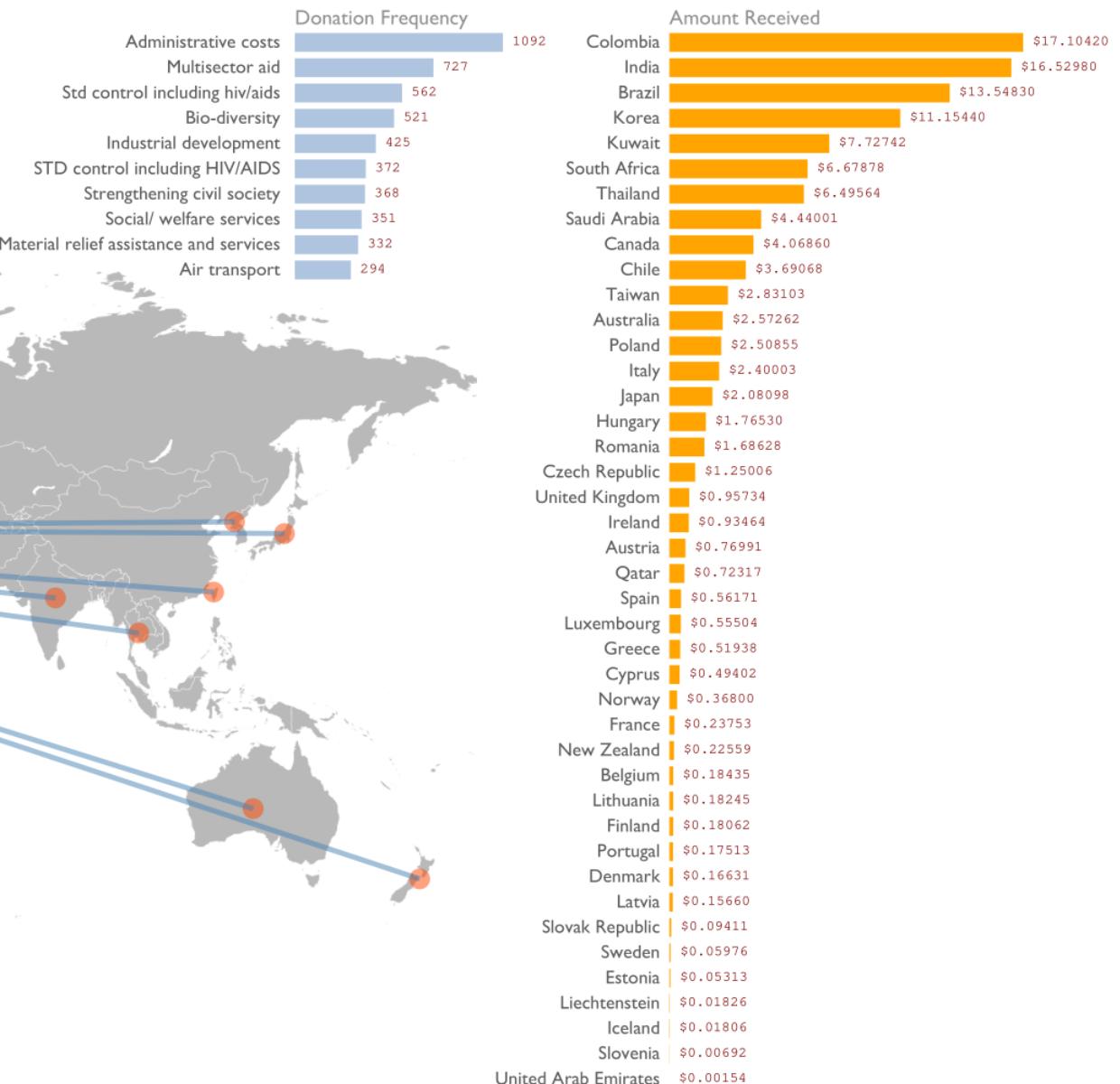
■ Avg. High

■ Avg. Low

# German Wildfires 2012-2018



# United States



PROPORTION OF FREEMEN AND SLAVES AMONG AMERICAN NEGROES .

PROPORTION DES NÈGRES LIBRES ET DES ESCLAVES EN AMÉRIQUE .

DONE BY ATLANTA UNIVERSITY .



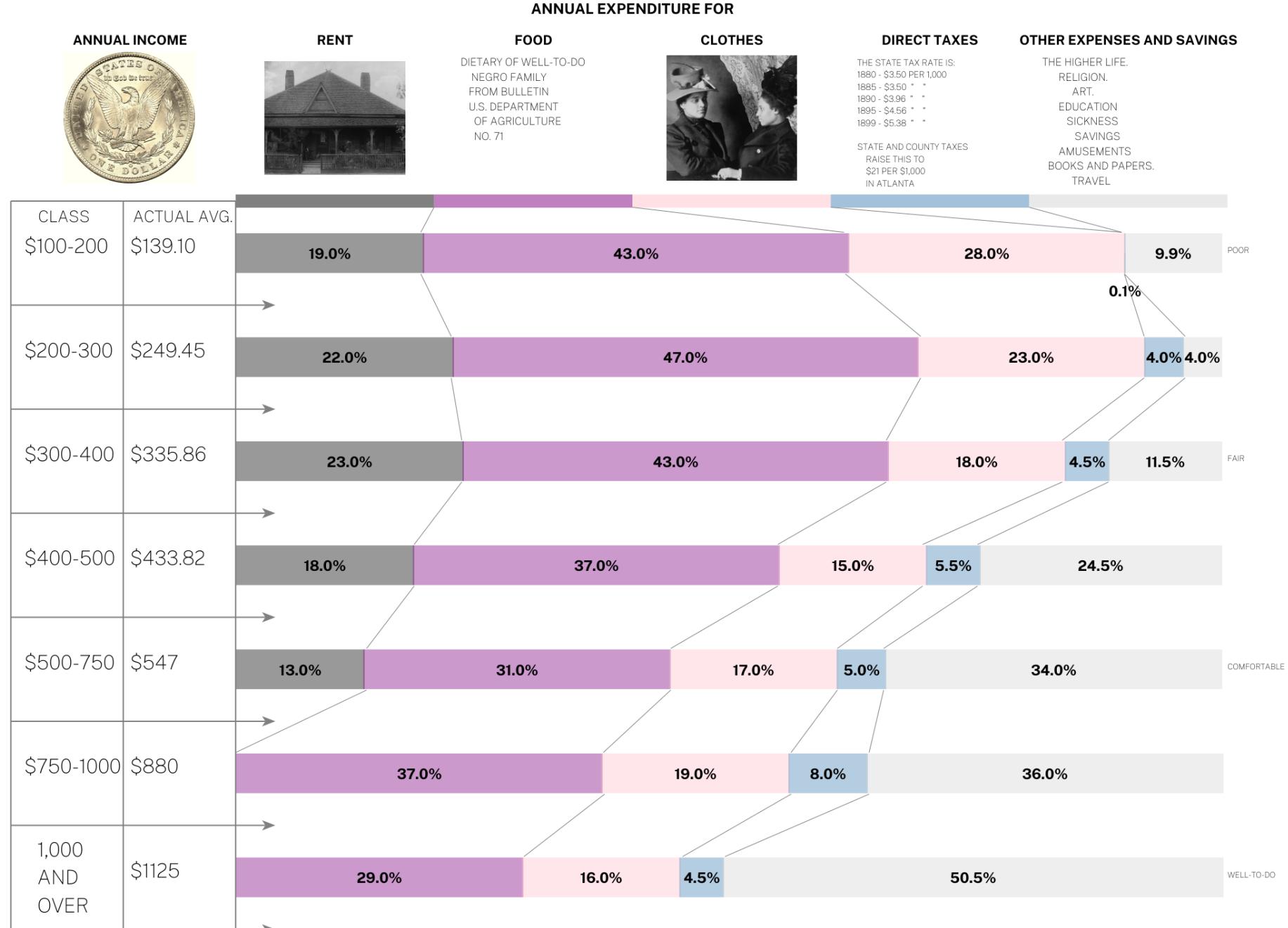
PROPORTION OF FREEMEN AND SLAVES AMONG AMERICAN NEGROES.

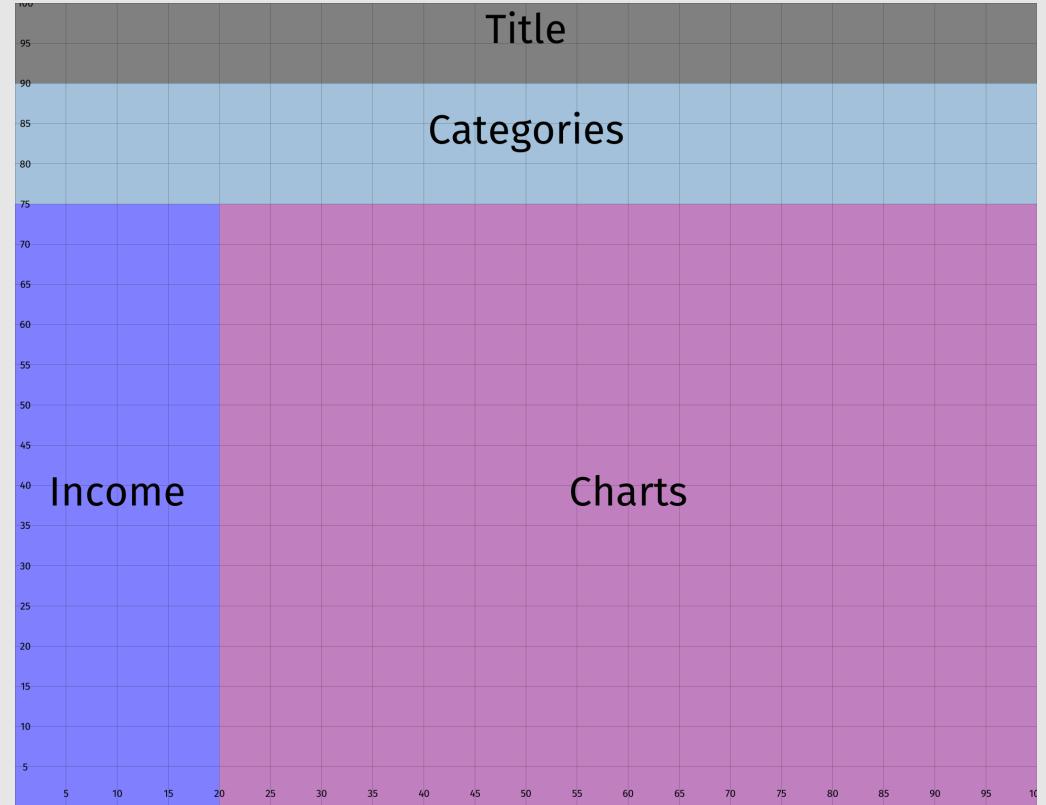
PROPORTION DES NÈGRES LIBRES ET DES ESCLAVES EN AMÉRIQUE.

DONE BY ATLANTA UNIVERSITY.



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





*go get it*

**decksh**

[github.com/ajstarks/decksh](https://github.com/ajstarks/decksh)

**dchart**

[github.com/ajstarks/dchart](https://github.com/ajstarks/dchart)

**pdfdeck**

[github.com/ajstarks/deck/cmd/pdfdeck](https://github.com/ajstarks/deck/cmd/pdfdeck)

**examples**

[github.com/ajstarks/deckviz](https://github.com/ajstarks/deckviz)

**fonts**

[github.com/ajstarks/deckfonts](https://github.com/ajstarks/deckfonts)

# Anthony J. Starks

## Art + Code



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[speakerdeck.com/ajstarks](https://speakerdeck.com/ajstarks)